39th Annual Meeting of the Southeast Deer Study Group

The Challenges of Meeting Hunter Expectations

February 15-17, 2016

Charlotte/Concord, NC

Hosted by the

North Carolina Wildlife Resources Commission

Welcome

The North Carolina Wildlife Resources Commission welcomes you to the 39th Annual Southeast Deer Study Group Meeting in Charlotte/Concord, North Carolina.

We would like to thank the Arkansas Game and Fish Commission who hosted last year's meeting, the North Carolina Chapter of The Wildlife Society, as well as the following sponsors for their generous contributions to this meeting:

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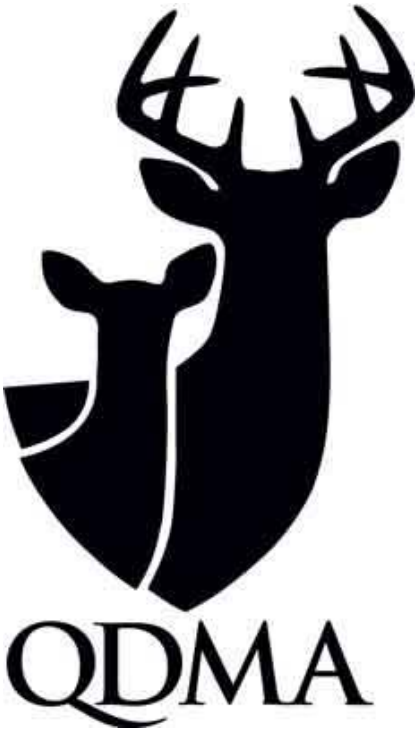

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2016 Southeast Deer Study Group Meeting

Hosted by the North Carolina Wildlife Resources Commission

Planning Committee:

Jonathan Shaw – Co-Chairman

Evin Stanford – Co-Chairman

Greg Batts

Shauna Glover

Ken Knight

Ryan Myers

Danny Ray

David Sawyer

James Tomberlin

Chris Turner

Additional Support:

Jason Allen

Sunanda Goparaju

Jeremy Harrill

Brad Howard

William Laton

Rupert Medford

Susan Miller (USFWS)

Deanna Noble

Colleen Olfenbuttel

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 39th 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). Electronic versions of this and previous proceedings are available at www.sedsg.com.

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
2016	Charlotte/Concord, NC	The Challenges of Meeting Hunter Expectations

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

STATE	NAME	AFFILIATION
Alabama	Chris Cook	**Alabama Department of Conservation and Natural Resources**
Arkansas	Cory Gray Ralph Meeker	**Arkansas Game and Fish Commission**
Delaware	Joe Rogerson	**Delaware Division of Fish and Wildlife**
Florida	Cory R. Morea Steve M. Shea	**Florida Fish and Wildlife Conservation Commission**
Georgia	Charlie Killmaster Tina Johannsen	**Georgia Department of Natural Resources**
	Karl V. Miller	**University of Georgia**
Kentucky	Gabe Jenkins	**Kentucky Department of Fish and Wildlife Resources**
Louisiana	Scott Durham Johnathan Bordelon	**Louisiana Department of Wildlife and Fisheries**
Maryland	Brian Eyler George Timko	**Maryland Department of Natural Resources**
Mississippi	William McKinley Chris McDonald	**Mississippi Department of Wildlife, Fisheries, and Parks**
	Steve Demarais (Chair)	**Mississippi State University**
Missouri	Emily Flinn Jason Sumners	**Missouri Department of Conservation**
North Carolina	David Sawyer Jonathan Shaw	**North Carolina Wildlife Resources Commission**
Oklahoma	Erik Bartholomew Jerry Shaw	**Oklahoma Department of Wildlife and 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 and Wildlife Department**
	Bob Zaiglin	**Southwest Texas Junior College**
Virginia	Matt Knox Nelson Lafon	**Virginia Department of Game And Inland Fisheries**
West Virginia	Jim Crum	**West Virginia Division of Natural Resources**
	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
2015 – Larry E. Castle

Outstanding Student Poster Presentation Award

2010 – Emily Flinn (Mississippi State University)
2011 – Melissa Miller (University of Delaware)
2012 – Brandi Crider (Texas A&M University)
2013 – Jacob Haus (University of Delaware)
2014 – Blaise Korzekwa (Texas A&M University– Kingsville)
2015 – Lindsay D. Roberts (Texas A&M University–Kingsville)

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)
2015 – Eric Michel (Mississippi State University)

Schedule of Events

All scheduled events will be held at the Great Wolf Lodge Conference Center, Concord, NC

Monday, February 15, 2016

Time:	Event:	Location:
12:00pm – 6:00pm	Conference Registration	Conference Lobby
12:00pm – 9:00pm	Poster & Vendor Setup	Fallen Timbers
3:00pm – 5:00pm	Deer Committee Meeting	The Oaks
4:00pm –	Lodging Check-in	Main Lobby - Front Desk
6:00pm – 9:00pm	Welcome Social (light food)	White Pine Ballroom

Tuesday, February 16, 2016

Time:	Event:	Location:
8:00am – 5:10pm	Poster & Vendor Session	Fallen Timbers
8:00am – 9:50am	Technical Session I	White Pine Ballroom
9:50am – 10:10am	Break	Fallen Timbers
10:10am – 10:20am	Announcements	White Pine Ballroom
10:20am – 12:00pm	Technical Session II	White Pine Ballroom
12:00pm – 1:30pm	Lunch	On your own
1:30pm – 1:40pm	Announcements	White Pine Ballroom
1:40pm – 3:20pm	Technical Session III	White Pine Ballroom
3:20pm – 3:40pm	Break	Fallen Timbers
3:40pm – 3:50pm	Announcements	White Pine Ballroom
3:50pm – 5:10pm	Technical Session IV	White Pine Ballroom
5:10pm – 7:00pm	Dinner	On your own
7:00pm – 9:00pm	Social - Click from the Hip	White Pine Ballroom

Wednesday, February 17, 2016

Time:	Event:	Location:
8:00am – 5:10pm	Poster & Vendor Session	Fallen Timbers
8:00am – 8:10am	Announcements	White Pine Ballroom
8:10am – 9:50am	Technical Session V	White Pine Ballroom
9:50am –10:10am	Break	Fallen Timbers
10:10am – 10:20am	Announcements	White Pine Ballroom
10:20am – 12:00pm	Technical Session VI	White Pine Ballroom
12:00pm – 1:30pm	Lunch	On your own
1:30pm – 1:40pm	Announcements	White Pine Ballroom
1:40pm – 3:20pm	Technical Session VII	White Pine Ballroom
3:20pm – 3:40pm	Break	Fallen Timbers
3:40pm – 3:50pm	Announcements	White Pine Ballroom
3:50pm – 5:10pm	Technical Session VIII	White Pine Ballroom
5:10pm – 6:30pm	Business Meeting	The Oaks
6:15pm – 7:00pm	Pre-Banquet Social	Foyer/Terrace
7:00pm – 9:00pm	Banquet	White Pine Ballroom

Tuesday, February 16, 2016
Technical Session I
White Pine Ballroom
Moderator: Jonathan C. Shaw – N.C. Wildlife Resources Commission

8:00 AM **Introductions**
Jonathan C. Shaw – Deer Biologist, N.C. Wildlife Resources Commission

8:10 AM **Welcome**
Gordon S. Myers – Executive Director, N.C. Wildlife Resources Commission

8:20 AM **Meeting Hunter Expectations in the 21st Century: How did we Get Here and Where are we Going?**
Brian P. Murphy – Chief Executive Officer, Quality Deer Management Association

8:50 AM **Who is Today's Deer Hunter?**
Mark D. Duda – Executive Director, Responsive Management

9:20 AM **Antler Scoring and Conservation: A Look Back and Forward**
Justin E. Spring – Director of Records, Boone and Crockett Club

9:50 AM **Break**

Tuesday, February 16, 2016
Technical Session II
White Pine Ballroom
Moderator: Stacy L. Hines – Texas A&M University-Kingsville

10:10 AM **Announcements**

10:20 AM **Assessing the Psychological Benefits of Hunting**
Susan T. Guynn - Clemson University; Robert B. Powell, Clemson University; D. Moore - Clemson University

10:40 AM **Hunter Expectations Relative to Access, Deer Visibility and State Agency Managers**
Matthew D. Ross - Quality Deer Management Association; Kip Adams – Quality Deer Management Association; Brian Murphy – Quality Deer Management Association

11:00 AM *__Predicting Whether Landowners Choose to Allow Hunting on Their Property__
Conner R. Burke - North Carolina State University; Nils Peterson - North Carolina State University; Chris Moorman - North Carolina State University; Chris DePerno - North Carolina State University; Chris Serenari - North Carolina Wildlife Resources Commission; David Sawyer - North Carolina Wildlife Resources Commission

11:20 AM **Addressing Hunter Expectations When Hunters Alter Deer Behavior**
Andrew R. Little - University of Georgia; Stephen L. Webb - Samuel Roberts Noble Foundation; Kenneth L. Gee - Oaks and Prairies Joint Venture; Steve Demarais - Mississippi State University; Seth M. Harju - Heron Ecological, LLC

11:40 AM ***Adjusting Hunter Expectations Based on Deer Response to Hunting Pressure**
Kevyn H. Wiskirchen -Auburn University; Todd C. Jacobsen - Auburn University; Stephen S. Ditchkoff - Auburn University; Chad H. Newbolt - Auburn University; Steve Demarais - Mississippi State University

12:00 PM **Lunch on your own**

*Student Presenter

Tuesday, February 16, 2016
Technical Session III
White Pine Ballroom
Moderator: Jacob M. Haus – University of Delaware

1:30 PM **Announcements**

1:40 PM *__A Population Model and Decision-making Framework for Managing Deer Hunter Populations__
Jennifer L. Price - Auburn University; Stephen S. Ditchkoff - Auburn University; Conor P. McGowan - Auburn University

2:00 PM ***Evaluation of Selective Harvest on the Distribution Male Mating Success in White-tailed Deer**
Masahiro Ohnishi - Texas A&M University-Kingsville; Randy W. DeYoung - Texas A&M University-Kingsville; Charles A. DeYoung - Texas A&M University-Kingsville; Bronson Strickland - Mississippi State University; Don A. Draeger - Comanche Ranch; David G. Hewitt - Texas A&M University-Kingsville

2:20 PM *__Antler Characteristics are Highly Heritable but Influenced by Maternal Factors__
Eric S. Michel - Mississippi State University; Steve Demarais - Mississippi State University; Bronson K. Strickland - Mississippi State University; Trent Smith - Mississippi State University; Chad Dacus - Mississippi Department of Wildlife, Fisheries, and Parks

2:40 PM ***Spatial and Temporal Patterns of White-tailed Deer Responses to the Presence and Absence of Bait during Camera Surveys**
Jared T. Beaver - Texas A&M University; Brian Pierce - Texas A&M University-College Station; Chad Grantham - Texas A&M University-San Antonio; Roel Lopez - Texas A&M University-San Antonio; Lucas Cooksey - U.S. Army Environmental Command

3:00 PM ***Spatial and Temporal Variations in Deer Social Dispersion Influence Camera Survey Estimates**
James T. Johnson - University of Georgia; Richard B. Chandler - University of Georgia; L. Mike Conner - Joseph W. Jones Ecological Research Center; Michael J. Cherry - Joseph W. Jones Ecological Research Center; Karl V. Miller - University of Georgia; William D. Gulsby - Auburn University

3:20 PM **Break**

*Student Presenter

Tuesday, February 16, 2016
Technical Session IV
White Pine Ballroom
Moderator: Jordan Youngmann – Mississippi State University

3:40 PM **Announcements**

3:50 PM ***Predator-sensitive White-tailed Deer Mortality Investigations**
Brian D. Kelly - University of Georgia; Michael J. Cherry - Joseph W. Jones Ecological Research Center; Daniel Crawford - University of Georgia; Richard B. Chandler - University of Georgia; L. Mike Conner - Joseph W. Jones Ecological Research Center; David B. Shindle - U.S. Fish and Wildlife Service; Elina Garrison - Florida Fish and Wildlife Conservation Commission; Cory Morea - Florida Fish and Wildlife Conservation Commission; Karl V. Miller - University of Georgia

4:10 PM ***Influences of Prescribed Fire and Herbicide on Forage Availability for Cervids in the Cumberland Mountains, TN**
Jordan S. Nanney - University of Tennessee; Craig A. Harper - University of Tennessee; David A. Buehler -University of Tennessee; Gary E. Bates - University of Tennessee

4:30 PM ***Economic Optimization of Forage and Nutrient Availability during Stress Periods for White-tailed Deer**
Michael P. Glow - Auburn University; Stephen S. Ditchkoff - Auburn University

4:50 PM ***Browse Species Responses to White-tailed Deer Densities in South Texas**
Justin P. Young - Texas A&M University-Kingsville; Timothy E. Fulbright - Texas A&M University-Kingsville; David G. Hewitt - Texas A&M University-Kingsville; Charles A. DeYoung - Texas A&M University-Kingsville; Kim N. Echols - Texas A&M University-Kingsville; Don A. Draeger - Comanche Ranch

*Student Presenter

Wednesday, February 17, 2016
Technical Session V
White Pine Ballroom
Moderator: Kevyn H. Wiskirchen – Auburn University

8:00 AM **Announcements**

8:10 AM ***Cause-specific Mortality during an Outbreak of Epizootic Hemorrhagic Disease; a Case for Compensatory Mortality?**
Jacob M. Haus - University of Delaware; Jacob L. Bowman - University of Delaware; Joseph E. Rogerson - Delaware Division of Fish and Wildlife

8:30 AM ***Survival and Cause-specific Mortality of White-tailed Deer Fawns on Tensas River National Wildlife Refuge, Louisiana**
Rebecca M. Shuman - University of Georgia; Michael J. Chamberlain - University of Georgia; John C. Kilgo - USDA Forest Service, Southern Research Station; Michael J. Cherry - Joseph W. Jones Ecological Research Center; Elizabeth A. Cooney - University of Georgia; Taylor N. Simoneaux - University of Georgia; Karl V. Miller - University of Georgia

8:50 AM ***Cause-specific Mortality of White-tailed Deer (*Odocoileus virginianus*) Neonates in Southeastern Kentucky**
Joseph R. McDermott - University of Kentucky; Caleb A. Haymes - University of Kentucky; Gabriel Jenkins - Kentucky Dept. of Fish and Wildlife Resources; John T. Hast - Kentucky Dept. of Fish and Wildlife Resources; Will E. Bowling - Kentucky Dept. of Fish and Wildlife Resources; John J. Cox - University of Kentucky; Kristina Brunjes - Georgia Dept. of Natural Resources

9:10 AM **Survival and Cause-specific Mortality of Female White-tailed Deer in Southeast Kentucky**
Caleb A. Haymes - University of Kentucky; Joe McDermott - University of Kentucky; John Cox - University of Kentucky; Gabriel Jenkins - Kentucky Dept. of Fish and Wildlife Resources; John Hast - Kentucky Dept. of Fish and Wildlife Resources; Will Bowling -Kentucky Dept. of Fish and Wildlife Resources

9:30 AM **Survival of Adult Female White-tailed Deer after Coyote Establishment in South Carolina**
John C. Kilgo - USDA Forest Service Southern Research Station; Mark Vukovich - USDA Forest Service Southern Research Station; Michael J. Conroy - University of Georgia; H. Scott Ray - USDA Forest Service, Francis Marion and Sumter National Forests; Charles Ruth - South Carolina Department of Natural Resources

9:50 AM **Break**

*Student Presenter

Wednesday, February 17, 2016
Technical Session VI
White Pine Ballroom
Moderator: Jordan S. Nanney – University of Tennessee

10:10 AM **Announcements**

10:20 AM **Using Existing Data to Identify Candidate Habitat Management Actions to Mitigate Coyote Predation on Fawns**
William D. Gulsby - Auburn University; John C. Kilgo - USDA Forest Service, Southern Research Station; Mark Vukovich - USDA Forest Service, Southern Research Station; James A. Martin - University of Georgia

10:40 AM **Local and Landscape-level Space Use Patterns of Coyotes in the Southeastern United States**
Joseph W. Hinton - University of Georgia; Karl V. Miller - University of Georgia; Michael J. Chamberlain - University of Georgia

11:00 AM ***Effects of a Stalking Ambush Predator on Temporal Activity Patterns of White-tailed Deer**
Daniel A. Crawford - University of Georgia; Michael Cherry - Joseph W. Jones Ecological Research Center; Brian Kelly - University of Georgia; Richard B. Chandler - University of Georgia; Karl V. Miller - University of Georgia; Elina Garrison - Florida Fish and Wildlife Conservation Commission; David Onorato - Florida Fish and Wildlife Conservation Commission; Cory Morea – Florida Fish and Wildlife Conservation Commission; David Shindle – U.S. Fish and Wildlife Service; L. Mike Conner – Joseph W. Jones Ecological Research Center

11:20 AM **Wildfire Effects on Spatial Ecology of White-tailed Deer**
Michael J. Cherry – Joseph W. Jones Ecological Research Center; Daniel Crawford - University of Georgia; Brian D. Kelly - University of Georgia; Richard B. Chandler - University of Georgia; L. Mike Conner - Joseph W. Jones Ecological Research Center; Elina Garrison - Florida Fish and Wildlife Conservation Commission; Cory Morea - Florida Fish and Wildlife Conservation Commission; Karl V. Miller - University of Georgia

11:40 AM *__Are We Underestimating the Frequency of Excursive Movements by White-tailed Deer?__
Todd C. Jacobsen - Auburn University; Kevyn H. Wiskirchen - Auburn University; Stephen S. Ditchkoff - Auburn University; Chad H. Newbolt - Auburn University; Steve Demarais - Mississippi State University

12:00 PM **Lunch on your own**

*Student Presenter

Wednesday, February 17, 2016
Technical Session VII
White Pine Ballroom
Moderator: David B. Stone – University of Georgia

1:30 PM **Announcements**

1:40 PM **Take a Walk on the Wild Side: Learning More about Deer Spatio-temporal Movement Behavior**
Stephen L. Webb - The Samuel Roberts Noble Foundation; Jed A. Long - University of St. Andrews; Seth M. Harju - Heron Ecological, LLC

2:00 PM **Spatio-temporal Individual Specialization of Mature Male White-tailed Deer**
Bradley S. Cohen – University of Georgia; Thomas J. Prebyl – University of Georgia; Tara G. Crawford – University of Georgia; Michael J. Chamberlain – University of Georgia; Karl V. Miller – University of Georgia

2:20 PM **Case Study of an Epizootic Hemorrhagic Disease Event in Northwestern North Carolina**
Christopher D. Kreh - North Carolina Wildlife Resources Commission; Bradley W. Howard, North Carolina Wildlife Resources Commission

2:40 PM **Monitoring Hemorrhagic Disease: What Every Wildlife Professional Should Know**
Mark G. Ruder - Southeastern Cooperative Wildlife Disease Study; John R. Fischer - Southeastern Cooperative Wildlife Disease Study; David E. Stallknecht – Southeastern Cooperative Wildlife Disease Study

3:00 PM **Technology Benefits Hunters and Biologists: A Smartphone App for Observation and Harvest Data Collection**
Steve Demarais - Mississippi State University; Bronson Strickland - Mississippi State University; Chris McDonald - Mississippi Department of Wildlife Fisheries and Parks

3:20 PM **Break**

Wednesday, February 17, 2016
Technical Session VIII
White Pine Ballroom
Moderator: Daniel L. Morina – Mississippi State University

3:40 PM **Announcements**

3:50 PM **A Predictive Model for Deer Cultural Carrying Capacity in Virginia: A Step Forward**
Nelson W. Lafon - Virginia Department of Game and Inland Fisheries; Amy Carrozzino-Lyon - Virginia Tech; Matt Knox – Virginia Department of Game and Inland Fisheries; Jim Parkhurst - Virginia Tech; Dave Steffen – Virginia Department of Game and Inland Fisheries

4:10 PM **Defining Management Units for Deer in New York State: Finding a Balance between Desired Precision and Fine-scale Management**
James D. Kelly - New York State Department of Environmental Conservation; Jeremy Hurst - New York State Department of Environmental Conservation

4:30 PM **Using Structured Decision Making to Guide Recommendations for Buck Harvest Management in New York State**
Jeremy E. Hurst - New York State Department of Environmental Conservation; Kelly F. Robinson - Cornell University; Angela K. Fuller - Cornell University; Bryan Swift - New York Department of Environmental Conservation Division of Fish, Wildlife & Marine Resources; Arthur Kirsch - New York Department of Environmental Conservation Division of Fish, Wildlife & Marine Resources; James Farquhar - New York Department of Environmental Conservation Division of Fish, Wildlife & Marine Resources; James Kelly - New York Department of Environmental Conservation Division of Fish, Wildlife & Marine Resources

4:50 PM **Evaluating the Launch of the Deer Management Assistance Program in Wisconsin**
Robert R. Nack - Wisconsin Department of Natural Resources; Robert H. Holsman - Wisconsin Department of Natural Resources; Ben Beardmore - Wisconsin Department of Natural Resources

Poster Session
Fallen Timbers

***Overwinter Fawn Habitat Selection and Survival in South Texas**
Justin P. Young - Texas A&M University-Kingsville; Timothy E. Fulbright - Texas A&M University-Kingsville; David G. Hewitt - Texas A&M University-Kingsville; Charles A. DeYoung - Texas A&M University-Kingsville; Kim N. Echols - Texas A&M University-Kingsville; Don A. Draeger - Comanche Ranch

***A Step Selection Function for White-tailed Deer Dispersal in an Agricultural Landscape**
Matthew T. Springer - Southern Illinois University Carbondale; Clayton K. Nielsen - Southern Illinois University Carbondale; Eric M. Schauber - Southern Illinois University Carbondale

***Preliminary Comparison of Adult Urban and Rural White-tailed Deer Home Range Size in Southern Indiana**
Jonathan K. Trudeau - Ball State University; Garrett B. Clevinger - Ball State University; Timothy C. Carter - Ball State University

***Comparisons of Dispersal and Excursion Events between Localized Populations of Urban and Rural White-tailed Deer (*Odocoileus virginianus*)**
Garrett B. Clevinger First - Ball State University; Jonathan K. Trudeau - Ball State University; Timothy C. Carter - Ball State University

***Using Eye Lens Weight to Predict the Age of Neonatal White-tailed Deer**
Rebecca M. Shuman - University of Georgia; Michael J. Chamberlain - University of Georgia; John C. Kilgo - USDA Forest Service, Southern Research Station; Elizabeth A. Cooney - University of Georgia; Karl V. Miller - University of Georgia

***Using Forward-looking Infrared (FLIR) Surveys to Determine Deer Density; How Many is Enough?**
Eric W. Ness - University of Delaware; Jacob L. Bowman - University of Delaware; Brian Eyler - Maryland Department of Natural Resources

Thermal Aerial Surveys for Deer Using UAS (Drone) Technology
J. Merlin Benner - Remote Intelligence, LLC & Wildlife Specialists, LLC; Gene Huntingdon - Remote Intelligence, LLC

***Age- and Gender-related Variation in Harvest Susceptibility at Bait Sites**
David B. Stone - University of Georgia; Brad Cohen - University of Georgia; Karl V. Miller - University of Georgia; Charlie Killmaster - Georgia Department of Natural Resources

*Student Presenter

Lifetime Reproductive Effort in Male White-tailed Deer: Start Fast and Be Persistent
Aaron M. Foley -Texas A&M University-Kingsville; Matthew J. Schnupp - King Ranch Inc.; David G. Hewitt – Texas A&M University-Kingsville; Randy W. DeYoung – Texas A&M University-Kingsville

Antler Growth by Age Class in the Sandy Soils of Central Florida
Donal A. Woodard - Deseret Ranches

***Effects of White-tailed Deer and Supplemental Feeder Densities on Canopy Volume and Mast Production**
Lindsey M. Phillips - Texas A&M University-Kingsville; Timothy E. Fulbright - Texas A&M University–Kingsville; David G. Hewitt - Texas A&M University–Kingsville; Charles A. DeYoung - Texas A&M University–Kingsville; Lindsay D. Roberts - Texas A&M University–Kingsville; David B. Wester - Texas A&M University–Kingsville; Kim N. Echols - Texas A&M University–Kingsville; Don A. Draeger - Comanche Ranch

***Effects of White-tailed Deer and Supplemental Feeder Densities on Woody Shrub Canopy Cover**
Lindsey M. Phillips - Texas A&M University-Kingsville; Timothy E. Fulbright - Texas A&M University–Kingsville; David G. Hewitt - Texas A&M University–Kingsville; Charles A. DeYoung - Texas A&M University–Kingsville; Lindsay D. Roberts - Texas A&M University–Kingsville; David B. Wester - Texas A&M University–Kingsville; Kim N. Echols - Texas A&M University–Kingsville; Don A. Draeger - Comanche Ranch

***Comparison of Food Plot Mixtures for Attracting White-tailed Deer**
Ryan E. Leeson - Southern Illinois University; Clayton K. Nielsen – Southern Illinois University; William J. Banz - Southern Illinois University

***Influence of White-tailed Deer on Oak Regeneration in Southern Illinois**
Ryan E. Leeson - Southern Illinois University; Clayton K. Nielsen – Southern Illinois University; Eric Holzmueller, Southern Illinois University

***Habitat Use and Bed Site Selection of White-tailed Deer Fawns in Northeast Louisiana**
Elizabeth A. Cooney -University of Georgia; Rebecca Shuman - University of Georgia; Taylor Simoneaux - University of Georgia; Michael J. Cherry - Joseph W. Jones Ecological Research Center; Scott Durham - Louisiana Department of Wildlife and Fisheries; John C Kilgo - US Forest Service, Southern Research Station; Michael Chamberlain - University of Georgia; Karl V. Miller - University of Georgia

*Student Presenter

***Are Cattle a Management Tool or Nemesis for Deer Habitat in North America?**
Stacy L. Hines -Texas A&M University-Kingsville; Timothy E. Fulbright - Texas A&M University–Kingsville; J. Alfonso Ortega-S. - Texas A&M University–Kingsville; David G. Hewitt - Texas A&M University–Kingsville; Thomas W. Boutton - Texas A&M University–College Station; Alfonso Ortega-S., Jr. - East Foundation, San Antonio

***Factors Influencing Water Consumption by White-tailed Deer in South Texas**
Jeffery H. Brooks - Texas A&M University-Kingsville; Charles A. DeYoung - Texas A&M University-Kingsville; Timothy E. Fulbright - Texas A&M University-Kingsville; David G. Hewitt - Texas A&M University-Kingsville; Kim N. Echols - Texas A&M University-Kingsville; Don A. Draeger - Comanche Ranch

***Pelleted Feed Consumption by White-tailed Deer in a Variable Environment**
Emily H. Belser - Texas A&M-Kingsville; David G. Hewitt - Texas A&M University–Kingsville; David B. Wester - Texas A&M University–Kingsville; Timothy E. Fulbright - Texas A&M University–Kingsville; Charles A. DeYoung - Texas A&M University–Kingsville; Kim N. Echols - Texas A&M University–Kingsville; Don A. Draeger - Comanche Ranch

***Immobilization of Free Ranging Populations of Urban and Rural White-tailed deer (*Odocoileus virginianus*) using Butorphanol-Azaperone-Medetomidine (BAM)**
Garrett B. Clevinger - Ball State University; Jonathan K. Trudeau - Ball State University; Caleb Haymes - University of Kentucky; Joseph McDermott - University of Kentucky; John J. Cox - University of Kentucky; Timothy C. Carter - Ball State University

*Student Presenter

Tuesday, 8:20 AM

Meeting Hunter Expectations in the 21st Century: How Did We Get Here and Where Are We Going?

Brian P. Murphy - Quality Deer Management Association

ABSTRACT: The restoration of white-tailed deer (*Odocoileus virginianus*) is a global wildlife management success with few parallels. Throughout most of the 20th century, wildlife agencies catered to a narrow group of constituents – hunters, anglers and trappers. For decades, hunter numbers and agency programs increased as deer populations expanded. Traditional management strategies maximized buck harvests and resulted in high hunter satisfaction. By the 1980s, deer populations were soaring and hunter expectations were changing, giving rise to the Quality Deer Management (QDM) movement. By 2000, the U.S. whitetail population had grown to more than 30 million while the number of hunters continued to decline. Wildlife agencies responded by liberalizing antlerless harvests and restricting buck harvests to meet biological goals and changing hunter expectations. More recently, deer herds in many states have experienced their first long-term declines in decades due to factors beyond prescription such as predation, disease, habitat loss, winter mortality and localized overharvest. In some areas, hunters have formed action groups to pressure their state wildlife agencies and/or commissions to increase deer populations. This has exacerbated tensions between wildlife agencies and hunters and led to increased involvement by elected and appointed officials, often with actions taken contrary to the advice of wildlife professionals. Today, deer management is highly complicated and contentious, especially given the growing role of economics and special interest groups. This exacerbates the challenges for already constrained wildlife agency staffs and budgets. The future of deer management will be shaped by a complex mix of biological, social, political and economic forces that will determine the public's acceptance of hunting, the role hunters in wildlife management, and agency policies and priorities.

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Notes:

Tuesday, 8:50 AM

Who is Today's Deer Hunter?

Mark D. Duda - Responsive Management

ABSTRACT: This presentation will provide an overview of the human dimensions of deer management by explaining why deer hunters hunt, the issues they are most interested in, and the things they want and expect out of their deer hunting experiences. Using the findings of numerous studies on deer management conducted in the southeast United States, this presentation will explain the role of hunter expectations in the future of deer management by detailing current attitudes toward population levels, management methods, hunting access and landowner assistance, and hunting regulations, including bag limits, season structures, harvest reporting, and other aspects. The presentation will also cover trends in hunter, landowner, and general population resident attitudes toward deer management, with a focus on how opinions differ or remain consistent across states. Additionally, the presentation will explore how motivations for deer hunting have shifted over the years and what this implies for the future of deer hunting.

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Notes:

Tuesday, 9:20 AM

Antler Scoring and Conservation: A Look Back and Forward

Justin E. Spring - Boone and Crockett Club

ABSTRACT: This presentation will explore the origins of scoring antlers going back to the beginning of the 1900s and put into context what scoring was meant to do as a tool for promoting conservation. It will cover some of the ideas fostered and promoted along the way in regard to limiting hunters take and the ethics sportsmen expressed of what was appropriate to harvest. These ideas and motivations have seen a major progression in the availability of wildlife over the last century and the usefulness of them in today's populations—and especially that of whitetail deer—will be explored. It will also discuss some of the trends we see now in terms of hunter participation in the system and discuss what, or if, trophy records have a place in hunting and wildlife management today.

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Notes:

Tuesday, 10:20 AM

Assessing the Psychological Benefits of Hunting

Susan T. Guynn - Clemson University; Robert B. Powell - Department of Parks, Recreation & Tourism, Clemson University; D. Moore - Department of Psychology, Clemson University

ABSTRACT: Contemporary research has explored the motivations and benefits associated with hunting. While the motivations (meat, to be with family, etc.) are well documented, the psychological benefits of hunting are less understood. Most studies assume that benefits are implied based on motivations for hunting. While wildlife agencies struggle with changing hunter demographics and expectations, research to better understand hunters and hunting has been limited. We developed a scale to measure the psychological benefits of hunting using Maslow's Hierarchy of Needs as a framework. A survey was conducted using South Carolina resident hunting license holders and participants of the Quality Deer Management Association's Deer Steward I program to develop the Benefits of Hunting Assessment Scale (BoHAS) as a valid and reliable instrument to gauge the psychological benefits received through hunting (S-B χ^2 = 1998.1; CFI = 0.953; RMSEA = 0.057; Rho = 0.975; Alpha = 0.965). The BoHAS has one higher order factor (the BoHAS score), 3 primary sub-factors (Love/Belonging, Self-Esteem and Self-actualization), and 6 sub-factors. While the BoHAS score is important to gauge the overall benefits received through hunting, the 3 primary sub-factors may be of more importance in determining how to manage hunter expectations. The BoHAS has management implications because it may gauge which benefits individual hunters are receiving through hunting, and therefore, lead to a better understanding of their expectations. The BoHAS will be presented with specific management examples for meeting hunter expectations and gender differences will be discussed.

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Tuesday, 10:40 AM

Hunter Expectations Relative to Access, Deer Visibility and State Agency Managers

Matthew D. Ross - Quality Deer Management Association (QDMA); Kip Adams - QDMA; Brian Murphy - QDMA

ABSTRACT: Successful white-tailed deer (*Odocoileus virginianus*) management programs are heavily influenced by hunter opinion, satisfaction and expectations. Having a place to hunt, seeing deer while afield and trusting agency managers and their management decisions play a role in developing each. Thus, we surveyed state wildlife agencies to learn about access, herd productivity and hunting avidity of deer project leaders. Hunter access was listed by 9 of 34 states as the biggest issue/concern impacting deer hunting in their jurisdiction. To help address this >50 million acres of state-owned land is open to deer hunting today, with 20 of 29 states reporting an increase in public land acreage from 2005 to 2015. During that same time period the average national fawn recruitment rate declined from 0.69 to 0.58 fawns per doe; directly and negatively impacting deer visibility and harvest. Predation is often cited as the culprit for fewer deer, and bobcat (*Lynx rufus*) populations are increasing in 8 of 29 states, coyotes (*Canis latrans*) in 18 of 28 states and black bears (*Ursus americanus*) in 18 of 26 states. Finally, a recent national survey showed hunters trust other avid participants in their own sport more than other resources, yet trust wildlife biologists about half as much. This may be based on the perception that biologists don't share the same pastime. Conversely, 20 of 35 deer project leaders we surveyed ranked themselves a 9 or 10 (out of 10) on a scale of deer hunting avidity, and 97 percent participate in deer hunting frequently.

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Tuesday, 11:00 AM

Predicting Whether Landowners Choose to Allow Hunting on Their Property

Conner R. Burke - North Carolina State University; Nils Peterson - North Carolina State University; Chris Moorman - North Carolina State University; Chris DePerno - North Carolina State University; Chris Serenari - North Carolina Wildlife Resources; David Sawyer - North Carolina Wildlife Resources Commission

ABSTRACT: The long-term feasibility of recreational hunting as the primary means of game species management depends on urban sprawl and landowner preferences. We expand efforts to model landowner decisions about allowing hunting by considering small properties and geographic variables. We surveyed North Carolina landowners (N=1,525), and used binary logistic regression to identify key geographic, social, and demographic variables that best predicted whether properties were hunted. Housing and road density slightly increased around hunted properties. Odds of hunting were 2.3 times higher on properties owned more than 30 years compared to properties that had changed ownership recently. Properties used to earn income, and those owned by older landowners were more likely to be hunted. Landowners who grew up in rural environments were more likely to allow hunting on the properties they now own (odds ratio = 1.4). Property size had a weak negative relationship with whether a property was hunted, suggesting that it may be less important than previously believed and future research should ensure it is not confounded with duration of property ownership. Our sensitivity analysis suggested a geographic radius of 1.24 miles around properties produced the best-fit model. Future research will explore non-linear relationships with independent variables and modeling multiple geographic scales simultaneously. These findings should help wildlife management agencies by identifying areas where regulated hunting may have limited management effects and also highlight where efforts to protect hunting access are most critical in a rapidly changing landscape.

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Tuesday, 11:20 AM

Addressing Hunter Expectations When Hunters Alter Deer Behavior

Andrew R. Little - Warnell School of Forestry and Natural Resources, University of Georgia; Stephen L. Webb - Samuel Roberts Noble Foundation; Kenneth L. Gee - Oaks and Prairies Joint Venture; Steve Demarais - Mississippi State University; Seth M. Harju - Heron Ecological, LLC

ABSTRACT: Hunters have high, and sometimes unrealistic, expectations for seeing and harvesting deer. We examined how hunters impact white-tailed deer behavior (i.e., micro-ranges, movement, resource selection, and observability) in southern Oklahoma at three risk treatment levels (i.e., control = no risk; low-risk = 1 hunter/250 ac; and high-risk = 1 hunter/75 ac) over the course of a 36-day study period, including both non-risk and risk (hunting) periods. Deer responded to the presence of hunters on the landscape by adapting movement and resource selection strategies both spatially and temporally to avoid potential contact with hunters. During the study, deer reduced micro-ranges and movement distance, and increased site fidelity by using smaller areas more intensively; the greatest reduction in space use behavior occurred during the 16-day hunting season. Deer altered their resource selection by increasing use of forested areas to reduce the risk of detection, meaning that deer perceived open habitat types as the riskiest places and moved through these at greater speeds. Observation rates (collared deer/hunter-hr/day) declined over the course of the study because of altered deer movement and resource selection behavior. Understanding the effects of hunting pressure on deer behavior can be used to explain decreased observation rates later in the season, facilitate or reduce harvest based on population management objectives, and help manage hunter expectations regarding observations and harvest.

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Tuesday, 11:40 AM

Adjusting Hunter Expectations Based on Deer Response to Hunting Pressure

Kevyn H. Wiskirchen -Auburn University; Todd C. Jacobsen - Auburn University; Stephen S. Ditchkoff - Auburn University; Chad H. Newbolt - Auburn University; Steve Demarais - Mississippi State University

ABSTRACT: Increased knowledge of white-tailed deer response to hunting pressure can aid in setting realistic harvest expectations among hunters and wildlife managers. Deer may display heightened antipredator behavior during times of greatest hunting effort, thereby limiting success. Thirty-seven adult white-tailed deer were fitted with GPS collars across 4 study sites in Alabama prior to the 2014 and 2015 hunting seasons. Hunting season was divided into 3 stages (weeks 1-5, 6-10, and 11-15), 2 temporal periods (night and day), and 2 day-type classifications (weekend and weekday) to identify times of greatest antipredator response. A preliminary examination of these data (n=6) revealed that during the first stage of the hunting season, corresponding with bow hunting only, there were no differences in hourly movement rates between night and day or weekends and weekdays. During the second stage, corresponding to the start of rifle season but prior to significant breeding activity, deer moved 27% less during the day than at night on weekends ($p<0.001$), however there was no difference between day and night movement rates on weekdays ($p=0.334$). During the third stage of the hunting season, characterized by peak hunting and breeding activity, deer moved 17% less during the day than at night on weekends ($p=0.024$) and there was again no difference between day and night movement rates on weekdays ($p=0.212$). Reduced movement by deer on weekends, particularly during shooting hours, suggests that deer respond to times of greatest hunting pressure. Awareness of this behavior will allow hunters and managers to adjust harvest expectations accordingly.

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Tuesday, 1:40 PM

A Population Model and Decision-making Framework for Managing Deer Hunter Populations

Jennifer L. Price - School of Forestry and Wildlife Sciences, Auburn University; Stephen S. Ditchkoff - School of Forestry and Wildlife Sciences, Auburn University; Conor P. McGowan - USGS, Alabama Cooperative Fish and Wildlife Research Unit, School of Forestry and Wildlife Sciences, Auburn University

ABSTRACT: In recent decades U.S. hunter populations have been on the decline, which reduces funds available to state wildlife agencies and limits agency capacity to manage wild populations. As long as financial support for the North American Model of Wildlife Conservation relies on the hunter-generated funds, declines in hunter participation are a threat to the conservation of both game and non-game species. To sustain funding, wildlife management agencies might benefit by setting objectives for and managing hunter populations. In order to address options to bolster hunter participation and evaluate the potential to sustain or increase hunter populations, we developed a stage-based, stochastic population model of a hunter population in order to predict trends over the next 50 years. The model included the stages "youth", "potential hunter", "annual hunter", and "life time hunter" and allowed for transitions between stages. We then evaluated the effect of hypothetical management actions to demonstrate the utility of the model to inform state agencies interested in boosting recruitment and retention rates of hunters. Finally, we parameterized the model using expert opinion and license sale data obtained from the Alabama Department of Conservation and Natural Resources. Using our model as the core of a decision analysis, state agencies can set hunter population or license revenue targets and evaluate management actions to achieve those objectives. Our model could be directly linked to a game species population model to account for the effects of hunters on games species and the effect of game species abundance on hunter populations. Results from our model demonstrate the utility of using population models to inform management of hunters and hunting-generated conservation funds.

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Tuesday, 2:00 PM

Evaluation of Selective Harvest on the Distribution Male Mating Success in White-tailed deer

Masahiro Ohnishi - Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville; Randy W. DeYoung - Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville; Charles A. DeYoung - Department of Animal, Rangeland, and Wildlife Sciences, Texas A&M University-Kingsville; Bronson Strickland - Department of Wildlife, Fisheries & Aquaculture, Mississippi State University; Don A. Draeger - Comanche Ranch; David G. Hewitt - Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville

ABSTRACT: Selective harvest, or culling, is a widely practiced strategy aimed at increasing antler size in managed populations of cervids. However, the effects of culling on deer populations are poorly documented. Culling based on age and antler size of male deer may change population sex ratio and age structure. As a result, culling practices may affect the distribution of male mating success, and ultimately genetic variation. The goal of this study was to define effects of culling on the demographic traits and distribution of male mating success in white-tailed deer from southern Texas, USA. We established 3 study areas, 1 subject to intensive culling (3,460 acres), 1 to moderate culling (17,800 acres), and 1 as a control (4,942 acres). Each autumn during 2006–2014, we captured deer using the helicopter net-gun method. We estimated age, measured antler characteristics, and collected a tissue biopsy for genetic analyses. Deer that did not meet culling criteria for their age class were sacrificed during 2006–2012. We recorded 4,264 captures of 2,503 individual deer. The culling treatments in the intensive and moderate treatments altered the sex ratio (1M:5F, 1M:1.5F, respectively) and age structure. Parentage analyses indicated that most offspring were sired by adult males (≥ 3.5 years old) regardless of treatment. Young males sired few offspring, even when sex ratio and age structure were skewed in their favor. The resulting information from this study will help understand population response to selective harvest and should have important implications for harvest management strategies that involve selective harvest based on age or antler traits.

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Tuesday, 2:20 PM

Antler Characteristics Are Highly Heritable but Influenced by Maternal Factors

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

ABSTRACT: Discrepancy exists in previous reports of heritability estimates for antler characteristics as well as the use of yearling antler size to predict antler size later in life. Using data from up to 37 male pen-raised white-tailed deer reared on optimum nutrition we assessed the level of heritability of seven antler characteristics for males aged two to five years as well as whether yearling antler size was a good predictor of antler size at three years after accounting for litter size and birth date. We determined parentage using DNA analysis and assigned litter size from parentage. We used an animal model in a Bayesian framework to determine heritability and assessed predictability of yearling antler size with a linear mixed model. We found that all antler characteristics were highly heritable (range $h^2 = 0.634–0.846$, *95% CI*=0.492–0.891, n=218). Yearling antler size alone was a moderate predictor of antler size at three-years of age (marginal R^2=0.385, P<0.001, n=50). Predictability doubled after accounting for birth date (range June 9–October 2) and litter size (range 1–3) (conditional R^2=0.747, P<0.001, n=50). Although antler characteristics are highly heritable, managers should fully consider other potential sources of variation prior to use of yearling antler size to predict antler size later in life.

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Tuesday, 2:40 PM

Spatial and Temporal Patterns of White-tailed Deer Responses to the Presence and Absence of Bait During Camera Surveys

Jared T. Beaver - Texas A&M Institute of Renewable Natural Resources, Department of Wildlife and Fisheries Sciences, Texas A&M University; Brian Pierce - Texas A&M Institute of Renewable Natural Resources, Texas A&M University, College Station; Chad Grantham - Texas A&M Institute of Renewable Natural Resources, Texas A&M University, San Antonio; Roel Lopez - Texas A&M Institute of Renewable Natural Resources, Texas A&M University, San Antonio; Lucas Cooksey - U.S. Army Environmental Command, Fort Sam Houston

ABSTRACT: Population monitoring is a critical component in wildlife ecology and management. Use of infrared-triggered camera (hereafter; camera) surveys for white-tailed deer (*Odocoileus virginianus*; hereafter deer) population estimation is popular among landowners. However, camera surveys often involve placing bait in front of the camera to capture animals more frequently, which could introduce biases in parameter estimates by failing to meet the assumption of equal detectability among animals and locations. However, no study has explicitly examined whether the use of bait during camera surveys can provide an unbiased sample of the population, and to what effect it alters the spatial and temporal pattern of deer. Using movement data from 18 deer (9 male and 9 female) fitted with SirTrack satellite GPS collars, we examined the sexual difference in spatial and temporal patterns of GPS-collared deer immediately before, during, and after the introduction of bait and their interaction with percent canopy coverage. Mantel test showed significant shifts in space use between male and female deer before, during, and after baiting. Both males and females did increase their use of locations immediately adjacent to bait sites after the application of bait; however, only males appeared to adjust their overall movements to select for those areas in closer proximity to bait sites indicating that bait had a stronger influence on males. Moving window frequency distributions indicated that males temporarily moved their peak deer distances farther away from bait stations after bait was removed giving support for a search-like behavior. This study gives support of the potential for the use of bait during camera surveys to favor males and ultimately violate the assumption of equal detectability. Managers should be aware of potential biases in their data and how they may affect management decisions.

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Tuesday, 3:00 PM

Spatial and Temporal Variations in Deer Social Dispersion Influence Camera Survey Estimates

James T. Johnson - University of Georgia; Richard B. Chandler - University of Georgia; L. Mike Conner - Joseph W. Jones Ecological Research Center; Michael J. Cherry - Joseph W. Jones Ecological Research Center; Karl V. Miller - University of Georgia; William D. Gulsby - Auburn University School of Forestry and Wildlife Sciences

ABSTRACT: The baited camera survey is the most widely used method to obtain data on white-tailed deer population parameters. However this technique only provides a snapshot in time of deer population parameters. To examine the spatial and temporal variability of population parameters during and after a baited camera survey, we established a high density passive camera grid (one camera/50 acres) in September of 2014 within a 2,500 acre area in Southwestern Georgia. Within this passive camera grid we conducted a camera survey following Jacobson et al. (1997) using one camera/100 acres prior to the 2014 deer season. We subdivided the camera grid into 900-acre quadrants to represent an average hunting lease in Georgia and calculated population parameters. To determine temporal variability within the entire camera grid and each 900-acre quadrant we tracked monthly sex ratios using the passive trail cameras. We collected 13,843 images of deer during the September baited survey and 4,409 passive images of deer from September to December. Following the Jacobson et al. protocol, the baited survey produced an estimate of 78 deer/sq. mile with a buck:doe ratio of 1:2.13. When broken into quadrants, the baited survey produced estimates ranging from 57-91 deer/sq. mile with buck:doe ratios ranging from 1:4.76 to 1:1.67. However monthly sex ratios produced from passive cameras varied greatly within quadrants and there was no pattern across quadrants. Our results suggest that deer populations are dramatically reorganized during autumn, which may result in demographic parameters that differ from pre-season camera surveys potentially influencing management decisions.

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Tuesday, 3:50 PM

Predator-sensitive White-tailed Deer Mortality Investigations

Brian D. Kelly - Warnell School of Forestry and Natural Resources, UGA; Michael J. Cherry - Joseph W. Jones Ecological Research Center; Daniel Crawford - Warnell School of Forestry and Natural Resources, UGA; Richard B. Chandler - Warnell School of Forestry and Natural Resources, UGA; L. Mike Conner - Joseph W. Jones Ecological Research Center; David B. Shindle - U.S. Fish and Wildlife Service; Elina Garrison - Florida Fish and Wildlife Conservation Commission; Cory Morea - Florida Fish and Wildlife Conservation Commission; Karl V. Miller - Warnell School of Forestry and Natural Resources, UGA

ABSTRACT: Improvements to telemetry technology have enabled rapid response to mortality events for GPS-collared animals. For survival or predation studies involving prey species such as white-tailed deer, such timely investigations improve our ability to determine predator-specific cause of death, but increase disturbance to predators' feeding sites. This carries the risk of altering their behavior, which may not only negatively affect the predator, but may also skew predation rates important to the study. Here we present a method to minimize and assess disturbance to predators and scavengers without compromising quality of mortality site data. We investigated mortality events for GPS-collared adult deer in southern Florida from 20 January to 30 June 2015. Typically 2 investigators spent an average of 71 minutes within 330 yds of a mortality site to locate carcass, identify kill site and feeding site(s), record predator sign, examine bite wounds, collect mandible and collar, and restore original carcass concealment. Trail cameras were placed to monitor feeding behavior at 14 carcasses which were only partially consumed by Florida panther (n=12), black bear (n=1), or bobcat (n=1). In every case, camera data indicated that the same predator species returned to the site after the investigation and continued to feed on the carcass, suggesting that the effect of our disturbance of the mortality site on the predators was negligible. Rigorous predator-sensitive investigation methods can ensure that research activities affect neither mortality rates of prey species nor behavior of sensitive or endangered predator species.

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Tuesday, 4:10 PM

Influences of Prescribed Fire and Herbicide on Forage Availability for Cervids in the Cumberland Mountains, TN

Jordan S. Nanney - Department of Forestry, Wildlife, and Fisheries, University of Tennessee; Craig A. Harper - Department of Forestry, Wildlife, and Fisheries, University of Tennessee; David A. Buehler - Department of Forestry, Wildlife, and Fisheries, University of Tennessee; Gary E. Bates - Department of Plant Sciences, University of Tennessee

ABSTRACT: Closed-canopy forests dominate the landscape in many parts of the eastern United States and often lack a well-developed forest understory, which limits nutrition available for cervids. We evaluated the influence of timber harvest combined with prescribed fire and/or herbicide treatment in young mixed-hardwood forest stands on forage availability for elk (*Cervus elaphus*) and white-tailed deer (*Odocoileus virginianus*) at the North Cumberland WMA, July-August, 2013-15. We compared forage availability in closed-canopy mature forest (MATFOR), reclaimed surface mines (MINE), and 6 harvest treatments (timber harvest alone (HARV), early growing-season fire (EBURN), late growing-season fire (LBURN), herbicide alone (HERB), herbicide and early growing-season fire (EB_HERB), and herbicide and late growing-season fire (LB_HERB)). We measured forage by collecting leaf material of herbaceous and woody plant species selected by elk or deer. Forage availability in MATFOR (128 lbs/ac) and MINE (328 lbs/ac) was less than all harvest treatments. More forage ($P<0.0001$) was available in HARV (1,000 lbs/ac), EBURN (1,054 lbs/ac), LBURN (1,203 lbs/ac), and HERB (1,141 lbs/ac) than EB_HERB (802 lbs/ac) and LB_HERB (852 lbs/ac). Additionally, we compared vegetation composition among the harvest treatments, MATFOR, and MINE. Herbaceous species coverage in LB_HERB (70%), EB_HERB (65%), and MINE (78%) was greater ($P<0.0001$) than HARV (27%), EBURN (43%), LBURN (35%), HERB (43%), and MATFOR (20%). Woody species coverage in LB_HERB (11%), EB_HERB (18%), and MINE (16%) were less ($P<0.0001$) than HARV (47%), EBURN (27%), LBURN (30%), HERB (31%), and MATFOR (46%). Our data indicate herbicide application followed with prescribed fire is an effective technique to transition young forests to early successional plant communities and increase forage for cervids.

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Notes:

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Tuesday, 4:30 PM

Economic Optimization of Forage and Nutrient Availability during Stress Periods for White-tailed Deer

Michael P. Glow - School of Forestry and Wildlife Sciences Auburn University; Stephen S. Ditchkoff - School of Forestry and Wildlife Sciences Auburn University

ABSTRACT: Providing a sufficient quantity of nutritional forage should be an integral component of any white-tailed deer management plan that aims to maximize deer condition and quality. Deer managers attempt to meet the nutritional needs of their herd through some combination of habitat management, food plot production, and/or supplemental feed provisioning. However, nutritional demands of deer, and forage quality and abundance fluctuate throughout the year, creating nutritional stress periods, as well as a dilemma for managers regarding how to maximize the nutritional plane of their herd while minimizing cost. We measured the crude protein (CP) available to deer from 2 primary sources (mature pine habitat managed with prescribed fire and ladino clover food plots) during 3 nutritionally stressful periods for deer (peak of antler development, third trimester of gestation, and peak of lactation) on a 640-acre enclosure located in east-central Alabama. Nutritional constraint models were used to estimate the amount of biomass available at 10-18% CP, which was then used to calculate the total nutrient output of the entire property if food plots hypothetically ranged from 0-5% of the total property area. Biomass availability at 16% CP in June ranged from 18.7 - 114.9 lbs/ac, was similar in July, and ranged from 1.4 – 27.1 lbs/ac in September. We discuss these data in the context of different management strategies to determine how managers can maximize the nutritional availability of their land for deer in a cost-effective and efficient manner.

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Notes:

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Tuesday, 4:50 PM

Browse Species Responses to White-tailed Deer Densities in South Texas

Justin P. Young - 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; Kim N. Echols - Caesar Kleberg Wildlife Research Institute-Texas A&M University, Kingsville; Don A. Draeger - Comanche Ranch

ABSTRACT: Research on African shrub communities similar to those in South Texas suggests heavy browsing stimulates regrowth with higher nutritional quality than un-browsed plants. Conversely, shrubs may allocate resources to defenses such as thorns, branching, or secondary compounds in response to herbivory. Based on the optimization hypothesis, the objective was to test the prediction that there may be an optimum white-tailed deer (*Odocoileus virginianus*) density at which regrowth and nutritional quality of blackbrush acacia (*Acacia rigidula*), twisted acacia (*Acacia schaffneri*), and spiny hackberry (*Celtis pallida*) can be maintained through browsing. Starting July 2014, shoots and thorns were measured annually on marked stems for each shrub species in 200-acre enclosures containing 0, 20, 40, and 60 deer per mi^2 on each of 2 ranches. Each July and October, leaf and twig samples were removed from a different set of plants of each shrub species for nutritional quality analysis. Measurements and samples were taken within the white-tailed deer's browsing zone (20-40 inches from the ground) in each cardinal direction on the plants. Preliminary results indicated that the number of non-lignified stems increased with increasing deer density, peaked at 40 deer per mi^2, and then declined from 40 to 60 deer per mi^2. Traditionally, managers try to achieve deer densities that are low enough to avoid causing undesirable changes in the plant community. A more efficient approach may be to manage for deer densities that optimize browse quality and quantity.

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Notes:

*Student Presenter

Wednesday, 8:10 AM

Cause Specific Mortality during an Outbreak of Epizootic Hemorrhagic Disease; a Case for Compensatory Mortality?

Jacob M. Haus - University of Delaware, Department of Wildlife Ecology; Jacob L. Bowman - University of Delaware; Joseph E. Rogerson - Delaware Division of Fish and Wildlife

ABSTRACT: Epizootic Hemorrhagic Disease (EHD) has the potential to complicate deer management through high rates of non-selective mortality. Due to unpredictable emergence and the highly localized nature of the disease, understanding the impacts of EHD on annual survival rates can be difficult. We monitored survival and cause specific mortality rates of adult females for 3 years (2010-2012) in southern Delaware. Survival rates were 43% (±11%) and 75% (±8%) during 2010 and 2011, respectively. Harvest accounted for 83% and 86% of mortalities and natural sources accounted for 8% and 0% of mortality in 2010 and 2011, respectively. Low survival in 2010 was attributed to abnormally high snowfall (50 in) relative to the long term average (6 in) during February. We observed a subsequent increase in fall movement rates which increased harvest probabilities. Annual survival rates for 2011 were similar to rates reported in recent literature. An outbreak of EHD occurred during summer 2012 throughout the study area, resulting in an annual survival rate of 38% (±11%). While overall annual mortality following EHD was comparable to 2010, harvest accounted for < 8% of all mortalities, and natural causes rose to 85% of all mortalities. Quantifying the effect of EHD on overall annual survival is difficult without a clear trend in non-disease year survival rates; however, mortality due to EHD may be partially compensatory due to severe reductions in harvest following an outbreak. The loss of selective harvest as a management tool however, will considerably hinder attempts to influence population sex and age structures.

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Notes:

*Student Presenter

Wednesday, 8:30 AM

Survival and Cause-specific Mortality of White-tailed Deer Fawns on Tensas River National Wildlife Refuge, Louisiana

Rebecca M. Shuman - Daniel B. Warnell School of Forestry and Natural Resources, University of Georgia; Michael J. Chamberlain - Daniel B. Warnell School of Forestry and Natural Resources, University of Georgia; John C. Kilgo - USDA Forest Service, Southern Research Station; Michael J. Cherry - Joseph W. Jones Ecological Research Center; Elizabeth A. Cooney - Daniel B. Warnell School of Forestry and Natural Resources, University of Georgia; Taylor N. Simoneaux - Daniel B. Warnell School of Forestry and Natural Resources, University of Georgia; Karl V. Miller - Daniel B. Warnell School of Forestry and Natural Resources, University of Georgia

ABSTRACT: Linking demographic parameters, such as fawn survival, to habitat attributes is important to understand and manage sustainable white-tailed deer (*Odocoileus virginianus*) populations. Changing predator communities in parts of the Southeast have resulted in increased interest in factors influencing fawn survival. Notably, little research has been conducted in areas with 3 sympatric fawn predators such as coyotes (*Canis latrans*), black bear (*Ursus americanus*), and bobcat (*Lynx rufus*). During 2013-15, we captured 70 fawns with the aid of vaginal implant transmitters on Tensas River National Wildlife Refuge in northeastern Louisiana and monitored fawns every 8 hours until 6 weeks of age and daily until 12 weeks of age. We assigned cause of death by using field and DNA evidence. Kaplan-Meyer survival to 12 weeks was 0.271 (95% CI: 0.185-0.398). Of the 51 mortalities, 45 (88%) were attributed to predation, 4 (8%) to starvation, 1 (2%) to natural causes, and 1 (2%) to unknown causes. We used an information theoretic approach to compare Cox proportional hazards models containing various combinations of biological and habitat covariates. Our best supported model contained sex, mass at birth, and distance to cropland, young reforestation (planted 2000-09), and old reforestation (planted 1985-89). Based on hazard ratios, female fawns had a higher probability of survival than males, and survival increased with mass at birth, which may be indicative of greater maternal investment. Survival increased with distance from cropland and young reforestation, and decreased with distance from old reforestation, which may be a result of spatial variation in predator densities.

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Notes:

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Wednesday, 8:50 AM

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

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

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 a combined 66 fawns in the 2014 and 2015 spring field seasons to determine survival and cause-specific mortality. Pooled fawn survival through the fall archery season was estimated at 40.98% (CI: 29.03-57.85%) using a Cox regression analysis. A log-rank test indicated no difference in survival curves between 2014 and 2015 fawns ($p = 0.6384$). 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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*Student Presenter

Wednesday, 9:10 AM

Survival and Cause-Specific Mortality of Female White-tailed Deer in Southeast Kentucky

Caleb A. Haymes - University of Kentucky; Joe McDermott - University of Kentucky; John Cox - University of Kentucky; Gabriel Jenkins - Kentucky Dept. of Fish and Wildlife Resources; John Hast - Kentucky Dept. of Fish and Wildlife Resources; Will Bowling - Kentucky Dept. of Fish and Wildlife Resources

ABSTRACT: White-tailed deer (*Odocoileus virginianus*) are the most sought after game species in Kentucky. Throughout much of the state, populations are on the rise. However, in southeast Kentucky, population growth has become stagnant despite restrictive doe harvest over the past decade. Many counties in southeast Kentucky have high unemployment rates and below average median household incomes. Illegal hunting, in the form of subsistence hunting, could be a factor in the stagnation of the deer population. Also, recent research in the southeastern United States suggests that deer population growth may be hindered by the recent expansion of the coyote (*Canis latrans*). Rates of survival and identifying the causes of mortality are required for managers to make the best management decisions possible. Since January of 2014, we have radio-collared 62 female white-tailed deer. We found overall survival of female deer to be 77.5%. There were no significant differences in survival between years (p=0.59) or age (p=0.76). Out of nine total mortalities, deer vehicle collisions claimed the highest percentage of deer 66.7% (n=6), followed by hunting 22.2% (n=2) and poaching 11.1% (n=1). Our results suggest that deer vehicle collisions could be the most important factor affecting deer population growth in our southeast Kentucky study area. Managers should be aware that in areas with low deer populations, any source of mortality could be limiting due to the sensitivity of adult female survival. There may not be just one factor but a combination of factors, which encumber the growth of a deer population.

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Notes:

Wednesday, 9:30 AM

Survival of Adult Female White-tailed Deer after Coyote Establishment in South Carolina

John C. Kilgo - USDA Forest Service Southern Research Station; Mark Vukovich - USDA Forest Service Southern Research Station; Michael J. Conroy - Daniel B. Warnell School of Forestry and Natural Resources, University of Georgia; H. Scott Ray - USDA Forest Service, Francis Marion and Sumter National Forests; Charles Ruth - South Carolina Department of Natural Resources

ABSTRACT: Recent evidence from the southeastern U.S. of high predation rates by coyotes (*Canis latrans*) on white-tailed deer (*Odocoileus virginianus*) neonates combined with reports of predation on adult female deer have prompted concern among wildlife managers and hunters regarding the effects on deer populations. We examined survival rates and causes of mortality among 138 radio-collared adult female deer over 7 years at the Savannah River Site (SRS) in South Carolina. Our model-averaged prediction of annual survival was 0.871 (95% CI: 0.839-0.902) and did not vary among years. The best model describing survival patterns included only month, with survival being lowest during November–December, coinciding with hunting season. Models assessing the effects of hunting and of distance from a primary road also received support ($\Delta AIC_c < 2.0$). Although harvest rates were low, harvest was the most important cause of death, followed by deer-vehicle collision. Probability of mortality from deer-vehicle collision decreased with distance of deer from a primary road. We did not detect predation as a cause of death among our sample, although some causes of death were unknown. We conclude that predation by coyotes on adult females was not important in the SRS deer population. Managers of southeastern deer populations wishing to increase population growth by limiting antlerless harvest should be aware that adult female survival may already be high, so limited increases in survival may be expected, particularly if antlerless harvest already is limited.

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Notes:

Wednesday, 10:20 AM

Using Existing Data to Identify Candidate Habitat Management Actions to Mitigate Coyote Predation on Fawns

William D. Gulsby - Auburn University School of Forestry and Wildlife Sciences; John C. Kilgo - USDA Forest Service, Southern Research Station; Mark Vukovich - USDA Forest Service, Southern Research Station; James A. Martin - Warnell School of Forestry and Natural Resources, University of Georgia

ABSTRACT: Growing concern surrounding the impacts of coyotes (*Canis latrans*) on white-tailed deer (*Odocoileus virginianus*) fawn survival and recruitment have led researchers and managers to advise or implement reduced antlerless deer harvest, coyote removal, and/or habitat modifications in affected areas. Reduced antlerless harvest and coyote removal may aid in achieving management objectives in some cases, but are either ineffective, unpalatable, or cost prohibitive in others. Habitat conditions are important in predator/prey interactions among a variety of species and ecosystems, but the role of habitat in coyote predation on deer in the Southeast is underexplored. Further, many previous examinations have relied on measurements and analysis of vegetation characteristics only in the immediate vicinity of fawn birth or bed sites. However, prior studies of other species or systems offer evidence to suggest fawn depredation by coyotes may be dependent on habitat features at the landscape, patch, and/or microhabitat (i.e., area surrounding the birth site) scales. We will present our procedure for examination of this hypothesis and use it to perform preliminary analysis of fawn spatial and survival data from South Carolina. Findings may be used to design and suggest a framework for a manipulative experiment designed to test the efficacy of habitat management techniques for mitigating coyote predation on fawns.

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Notes:

Wednesday, 10:40 AM

Local and Landscape-level Space Use Patterns of Coyotes in the Southeastern United States

Joseph W. Hinton - Warnell School of Forestry and Natural Resources, University of Georgia; Karl V. Miller - Warnell School of Forestry and Natural Resources, University of Georgia; Michael J. Chamberlain - Warnell School of Forestry and Natural Resources, University of Georgia

ABSTRACT: Predation on white-tailed deer (*Odocoileus virginianus*) by coyotes (*Canis latrans*) can be considered an interaction between intrinsic dangers of the habitat (e.g., the frequency of potential attacks) and the relative ability of individual deer to avoid areas of high mortality risks to coyote predation. Because coyotes are generalist predators capable of extensive and dynamic space and habitat use patterns, understanding how coyote populations structure themselves on the landscape and which landscape characteristics facilitate coyote persistence is critical for making reliable inferences about coyote ecology and its impact on white-tailed deer herds. To accomplish this, the University of Georgia, Georgia Department of Natural Resources' Wildlife Resources Division, South Carolina Department of Natural Resources, and Alabama Department of Conservation and Natural Resources initiated a broad-scaled study in each of 3 states (Alabama, Georgia, and South Carolina) to identify habitat characteristics where coyotes establish territories, describe space use patterns of residents and transients, and determine potential colonization routes into the Southeast. We fit 165 coyotes (80 Males, 85 females) with satellite GPS collars. Preliminary data indicates 70% of radio-marked coyotes were residents defending territories, whereas 30% were transients dispersing through the landscape. Mean (±SD) home-range size for residents was 2,891 acres ± 2,817 and ranged between 1,730 acres and 12,108 acres. Mean (±SD) range size for transients was 29,331 acres ± 13,398 and ranged between 8,402 acres and 85,500 acres. Approximately 220 tissue samples were sent to the North American Canine Ancestry Project at Princeton University. We will discuss preliminary findings and future expectations.

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Wednesday, 11:00 AM

Effects of a Stalking Ambush Predator on Temporal Activity Patterns of White-tailed Deer

Daniel A. Crawford - University of Georgia; Michael Cherry - Joseph Jones Ecological Research Center; Brian Kelly - University of Georgia; Richard B. Chandler - University of Georgia; Karl V. Miller - University of Georgia; Elina Garrison - Florida Fish and Wildlife Conservation Commission; David Onorato - Florida Fish and Wildlife Conservation Commission; Cory Morea - Florida Fish and Wildlife Conservation Commission; David Shindle - U.S. Fish and Wildlife Service; L. Mike Conner - Joseph Jones Ecological Research Center

ABSTRACT: The effects of predators on prey populations can be categorized as direct, consumptive effects or indirect, non-consumptive effects (NCEs). Consumptive effects on prey populations are the result of lethal encounters whereby predators affect prey population dynamics by removing individuals. Alternatively, NCEs arise in the form of physiological and behavioral responses of prey to the risk of predation. For example, behavioral responses such as shifts in spatiotemporal movement patterns may come at an energetic cost potentially impacting reproductive fitness. We examined the activity patterns of sympatric white-tailed deer (*Odocoileus virginianus*) and Florida panthers (*Puma concolor coryi*) by comparing velocities of GPS-collared deer (n = 57) and panthers (n=13) and captures of both species at 180 motion-triggered camera traps from 2015 February 1 to 2015 November 1. We found that 79% of deer captures at camera traps occurred between sunrise and sunset compared to 35% for panthers. Mean daytime deer velocities (180 ± 6 ft/hr) were significantly greater ($p < 0.001$) than at night (141 ± 1 ft/hr) when estimated with a linear mixed-effects model. Conversely, mean daytime velocities of panthers (375 ± 79 ft/hr) were less than at night (1141 ± 185 ft/hr). Our data indicate that peak deer activity in south Florida occurs during daylight in a system where diurnal activity should come at a relatively high energetic cost and are strongly suggestive of temporal partitioning of space as a NCE of a stalking ambush predator on its primary prey.

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Wednesday, 11:20 AM

Wildfire Effects on Spatial Ecology of White-tailed Deer

Michael J. Cherry - W. Jones Ecological Research Center; Daniel Crawford - Warnell School of Forestry and Natural Resources, UGA; Brian D. Kelly - Warnell School of Forestry and Natural Resources, UGA; Richard B. Chandler - Warnell School of Forestry and Natural Resources, UGA; L. Mike Conner - Joseph W. Jones Ecological Research Center; Elina Garrison - Florida Fish and Wildlife Conservation Commission; Cory Morea - Florida Fish and Wildlife Conservation Commission; Karl V. Miller - Warnell School of Forestry and Natural Resources, UGA

ABSTRACT: Fire is an organizing force in ecology that influences the distributions of species, wildlife communities and ecosystems. Relatively little is known about the effects of wildfire on white-tailed deer behavior because the unpredictable nature of the disturbance is not easily integrated in to study design. The Mud Lake Fires burned across parts of the Big Cypress National Preserve in southern Florida during May of 2015, while we were monitoring the deer population with GPS collars. A portion of the monitored population were exposed to the fires (n=19) while others were not (n=52) providing an opportunity to conduct a natural experiment. We used a Before-After-Control-Impact design to examine the effects of fire on space use estimated with dynamic Brownian Bridge Movement Models. Wildfire had a substantial impact on the spatial ecology of white-tailed deer in this system. Home ranges sizes were 1.6 times larger the month following fire than the month prior to the fire for those animals exposed to the burn ($t=2.44$, $P=0.017$), while it was relatively unchanged for those animals not exposed to fire. Furthermore, five deer whose home ranges did not include burned areas previously shifted their home ranges to include recently burned areas. Similar to many herbivores, white-tailed deer appear to be attracted to recently burned patches that offer forage that is higher in nutrient quality, palatability and digestibility, and open sight lines that may be increase the detection of ambush predators that utilize cover to stalk prey.

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Notes:

Wednesday, 11:40 AM

Are We Underestimating the Frequency of Excursive Movements by White-tailed Deer?

Todd C. Jacobsen - Auburn University; Kevyn H. Wiskirchen - Auburn University; Stephen S. Ditchkoff - Auburn University; Chad H. Newbolt - Auburn University; Steve Demarais - Mississippi State University

ABSTRACT: Recently, increased emphasis has been placed on identifying and understanding infrequent, long-distance movements of deer outside their typical areas of use. Conventionally, these "excursive behaviors" have been identified by visually inspecting isolated strings of GPS location points that fall outside of seasonal, 95% home range contours. However, biological motives for excursive behaviors are still unclear. We posit that this may stem from the temporal, seasonal scale at which excursions are viewed. To detect excursive movements over a finer temporal scale, we constructed a shifting 2-day window for each day of GPS data recorded for each deer and compared locations recorded during this window to the 95% home range contour encompassing movements during the 30 days prior to this window. Additionally, locations during each 2-day window were compared to the home range contour containing the subsequent 30 days of movement to determine if excursions led to consequent shifts in home ranges. Though data is still being collected on the majority of deer equipped with collars in our study, preliminary data from mortalities indicate that while deer may undertake long-distance, out-and-back movements beyond normal home-range areas that result in no discernible changes in space use, they also occasionally shift or expand their home range to encompass part or all of the area visited during an excursion, often within the frame of a given season. This suggests that excursive movements have likely been underestimated, may be driven by changes in resource availability, and can yield important insights for land managers and hunters alike.

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Wednesday, 1:40 PM

Take a Walk on the Wild Side: Learning More about Deer Spatio-temporal Movement Behavior

Stephen L. Webb - The Samuel Roberts Noble Foundation; Jed A. Long - University of St. Andrews; Seth M. Harju - Heron Ecological, LLC

ABSTRACT: The development of GPS and the collection of high resolution data have revolutionized research and increased our understanding of animal movement ecology. Although GPS data are available in multiple dimensions (e.g., x, y, z and *t*), most analyses focus simply on movement metrics (e.g., distance traveled and velocity) and two-dimensional descriptions of space use (e.g., home range). However, more detailed and complex spatio-temporal analyses are possible. One such area involves the study of inter-individual movement, often termed dynamic interactions, where both spatial and temporal components of the data are considered. Point-, path- and polygon-based approaches to dynamic interaction are available. Point-based metrics measure proximity or contacts while path-based metrics can measure cohesion or similarity in movement behavior; polygon-based metrics delineate broad-scale areas where spatio-temporal overlap of ≥2 individuals can occur. Methods, examples and code will be provided for identifying contacts, local (di) and global (DI) dynamic interaction indices, and the joint potential path area (jPPA), which is based on time-geographic methodology. Empirical white-tailed deer data from Oklahoma are used to highlight each analysis and to show potential applications of each method. These new spatio-temporal analyses will shed light into deer social behavior (e.g., parturition, breeding, feeding, etc.) and can be used to assess flight responses of white-tailed deer to disturbance (e.g., deer response to hunters in a controlled experiment in Oklahoma). Other avenues of research in which these analyses can be applied include predator-prey dynamics, territorial defense, herd assignment, and disease spread.

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Notes:

Wednesday, 2:00 PM

Spatio-temporal Individual Specialization of Mature Male White-tailed Deer

Bradley S. Cohen - University of Georgia; Thomas J. Prebyl - University of Georgia; Tara G. Crawford - University of Georgia; Michael J. Chamberlain - University of Georgia; Karl V. Miller - University of Georgia

ABSTRACT: Wildlife populations are typically treated as if they are comprised of ecologically equivalent individuals; however, accumulating data at sub-population and individual levels indicate that wildlife populations exhibit higher degrees of within-population heterogeneity than is often assumed. Individuals' energy income, risk exposure, and mating opportunities derive from their habitat and resource use, which suggests that persistent inter-individual differences in foraging or mating strategies can alter the strength of selective pressures (e.g., predation, disease, humans) acting on subsets of the population. Using telemetry data from 24 individuals (≥ 3.5 years old), we characterized the degree of individual specialization present within the population in terms of individuals' activity (velocity), space use (95% home range), habitat selection (selection ratios), spatial and temporal dynamics of site re-visitation across breeding and inter-breeding periods. We found that inter-individual variation in spatial ecology is temporally variable and manifests in some, but not all, aspects of adult male deer movements. Individuals tended to be less variable in the times they moved, but more specialized in general habitat selection (forest, agriculture or fallow fields). As the breeding season progressed to the rut, there was a higher degree of inter-individual variation in space use. The number of revisits to an area was highly specialized across the individuals, regardless of breeding phase. Although hunting pressure was not ubiquitous across our study area, we were unable to elicit whether differences in hunting pressure drive changes in spatial partitioning.

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Notes:

Wednesday, 2:20 PM

Case Study of an Epizootic Hemorrhagic Disease Event in Northwestern North Carolina

Christopher D. Kreh - North Carolina Wildlife Resources Commission; Bradley W. Howard - North Carolina Wildlife Resources Commission

ABSTRACT: Hunter expectations and public concern were extremely high during a severe Epizootic Hemorrhagic Disease event in northwestern North Carolina in 2012. Thus, we instigated an intense data collection effort and increased public outreach. We observed the resilience of white-tailed deer to an extreme HD mortality event. Our results and harvest trends may provide deer managers with better insight into future disease events.

- We made no changes to deer hunting regulations.
- We received reports of 1,968 dead deer in western North Carolina, with 589 coming from Caldwell County, 254 from Surry County, and 523 from Wilkes County.
- Before the disease event, total deer harvest in Caldwell, Wilkes, and Surry counties collectively averaged 7,153 deer annually (2.2 antlered bucks/square mile). In 2012 deer harvest in these three counties declined by 35% to 4,632 deer (1.4 antlered bucks/square mile). In 2013, total deer harvest in these counties was 6,593 (1.99 antlered bucks/square mile), or 92% of the pre-disease average.
- Viral isolations confirmed Epizootic Hemorrhagic Disease Serotype 2 from 16 deer in 11 different counties.
- We spent 91 man-hours surveying 18 miles of streams (with 4,133 surrounding acres) and counted 80 dead deer. Thus, on average we found 4.5 deer/stream mile, 12.4 deer/square mile, or 0.9 deer/hour.
- We recorded the sex and age of dead deer when possible. In total, we tallied 231 females and 125 males. Of 48 known-age males, 4 were 0.5 years, 20 were 1.5 years, 10 were 2.5 years, 8 were 3.5 years, and 6 were 4.5 years old. Of 75 known-age females, 4 were 0.5 years, 4 were 1.5 years, 12 were 2.5 years, and 22 were 3.5 years and 33 were 4.5 years or older. The relative scarcity of young females (1.5 and 2.5 years old) was unexpected and we feel it is indicative of lower mortality in those cohorts.

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Notes:

Wednesday, 2:40 PM

Monitoring Hemorrhagic Disease: What Every Wildlife Professional Should Know

Mark G. Ruder - Southeastern Cooperative Wildlife Disease Study (SCWDS); John R. Fischer - SCWDS; David E. Stallknecht - SCWDS

ABSTRACT: Hemorrhagic disease (HD) of wild ruminants is caused by two closely related orbiviruses, epizootic hemorrhagic disease viruses and bluetongue viruses. These viruses are transmitted to wild and domestic ruminants by *Culicoides* biting midges, thus the occurrence of HD is seasonal. The multitude of viruses, ruminant hosts, *Culicoides* vectors, and influence of the environment make this disease system dynamic. Hemorrhagic disease is one of the most significant infectious diseases of white-tailed deer (WTD; *Odocoileus virginianus*) and the cyclical and explosive nature of local and regional HD outbreaks, coupled with high mortality among some WTD populations, have made HD a well-known disease among wildlife professionals. Accordingly, HD has been a focus of surveillance and research activities for decades. Early outbreak investigations, field surveys and controlled studies laid the foundation for our current understanding of HD in North America, which has been enhanced by two long-term surveillance systems at the Southeastern Cooperative Wildlife Disease Study (SCWDS; University of Georgia): 1) diagnostic virology on tissue samples from diseased wild ruminants 1994–present, and 2) annual, questionnaire-based HD reporting by state wildlife management agencies 1980–present. Acting synergistically, these two long-term data sets have been fundamental to our understanding of HD and have been essential to capturing numerous changes in disease patterns over the past three decades. Our objectives are to 1) review field signs, necropsy findings, and diagnostic sample collection procedures for HD as they relate to these two surveillance systems, and 2) highlight what we have learned over the past three decades.

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Wednesday, 3:00 PM

Technology Benefits Hunters and Biologists: A Smartphone App for Observation and Harvest Data Collection

Steve Demarais - Mississippi State University; Bronson Strickland - Mississippi State University; Chris McDonald - Mississippi Department of Wildlife Fisheries and Parks

ABSTRACT: Harvest and observation data are critical for making decisions regarding trends in game populations. Historical methods using post-season hunter-submitted paper reports can be replaced by smartphone and tablet technology that allow real time data entry by hunters and negates the need for state wildlife agency personnel to enter data post-season. Our smartphone and tablet application allows individuals or groups to identify hunting properties and stands on aerial photos. Hunter selection of stands is aided by inclusion of current wind and scent dispersion. Group stand list identifies occupied stands for convenience and safety. Stand and time-of-day reports inform individuals and groups of stand use and deer observation patterns. Hunters enter DMAP data and receive estimated pounds of boned-out venison and Boone and Crockett Score. Individual and group data are password protected. Biologists access reports online that summarize data at county, region, and state levels. Examples of reports from the 2015-16 hunting season are provided for selected states.

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Wednesday, 3:50 PM

A Predictive Model for Deer Cultural Carrying Capacity in Virginia: A Step Forward

Nelson W. Lafon - VA Department of Game and Inland Fisheries (VDGIF); Amy Carrozzino-Lyon - Virginia Tech; Matt Knox - VDGIF; Jim Parkhurst - Virginia Tech; Dave Steffen - VDGIF

ABSTRACT: The Virginia Deer Management Plan recommends that the Virginia Department of Game and Inland Fisheries (VDGIF) incorporate assessments of cultural carrying capacity (CCC) when establishing deer (*Odocoileus virginianus*) population objectives for management units (counties/cities). During 2011-2014, VDGIF and Virginia Tech developed a draft predictive model for CCC based on metrics of risks (agricultural damage, residential plant damage, vehicle collisions, Lyme disease) and benefits (hunting). Residents of 15 counties across Virginia, selected to represent the spectrum of benefits and risks, were surveyed regarding deer populations. Although the modeling effort failed to identify predictive metrics that accurately represented CCC, as validated by survey results, a strong negative correlation was found between deer density (indexed as antlered deer killed/square mile of deer habitat) and human tolerance of or desire for deer populations. A 1998 study showed that Virginians' tolerance of deer declined dramatically when deer density surpasses a threshold. Based on these findings, deer project coordinators proposed lower and upper bounds in deer density that would establish "default" objectives to either increase or reduce deer populations, respectively. Regional VDGIF staff who routinely interact with stakeholders reviewed these objectives and suggested modifications based on local considerations (e.g., human land use changes, ecological impacts from deer, deer disease risks). These deer population objectives were incorporated into the revised Virginia Deer Management Plan. Anticipated future improvements include formalizing the staff decision-making process and modeling CCC only in management units with moderate deer density, where establishing deer population objectives is challenging.

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Notes:

Wednesday, 4:10 PM

Defining Management Units for Deer in New York State: Finding a Balance between Desired Precision and Fine-scale Management

James D. Kelly - New York State Department of Environmental Conservation; Jeremy Hurst - New York State Department of Environmental Conservation

ABSTRACT: Since 1982 New York State has set hunting regulations, issued deer management (antlerless) permits, and monitored estimated harvest parameters at a scale of no less than 60 Wildlife Management Units (WMUs) and as many as 92 WMUs. Because of the inability to consistently achieve desired statistical precision for all harvest monitoring metrics, aggregation of WMUs into larger 'WMU Aggregates' was identified as an objective in the current (2012 – 2016) state deer management plan. To minimize the tradeoffs between fine-scale management and achieving desired precision, we identified WMU Aggregates by using a spatially constrained clustering algorithm, max-*p*. Unlike other cluster analyses, the max-*p* algorithm does not require *a priori* knowledge of how many groupings should be output from the analysis. Given a suite of unit-specific covariates, the max-*p* algorithm maximizes the number of spatially contiguous aggregates (*p*) and maximizes homogeneity within aggregates while simultaneously requiring that each aggregate meets a minimum value of a specified floor variable (e.g., mean number of deer checked or mean number of deer harvested). We elicited regional big game biologists to identify region-specific floor variables and floor values to produce model output containing aggregates with a practical configuration for management purposes. As a result of this iterative analysis we aggregated 92 WMUs into 24 WMU Aggregates, for which regional staff will be able to meet sample size quotas with either a minimal increase in effort, no change in effort, or a substantial reduction in effort. Implications and recommendations for other deer management programs are discussed.

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Notes:

Wednesday, 4:30 PM

Using Structured Decision Making to Guide Recommendations for Buck Harvest Management in New York

Jeremy E. Hurst - New York State Department of Environmental Conservation; Kelly F. Robinson - New York Cooperative Fish and Wildlife Research Unit; Department of Natural Resources, Cornell University; Angela K. Fuller - New York Cooperative Fish and Wildlife Research Unit Department of Natural Resources, Cornell University; Bryan Swift - New York Department of Environmental Conservation Division of Fish, Wildlife & Marine Resources; Arthur Kirsch - New York Department of Environmental Conservation Division of Fish, Wildlife & Marine Resources; James Farquhar - New York Department of Environmental Conservation Division of Fish, Wildlife & Marine Resources; James Kelly - New York Department of Environmental Conservation Division of Fish, Wildlife & Marine Resources

ABSTRACT: Buck harvest strategies have been a divisive and highly politicized issue among deer hunters in New York. Although a majority of deer hunters have voiced a desire for regulations to reduce harvest of yearling bucks, a similar majority of hunters value the freedom to choose which buck they harvest. To make informed recommendations to policy makers, we used a structured decision making (SDM) framework to evaluate potential buck harvest strategies while accounting for regional variation in hunter values and deer population status. Our primary objectives were to: (1) maximize hunter satisfaction, (2) minimize impact on our ability to manage and monitor deer populations, and (3) minimize management costs. We considered six strategies that could impact yearling buck harvest and hunter choice and opportunity to varying degrees. These included: (1) no change, (2) promotion of voluntary antler restrictions, (3) a 1 buck per year limit, (4) shortening the regular firearms season, (5) mandatory antler point restrictions for part of the season, and (6) mandatory antler point restrictions during all seasons. We created a population model and used a hunter survey to evaluate how well each of the six alternatives would achieve each of the primary objectives regionally, and we used input from agency managers and deer hunters to assess the relative importance of each objective. Thus, the SDM process allowed us to identify recommendations for buck harvest strategies that may best balance competing interests in various regions of New York.

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Notes:

Wednesday, 4:50 PM

Evaluating the Launch of the Deer Management Assistance Program in Wisconsin

Robert R. Nack - Wisconsin Department of Natural Resources; Robert H. Holsman - Wisconsin Department of Natural Resources; Ben Beardmore - Wisconsin Department of Natural Resources

ABSTRACT: Wisconsin developed and implemented a Deer Management Assistance Program (DMAP) in 2014 following a recommendation in the 2012 Deer Trustee Report. DMAP was presented as a way to improve habitat for deer and other wildlife and to build trust and credibility with deer hunters and landowners through increased interaction and cooperation with agency biologists and foresters. Currently, 20 state agencies utilize some type of DMAP as an outreach tool for private land conservation and deer herd control efforts. This presentation will highlight Wisconsin's experience with developing and implementing DMAP over the first two years of the program. To date, over 700 landowners and approximately 90,000 acres have been enrolled in the program. The program emphasizes forest management and harvest strategies that strike an appropriate balance between deer herd size and sustainable habitat. We developed an evaluation framework to measure the influence of program interventions on participant attitudes about habitat carrying capacity as well as on agency credibility. Baseline survey results indicate that most participants entering the program believe their properties are below carrying capacity and that local deer impacts are minor. Initial program enrollees entered with positive attitudes toward the WDNR. Enrollees in the first year of the program expressed very positive experiences. We conclude by sharing lessons learned from the initial implementation of the program.

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Poster Session

Overwinter Fawn Habitat Selection and Survival in South Texas

Justin P. Young - 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; Kim N. Echols - Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville; Don A. Draeger - Comanche Ranch

ABSTRACT: White-tailed deer (*Odocoileus virginianus*) harvest recommendations after autumn surveys are often based on the assumption that most fawns will be recruited into the population. We hypothesized overwintering fawns may be pushed into lower quality habitat as deer density increases resulting in increased mortality after weaning. Based on this hypothesis, we predicted that with increased deer density overwintering fawn use of lower quality areas will increase, home range size will decrease, spatial overlap will increase, foraging time will increase, body mass will decrease, and survival will decrease. We also predicted that providing more supplemental feeders may reduce these effects. Fawns captured during November 2014 in 200-acre enclosures on the Comanche and Faith ranches were fitted with GPS collars and/or ear tags within enclosures with 40 deer/1 feeder, 60 deer/1 feeder, or 60 deer/3 feeders. Relocation data from the GPS collars and survival estimates using trail cameras in conjunction with program MARK were used to test our predictions. Preliminary results indicate fawns in the high density with 1 feeder treatment concentrated foraging efforts in areas where high quality forage would be most prevalent, unlike the lower density and multiple feeder treatments in which habitat selection was at random. Our results suggest fawns increased search time for high quality forage in the presence of increased intraspecific competition, and providing multiple feeders or decreasing deer densities may resolve this effect.

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Poster Session

A Step Selection Function for White-tailed Deer Dispersal in an Agricultural Landscape

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

ABSTRACT: Movement of individuals outside their home ranges (i.e., dispersal, migration) affects population dynamics, gene flow, and disease spread. Understanding the landscape factors that influence path selection during these behaviors can increase insight into the ecology of a species and also enables predictions for movement paths. Multiple methods exist to identify habitat selection within these behaviors but many of these methods do not consider the step-wise manner in which individuals are making decisions. We placed GPS collars on 61 juvenile white-tailed deer (*Odocoileus virginianus*) from 2011-2014 to obtain locations from deer dispersal paths in the agricultural landscape of east-central Illinois. We used dispersal locations paired with 10 randomly generated paths at each movement step to create a step selection function using multiple land cover variables. Using conditional logistic regression, we found significant nonlinear impacts of both distance to forest and streams ($P < 0.001$). We found that deer were likely (probability >0.50) to select dispersal paths moving toward forested habitat when <375 yd and > 2,744 yd from forested habitat. Deer were also more likely to select dispersal paths moving towards streams when < 387 yd from them. Deer in the agricultural landscape of east-central Illinois are using areas within and around ditches/riparian zones and forested areas while dispersing. Managers in Illinois should target riparian zones and forest patches surrounding Chronic Wasting Disease areas when conducting surveillance or actively culling for limiting disease spread.

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Poster Session

Preliminary Comparison of Adult Urban and Rural White-tailed Deer Home Range Size in Southern Indiana

Jonathan K. Trudeau - Ball State University; Garrett B. Clevinger - Ball State University; Timothy C. Carter - Ball State University

ABSTRACT: White-tailed deer (Odocoileus virginianus) have been extensively researched throughout their distribution and in varying habitats. Interest in urban populations has grown due to increasing densities of white-tailed deer in these areas. Though much is known about urban populations and their rural counterparts, little is known about how these two populations interact with one another and how their home ranges vary within adjacent areas during the same time period. Understanding the differences between urban and rural white-tailed deer home range sizes in adjacent areas is essential to effectively manage the two populations using proper management methods. Our study sites were Morgan, Monroe, and Brown counties in southern Indiana. The white-tailed deer population in the City of Bloomington, IN stood as our urban study zone. Using a drop net and dart projector, we caught and collared 5 rural and 16 urban adult white-tailed deer between January 21st and July 30th, 2015. Of the 21 deer collared, 17 had Global Positioning System (GPS) collars and the other 4 had VHF radio transmitter collars. Locations were collected three times per day on GPS collars and twice a week on radio transmitter collars. We expected the urban deer to have smaller home ranges than the rural deer. Preliminary results show estimated rural deer home range sizes to be approximately 40% larger than the adjacent urban deer population. Male and female estimated home range sizes did not vary within urbanization class, suggesting that development may have a greater impact on home range size than sex.

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Poster Session

Comparisons of Dispersal and Excursion Events between Localized Populations of Urban and Rural White-tailed Deer (*Odocoileus virginianus*)

Garrett B. Clevinger - Ball State University; Jonathan K. Trudeau - Ball State University; Timothy C. Carter - Ball State University

ABSTRACT: In recent years, the movement patterns of urbanized populations of white-tailed deer (WTD) have become a major area of interest to both academic and professional wildlife organizations. Although a handful of studies have focused on the dispersal and temporary excursion events of either the urban or rural populations of this species, few if any have ever compared these parameters between both populations on a localized scale. By understanding the extent of seasonal movement between urban and rural populations of WTD within the same general area, wildlife biologists and other stakeholders gain valuable information in which to base management decisions for the benefit of both the herd and the impacted citizens. This study was conducted in three counties in southern Indiana: Morgan, Monroe, and Brown; with our urban study area in the city of Bloomington, Indiana. WTD were captured using drop nets or free-darted from a distance. WTD were then equipped with GPS or VHF collars and monitored using radio or satellite telemetry to obtain location data. From April-July 2015 a total of 21 WTD was captured consisting of 16 urban individuals and 5 rural individuals. Preliminary observations indicate an increase in average distance traveled (2.14 mi) from home ranges of rural WTD as opposed to that of urban WTD (0.93 mi). Our data also shows individuals traveling across multiple subsets of urbanity, which may suggest that the localized population is operating as an open system.

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Poster Session

Using Eye Lens Weight to Predict the Age of Neonatal White-tailed Deer

Rebecca M. Shuman - Daniel B. Warnell School of Forestry and Natural Resources, University of Georgia; Michael J. Chamberlain - Daniel B. Warnell School of Forestry and Natural Resources, University of Georgia; John C. Kilgo - USDA Forest Service, Southern Research Station; Elizabeth A. Cooney - Daniel B. Warnell School of Forestry and Natural Resources, University of Georgia; Karl V. Miller - Daniel B. Warnell School of Forestry and Natural Resources, University of Georgia

ABSTRACT: Eye lens growth in mammals is generally independent of gender and unaffected by external factors such as environment and diet. Eye lens weight has been used as a predictor of age in many vertebrate species. The relationship between eye lens weight and age has been examined in several cervid species but not in neonates. From June-August 2014 and 2015, we collected eye lenses opportunistically from 18 known-age neonatal (range 1 day to 34 days of age) white-tailed deer (*Odocoileus virginianus*) who suffered mortalities attributable to predation or natural causes. We fixed eyes in 10% buffered formalin for >60 days. Lenses were removed, oven-dried at 86°F until weights did not vary by more than 1 mg, and weighed to the nearest 0.1 mg. There was no significant difference ($P<0.05$) between the weights of the right and left eye lens; so when both eyes were present, we averaged weights for analysis. Although linear regression revealed a positive relationship between neonate age and eye lens weight ($r^2 = 0.55$), variability in lens weight among similar-age neonates and the slow rate of increase in lens weight across time makes prediction of neonate ages unreliable. Utilizing lens weight alone to estimate age of neonates is not suggested.

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Poster Session

Using Forward-looking Infrared (FLIR) Surveys to Determine Deer Density; How Many is Enough?

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

ABSTRACT: The population abundance of white-tailed deer is often estimated using hunter harvest data, remote cameras, or spotlight surveys. A recent variation of the spotlight survey is the use of forward-looking infrared (FLIR) technology. In our study, we examined the relationship between the number of FLIR surveys and estimates of deer density. We performed 6 FLIR surveys and used program Distance 6.2 to estimate deer density on 3 state forests in western Maryland from August-October, 2015. We calculated estimates using 6 surveys and then all possible iterations of 5, 4, and 3 surveys. Green Ridge surveys had a comparable percent coefficient of variation (CV) and overlapping 95% confidence intervals (95% CI) among 6,5,4, and 3 surveys respectively (6: CV=7.8, 95% CI=16.1-21.8; 5: CV=8.9, 95% CI=14.5-20.7; 4: CV=10.1, 95% CI=14.3-21.6; 3: CV=11.8, 95% CI=14.1-23.0 deer/mi^2). Potomac-Garrett had similar CVs and 95% CIs (6: CV=12.8, 95% CI=16.8-28.8; 5: CV=13.5, 95% CI=15.6-28.2; 4: CV=14.4, 95% CI=14.7-29.1; 3: CV=15.9, 95% CI=13.9-30.6 deer/mi^2). Savage River had the greatest CVs but similar 95% CIs (6: CV=19.2, 95% CI=8.8-20.7; 5: CV=21.0, 95% CI=8.2-21.7; 4: CV=23.5, 95% CI=7.4-23.6; 3: CV=25.7, 95% CI=6.6-29.8 deer/mi^2). For all areas, the CVs increased as the survey number decreased, but in most cases only slightly. Savage River experienced the greatest change, because surveys had the largest amount of variation. Reducing FLIR surveys did not affect the calculated deer density significantly. These results show the effectiveness of using FLIR surveys as a management tool, even at low survey numbers.

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Poster Session

Thermal Aerial Surveys for Deer Using UAS (Drone) Technology

J. Merlin Benner - Remote Intelligence, LLC & Wildlife Specialists, LLC; Gene Huntingdon - Remote Intelligence, LLC

ABSTRACT: Use of unmanned aerial systems (UAS or drones) is growing as technology improves, sensors are miniaturized, and the regulatory framework is developed. These systems show promise in some situations for obtaining high quality, safe, and cost-effective deer aerial survey data. While such new systems present more options, there are many factors to consider when deciding to employ them on a project. The ability of UAS to fly slow and low with stabilized sensor systems can provide high quality imaging. We tested both fixed-wing and VTOL multi-rotor UAS, and found advantages and limitations of each. Safety of the flight crew, who stays on the ground, is a major benefit. Limitations include battery life and flight times, which impact coverage areas. Other limitations are regulatory, with requirements on permitting, piloting, and areas that can be surveyed. Currently, surveys in the US airspace must be conducted during daylight hours, within the line of sight of the Pilot in Charge, and over unpopulated areas. We found these systems to be an effective tool in managing deer and gathering information on local deer populations in relatively small, unpopulated areas such as parks and preserves.

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Poster Session

Age- and Gender-related Variation in Harvest Susceptibility at Bait Sites

David B. Stone - University of Georgia; Brad Cohen - University of Georgia; Karl V. Miller - University of Georgia; Charlie Killmaster - Georgia Department of Natural Resources

ABSTRACT: The use of bait for hunting white-tailed deer (*Odocoileus virginianus*) is a controversial issue among hunters and the non-hunting public. Baiting can alter natural movement patterns and spatial distribution of deer potentially leading to a change in harvest rates. Our objective was to determine potential differences in harvest susceptibility for female (≥1.5 years-old), immature male (≤2.5 years-old), and mature male (≥3.5 years-old) white-tailed deer in a baited area of west-central Georgia, USA. We monitored 11 bait sites with camera traps throughout the entire hunting season. We calculated the total number of occurrences for female, immature male, and mature males at each bait site during legal shooting hours, weighted these counts by the group's relative abundance in a pre-season camera survey, and assumed equal probability of detection across groups. We fit a Poisson log-linear model to the mean weighted-counts per week by season, site, and sex-age class. Harvest susceptibility for each sex-age class differed across each phase of the breeding season and from site-to-site ($p<0.0001$). Across all sites, mean photographic occurrences during legal hunting hours per trap week was highest (mean ± 95% CI; 3.6± 1.7) for females during the pre-breeding phase and greatest for immature (7.2 ± 11.5) and mature (12.1 ± 5.2) males during the post-breeding phase. Although mature males were most susceptible to harvest during the post-breeding phase, 4 (12.5%) deer were responsible for 68.3% of all photographic occurrences during legal hunting hours. Our results demonstrate the effect of baiting on harvest susceptibility may depend on habitat characteristics associated with the feeder, competition, predation-risk, or intra-specific temporal and spatial partitioning.

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Poster Session

Lifetime Reproductive Effort in Male White-tailed Deer: Start Fast and Be Persistent

Aaron M. Foley - Caesar Kleberg Wildlife Research Institute (CKWRI); Matthew J. Schnupp - King Ranch Inc.; David G. Hewitt - CKWRI; Randy W. DeYoung - CKWRI

ABSTRACT: Competition for mates is energetically expensive, so the optimal strategy for allocation of mating effort may change during a male's lifetime. We evaluated mating effort relative to age class in white-tailed deer using 7,199 males harvested from a free-ranging population on the King Ranch, Texas, over a 22-year period. We used changes in body mass of harvested bucks relative to harvest date during rut as an index of male mating effort. Pre-rut body mass increased from 1 to 4 years old, peaked at age 5, then declined 2% annually from 6–10 years old. Loss of body mass peaked at 5 years old (24% of pre-rut mass). However, bucks 6–10 years old continued to invest heavily in mating activities (21% body mass loss) despite the decline in pre-rut mass. Surprisingly, physically immature bucks (2–3 years old) also invested significant effort in mating activities (13–16% body mass loss). Unlike other ungulates, male white-tailed deer can maintain reproductive effort late in life because the energetic cost of mating consists of mate-searching rather than fighting. Bucks probably lose body mass because time is allocated to mate-searching vs. foraging, and rely heavily on endogenous reserves to sustain mating activities. Total mating effort is thus dependent on the male's pre-rut condition. Young and senescent (11+ years old) males enter the rut with fewer endogenous reserves and may have to allocate less time towards mating activities.

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Poster Session

Antler Growth by Age Class in the Sandy Soils of Central Florida

Donal A. Woodard - Deseret Ranches

ABSTRACT: Like many states across the Southeast, white-tailed deer hunting is a large recreational activity in Florida. Historical trends of producing smaller sized antlers have left most managers believing that quality deer management is not applicable within the state. Since 1982, all deer harvested legally within the property boundaries were assigned a unique ID number and aged by a staff Wildlife Biologist. In 2015 we began a study to retrieve Gross Boone and Crockett Scores (GBC) from all antlers still containing an ID tag. Our staff measured 410 bucks and received 257 GBC measurements from the state's Florida Buck Registry program (FBR). All 667 uniquely identified deer were traced back to their specific harvest record information such as age, weight, and harvest date. We found mean GBC scores of age classes to be: 2.5 (87.25 GBC, SE 1.93); 3.5 (101.5 GBC, SE 1.01); 4.5 (109.25 GBC, SE 1.24) and 5.5 plus (109.75 GBC, SE 1.16). These results show remarkable similarities with other age based antler growth research in both the 2.5 and 3.5 years old age class, but these similarities seem to drift apart into the older age classes. Our history is flooded by shooting immature deer and consequently removing that potential from those age cohorts before reaching peak antler age. Since 1982, 93% of the bucks were harvested before reaching maturity. This data and information will hopeful help managers in poor quality soils look beyond surrendering defeat and realizing potential of their populations at maturity. This project is ongoing.

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Poster Session

Effects of White-tailed Deer and Supplemental Feeder Densities on Canopy Volume and Mast Production

Lindsey M. Phillips - 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; Lindsay D. Roberts - Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville; David B. Wester - Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville; Kim N. Echols - Caesar Kleberg Wildlife Research Institute, Texas A&M University–-Kingsville; Don A. Draeger - Comanche Ranch

ABSTRACT: White-tailed deer (*Odocoileus virginianus*) browse upon shrubs across their range of distribution because shrubs are the most reliable food source, particularly in drought-prone portions of their range. Our objective was to determine the impacts of varying deer and supplemental feeder densities on canopy volume and mast production of three palatable shrub species. In March 2013, we established 6 200-acre enclosures on each of 2 ranches, with target densities of 0, 20, 40, and 60 deer/200 acres with one feeder each, 60 deer/200 acres with three feeders, and 80 deer/200 acres with four feeders. In summer 2013-2014, we measured canopy volumes of pairs of Texas lignum-vitae (*Guaiacum angustifolium*), blackbrush acacia (*Vachellia rigidula*), and spiny hackberry (*Celtis ehrenbergiana*) that were unprotected or protected from browsing. Blackbrush acacia and spiny hackberry were split into 2 height classes (<4.92 ft tall and >4.92 ft tall). In summer 2014-2015, we measured mast production on these same plants. Data were analyzed using repeated measures for mixed models. Canopy volume of spiny hackberry in the large height category increased with increasing deer density and a constant deer to feeder ratio ($P = 0.016$). Mast production of spiny hackberry in the large height category decreased with increasing deer density ($P = 0.041$) and increased with increasing deer density and a constant deer to feeder ratio ($P = 0.023$). These shrubs appear to be adapted to surviving with increased deer browsing and the addition of feed appears to allow increased growth and reproduction of spiny hackberry.

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Poster Session

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

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ABSTRACT: Traditional browsing theory predicts that with increasing white-tailed deer (*Odocoileus virginianus*) density, selective foraging results in a decline in palatable shrubs and an increase in unpalatable shrubs. Removing nutritional constraints by providing high-quality food may either exacerbate this effect, or protect shrubs from excessive browsing because feed replaces the natural vegetation in deer diets. Our objective was to determine the effects of increasing deer density and provision of supplemental feed on canopy cover of shrubs. In March 2013, we established 6 200-acre enclosures on each of 2 ranches, with target densities of 0, 20, 40, and 60 deer/200 acres with one feeder each, 60 deer/200 acres with three feeders, and 80 deer/200 acres with four feeders. We divided shrubs into 13 ecologically important plant functional groups that included groups of unpalatable shrubs and low-growing, palatable shrubs that should be susceptible to damage from browsing. During summer 2012-2014, we used the line intercept method to estimate shrub canopy cover along 20 transects/enclosure. Data were analyzed using repeated measures for mixed models. Canopy cover of honey mesquite increased ($P < 0.001$) with increasing deer density and a single feed site. Canopy cover of honey mesquite and other unpalatable shrubs decreased ($P < 0.025$) with increasing deer density and a constant deer to feeder ratio. Canopy cover of palatable shrubs was not affected ($P > 0.052$). Deer consuming supplemental feed may increase use of unpalatable shrubs that are poorly digestible to offset ruminal acidosis or other effects of a highly digestible diet.

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Poster Session

Comparison of Food Plot Mixtures for Attracting White-tailed Deer

Ryan E. Leeson - Southern Illinois University (SIU); Clayton K. Nielsen – SIU; William J. Banz - SIU

ABSTRACT: Despite the multitude of food plot mixtures available for white-tailed deer (*Odocoileus virginianus*), few studies have assessed the efficacy of different mixtures at attracting deer in midwestern landscapes. During September-November 2015, we established 4 no-till food plot mixtures in 16 plots (5445 feet^2 in size) in southern Illinois and measured deer use via 2 methods: vegetation growth in exclosures versus control (i.e., unfenced) areas and camera traps. We compared Big Tine Buck Brunch, Evolved Harvest Throw & Gro, Antler King No Sweat, and a food plot mix that we created. Deer used all 4 food plot mixtures (n = 292 – 2,522 pictures per plot over 9 weeks), having a negative impact on mean vegetation height outside of exclosures ($F_{3,1148} = 6.71$, $P < 0.001$). Analysis of camera data indicated that deer did not preferentially use any one food plot mixture over the others ($F_{3,12} = 0.090$, $P > 0.050$). There was also no difference in the proportion of deer pictured in the process of eating within each food plot mixture ($F_{3,12} = 0.592$, $P > 0.050$). We suggest any of these 4 food plot varieties could be planted by a hunter or wildlife manager in the Midwest and observe similar use by deer.

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Poster Session

Influence of White-tailed Deer on Oak Regeneration in Southern Illinois

Ryan E. Leeson - Southern Illinois University (SIU); Clayton K. Nielsen - SIU; Eric Holzmueller, SIU

ABSTRACT: Many oak-dominated forests in the eastern U.S. are experiencing a lack of oak (*Quercus* spp.) regeneration that threatens the long-term sustainability of these forests. White-tailed deer (*Odocoileus virginianus*) may contribute to this issue by altering composition of forest stands through browse of seedlings and/or consumption of acorns. In order to determine how much of an impact white-tailed deer may have on oak regeneration, 150 paired plots (fenced and unfenced) were established in June 2015 at Trail of Tears State Forest in southern Illinois. At each plot, we measured 25 habitat variables to assess impacts of deer herbivory; analysis of these data are ongoing. During September-November 2015, we counted and marked fallen acorns within 50 random paired-plots 3 times. Preliminary results indicate that there was no difference in the number of acorns discovered or lost in fenced versus unfenced plots ($F_{4,95}$ = 0.018, $P > 0.050$ and $F_{4,95} = 0.001$, $P > 0.050$, respectively). When complete, our study will aid managers in making deer management decisions that will best encourage oak and hickory regeneration.

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Poster Session

Habitat Use and Birth Site Selection of White-tailed Deer Fawns in Northeast Louisiana

Elizabeth A. Cooney - Warnell School of Forestry and Natural Resources, University of Georgia; Rebecca Shuman - Warnell School of Forestry and Natural Resources, UGA; Taylor Simoneaux - Warnell School of Forestry and Natural Resources, UGA; Michael J. Cherry - Joseph W. Jones Ecological Research Center; Scott Durham - Louisiana Department of Wildlife and Fisheries; John C Kilgo - US Forest Service, Southern Research Station; Michael Chamberlain - Warnell School of Forestry and Natural Resources, UGA; Karl V. Miller - Warnell School of Forestry and Natural Resources, UGA

ABSTRACT: Recent studies have noted considerable variation in rates of fawn recruitment in white-tailed deer (*Odocoileus virginianus*) populations. This variation has been primarily linked to differences in predator communities and habitat characteristics. Understanding habitats used for parturition and their influence on survival could allow managers to better understand habitat requirements necessary for sustainable herd management. We investigated patterns of space use and birth site selection by female white-tailed deer and assessed how each influenced fawn survival. We conducted research on the Tensas River National Wildlife Refuge in northeastern Louisiana, an area dominated by varying seral stages of bottomland hardwoods and agricultural plots. We captured 98 mature females and fit them with a VHF radio-collar and vaginal-implant transmitter (VIT). We triangulated females and monitored VITs to assess space use and locate birth sites. Average annual home range size, using minimum convex polygons, was 69.4 acres (SE = 5.6), and was similar among females that successfully reared fawns to 12 weeks and those that did not. We collared 70 fawns and identified 49 parturition sites. We used logistic regression to assess the influence of visual obstruction, wood volume, and canopy cover on the probability of a site being used as a birth site. Our results suggest that there is some selection for parturition sites. The most informative parameter was wood volume, whereas females selected for areas of lower basal areas and stem counts (P = 0.03). However, this selection should be coupled with studies of fawn predation to identify how parturition site selection and habitat specific predation affect recruitment rates.

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Poster Session

Are Cattle a Management Tool or Nemesis for Deer Habitat in North America?

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ABSTRACT: Livestock impacts to wildlife habitat are controversial, ranging from Aldo Leopold's suggestion that cattle (*Bos* species) are a habitat management tool to assertions that cattle destroy habitat. Our objective was to determine if the published literature supports or refutes that cattle grazing is a potential tool in deer (*Odocoileus* species) habitat management. We predicted if cattle negatively impact deer the literature would support 1) deer spatially avoid cattle, 2) cattle and deer diets overlap, and 3) cattle grazing increases grasses and reduces forbs. We extracted data from 102 manuscripts and created 3 data sets to quantitatively evaluate our predictions (thus far, 2 of 3 have been evaluated). Deer were 1.76× more likely to shift (P = 0.022) use of space in response to cattle grazing and displacement occurred more often during fawning seasons ($P \leq 0.033$). Diet overlap was not affected by deer density ($P = 0.834$), but increased ($P < 0.001$) 5% for every 0.1 AUY/acre increase in cattle density. Our preliminary results indicate cattle and deer are compatible land uses when cattle are excluded from areas heavily utilized by deer during fawning seasons and low cattle stocking rates used, thus minimizing negative impacts on deer use of space and probability of diet overlap.

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Poster Session

Factors Influencing Water Consumption by White-tailed Deer in South Texas

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ABSTRACT: Little is known about water consumption by white-tailed deer (*Odocoileus virginianus*). The highly variable climate in South Texas may cause stress in animals that are unable to maintain water balance. This study was replicated on the Faith and Comanche ranches in Dimmit County, Texas. Each ranch had two 200-acre enclosures with 20 or 60 deer. Each enclosure had one centrally located water trough and supplemental feed site. Five bucks and five does of varying ages were selected in each of the 4 enclosures. The amount of water consumed by the selected deer was monitored using a video camera, scale, and water tub. Water consumption data were collected for one year and compared to rainfall, temperature, Palmer Drought Severity Index (PDSI), productive processes, and deer density in order to determine the effects of these variables on water consumption. Bucks (0.389 gal./week) consumed over 3 times more water than does (0.114 gal./week) and deer on the Comanche Ranch (0.359 gal./week) consumed at least twice as much water as deer on the Faith Ranch (0.144 gal./week).

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Poster Session

Pelleted Feed Consumption by White-tailed Deer in a Variable Environment

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ABSTRACT: Providing pelleted feed as a nutritional supplement for white-tailed deer (*Odocoileus virginianus*) is a common management practice. However, as deer densities increase, feed may not be accessible to all deer due to competition at the feed site. This could limit the success of a feeding program. Patterns of feed consumption may vary by season and amount of vegetation available, which is influenced by rainfall in variable environments. Some feed may be lost to sources other than deer, i.e. waste and non-targets. To test these assumptions, pelleted feed was provided year round, ad libitum within six, 200-ac enclosures on two ranches in South Texas with the following numbers of deer and feeders, respectively: 0/1, 20/1, 40/1, 60/1, 60/3, and 80/4. Feed levels were measured when feeders were filled to determine feed disappearance (lb/day). Preliminary results show that feed disappearance, which is affected by an interaction between deer density, rainfall and season, generally increases with an increasing deer density and decreases with increasing rainfall, suggesting that deer turn to vegetation and rely less on the feed. Additionally, feed disappearance was lowest during the summer, despite this period being important nutritionally for antler growth and parturition and lactation. The average amount of feed lost to non-targets was 4.69 lb per day per feeder, which can add up to be a significant loss. The results of this study provide insight into diets of white-tailed deer in a variable environment, which can ultimately affect management goals.

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Poster Session

Immobilization of Free-ranging Populations of Urban and Rural White-tailed deer (*Odocoileus virginianus*) using Butorphanol-Azaperone-Medetomidine (BAM)

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ABSTRACT: Incorporating protocols that promote the safe capture and handling of animals is a critical component of wildlife research. The ideal immobilizing agent used for wildlife capture should: 1.) Promptly induce a safe anesthetic plane that enables handlers to process animals in a timely manner and (2.) Allow handlers to quickly and easily reverse the effects of anesthesia at any point within the workup process. These characteristics are crucial when conducting research that involves the capture and immobilization of free-ranging wildlife populations, such as white-tailed deer, which thrive in both urban and rural landscapes. Butorphanol-Azaperone-Medetomidine (BAM) is a relatively new drug compound exclusively designed for cervid immobilization. However, its efficacy in free-ranging deer populations has only been assessed by a handful of researchers since the late 2000's. Between January and July of 2014 and 2015, 115 deer were captured and immobilized from two study areas in southeastern Kentucky (n=94) and southern Indiana (n=22). Deer were captured using drop nets (n=78), clover traps (n=28), and dart projectors (n=10). All were injected with an initial dose of 1-2 cc of BAM in the shoulder or hindquarter. Preliminary observations indicate an average total induction time of 9.1 minutes and average total recovery time of 6.3 minutes. These observations are consistent with previous research involving BAM. Compared to other available agents, BAM is superior in both induction and recovery times. However, the greatest benefit of using BAM was the complete and rapid reversibility of the agent on demand. Our observations support the use of BAM as a highly effective immobilizing agent for free ranging white-tailed deer capture.

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Table 1. Southeastern state deer harvest summaries for the 2014-2015 or most recent available season.

State	Land Area (sq. mi)	Deer Habitat (sq. mile)	Deer Habitat (% Total)	Percent Forested	% Land Area Public Hunting	Harvest Male	Harvest Female	Harvest Total
AL	51,628	48,014	93	71	5	109,500	143,000	252,500
AR	52,609	44,718	85	53	12	104023	104,052	208,075
DE	1,954	714	36	15	10	6,556	7,683	14,239
FL	51,628	29,280	50	45	16	64,223	38,255	102,478
GA	57,800	38,674	67	67	6	149,498	262570	412,068
KY	40,395	39,654	97	59	9	75,378	63,521	138,889
LA	41,406	26,562	64	52	9.5	82,541	57,359	139,900
MD	9,837	8,766	89	39	4	35,683	48,172	83,855
MO	69,561	63,910	92	31	4	144,145	112,608	256,753
MS	47,296	31,250	66	66	6	106,158	145,328	251,486
NC	48,511	37,149	77	57	6	91,857	107,654	199,511
OK	69,919	37,425	54	19	3	57,660	39,605	97,265
SC	30,207	21,920	73	63	7.5	109,446	93,506	202,952
TN	42,246	25,770	61	49	9	95,501	69,427	164,928
TX	261,914	152,730	58	40	<2	325,008	265,104	590,112
VA	39,589	35,642	90	59	8	103,166	86,043	192,278[1]
WV	24,064	22,972	95	79	9	56,884	47,423	104,707[1]
Avg or Total	940,564	665,150	73.6	50.8	7.4	1,717,227	1,691,310	3,411,996

Table 1. Continued

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	5.3	A,B,C,I	1,500,000	119 (C)	5 (A)	86 (A,C)	A,B	67
AR	4.6	A,C, F, G	1,000,000	175 (C)	12 (C)	50 (C)	A,B	70
DE	9.2	B, F, G	36,000	131 (C)	14 (A,B)	35 (A,B)	A,B,C	0
FL	3.5	E		35-38	14	74-79	A,B	20
GA	10.7	A,C,D,E, G	1,260,000	115-146 (C)	80-95 (A,C)	73-88 (C)	A,B,C	23
KY	3.5	D,F,G	777,912	136 (C)	3(A), 9(B)	10-16 (C) + 4 Jr	A,B,C	0
LA	5.3	A,B,C	500,000	123(C)	14(A,B)	65	A,B,C	80
MD	9.6	B,C,D,F,G	200,000	97 (C)	3+9 (A), 13 (B)	13 (A), 2 (B), + 2 Jr. day	A,B,C	
MO	4.0	B,C,D,F,G	1,400,000	98	11	25	A,B	0
MS	8.1	C, E	1,700,000	123 (C)	12 (A)	71	C	90
NC	5.2	A,B,C,D,F, G	942,399	16-56	14	18-82	A,B,C[0]	50
OK	2.6	A,C, E, online	500,000	107 (C)	9	16	A,B	0
SC	10.7	A,B,C	700,000	16 (A)	10 (A)		C	60
TN	6.4	A,D, mobile App	600,000	102(C)	62(C)	48(C)	A,B	0
TX	3.9	B,C	3.4-4.6 million[5]	35	14	70-14065-94 (B, C)	A,B	0
VA	5.4	A,B,C,D,F	~964,000	42-77	14-36	15-50	A,B	55
WV	4.6	A	523,000	93 (C)	6 (C)	22(C)	A,B,C	0
Avg. or Total	6		16 to 17.2 million					32.2

Table 1. Continued

State	No. of Hunters	5-Year Trend	Hunting (Full Season) License Fees		Tagging System		
			Resident	Non-Resident	Physical Tag? License Tag? None?	Mandatory? Volunteer? None?	Bonus Tags Available?
AL	197,700	Stable	$26.20	$301.35	Hunter Log	Mandatory	N/A
AR	296,850	Stable	$10.50 – 25	$55 – 350	License Tag	Mandatory	Female/Mgt buck
DE	21,200	Stable	$25	$130	Physical Tag	Mandatory	2 Antlered, Unlimited Antlerless
FL	110,680	Down	$17	$152	None	None	No
GA	318,181	Stable	$19-$43	$295-$373	License Tag	Mandatory	WMAs
KY	311,084	Up	$55	$260	License Tag/ Hunter Log	Mandatory	
LA	192,600	Stable	$29-50	$300-352	Physical Tag	Mandatory	DMAP
MD	60,000	Stable	$36.50	$130	Physical Tag	Mandatory	Antlered only
MO	511,182	Stable	$17	$225	License Tag	Mandatory	Yes Antlerless only
MS	138,044	Down	$18.85-33.85	$303.85-382.70	None	None	Antlerless, DMAP & FMAP
NC	233,581	Stable	$36	$160	License Tag	Mandatory	Antlerless Only
OK	178,028	Stable	$25	$280	License Tag	Mandatory	DMAP
SC	144,261	Stable	$25	$225	None	None	Yes & DMAP
TN	198,795	Stable	$56	$251	Physical/ Digital Log	Mandatory	WMA's, Some Counties
TX	704,365	Stable	$25	$315	License Tag	Mandatory	MLDP permits
VA	218,000	Down	$46-82	$197-259	License Tag	Mandatory	Unlimited on private lands, antlerless only
WV	220,800	Stable	$35	$196	Physical Tag	Mandatory	Yes
Total	4,055,351						

Table 1. Continued

			Deer Related Accidents						
			Firearms		Stands		Other		
State	Mandatory Orange	Crossbows Permitted		Fatalities	Inj.	Fat.	Inj.	Fat.	Highway Kill[7]
AL	Yes	Yes	4	1	13	1	0	0	29,111(B)
AR	Yes	Yes	7	1	7	1	0	0	20,763 (C)
DE	Yes	Yes	0	0	1	0	0	0	5,113 (B)
FL	WMAs only	Yes	2	0	0	0	0	0	14,706 (C)
GA	Yes	Yes	12	1	15	0	5	0	50,000 (C)
KY	Yes	Season & Handicap	1	0	5	0	0	0	3,108 (A)
LA	Yes	Yes	7	0	2	0	0	0	9,778 (C)
MD	Yes	Yes	1	0	4	0	0	0	30,985 (C)
MO	Yes	Yes, Firearms	8	1	1	1	1	2	35,557 (C)
MS	Yes	Yes	5	1	21	2	0	0	22,373 (C)
NC	Yes	Yes	4	2	10	1	0	0	59,422 (C)
OK	Yes	Yes	1	1	0	0	1	0	12,217 (C)
SC	WMAs only	Yes	8	1	11	1	0	0	2,277 (A)
TN	Yes	Yes	7	1	16	0	1	0	26,800 (C)
TX	WMAs only	Yes	5	1	1	1	1	0	52,000 (C)
VA	Yes	Yes	15	0	15	2	0	0	57,500 (C)
WV	Yes	Yes (2014 Disabled, 2015 all)	4	1	4	0	9	5	13,547 (A)
Total									445,257

Injuries

Table 1. Continued

State	Limits [8]			Antler Restrictions [9]	% Hunting Success[10]			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]	A	----------	36% Combined	----------	$10-12
GA	12	10	2	A (One buck must be 4-points on 1 side) B (9 counties are more restricted)	26	19	50	$5-25
KY	None	Varies	1	C (6 WMAs)	----------	34% Combined	----------	$5-40
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	Yes, on part of buck bag limit	40	32 (C)	43	$5-35
MO	Varies	Varies	3; 1 with firearm	Yes, 63 counties	20	-	36	?
MS	Varies	Varies	3	C	40	31	49	?
NC	6[8]	6 [8]	2/4 [8]	NA	----------	46% Combined	----------	?
OK	6	Up to 6	2	No	27	18	28	$5-10
SC	15+	10+	5+	C (10 WMAs)	29	24	64	$8–20
TN		Varies	3 statewide	None	----------	49% Combined	----------	$5-10
TX	5	Up to 5	Up to 3	C	----------	56% 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	26	12	50	$1-6
Avg.					27.9	31.1	45.6	

Table 1. Continued

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	75	Yes	Yes	No
AR	A	None	None	800	Yes	Yes	Yes, Private
DE	DDAP SDDAP	None	None	117 237	No	Yes	Yes, Private
FL	A, C	640; 5000	None	1,490; 14	Yes	Yes	Yes, Private
GA	None				Yes	Yes	No-North Zone Yes-South Zone
KY	B	None	None	537	Yes	Yes (except March – May)	Yes, Private
LA	A	40	Yes	703	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	525	Yes	Yes	No
NC	A	Regional; 1,000/500	$50	40	Yes	Yes	Yes, Private
OK	A	1,000	$200-400	142	No	Yes	Yes, Private
SC	A	None	$50	1,604 (3.3 mil ac)	Yes	Yes	Yes, Private
TN	None				With officer approval	Yes	No
TX	A,B,C	None	None	8,274 29.9 mil ac.	Most of Texas	Yes	Yes
VA	DCAP DMAP DPOP	None	None	901 805 14	Yes (no weapon)	No (Sept 1 – first Sat in Jan)	No
WV	None				No	Yes[12]	Yes[12]

Table 1. Footnotes

[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 firearms antlerless deer seasons.
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.

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

Note:


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