26th Annual Meeting of the Southeast Deer Study Group

February 23-26, 2003

Hosted By:
The Tennessee Wildlife Resources Agency
and The University of Tennessee

FINANCIAL SPONSORS AND CONTRIBUTORS

THE TENNESSEE WILDLIFE RESOURCES AGENCY THANKS THE FOLLOWING COMPANIES AND ORGANIZATIONS FOR THEIR GENEROUS DONATIONS AND/OR CONTRIBUTIONS OF MERCHANDISE OR SERVICES TO THE 26TH ANNUAL MEETING.

Sunday evening social provided by a donation from the Quality Deer Management Association, in partnership with A. Wilbert's Sons, LLC, BASF, BioLogic Scientifically Proven Wild Game Seed, Davis-Garvin Agency, Inc., DeerCam Scouting Camera, International Paper, Mossy Oak Camo, Plum Creek Timber Company, Inc., Roy O. Martin Lumber Company, StumpCam, Inc., and Westervelt Wildlife Services.

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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 values of the white-tailed deer (Odocoileus virginianus) 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. 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.

SOUTHEAST DEER STUDY GROUP MEETINGS

YEAR	LOCATION	MEETING THEME
1977	Fort Pickett, VA	-
1979	Mississippi State, MS	-
1980	Nacogdoches, TX	-
1981	Panama City, FL	Antlerless Deer Harvest Strategies
1982	Charleston, SC	-
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

YEAR	LOCATION	MEETING THEME
1988	Paducah, KY	Now That We Got 'Um, What Are We Going To Do With 'Um?
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 the 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

MEMBERS OF THE DEER COMMITTEE OF THE SOUTHEASTERN SECTION OF THE WILDLIFE SOCIETY

Name	State	Employer
Chris Cook	Alabama	Alabama Department of Conservation and Natural Resources
Michael E. Cartwright	Arkansas	Arkansas Game and Fish Commission
John Morgan	Florida	Florida Fish and Wildlife Conservation Commission
Robert E. Vanderhoof	Florida	Florida Fish and Wildlife Conservation Commission
Stephen M. Shea	Florida	St. Joe Timberland Company
Kent E. Kammermeyer	Georgia	Georgia Department of Natural Resources
Jon Gassett	Kentucky	Kentucky Department of Fish and Wildlife
Jonathan W. Day	Kentucky	Kentucky Department of Fish and Wildlife
David W. Moreland	Louisiana	Louisiana Department of Wildlife and Fisheries
L. Douglas Hotton	Maryland	Maryland Department of Natural Resources
Stephen Demarais	Mississippi	Mississippi State University
Larry Castle	Mississippi	Mississippi Department of Wildlife, Fisheries and Parks
Jeff Beringer	Missouri	Missouri Department of Conservation
Lonnie Hansen	Missouri	Missouri Department of Conservation
Evin Stanford	North Carolina	North Carolina Wildlife Resources Commission

Name	State	Employer
J. Scott Osborne	North Carolina	North Carolina Wildlife Resources Commission
Kenneth L. Gee	Oklahoma	Samuel Roberts Noble Foundation
Michael G. Shaw	Oklahoma	Oklahoma Department of Wildlife Conservation
David C. Guynn, Jr.	South Carolina	Clemson University
Charles Ruth	South Carolina	South Carolina Department of Natural Resources
Mark R. Boersen	Tennessee	Tennessee Wildlife Resources Agency
Ben Layton	Tennessee	Tennessee Wildlife Resources Agency
Clayton Wolf	Texas	Texas Parks and Wildlife Department
Bob Zaiglin	Texas	Harrison Interest LTD
W. Matt Knox	Virginia	Virginia Department of Game and Inland Fisheries
Jim Crum	West Virginia	West Virginia Department of Commerce, Labor and Environmental Resources

SOUTHEAST DEER STUDY GROUP AWARDS

Southeast Deer Study Group Career Achievement Award

1996 – Dr. Richard F. Harlow
1997 – Dr. Larry Marchinton
1998 – Dr. Harry Jacobson
1999 – Dr. David C. Guynn, Jr.
2000 – Joe Hamilton
2002 – Robert L. Downing

Southeast Deer Study Group Outstanding Student 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)

SUNDAY, FEBRUARY 23, 2003

1:00–6:00 p.m. Registration – Dome Lobby (Main Lobby)

3:00–5:00 p.m. Southeast Deer Study Group Committee Meeting – Crystal Room

7:00 p.m. Social/Dinner – Tennessee Aquarium (Name Badges are Required) – Buses begin leaving the Choo Choo at 6:30 p.m.

MONDAY, FEBRUARY 24, 2003

7:00 a.m.–5:00 p.m. Registration – Centennial Lobby

Opening Session – Keeping Deer Management on Track: Where are We Heading?

8:30 a.m. Welcome
Gary Myers – Director, Tennessee Wildlife Resources Agency
Bob Corker – Mayor, City of Chattanooga

8:45 a.m. Keynote Speaker – Dr. Gary Alt, Deer Management Section Supervisor – Pennsylvania Game Commission
The role of deer hunting providing an environmental/ecological service to society and its possible implications to the future of hunting.

Technical Session I

Moderator – David A. Osborn, University of Georgia

9:15 a.m. Age-specific activity rates of male white-tailed deer in southern Texas. Mickey W. Hellickson – King Ranch, Inc. and The Caesar Kleberg Wildlife Research Institute, Karl V. Miller and R. Larry Marchinton – University of Georgia, Charles A. DeYoung – Texas A&M University

9:35 a.m. *GPS-tracking collars for understanding factors affecting deer use of soybean fields and surrounding habitats. Kent A. Adams and Lisa I. Muller – University of Tennessee, Mark C. Conner – DuPont Agricultural Products, Frank van Manen – USGS, University of Tennessee, and Craig A. Harper – University of Tennessee

9:55 a.m. **Break**

10:15 a.m. *Effects of controlled dog hunting on the movements of white-tailed deer. Gino J. D'Angelo – University of Georgia, John C. Kilgo – U.S. Forest Service Southern Research Station, Christopher E. Comer, Cory D. Drennan, David A. Osborn and Karl V. Miller – University of Georgia

10:35 a.m. *Mortality and emigration of a white-tailed deer population in the Coastal Plain of South Carolina. David Rudisail – Clemson University, Jay Cantrell – Georgia Department of Natural Resources, Melissa Ide – Clemson University, Lee Taylor – Florida Fish and Wildlife Conservation Commission, Tim Fendley – Clemson University, Charles Ruth – South Carolina Department of Natural Resources, Rick Hemingway and Edsel Hemingway – Back Woods Quail Club

10:55 a.m. *Survivorship of neonatal white-tailed deer in the Coastal Plain of South Carolina. Lemuel W. Boykin and Tim Fendley – Clemson University, and Charles Ruth – South Carolina Department of Natural Resources

11:15 a.m. **Lunch (on your own)**

Technical Session II

Moderator – Dr. Karl V. Miller, University of Georgia

1:00 p.m. *Can restricting hunter access reduce the harvest of yearling male white-tailed deer? Tyler A. Campbell, Benjamin R. Laseter, and David A. Osborn – University of Georgia, W. Mark Ford – USDA Forest Service Northeastern Research Station, and Karl V. Miller – University of Georgia

1:20 p.m. Fate of male white-tailed deer in four Georgia counties with antler restriction regulations. Michael D. Van Brackle and J. Scott McDonald – Georgia Department of Natural Resources

1:40 p.m. An Adaptive Management Approach to Increase Deer Harvest. David S. deCalesta – State University of New York, Kevin McAleese – Sand County Foundation

2:00 p.m. *Use of antler-based, selective-harvest criteria to produce older-aged bucks: does the bandwagon have wheels? Bronson K. Strickland and Stephen Demarais – Mississippi State University, Larry Castle – Mississippi Department of Wildlife

2:20 p.m. *Opinions and preferences of Arkansas deer hunters towards statewide QDM. Bret A Collier and David G. Krementz – USGS Arkansas Cooperative Fish and Wildlife Research Unit

2:40 p.m. Laissez lesbons temps rouler – Louisiana Joins the Parade, David Moreland, Louisiana Department of Wildlife and Fisheries

3:00 p.m. **Break**

Technical Session III

Moderator – Jonathan Day, Kentucky Department of Fish and Wildlife

3:20 p.m. Determination of deer reproductive parameters on Ossabaw and Sapelo Islands, Georgia. John W. Bowers, Dan Forster, and Jim Simmons – Georgia Department of Natural Resources

3:40 p.m. *Genetic comparisons of white-tailed deer populations with different breeding dates in Mississippi and Louisiana. Jason A. Sumners, Stephen Demarais, and Alejandro P. Rooney – Mississippi State University, Ken Gee and Robert Gonzalez – Samuel Roberts Noble Foundation, Rodney Honeycutt – Texas A&M University, Randy W. DeYoung and Christopher Taylor – Mississippi State University

4:00 p.m. Antler growth of white-tailed deer in southern Texas. David G. Hewitt – The Caesar Kleberg Wildlife Research Institute, Mickey W. Hellickson – King Ranch, Inc. and The Caesar Kleberg Wildlife Research Institute, and Fred Bryant – The Caesar Kleberg Wildlife Research Institute

4:20 p.m. Comparative mating success of male white-tailed deer in relation to age and antler quality. James R. Ott (co-senior author) – Southwest Texas State University, Donnie Frels (co-senior author), William Armstrong, and Jason Carroll – Texas Parks and Wildlife Department, Randy DeYoung – Mississippi State University, Mark Mitchell – Texas Parks and Wildlife Department, Deirdre Honeycutt and Loren Skow – Texas A&M University, John Baccus – Southwest Texas State University, Rodney Honeycutt – Texas A&M University, and Robert Gonzalez – The Noble Foundation

4:40 p.m. Relationship of white-tailed deer, black bears, and oak mast on seven wildlife management areas in north Georgia. Kent E. Kammermeyer and David Gregory – Georgia Department of Natural Resources, and Tamara Terry – University of Georgia (present affiliation – West Virginia University)

5:00 p.m. **Dinner (on your own)**

7:00 p.m. **Shoot From The Hip** – Grand Central – Chronic Wasting Disease Management: Are We On the Right Track?
(*Note: No recording devices will be allowed into this event*)

TUESDAY, FEBRUARY 25, 2003

7:00 a.m. – noon Registration – Centennial Lobby

8:30 a.m. Announcements

Technical Session IV

Moderator – Dr. Craig A. Harper, The University of Tennessee

8:40 a.m. *White-tailed deer forage production in managed pine stands and summer food plots. Scott L. Edwards and Steve Demarais – Mississippi State University, Bobby Watkins – BASF Corporation, and Bronson K. Strickland – Mississippi State University

9:00 a.m. Evolving loblolly pine plantation establishment and the potential benefits to white-tailed deer habitat in MeadWestvaco's southern region. G. Chris Muckenfuss, David M. Bourgeois, and William M. Baughman – MeadWestvaco

9:20 a.m. *White-tailed deer browse preferences in clear-cuts in the central Appalachians of West Virginia. Benjamin R. Laseter, Tyler A. Campbell, David A. Osborn, and Karl V. Miller – The University of Georgia, and W. Mark Ford – USDA Forest Service

9:40 a.m. **Break**

Technical Session V

Moderator – Dr. Mark C. Conner, DuPont Agricultural Products

10:00 a.m. Do infrared-triggered still camera surveys give you the "real picture"? Kenneth L. Gee and John H. Holman – The Samuel Roberts Noble Foundation

10:20 a.m. Use of FLIR for wildlife survey: An evaluation of the technique. Susan Bernatas – Vision Air Research

10:40 a.m. Accuracy and precision of pellet group counts for estimating deer density. David S. deCalesta – State University of New York

11:00 a.m. A Long-standing error in deer aging? R. Larry Marchinton – University of Georgia, Kent E. Kammermeyer – Georgia Department of Natural Resources, Sara H. Schweitzer – University of Georgia, and Brian P. Murphy – Quality Deer Management Association

11:20 a.m. Improving accuracy and precision of aging techniques for white-tailed deer in southern Texas. Mickey W. Hellickson – King Ranch, Inc. and The Caesar Kleberg Wildlife Research Institute, David G. Hewitt and Fred C. Bryant – The Caesar Kleberg Wildlife Research Institute,

11:40 a.m. **Lunch (on your own)**

Technical Session VI

Moderator – Dr. W. Mark Ford, U.S. Forest Service

1:00 p.m. Pivot table – a tool for the deer manager. Randy L. Tucker – West Virginia Division of Natural Resources

1:20 p.m. The Noble Foundation drop-net system for capturing white-tailed deer – the next generation. Kenneth L. Gee and John H. Holman – The Samuel Roberts Noble Foundation, and Dewayne Crelia – RSI Communications

1:40 p.m. *Effectiveness of antagonists for reversal of Telazol/Xylazine immobilization in female white-tailed deer. Brad F. Miller, Lisa I. Muller, and Tom Dougherty – University of Tennessee, David O. Osborn, Karl V. Miller and Robert J. Warren – University of Georgia

2:00 p.m. Theory meets practice: a new tool for deer herd management in the twenty-first century. Patrick D. Keyser – MeadWestvaco Corporation, D. C. Guynn, Jr. and H. S. Hill, Jr. – Clemson University, W. Matt Knox – Virginia Department of Game & Inland Fisheries, and Steve R. Bloomer – USDA-Forest Service Land Between the Lakes

2:20 p.m. **Break**

Technical Session VII

Moderator – Mark R. Boersen, Tennessee Wildlife Resources Agency

2:40 p.m. *Effectiveness of targeted deer population control along roadways to reduce deer vehicle collisions. Christopher E. Comer, Gino J. D'Angelo, and Cory D. Drennan – University of Georgia, John C. Kilgo – USDA Forest Service Southern Research Station, and Karl V. Miller, University of Georgia

3:00 p.m. *The effect of fertility control on postnatal deer fawn mortality on Kiawah Island, South Carolina. Shane B. Roberts, James D. Jordan, and Robert J. Warren – University of Georgia

3:20 p.m. A preliminary assessment of hunt strategies to improve bowhunting as a management tool in urban areas. Howard K. Kilpatrick and Andrew M. LaBonte – Connecticut Department of Natural Resources, and Dr. John S. Barclay – University of Connecticut

3:40 p.m. Attitudes of Residents Toward a Managed Deer Hunting Program in the Vicinity of Suburban Parks. Philip C. Norman – Howard County Department of Recreation and Parks, and Jacob L. Bowman – University of Delaware

4:00 p.m. Farmers and Hunters Feeding the Hungry (FHFH) - State Funding Secured? C.J.Winand – Farmers and Hunters Feeding the Hungry

4:30 p.m. Southeast Deer Study Group Business Meeting (Technical Session Meeting Room)

6:00 p.m. Social Hour

7:00 p.m. Banquet (Name Badge Required) – Imperial Ballroom

*Indicates Student Paper

ABSTRACTS

MONDAY, FEBRUARY 24, 2003

Opening Session

8:45 a.m.

The role of deer hunting providing an environmental/ecological service to society and its possible implications to the future of hunting. Gary L. Alt – Pennsylvania Game Commission

The national decline in numbers and increase in average age of hunters is a cause of concern for the future of hunting. An improvement in public perceptions of hunting and hunters may help mitigate recruitment and retention losses and certainly should improve public acceptance necessary for managers to make needed changes. During the past four years Pennsylvania has made the most sweeping changes in deer management in its history. Public education, explaining the role of hunters providing a free environmental/ecological service-balancing the deer herd with its habitat, providing a healthy forest ecosystem for everyone, and balancing the sex and age distribution of the deer herd-has been a powerful message that has been very popular and made these changes possible.

Technical Session I

Moderator – David A. Osborn, University of Georgia

9:15 a.m.

Age-specific activity rates of male white-tailed deer in southern Texas. Mickey W. Hellickson – King Ranch, Inc. and The Caesar Kleberg Wildlife Research Institute, Karl V. Miller and R. Larry Marchinton – University of Georgia, and Charles A. DeYoung – Texas A&M University

Knowledge of the age-specific activity rates of male white-tailed deer is required for making informed management decisions as the popularity of non-traditional management programs increase. We combined radio-transmitting collars equipped with variable-pulse activity sensors with an automated telemetry system to quantify relative activity rates of 35 males in southern Texas during July 1993-October 1995. Males within 2.4-km of the data collection unit were monitored for 3 to 28 months. We categorized each of 470,443 1-min observations as inactive or active. Activity data were grouped into 2-hour intervals and divided into prerut, rut, postrut, spring, and summer periods and analyzed for age class and period effects. Males were active an average of 42.6% (±2.1 SE) of the time monitored. Seasonal and monthly diel activity patterns within years were variable. Activity levels were highest during January and September-October and lowest during March and April-August. Males were most active during the evening crepuscular period except during rut when diurnal activity was highest. Activity rates were highly variable, with some males >4 times as active as other males. Rates tended to decrease as

individuals increased in age. Activity rates were highest for young and middle-aged males and lowest for mature and old males. Activity appeared to be unrelated to forage quantity and quality, precipitation, estimated density, or antler and body size. We suggest that changes in activity rates among individuals and age classes may be explained in part, by social interactions, relative dominance, and the varying ability among males to assimilate into bachelor groups.

9:35 a.m.

***GPS-tracking collars for understanding factors affecting deer use of soybean fields and surrounding habitats.** Kent A. Adams and Lisa I. Muller – University of Tennessee, Mark C. Conner – DuPont Agricultural Products, Frank van Manen – USGS, University of Tennessee, and Craig A. Harper – University of Tennessee

The white-tailed deer (*Odocoileus virginianus*) is the leading species associated with wildlife damage to agriculture. Surrounding land use, habitat interspersion, and deer movement among habitats may affect feeding intensity in crop fields. Temporal changes in food availability, vegetation structure, and plant growth stage may also influence soybean use by deer. Fine-scale deer movements and use of surrounding habitat can only be determined with accurate animal locations. Therefore, we tracked 16 adult (> 1 year old) does in an agricultural area (Chesapeake Farms, Chestertown, MD) using GPS tracking collars (*GPS-2000 Lotek Engineering*) in 2001 (n = 10) and 2002 (n = 6). Collars obtained locations every two hours throughout the soybean growing season. Using Geographic Information Systems (GIS) we developed multiple spatial and temporal variables for deer locations in soybean fields related to adjacent cover and food sources, edge characteristics, and crop growth stage. Significant variables will be used to develop a predictive model to identify crop fields at the greatest risk for deer damage.

Understanding how deer utilize agricultural landscapes on a small scale will facilitate integrated management of deer populations and surrounding habitats. Reducing deer density is the best way to attenuate deer damage; however, significant depredation losses can occur even at low densities. Farmers may be able to modify land use practices around cash crops to reduce the impact of deer. We expect this research will promote sound deer management, profitable agriculture and quality hunting opportunities.

10:15 a.m.

***Effects of controlled dog hunting on the movements of white-tailed deer.** Gino J. D'Angelo – University of Georgia, John C. Kilgo – U.S. Forest Service Southern Research Station, Christopher E. Comer, Cory D. Drennan, David A. Osborn and Karl V. Miller – University of Georgia

Understanding the responses of white-tailed deer (*Odocoileus virginianus*) to short-term, intensive, controlled dog hunting may aid in designing more effective population management strategies. We examined the 24-hr diel movements of 13 radiocollared female deer exposed to dog hunting on the Savannah River Site near Aiken, SC, where regulated dog hunting has occurred since 1965. Individual hunt units (8,544-13,030 ac [3,458-5,273 ha]) were hunted only 1-2 days during the season. Hunts involved 91-200 stationary standers and 67-70 dog packs (3-6

hounds each and 1 handler per pack). We monitored deer at 1-hr intervals for 2-5 24-hr diel periods during the 10 days pre- and post hunt and on the hunt day. We compared diel home range size, rate of travel, and distance between extreme diel locations among 24-hr periods before, during, and after the hunts. Our preliminary results indicate that diel home range size on the hunt day was slightly greater (P = 0.064) than that of the pre- or post-hunt periods, as was distance between extreme diel locations (P = 0.023). However, rate of travel did not differ (P = 0.194) between the pre-, during, and post-hunt periods. Our results also indicated that deer used a greater proportion of their seasonal home ranges during the hunt. As the hunt progressed, deer had a tendency to remain stationary for longer periods, which may have reduced the efficacy of the hunt, but still made occasional extensive movements within their home ranges possibly due to repeated hunt-related disturbance.

10:35 a.m

***Mortality and emigration of a white-tailed deer population in the Coastal Plain of South Carolina.** David Rudisail – Clemson University, Jay Cantrell – Georgia Department of Natural Resources, Melissa Ide – Clemson University, Lee Taylor – Florida Fish and Wildlife Conservation Commission, Tim Fendley – Clemson University, Charles Ruth – South Carolina Department of Natural Resources, Rick Hemingway and Edsel Hemingway – Back Woods Quail Club

Managers need to know mortality and emigration rates of different sex and age classes in a white-tailed deer (*Odocoileus virginianus*) population for proper management. From 1998 to 2001, to determine sex and age specific mortality and emigration rates on the 5,670 ha Backwoods Quail Club in the Coastal Plain of South Carolina, we captured, radio-collared, and monitored 116 fawns (59 female, 57 male) and 46 yearlings (33 female, 13 male) until death or transmitter failure. Estimated Kaplan-Meier mortality and emigration rates among sex and age classes varied between years but were not significantly different and were therefore pooled. Male annual mortality rates were 0.28, 0.52, and 0.70 for fawn (0.5-1.5 yrs.), yearling (1.5-2.5 yrs.), and 2.5 (2.5-3.5 yrs.) year age classes, respectively. Female annual mortality rates were 0.18, 0.21, and 0.15 for fawn, yearling, and 2.5-year age classes, respectively. Causes of mortality included legal harvest, predation, deer-vehicle collisions, and unknown natural causes. Overall mortality was divided into hunting (55%) and non-hunting (45%). Hunting mortality that occurred off the property was 36% for males and 0% for females. Male fawn liberal and conservative emigration rates were 0.49 and 0.38; male yearling rates were 0.08 and 0.03, respectively. Several females of various ages made temporary movements from their usual ranges, however, only one emigrated. To estimate total losses from the on site population we combined deer lost to mortality and emigration from the property. Estimated Kaplan-Meier male loss rates were 0.50 for fawn, 0.54 for yearling, and 0.70 for 2.5 year-old age classes. Female loss rates were 0.18, 0.21, and 0.17 for fawn, yearling, and 2.5 year-old age classes, respectively.

10:55 a.m.

***Survivorship of neonatal white-tailed deer in the Coastal Plain of South Carolina.** Lemuel W. Boykin and Tim Fendley – Clemson University, and Charles Ruth – South Carolina Department of Natural Resources,

An understanding of fawn mortality is essential to proper management of white-tailed deer (*Odocoileus virginianus*). With the exception of one barrier island study, almost no data exists on the mortality of neonatal white-tailed deer fawns in the Coastal Plain of South Carolina. From May 5 – July 3, 2002, 8 female and 10 male fawns were captured on Back Woods Quail Club, a 5,670 ha commercial hunting club. Fawns were located by spotlighting from a vehicle and captured using dip nets, a cast net, and by hand. Captured fawns were weighed, sexed, measured for neck circumference, and hoof growth measurements were taken to estimate age. Fawns were fitted with an expandable radio-collar and monitored daily to observe mortality and movement. Mean weight, neck circumference, and age for males and females were 4,475 g (220 SE), 18.2 cm (0.4 SE), 12.3 days (2.3 SE), and 3,688 g (247 SE), 17.6 cm (0.3 SE), 10.2 days (1.4 SE), respectively. Two mortalities occurred during the first five months of the study. A bobcat (*Felis rufus*) killed one fawn (10 days old). The cause of death of a 117 day old fawn could not be determined. The Kaplan- Meier survival estimate was 0.85 (0.09 SE). Results of this study indicate a higher survival rate for neonatal fawns than previous southeastern studies utilizing similar capture techniques. The high observed survival rate could be due to the advanced age of fawns at capture and predator control through commercial furbearer harvest on the property. Additional fawns will be captured and monitored during 2003.

Technical Session II

Moderator – Dr. Karl V. Miller, University of Georgia

1:00 p.m.

***Can restricting hunter access reduce the harvest of yearling male white-tailed deer?** Tyler A. Campbell, Benjamin R. Laseter, and David A. Osborn – University of Georgia, W. Mark Ford – USDA Forest Service Northeastern Research Station, and Karl V. Miller – University of Georgia

Restricting hunter access during antlered buck seasons (e.g. locking property gates) has been suggested as a means to reduce harvest of male deer in efforts to increase male age structure. However, the success of this tool has not been demonstrated. Our objective was to evaluate the effectiveness of locking property gates (thereby allowing foot access only) to reduce the yearling male harvest on the 3,413 ha MeadWestvaco Wildlife and Ecosystem Research Forest, West Virginia. Due to limited hunter access, we hypothesized that philopatric yearling males would have higher survival rates than those that emigrated from the Research Forest onto adjacent lands where access was less restricted. We radio-monitored 32 yearling males from February 2000 through May 2002. Mean (SE) home ranges were 86.0 (5.8) ha. A majority of yearling males (60%) dispersed from their natal ranges, traveling a mean distance of 6 km (range 2 to 21 km). Philopatric and emigrating yearling male annual (1 June to 31 May) survival estimates of 0.22 and 0.21, respectively, did not differ (Z=1.03, P=0.303). Hunting was the primary source of mortality, accounting for 67% of philopatric and 92% of emigrating yearling male annual mortalities. Of 24 deer with known fates, only 3 (12.5%) remained on the Research Forest and survived to 2 years of age. Our data suggest that limiting hunter access alone is not an effective

tool to reduce the harvest of yearling males. The additions of educational campaigns or restricted harvest criteria are likely necessary to reduce the yearling male harvest.

1:20 p.m.

Fate of male white-tailed deer in four Georgia counties with antler restriction regulations. Michael D. Van Brackle and J. Scott McDonald – Georgia Department of Natural Resources

In 1993 Dooly County, Georgia became the first in the nation to have a county-wide antler restriction regulation for hunting white-tailed deer (*Odocoileus virginianus*). Cooperative research by the Georgia Department of Natural Resources (GADNR) and the University of Georgia found the regulation socially successful, but biological information was limited to voluntarily-reported, hunter-harvested deer. Other counties began requesting similar antler restrictions despite unanswered biological questions. Beginning in 1998 GADNR captured and radio-collared 135 bucks in two separate study areas under antler restriction regulations to investigate survival and mortality causes and distribution. Sixty-three (63) deer were collared in Dooly and Macon counties in the upper coastal plain where bucks must have a 15 inch minimum outside spread to be eligible for harvest. Seventy-two (72) deer were collared in Harris and Meriwether counties in the western piedmont where bucks must have at least 4 points on one side to be harvested legally. Deer were monitored at least once weekly September - January and bi-weekly February – August until death. Mortalities were categorized as legal harvest, illegal harvest, or non-harvest. Fifty-six (56) percent of deer captured as yearlings (1.5-years-old) in Dooly-Macon and 47% in Harris-Meriwether survived to 2.5 years-old. Through 1 November 2002 at least 26% and 22% of yearlings had survived to 3.5+ years-old in Dooly-Macon and Harris-Meriwether, respectively. We continue to monitor surviving deer. Up to date frequency distributions of legal harvest versus percentages of animals "lost" to illegal harvest, non-harvest factors, as well as emigration from the county will be discussed.

1:40 p.m.

An Adaptive Management Approach to Increase Deer Harvest. David S. deCalesta – State University of New York, and Kevin McAleese – Sand County Foundation

Deer have increased in eastern states since the 1920's, as has damage to forest regeneration, wildlife habitat, and herbaceous vegetation. The solution, increasing doe harvest, is thwarted by harvest regulations, poor access, and low hunter turnout and success rates. The Sand County Foundation developed an adaptive management approach (*Quality Hunting Ecology)* to reduce the ecological impact of deer damage. This approach is being applied on 74,000 acres of hardwood forest in north central Pennsylvania. A committee (Kinzua Quality Deer Cooperative) of foresters, biologists, researchers, hunters, and local community leaders developed a program to promote hunting to reduce deer impact while increasing deer quality. Program thrusts are: 1) education on deer quality, biology, and impacts; 2) increased hunter awareness of the program and access to hunting areas; 3) incentives for harvesting does; and, 4) monitoring deer density, pre-hunt herd composition, health and quality, hunter success and satisfaction, and impact of deer. The overwinter population has been 40% higher than recommended by the state game commission. Hunters favor buck rather than doe deer, and deer are in fair condition with few

large racks. The pre-hunt herd is heavily weighted to does with few bucks and a low fawn:doe ratio. Deer impact is moderately high. New regulations requiring 3 points or better for buck may result in a higher harvest of antlerless deer and will be monitored by the program, which runs for 10 years. Based on monitoring, the committee will adapt its strategy to reduce deer impact and improve deer quality.

2:00 p.m.

***Use of antler-based, selective-harvest criteria to produce older-aged bucks: does the bandwagon have wheels?** Bronson K. Strickland and Stephen Demarais – Mississippi State University, and Larry Castle – Mississippi Department of Wildlife

A common goal of antler-based, selective-harvest criteria is protection of younger-aged bucks to facilitate their recruitment into older age classes for harvest. Mississippi established a 4-total-point antler criterion in 1995 to protect a majority of 1.5-year bucks from harvest. We compared pre- and post-regulation buck harvest characteristics on state-operated wildlife management areas in three size categories: 5,000-10,000 acres (n = 10), 10,000-20,000 acres (n = 7), and >20,000 acres (n = 8). This regulation decreased ($P < 0.1$) the absolute harvest of 1.5-year bucks at all management unit sizes. During the post-regulation period, the percentage of 2.5, 3.5, and >4.5-year harvested bucks increased at all management unit sizes ($P < 0.1$). However, this increase in percentage of harvested >2.5-year bucks was due to the decrease in harvest of 1.5-year bucks. No biologically significant increase in the absolute harvest rate of bucks (bucks per 1,000 acres) >2.5 years was observed at any management unit size. Although it appears that antler-based, selective-harvest criteria designed to protect 1.5-year bucks failed to increase the harvest of older-aged bucks, we will address potentially confounding effects such as decreased hunter effort and hunter selection.

2:20 p.m.

***Opinions and preferences of Arkansas deer hunters towards statewide QDM.** Bret A Collier and David G. Krementz – USGS Arkansas Cooperative Fish and Wildlife Research Unit

Quality Deer Management (QDM) practices have become common across the southeastern United States. Several states have applied QDM techniques when planning regional harvest regulations. Only Arkansas uses QDM in planning at the statewide level. We conducted a pilot survey of licensed hunters in Arkansas to determine opinions and preferences for current white-tailed deer management. Of 7,500 hunters surveyed, 35% responded. Preliminary results show that 79% of respondents who hunt white-tailed deer in Arkansas think the Arkansas Game and Fish Commission (AGFC) is doing a good job of managing white-tailed deer. Seventy percent of respondents hunted on private lands (owned or leased). Fifty-six percent of respondents felt that the 3-point rule currently in use by the AGFC would increase their opportunity to harvest a "quality deer". We asked respondents to rank (1=highest, 8=lowest) their opinions regarding what constitutes a "quality deer". Responses with highest mean rank were 1) healthy deer (either buck or doe); mean rank= 2.91 (SE=0.06), 2) healthy buck (> 8 points); mean rank= 3.02 (SE=0.04), and 3) healthy buck (> 10 points); mean rank= 3.23 (SE=0.06). Forty-one percent of hunters stated that they would most like to see, as a result of the AGFC deer management plan,

an improvement in antler development/physical condition of the deer herd (more bucks reaching >2.5 years old). Forty-five percent of respondents felt expanded educational efforts for hunters on deer management for private lands is a needed management option. Based on preliminary results, hunter support for current QDM techniques in Arkansas is high.

2:40 p.m.

Laissez lesbons temps rouler- Louisiana Joins the Parade. David Moreland, Deer Program Manager, Louisiana Department of Wildlife and Fisheries

An experimental antler restriction program has been established in three parishes in south Louisiana for the 2002/03 hunting season. Only bucks with six or more points (points must be at least one inch long) or bucks with both spikes, three inches or less, can be legally harvested. Landowners and hunters within these three parishes asked the Commission to initiate this program in their area. A pre-season opinion and attitude survey regarding this six point program and program expectations has been sent to hunters, hunting clubs, and landowners. Once the season is over, another opinion and attitude survey concerning the perceived results and accomplishments of the program during the first year will be mailed out to the same group. Harvest data from hunting clubs and landowners will be collected and compared with data from previous years. Survey results, along with harvest data for this first year, will be presented.

Technical Session III

Moderator – Jonathan Day, Kentucky Department of Fish and Wildlife

3:20 p.m.

Determination of deer reproductive parameters on Ossabaw and Sapelo Islands, Georgia. John W. Bowers, Dan Forster, and Jim Simmons – Georgia Department of Natural Resources

In an effort to determine breeding periodicity, ovulation incidence, and parturition frequency for isolated white-tailed deer populations on Ossabaw and Sapelo Islands, ovaries and fetuses were collected from hunter-harvested adult does ($\geq$1.5 years of age) taken during a 3-day hunt in December from 1996-2000. Fetuses were aged immediately after removal using a Forestry Suppliers Fetus Scale for White-tailed Deer based on data by Hamilton et al. (1985). Ovaries for each doe were sectioned and corpora lutea of pregnancy counted following the procedure outlined by Cheatum (1949). Fetal age and corpora lutea of pregnancy data were used to determine breeding periodicity, frequency of fertilization, ovulation incidence, and estimated fawn production per doe on the respective islands. A total of 76 and 43 sets of ovaries, and 73 and 41 fetuses were collected from Ossabaw and Sapelo, respectively. Deer on Sapelo Island experienced an earlier average conception and parturition date in all 5 years than did Ossabaw, but the difference was only significant in 2 of those years (1997 and 1998, $P \leq 0.005$). Although the differences were not significant, Ossabaw experienced a higher frequency of fertilization (0.95), ovulation incidence (1.17) and estimated fawns produced per doe (1.09) than did Sapelo

(0.93, 1.07, and 0.97, respectively). Mitochondrial DNA assays indicate that Ossabaw and Sapelo possess unique genetic populations. Consideration of this genetic uniqueness and its interaction with environmental variables may explain the earlier conception and parturition dates experienced on Sapelo.

3:40 p.m.

***Genetic comparisons of white-tailed deer populations with different breeding dates in Mississippi and Louisiana.** Jason A. Sumners, Stephen Demarais, and Alejandro P. Rooney – Mississippi State University, Ken Gee and Robert Gonzalez – Samuel Roberts Noble Foundation, Rodney Honeycutt – Texas A&M University, Randy W. DeYoung and Christopher Taylor – Mississippi State University

The influence of genetics on the reproductive timing of white-tailed deer (Odocoileus virginianus) is not well understood. We compared genetic characteristics between pairs of populations in Mississippi and Louisiana in close geographic proximity (i.e. < 30 miles) but with large differences in breeding dates (i.e., 3-5 weeks). We genotyped 413 individuals collected during 1998-2002 using 17 DNA microsatellite markers. The mitochondrial control region was sequenced for 10 individuals from 11 of the 13 populations. Median breeding dates within population pairs differed ($P < 0.05$) by an average of 28 days. Mitochondrial DNA shows differences between populations within all the population pairs ($P < 0.05$) with Fst estimates ranging from 0.610 to 0.084. Microsatellite DNA shows differences between populations within 4 of 6 population pairs ($P<0.05$) with Fst estimates ranging from 0.054 to 0.007. Female philopatry results in population subdivision of the maternally-inherited mitochondrial DNA. Male-biased dispersal mixes nuclear DNA between populations and reduces differentiation between populations using microsatellite DNA. These results suggest that the maternal lineage present in local populations contributes to the observed differences in breeding dates.

4:00 p.m.

Antler growth of white-tailed deer in southern Texas. David G. Hewitt – The Caesar Kleberg Wildlife Research Institute, Mickey W. Hellickson – King Ranch, Inc. and The Caesar Kleberg Wildlife Research Institute, and Fred Bryant – The Caesar Kleberg Wildlife Research Institute

Nutrition, age, and genetics are the 3 factors most important in regulating antler growth. In southern Texas, nutrition is primarily affected by rainfall. April rainfall seem to influence antler growth most, however, it is unknown how widely this pattern applies. The relationship between yearling and mature buck antler size in free-ranging populations is unknown and could be used to design selective harvest programs to favor bucks with more antler growth potential. Since 1998, ≥1,500 bucks have been captured on 5 ranches in South Texas. All bucks were aged by tooth wear, measured to determine antler and body size, and marked for future identification. Average gross Boone and Crockett Club scores (GBC) of mature bucks (5.5+ years old) have ranged from 110 on 1 ranch in 2000 to 137 on another ranch in 1998. Preliminary results indicate antler characteristics peak at age 6.5 and decline in bucks ≥8.5 years old. At least 60 bucks captured as yearlings have been recaptured at older ages during subsequent years. At age

2.5 ($n \geq 50$), fork-antlered yearlings were larger in most characteristics than spike-antlered yearlings. At ages 3.5 ($n \geq 25$) and 4.5 ($n \geq 16$), fork-antlered yearlings had higher GBC scores and more antler points than spike-antlered yearlings. Data from ≥367 deer captured during 2002 will be added. However, caution is needed due to small sample sizes and ranch affects.

4:20 p.m.

Comparative mating success of male white-tailed deer in relation to age and antler quality. James R. Ott (co-senior author) – Southwest Texas State University, Donnie Frels (co-senior author), William Armstrong, and Jason Carroll – Texas Parks and Wildlife Department, Randy DeYoung – Mississippi State University, Mark Mitchell – Texas Parks and Wildlife Department, Deirdre Honeycutt and Loren Skow – Texas A&M University, John Baccus – Southwest Texas State University, Rodney Honeycutt – Texas A&M University, and Robert Gonzalez – The Noble Foundation

We conducted a replicated manipulative field experiment to determine single-season reproductive success of male white-tailed deer. The experiment tested the null hypothesis of equal mating success between mature (4.5 age classes) and yearling males and between mature males of high and low antler quality. The experiment was conducted within two 500 acre enclosures at Mason Mountain Wildlife Management Area, Mason, Texas at a sex ratio of 2.5 females/male and a density of 1 deer/7 acres. To establish the experimental populations, resident deer were removed (fall 1999) and enclosures stocked with selected WTD culled from 320 native deer trapped in central Texas during winter 1999. The following classes of WTD were introduced into the enclosures and allowed to acclimate until the 2001 breeding season: does 1.5 years old, bucks 3.5 years old of high and low antler quality, and 0.5 year old buck fawns. DNA samples were collected prior to release of all deer. Following the 2001 breeding season, deer were collected and adults and fetuses were typed at 13 microsatellite loci. The computer program "Cervus" followed by hand-matching was used to assign paternity. Reproductive success differed significantly between mature and yearling males and between antler quality classes of mature bucks. However, both yearling and low antler quality bucks sired offspring in each population. Additionally, multiple paternity of 16% to 28% was observed. Our results provide the first estimates of single-season male reproductive success and multiple paternity in field populations of WTD and raise questions regarding both the breeding ecology and management of WTD.

4:40 p.m.

Relationship of white-tailed deer, black bears, and oak mast on seven wildlife management areas in north Georgia. Kent E. Kammermeyer and David Gregory – Georgia Department of Natural Resources, and Tamara Terry – University of Georgia (present affiliation – West Virginia University)

Correlation analyses were used to test for relationships among black bear and white-tailed deer harvests, population parameters and indices, oak mast and associated hunter harvest on seven Wildlife Management Areas (totaling 167,000 acres) in the north Georgia Mountains. By pooling

these data and comparing separate data sets (containing a total of 18 variables) beginning in 1977 and continuing through 2002, we found several statistical relationships. First, mid-summer black bear bait station survey indices were positively correlated with number of bears harvested in the fall ($r = 0.79$, $P = 0.001$) suggesting that the index is a good indicator of bear population changes. Bear bait station data were negatively correlated with fall deer recruitment rate (number of fawns/adult doe in the hunter harvest) ($r = -0.85$, $P = 0.001$) and also with six-month old fawns harvested per year ($r = -0.58$, $P = 0.05$) suggesting higher bear populations coincided with lower fawn crops over the 25-year period. Bear harvest was also negatively correlated with deer recruitment rate ($r = -0.65$, $P = 0.001$) and with six-month old fawns harvested ($r = -0.51$, $P = 0.02$) further indicating that more bears equal fewer fawns. Deer recruitment was also correlated with the previous year's mast crop ($r = 0.66$, $P = 0.001$). These correlations suggest that deer recruitment is related to the previous year's mast crop and that lower deer recruitment is related to higher bear densities. A plausible mechanism for this correlation is increased bear predation on newborn deer fawns in late spring and summer especially following poor mast years. Mast production was also positively correlated with antlered buck harvest ($r = 0.72$, $P = 0.001$), but not with bear harvest ($r = -0.06$, $P = 0.50$). We suspect that when acorns were abundant, buck activity levels increased (especially related to the rut) while bear movements probably decreased due to reduced foraging activity.

TUESDAY, FEBRUARY 25, 2003

Technical Session IV

Moderator – Dr. Craig A. Harper, The University of Tennessee

8:40 a.m.

***White-tailed deer forage production in managed pine stands and summer food plots.**
Scott L. Edwards and Steve Demarais – Mississippi State University, Bobby Watkins – BASF Corporation, and Bronson K. Strickland – Mississippi State University

Nutritional habitat quality in Southeastern forests often is limited by a dense midstory and litter layer impeding the growth of high quality, shade-intolerant forage species. Management actions often are designed to improve the quality of natural forages and to supplement the natural forage base with food plots. A treatment including the selective herbicide ARSENAL® Applicators Concentrate, controlled burning, and fertilizer was applied to naturally regenerated, mature loblolly pine (*Pinus taeda*) stands in Mississippi during 1998-1999 to improve the natural forage base for white-tailed deer (*Odocoileus virginianus*). We compared the nutritional quality and abundance of selected forages produced in treated ($N = 4$) and untreated ($N = 4$) areas during years 2 and 3 post-treatment. We also measured quality and abundance of cowpeas (*Vigna unguiculata*) produced in food plots ($N = 4$). Treated pine stands produced 387 lbs/ac of forage biomass and 30 lbs/ac of digestible protein compared to untreated pine stands which produced 106 lbs/ac of forage biomass and 6 lbs/ac of digestible protein. Cowpea food plots produced 485 lbs/ac of forage biomass and 98 lbs/ac of digestible protein. Extrapolated over a 10-year economic planning horizon, the cost of producing digestible protein was $3.72/lb for treated pine

stands compared to $6.70/lb for cowpea food plots. Due to the cost-effective production of quality natural deer forages, this timber management regime can be used in conjunction with traditional food plots as a habitat management tool to improve nutritional habitat quality.

9:00 a.m.

Evolving loblolly pine plantation establishment and the potential benefits to white-tailed deer habitat in MeadWestvaco's southern region. G. Chris Muckenfuss, David M. Bourgeois, and William M. Baughman – MeadWestvaco

During the past decades, forest management practices have intensified to new levels. MeadWestvaco has taken a management approach that focuses on intensive timber management, while also maintaining and enhancing biological diversity. Landscape-scale management, based on MeadWestvaco's Ecosystem-Based Forestry, has created favorable habitat conditions for white-tailed deer and many other species. Over the past 15 years, this management approach, along with evolving technology, has been used in loblolly pine (*Pinus taeda)* plantation establishment. We examined pine plantation establishment, pine productivity, and potential impacts on white-tailed deer management using different site preparation treatments and release applications. We sampled the vegetative community on three sites during the spring, summer, and fall. Each site was established on beds spaced at twelve and fifteen-feet apart and sampled each year after establishment for a total of two years. Both twelve-and fifteen-foot beds received a combination of competition control herbicide treatments, (A-fall-after-bed broadcast treatment, a spring banded release treatment, and a second spring banded release treatment). A second year spring banded treatment on fifteen-foot beds provided competition control needed on the beds while maintaining plant diversity in the wide alley associated with the fifteen-foot beds. We present two years of vegetation data sampled from each treatment that shows species richness, diversity, and percent cover for each treatment. According to our data, pine plantations established on wider bed spacing would increase occurrence and prevalence of preferred foodstuffs in these plantations. When taken at a landscape level, these data suggest that white-tailed deer populations would tend to benefit from wider spaced beds due to an increase in desirable habitat conditions.

9:20 a.m.

***White-tailed deer browse preferences in clear-cuts in the central Appalachians of West Virginia.** Benjamin R. Laseter, Tyler A. Campbell, David A. Osborn, and Karl V. Miller – The University of Georgia, and W. Mark Ford – USDA Forest Service

Clear-cutting is a silviculturally appropriate method when regenerating commercially and ecologically valuable species, especially in the context of typically mast-poor northern hardwood stands of the central Appalachians. We sampled 9 clear-cut regeneration areas ≤ 5 years old on a site in the central Appalachians during August 2001 to compare availability and use of woody browse in clear-cuts. We used chi-square analysis to categorize species as high or low use based on the proportion of twigs browsed for a species relative to the proportion of twigs browsed for all species. A total of 731,993 twigs was recorded, 126,427 of those were browsed (17.3%). Nine of the twenty-one species included in the analysis were classified as high-use while twelve

were classified as low-use species relative to their availability. Based on relative use data, blackberry (*Rubus* spp.) and greenbrier (*Smilax* spp.) were the most important browse species in these regeneration areas, followed by pin cherry (*Prunus pensylvanica*), black cherry (*P. serotina*), and black birch (*Betula lenta*). Black cherry is highly valuable in both wildlife and commercial uses, while it is a relatively low preference browse species in areas of low deer density. Our observations of this low-preference species exhibiting elevated relative use on regeneration areas underscores the potentially significant ecological impacts associated with high deer density relative to ecological carrying capacity. Our data suggest that selective browsing by deer may affect abundance and species composition of woody plant communities and can have significant implications for simultaneously managing forest regeneration and deer density.

Technical Session V

Moderator – Dr. Mark C. Conner, DuPont Agricultural Products

10:00 a.m.

Do infrared-triggered still camera surveys give you the "real picture"? Kenneth L. Gee and John H. Holman – The Samuel Roberts Noble Foundation

In recent years, surveying white-tailed deer populations using infrared-triggered still cameras at bait stations has become increasingly popular. We evaluated the validity of 2 assumptions associated with using this technique. First, we examined if disturbance created by the infrared-triggered still camera and its associated flash had an effect on deer visitation to a bait station. Non-intrusive infrared-triggered video cameras were used to monitor bait stations 5 days prior to initiating a 10-day infrared-triggered still camera survey. We compared identifiable deer (bucks and marked does) captured by infrared-triggered video cameras with those captured during a still camera survey on a site-specific basis. At all sites (5), there were identifiable deer (2-8) captured on video during the pre-still camera survey that were not captured during the still camera survey, indicating that some avoidance was taking place. Population estimates derived using camera surveys are usually based on the assumption that bucks and does have their pictures taken at the same rate. We compared the number of pictures taken per identifiable buck with the number taken per marked doe during 4 infrared-triggered still camera surveys. In 2 out of 4 surveys, the number of pictures taken per marked doe was dramatically fewer (34% and 44%) than the number of pictures taken per identifiable buck. Herd composition and population estimates extrapolated using only the number of pictures taken per identifiable buck are of questionable accuracy.

10:20 a.m.

Use of FLIR for wildlife survey: An evaluation of the technique. Susan Bernatas – Vision Air Research

Airborne infrared, commonly called forward-looking infrared (FLIR), has been tested and is considered appropriate and state of the art for some wildlife survey applications. Today's

sensors have less than one degree Centigrade thermal resolution and a range of pixel configurations, lenses, and may be gimbaled and gyro-stabilitized. Some have video cameras within the gimbal to support additional analytical capabilities. The species can be identified and in where there is morphological difference, such as antlers and horns, the age and sex class could be determined. I reviewed the literature and conducted follow up interviews for information on the method and equipment used in the tests. I collected information on the flight parameters and skill sets of the workers. A range of species, habitats, equipment, and skill sets were found. Most articles use the term FLIR but do not provide sufficient information as to the type of system. Manufacturers change product lines or product name so determining the thermal resolution, pixel configuration and lenses used is often not possible. Poor results is generally related to use of the wrong sensor for the flight altitude and speed, lack of training in thermography, or lack of training in wildlife behavior and survey requirements. Good results were related to cross-training in thermography, an understanding of wildlife behavior and population surveys.

10:40 a.m.

Accuracy and precision of pellet group counts for estimating deer density. David S. deCalesta – State University of New York

Deer managers need a quick, inexpensive, and reliable method for estimating deer density within local landscapes. Pellet group counts are quick and inexpensive, but concerns about their accuracy and precision prevent many from using them. This work utilized two data sets to estimate accuracy and precision of pellet group counts. The first set, collected at the watershed landscape level, compared density estimates from pellet group counts with deer counted on a drive within a fenced, 1,063 acre enclosure. Pellet group data were collected by two novice and two expert observers on 4' radius plots at 100' intervals along parallel transects 1,000' apart. The second set, collected on a large landscape (74,000 acres), utilized pellet group counts from 24 grids of five 5,280' transects 1,000' apart with plots every100'. Differences among observers were tested with a *t*-test. Accuracy was computed by comparing results of pellet group counts with the drive count from the first data set. Precision was computed by dividing the 95% confidence interval of 10 randomly selected subsets of half of each data set by the estimated count. The drive counted 50.7 deer per square mile: experienced counters averaged 52.1, and inexperienced counters averaged 55.7. These differences were not significant and overall average was within 6.3% of drive estimate. Precision was $\pm$ 12%. Precision of estimates from the larger landscape was $\pm$ 6.2%. Precision increases with landscape size because more samples are taken. Managers should reconsider use of pellet group counts as accurate and precise estimates of deer density.

11:00 a.m.

A Long-standing error in deer aging? R. Larry Marchinton – University of Georgia, Kent E. Kammermeyer – Georgia Department of Natural Resources, Sara H. Schweitzer – University of Georgia, and Brian P. Murphy – Quality Deer Management Association

There is a growing perception among biologists [e.g., Gee et al., WSB 30(2), 2002], that aging white-tailed deer (Odocoileus virginianus) by tooth eruption and wear is unreliable. In attempting to understand variation in ages assigned by Georgia DNR biologists, we discovered an apparent error in the tooth wear description in The Wildlife Society's Techniques manual. This reference is widely used in university wildlife courses and by practicing biologists. The original research paper [Severinghaus, JWM 13(2), 1949] and more recent reports have clearly indicated that the dentine line of the second molar's lingual crests does not become wider than the enamel until 4½ years old. In the 2nd edition of the manual (1963), the tooth wear illustration showed it to be wider at 3½. This apparently was a simple labeling mistake, but it has been retained in all subsequent editions. The error results in under-aging most 4½-year-olds by a year. We suspect it would also result in under-aging many 3½-year-olds as 2½.

Recent research reports of high variability in biologists' ability to age deer suggests that many may be using the incorrect criteria. Has the error affected management decisions? We think it is likely. Significant errors in aging certainly could affect some models used to track deer populations. One example relates to Quality Deer Management. Because of this changing hunting and management ethic, biologists increasingly have a goal of moving more bucks into the 3½+ age classes. Several reasons have been suggested to account for difficulties in achieving this goal. Under-aging errors also may be a factor.

11:20 a.m.

Improving accuracy and precision of aging techniques for white-tailed deer in southern Texas. Mickey W. Hellickson – King Ranch, Inc. and The Caesar Kleberg Wildlife Research Institute, David G. Hewitt and Fred C. Bryant – The Caesar Kleberg Wildlife Research Institute,

Debates continue regarding the accuracy and precision of deer aging techniques. Several researchers have reported inefficiencies in current techniques, especially in southern latitudes. At present, aging techniques do not allow for accurate separation of deer into individual age classes. Our objectives are to: (1) randomly capture a minimum of 60 bucks and fawns annually on 6 areas (≥360 deer per year); (2) recapture fawns and yearling bucks at older ages to obtain known-age incisor teeth; and (3) harvest as many fawns and yearling bucks as possible at older ages to obtain known-age mandibles. Five areas in Webb County and 1 area in Kleberg County, Texas have been chosen as study sites. To date, ≥524 of 1,893 deer captured were of known age, with an I-2 incisor tooth extracted from 34 bucks ≥2.5 years old originally captured during 1998 as yearlings. Incisors were then sent to Matson's Laboratory to be aged by the cementum annuli technique. Excluding teeth with broken roots, Matson's Laboratory has correctly aged 19 of 19 1.5-year-old incisors, 6 of 7 2.5-year-old incisors, 3 of 3 3.5-year-old incisors, and 2 of 3 4.5-year-old incisors. During future years, deer will be recaptured at older ages to obtain additional incisor teeth. Known-age mandibles will also be obtained from deer "recaptured" through harvest. To date, 77 mandibles and 188 incisors from known-age deer have been collected. It is hoped that by the conclusion of the study, we will have developed a cementum annuli aging model specific to southern Texas that includes all age classes, as well as a sufficient set of known-age mandibles for refinement of the tooth replacement and wear aging technique.

Technical Session VI

Moderator – Dr. W. Mark Ford, U.S. Forest Service

1:00 p.m.

Pivot table – a tool for the deer manager. Randy L. Tucker – West Virginia Division of Natural Resources

Proper deer management requires the collection and analysis of biological data. Often a manager's interest is limited to the frequency, sum, average, or percent occurrence of an interest variable (e.g., weight, beam diameter, number of points, etc.). Summaries of these interest variables are usually stratified by categorical variables such as age, sex, location, or year. Numerous software packages exist to statistically compare biological data, but such packages often require the user to invest considerable training to become efficient in generating desired results. Conversely, a pivot table can quickly generate summaries with a minimal level of expertise.

A pivot table (a data reporting tool in MS Excel) is an interactive table that automatically extracts, organizes and summarizes your data. Graphic representations are easily produced from the results generated by the pivot table.

West Virginia has a mandatory game check-in system with stations located throughout the state. Deer biological data (sex, age, weight, beam diameter, number of points) were collected at selected stations from 1996 to 2001 for comparative purposes. A pivot table was used to calculate frequency, sum, average and percent occurrence of these interest variables. An interactive demonstration of the pivot table will be presented focusing on its utility in deer management.

1:20 p.m.

The Noble Foundation drop-net system for capturing white-tailed deer – the next generation. Kenneth L. Gee and John H. Holman – The Samuel Roberts Noble Foundation, and Dewayne Crelia – RSI Communications

At the 1999 SEDSG meeting in Fayetteville, Arkansas, we reported on a manpower-efficient drop-net system for capturing white-tailed deer. In an effort to improve trapping effectiveness and efficiency, we have modified that system to make its operation completely remote. Modifications to the field unit consist of a day/night weatherproof closed-circuit surveillance camera, an infrared light source, a video transmitter, an antenna tower with parabolic directional antenna, and a remote net release unit. The monitoring unit consists of an antenna tower with an omni-directional antenna, a video receiver, a television monitor, and a 2-way radio with keypad. These additions, coupled with the infrared-triggered monitoring unit described in Arkansas, eliminate the need for on-site monitoring and the associated disturbance. This drop-net system also facilitates around-the-clock monitoring and selective trapping. Twelve-volt deep cycle

batteries power the field unit, making it ideal for use in remote locations. We have successfully used this system at distances up to 2 miles. If a clear line-of-sight is maintained between the transmitting and receiving antennas, use at greater distances is possible. The fixed cost of improvements is $3,850. Cost of antenna towers at the trap site and receiving station is $10 per foot and varies with height required to achieve line-of-sight transmissions. Multiple sites may be monitored and trapped simultaneously with the addition of field units ($3,450).

1:40 p.m.

***Effectiveness of antagonists for reversal of Telazol/Xylazine immobilization in female white-tailed deer.** Brad F. Miller, Lisa I. Muller, and Tom Dougherty – University of Tennessee, David O. Osborn, Karl V. Miller and Robert J. Warren – University of Georgia

A combination of Telazol®/xylazine has been shown to be effective in the chemical immobilization of white-tailed deer (*Odocoileus virginianus*); however, the lengthy duration of immobilization may limit usefulness. From October to November 2002, 21 captive female deer were randomly assigned to an alpha$_2$ antagonist treatment to reverse xylazine effects. All deer were given 220 mg of Telazol® (4.5 ± 0.4 mg/kg) and 110 mg of xylazine (2.2 ± 0.2 mg/kg). Treatments were either 200 mg of tolazoline (4.0 ± 0.4 mg/kg), 11 mg of atipamezole (0.23 ± 0.02 mg/kg), or 15 mg of yohimbine (0.30 ± 0.02 mg/kg) injected half intravenously and half subcutaneously 45 minutes after the intramuscular Telazol®/xylazine injection. Ten additional deer were immobilized as before, half given tolazoline and a carrier (Dimethyl Sulfoxide), and the rest given tolazoline, 5 mg flumazenil (1mg flumazenil / 22 mg zolazepam), and the carrier. Flumazenil antagonizes the zolazepam portion of Telazol®. Mean times from antagonist injection until a deer raised its head were significantly longer for yohimbine (62.3 ± 42.7 min.) than either atipamezole (24.3 ± 17.1 min.) or tolazoline (21.3 ± 14.3 min.). Mean times from antagonist injection until standing were not significantly different among yohimbine (112.0 ± 56.4 min), atipamezole (89.7 ± 62.8 min), or tolazoline (52.6 ± 37.2 min). A sedation score based on behavioral criteria was assigned every 30 minutes for 5 hours. Based on sedation scores, tolazoline resulted in a faster and more complete reversal of immobilization. The addition of flumazenil did not affect recovery.

2:00 p.m.

Theory meets practice: a new tool for deer herd management in the twenty-first century. Patrick D. Keyser – MeadWestvaco Corporation, D. C. Guynn, Jr. and H. S. Hill, Jr – Clemson University, W. Matt Knox – Virginia Department of Game & Inland Fisheries, and Steve R. Bloemer – USDA-Forest Service Land Between the Lakes

Density-physical parameter relationships were assessed in nine exploited deer populations from across the Southeast that spanned a range of densities, physiographic provinces, and habitat qualities. All nine populations had large (265-1,036 animals/year), long-term (15-31 years) data sets from hunter-harvested deer. Population densities were estimated for each population by Downing and Wisconsin reconstructions. Dressed yearling male weights (BYWT), yearling antler measures (mean number of points or spike rate), and dressed yearling doe weight (DYWT) all were significantly related to density. To allow for more direct comparisons of these

relationships among populations, the models were converted to relative density models using an estimate of K-carrying capacity derived from recruitment models developed for these same populations. These relative density models did not change parameter estimates or significance levels, only the units of measure from deer/mi^2 to relative density (% of K). Slopes for both BYWT and DYWT ranged from -0.011 to -0.038, and from -0.14 to -0.46 for POINTS. The absolute differences in these slopes, however, were modest and did not seem to be entirely the result of habitat quality. Genetics and the range of relative densities for different populations may have contributed more to these differences. The models developed proved to be very sensitive to modest changes in relative density and, therefore, position on the stock-recruitment curve. Results indicate that the models developed here are directly applicable throughout the South, and are a potentially powerful tool for monitoring deer herds and their response to harvests.

Technical Session VII

Moderator – Mark R. Boersen, Tennessee Wildlife Resources Agency

2:40 p.m.

***Effectiveness of targeted deer population control along roadways to reduce deer vehicle collisions.** Christopher E. Comer, Gino J. D'Angelo, and Cory D. Drennan – University of Georgia, John C. Kilgo – USDA Forest Service Southern Research Station, and Karl V. Miller, University of Georgia

Nationwide, the significant rise in deer-vehicle collisions is a major threat to highway safety. At the Savannah River Site in Aiken, SC, site-wide reductions in the white-tailed deer population have not resulted in concomitant reductions in accidents. We implemented a program to determine if targeted deer control along roadways with a high incidence of deer-vehicle collisions could effectively reduce population density in areas directly adjacent to roadways, and, therefore, the incidence of collisions. Deer control activities were implemented at three levels of intensity in fall-winter 2001. We estimated relative population densities in four study areas before and after deer control activity by using infrared camera surveys, pellet counts, and track counts. Population density was indexed as a function of perpendicular distance from the target roadway to determine if lower population density can be created close to the road while higher population density is maintained as distance from the road increases. We also recorded the number of deer-vehicle collisions within the study areas. We observed significant population reductions in three study areas where control measures were implemented. In two study areas, no relationship existed between population reduction and distance from the roadway. However, the study area with the highest intensity of control showed greater population reduction closer to the roadway. The number of deer-vehicle collisions in the targeted road sections was lower through October 2002 than the corresponding period in 2001. Our results suggest that targeted removal of white-tailed deer in the vicinity of road sections of concern can reduce population density and accident frequency on those roads.

3:00 p.m.

***The effect of fertility control on postnatal deer fawn mortality on Kiawah Island, South Carolina.** Shane B. Roberts, James D. Jordan, and Robert J. Warren – University of Georgia

Kiawah Island is a 3,200-ha coastal barrier island with moderate levels of development located near Charleston, SC. A population-level experiment was conducted from 1999-2002 to test whether a remotely delivered, contragestation drug (prostaglandin) could be applied to this urban white-tailed deer (*Odocoileus virginianus*) herd. The island was divided into 2 areas (treated and control) with similar levels of housing development and deer numbers. Pregnancy rates were about 50% lower for does in the treated vs. control area during all 4 years. Spotlight surveys showed lower fawn:doe ratios in the treated vs. control area. Therefore, we designed this fawn mortality study to evaluate fawn survival between our treated and control areas. Our hypothesis was that compensatory mortality mechanisms could have increased postnatal fawn survival in the treated area, thereby negating the effects of fertility control. During April-June 2002, we captured and radio-collared 16 fawns in the treated area and 13 fawns in the control area to test this hypothesis. As of October 2002, fawn survival rates are 8% in the treated area compared to 19% in the control area, thus disproving the hypothesis. Cause of mortality was documented for 23 fawns and consisted of bobcat predation (n = 15), alligator predation (n = 3), deer-vehicle collision (n = 3), drowning (n = 1), and accidental injury (n = 1). Radio-telemetry data are currently being analyzed to evaluate spatial relationships between does and their fawns to determine possible effects on fawn survival. These data will be included in our presentation.

3:20 p.m.

A preliminary assessment of hunt strategies to improve bowhunting as a management tool in urban areas. Howard K. Kilpatrick and Andrew M. LaBonte – Connecticut Department of Natural Resources, and Dr. John S. Barclay – University of Connecticut

Firearms hunting often is limited as a deer management tool in urban and suburban areas due to firearms discharge ordinances or restrictive hunting laws. Many states are using bowhunters to manage overabundant deer populations in urban-suburban areas. Little information exists on the effectiveness of bowhunting as a deer management tool in developed areas. Our objectives were to evaluate the potential for bowhunting to manage deer populations in urban-suburban areas and identify important variables influencing hunt effectiveness using Program STELLA. Deer population size and herd composition was estimated using aerial deer surveys and spotlight counts. Reported harvest was obtained from mandatory kill report cards and natural mortality was determined from radio telemetry data. A comprehensive 9-page survey was mailed to bowhunters in a residential community with high deer densities to determine success rates, willingness to harvest additional deer, and interest in employing aggressive deer management strategies. Of 155 surveys mailed, 71% were completed and returned. We ran a sensitivity analysis using STELLA to determine which management strategies would contribute most to stabilizing deer population growth. Important variables identified during the analysis were compared to survey data to determine hunter willingness to employee these strategies. Management recommendations will be provided.

3:40 p.m.

Attitudes of Residents Toward a Managed Deer Hunting Program in the Vicinity of Suburban Parks. Philip C. Norman – Howard County Department of Recreation and Parks, and Jacob L. Bowman – University of Delaware

The Howard County Maryland Department of Recreation and Parks began a managed hunting program to control the population of White-tailed Deer (*Odocoileus virginianus*) in the Middle Patuxent Environmental Area (MPEA) in January 1998, adding David W. Force Park (DWFP) in 2000. Residents have always expressed a mixture of support and opposition to the hunts, but no survey had quantified the opinions of the nearby residents regarding hunting as a deer management tool or the managed hunt program and it impacts on their day-to-day lives. A Countywide survey conducted in 1996-97 investigated public opinion prior to the managed hunt program, so that a comparison of resident opinions subsequent to several years of hunting was deemed valuable. Surveys were sent to resident property owners near each park, and to a similar group of residents surrounding Blandair, a park known to have an over-abundant deer herd, but which is closed to hunting.

Our results demonstrated that residents in the vicinity of these parks supported managed hunting as an option, and, specifically, the managed hunting program used at MPEA (63% agree or strongly agree) and DWFP (75%). The residents around Blandair also favor managed hunting (65%). Strong support for the managed hunts is likely related to public involvement in the decision-making process and attitudes that the hunts are conducted safely. The managed hunting program of the Howard County Department of Recreation and Parks can serve as a model for other suburban areas experiencing problems related to overabundant deer.

4:00 p.m.

Farmers and Hunters Feeding the Hungry (FHFH) - State Funding Secured? C.J.Winand – Farmers and Hunters Feeding the Hungry

Due to the increasing numbers of deer being donated to feed the hungry in Maryland, volunteer funding sources have fell short on what is needed to accept all available deer donations throughout the year. In an unprecedented move, the Maryland Sportsmen's Association and Maryland DNR-Wildlife and Heritage Service proposed a $12 resident hunting license increase, including $1 from each license to be used by programs that provide donated deer to feed the hungry. The proposal became MD Senate Bill 599, and passed with surprisingly little opposition! It became apparently clear that the inclusion of $1 for use in providing donated venison to the hungry helped justify the increase!

According to Paul Peditto, Director of Maryland DNR's Wildlife and Heritage Service, "This bill will result in nearly $100,000 available for venison donation efforts in Maryland; while eliminating a major roadblock for hunters who want to take additional antlerless deer. We believe it sets a standard for other states with burgeoning deer populations. Hunters are providing a free public service, our deer populations will be reduced, participating butchers are

being paid for their service and the hungry are being fed. It's truly a winning combination for all those concerned!"

With the foundation laid in Maryland, FHFH is now working with 40 programs nationwide, challenging other states to include money for venison donations whenever a hunting license increase is proposed. The one and only goal of the national feeding ministry of FHFH is to provide donated venison and other big game to the hungry. To date, over 10 million servings have been distributed. More information about FHFH can be found at www.fhfh.org.

STATE NARRATIVES

ALABAMA

Few areas of comparable size rival Alabama when one considers the diversity of plant and animal species found within the state. From the Gulf Coast to the Cumberland Plateau, numerous physiographic regions divide the state. The Fall Line extends as an arc from the northwestern corner, southeastward across Alabama. This line separates the Coastal Plain to the south from the older upland provinces of the north and northeast. Elevation ranges from sea level to 2,407 feet above sea level. Several major rivers and their tributaries dissect the state, further adding to the diversity of habitats within Alabama.

Historically, deer were abundant in Alabama until unrestricted hunting and changes in land use reduced their numbers to only a few thousand animals in a couple of isolated locations by the early 1900's. The Game and Fish Department began cooperative restocking of suitable habitat as early as 1925 and with growing public support, the Department accelerated restocking efforts through the 1960's. By 1970, the State's deer population had increased to approximately 750,000 animals. Today's preseason population is estimated at 1.75 million deer.

All 67 counties have huntable numbers of deer and an open deer season. South and south central Alabama support the highest concentrations of deer and currently command the highest deer hunting lease fees. All counties have a 70-day gun deer season, allowing the harvest of one antlered buck per day. Prior to the 1998-99 hunting season, most areas were limited to 10 or less days of either-sex hunting during the general gun deer season. During this time 65-70% of the annual harvest were bucks. Age structure of harvested bucks is typically young, with the average age being less than 2 years old. For the 1998-99 deer season, either-sex opportunities were increased in most counties. Most of the southern half of the state had 15-30 days of either-sex hunting during the general gun season. During these either sex seasons, hunters were allowed to take one antlerless deer, in addition to one antlered buck, per day. The number of either-sex days was further increased in many counties during the 1999-2000 season, with some counties having as many as 45 days of either-sex hunting during the general gun season. With the additional opportunities for doe harvest, the total deer harvest for the 1999-2000 season was more closely balanced between bucks (55%) and does (45%).

Alabama's Deer Management Assistance Program (DMP) has been a very popular program since it's inception in 1984. By allowing the use of antlerless tags to meet harvest quotas, the DMP has given many landowners and hunting clubs the opportunity to manage their properties for better quality deer that the normal hunting seasons and bag limits could not offer. The DMP has been very successful in Alabama, but the need still exists for other options for managing deer herds on properties not enrolled in the program. In response to the continued need and desire for more opportunities to harvest antlerless deer, the lengths of either-sex season in many counties were increased for the 2000-2001 hunting season. For the first time, all 67 counties had an either-sex season during the general gun season. The length of these seasons ranged from 3 days to 75 days (the entire gun deer season). The bag limit was also raised to two deer a day, only one of which could be antlered, with no season limit applying to antlered or antlerless deer. As a result of the liberalized either-sex seasons, hunters harvested more does (243,180) than bucks (235,520) during the 2000-01 hunting season. These changes gave hunters in most of Alabama ample opportunity to harvest antlerless deer. This increase provides the framework many landowners, hunting clubs, etc. need to manage their properties as they wish, without having to enroll in the DMP. It is hoped this increase in either-sex hunting opportunities will help stabilize expanding deer herds and correct out of balance sex ratios found in many parts of the state. The liberal either-sex opportunities remained in place during the 2001-02 hunting season.

ARKANSAS

Arkansas is a very diverse state in terms of physical and biotic characteristics. In terms of topography, geographical substrate and dominant vegetation, the state is divided into two primary regions -- the Interior-Highlands (Ozark and Ouachita Mountain Natural Divisions) and the Lowlands (West Gulf Coastal Plain, Mississippi Alluvial Plain and Crowley's Ridge Natural Divisions). General vegetation in the Ozarks, Ouachitas, West Gulf Coastal Plain and Mississippi Alluvial Plain divisions is upland hardwood and bottomland hardwood, respectively. Crowley's Ridge is forested with upland and bottomland hardwood types. The state is still classed as rural with a total human population of less than 2.5 million. Eighty-nine percent of the total land base is privately owned.

Arkansas' deer herd declined drastically around the turn of the century, reaching a low of approximately 500 deer statewide in 1930. The Arkansas Game and Fish Commission began an aggressive deer restoration program in the 1920s, 1930s and 1940s, which included refuge establishment, trapping and restocking, strict enforcement of laws and regulations, and conservative bucks-only hunting seasons. These efforts resulted in a rapidly expanding deer herd. In 1950, the estimated deer herd was about 40,000. By 1972, the herd had grown to an estimated population of approximately 300,000 and today approaches 1,000,000. Legal harvest increased from 540 deer taken in 1939 to a record harvest of 194,687 in 1999.

Today, the herd is somewhat stable in some areas with slow growth continuing in other areas. Highest densities occur in the coastal plain region while the lowest occur in portions of the mountainous interior highlands. The highest percentage of trophy deer occurs in portions of the Delta region.

A ten-year Strategic Deer Management Plan was approved in 1999. Deer management units and zones are used for statewide herd management. Broadly, management efforts are directed toward increasing the female harvest and reducing the harvest of young males to improve buck-doe ratios and to also improve the buck age structure. Female harvest is accomplished with a liberal doe bag limit and special bonus doe permits. To reduce the harvest of young bucks Arkansas implemented a statewide antler restriction in 1998. Legal bucks must have at least three points on at least one antler. During the 1997-98 deer season in the West Gulf Coastal Plain Region, 1.5, 2.5, and 3.5 year old bucks made up 44%, 30%, and 9% of the buck harvest. By the 2001-02 season, those percentages had changed to 13%, 44%, and 25% respectively. Statewide, during the 1997-98 deer season, bucks, button bucks and does made up 55%, 8%, and 37% of the total harvest respectively. By the 2001-02 season, those percentages had changed to 40%, 10%, and 50% respectively. The statewide bag limit is 4 deer, no more than two of which may be bucks. Button bucks count toward the buck bag limit. Checking of deer in Arkansas is mandatory. Starting in 2001, a biological data collection initiative was implemented. During the 2001-02 season, biological data was collected from approximately 14% of the total harvest.

FLORIDA

Florida's topography, with the exception of coastal dunes and bluffs, is flat for a considerable distance inland from both the Atlantic and Gulf coasts. Hilly, rolling topography extends from the northwestern part of the state ranging southerly through the center of the peninsula and gradually diminishes in Highlands County near Avon Park.

Florida has 15 general vegetation types of which 13 are important to deer because of the amount and variety of deer food plants present. These types are grouped into major categories of vegetation considered important to deer: flatwoods (39.6%), pine-oak uplands (29.3%), swamps (8.6%), hammocks (6.7%), fresh water marshes (5.6%), prairies (5.2%), sand pine-scrub oak ridges (1.5%), and various mixtures or other types including tidal marsh (3.5%).

In the 1800's and early 1900's, hunting was a way of life to the pioneers as well as the Indians. The sale of hides made up much of their income. Fire hunting (with torches) was a common practice of taking animals in the early days. From the 1920's to 1930's, ranchers were losing large amounts of money due to the loss of cattle as a result of "Texas Cattle Fever". Pressure was placed on the legislature for a cattle fever tick eradication program, which included the slaughtering of deer because they were believed to be reservoirs for the disease. Between 1939 and 1941, an estimated 10,000 deer were killed. However, in some areas of the Southeast and on the Seminole Indian Reservation in south Florida, the cattle fever tick was eradicated without the slaughtering of deer. This raised serious doubts that the slaughter of deer was necessary. Possibly the most serious problem facing the white-tailed deer during this time in Florida history was the screw-worm. An acute increase in deer numbers was evident immediately following the eradication of the screw-worm fly by the U.S. Department of Agriculture in 1958.

Since the 1930's, Florida's white-tailed deer herd has increased dramatically as a direct result of enforcement of harvest restrictions and the screw-worm eradication. White-tailed deer harvest in Florida currently exceeds 100,000 animals annually, which is higher than estimates of the entire population during the early 1960's. Today, the Florida Game and Fresh Water Fish Commission allows either-sex archery hunting, has a lottery drawing for antlerless deer permits on most wildlife management areas, and issues antlerless deer permits to private lands in addition to two days of antlerless deer hunting during the gun season.

GEORGIA

Georgia's deer population (as estimated by computer models) has declined from 1.5 million in 1991-92 to 1.3 million in 1997-98. This decline has been by design due to steadily increasing opportunities for either-sex harvesting since the 1990-91 hunting season. The reduction of either-sex hunting opportunities during the early and mid 1980's resulted in a herd expansion that pushed the population from approximately 500,000 in 1981-82 to almost over million in 1986-87. This expansion continued though 1991-92, even though either-sex hunting opportunities were increased annually. The increased removal of does began to decrease the population in 1992-93 through the present.

Georgia's Piedmont physiographic province is the predominant physiographic province of the northern deer zone as well as the more productive habitat. Prior to the 1987-88 hunting season, the Piedmont province supported approximately 600,000 deer. This province also supports the most intense hunting pressure due to its proximity to the highest hunter populations. It was apparent that if the statewide population was to be reduced, the Piedmont was the appropriate starting place. To affect this reduction, the number of either-sex hunting days was increased and now stands at 28 in most counties. In addition, prior to the 1991-92 hunting season, the statewide bag limit was increased from three to five deer with no more than two antlered bucks. Either-sex days began increasing in the Coastal Plain province in the 1990-91 season and now stands at 53 in most counties. Due to the lower hunter numbers, a reduction in the Coastal Plain deer populations has not been easily accomplished.

As one might expect, this increase in either-sex hunting days and bag limit resulted in a steady increase in the harvest of does. Statewide, the percentage of does in the harvest has increased from an average of 27.4% annually during the 1980's to over 54% in 1997. As a result, the population has been reduced somewhat, but the 1990 goal of 1 million has not yet been reached.

These efforts to reduce the population are continuing; however, they have presented a new challenge not previously faced by wildlife agencies in the southeast B managing a declining deer population. The preferred method for the future would be to provide the same either-sex hunting opportunities and educate the hunters to use this framework to manage the deer populations on their respective hunting lands as needed. To accomplish such a goal will require some innovative educational programs, since most of the hunters are accustomed to harvesting deer from high deer populations.

KENTUCKY

The forest regions of Kentucky include the Mixed Mesophytic Forest, Western Mesophytic Forest and Southeastern Evergreen Forest. Divisions within the Mixed Mesophytic Forest include the Cumberland Mountains and the Cumberland and Allegheny plateaus. The Western Mesophytic Region divisions include the Bluegrass section, Hill section, Mississippian Plateau section, and the Mississippian Embayment. The Southeastern Evergreen Region includes the Mississippi Alluvial Plain on the western most tip of Kentucky.

Ninety-five percent of Kentucky is in private ownership. The average farm size is 185 acres and there are about 210,000 farm owners in the state. The best deer habitat is in the Western Mesophytic Forest, which comprises the western two thirds of the state.

Kentucky's deer restoration program began in 1948, but most stocking occurred during the 1960 to 1970 period. The deer population has risen from an estimated 2,000 in 1945 to a current prepartum number of 410,000. Deer harvests have reached new records for each of the past 14 years. The deer herd is managed on a doe day system and female deer make up 36 percent of the total harvest. Almost all antlerless harvest come from the Western Mesophytic Region of the state. Harvests declined in 1992 and 1993, primarily due to herds being reduced by heavy doe hunting. Deer herds are continuing to be allowed to grow in the Mixed Mesophytic Region and have yet to reach carrying capacity of the habitat.

The largest problem in managing Kentucky's deer herd is conflict with agricultural interests. Deer herds in the western two-thirds of the state are currently being held at levels well below carrying capacity of the habitat. Herds in this region cannot be increased because of landowner intolerance of deer damage. This will remain the case unless attitudes change or leasing makes deer more valuable to landowners.

LOUISIANA

Mention Louisiana and most non-residents conjure up thoughts of swamps, bayous and alligators. While Louisiana has its share of these, the Bayou State's environment is a little more diverse than what some people imagine. In his book *Louisiana's Wildlife Inventory*, Dr. Lyle St. Amant lists seven ecological divisions of the state. These areas include: the Lower Mississippi-Atchafalaya Alluvial Plain; Upper Mississippi, Tensas, and Ouachita, and Red River Alluvial Plains; Northwest Louisiana Uplands; Southeast Louisiana Terrace Lands; Southwest Louisiana Terrace Lands; and Coastal Marshes. Deer can be found in all of these divisions today, and the present population is approaching one million animals.

The Louisiana deer story is similar to that of most other states. A once thriving deer population was reduced by a combination of habitat loss and unregulated hunting. Deer could only be found in remote swamp and bottomland areas and on a few protected refuges. This occurred between 1880 and 1925.

The Louisiana Department of Wildlife and Fisheries began a deer trapping and relocation program in the fifties. The program began slowly but, by 1970 deer had become established throughout the state. The restoration program was a success, and during the 1970s, deer herds continued to increase, resulting in a need for sound deer management programs. In the late 70s, LDWF began to assist hunting clubs and landowners with their deer management problems and needs.

The Wildlife Division of LDWF is divided into seven game districts. The wildlife biologists in each district are responsible for management of the herds on public and private lands within their district. The Department's wildlife management areas provide excellent deer hunting opportunities due to sound herd and habitat management. During the 1993 either-sex gun season on these WMA's, there were 38,335 hunter efforts, resulting in a harvest of 3,016 deer (1 deer per 12 hunter efforts). These areas are also open for additional days of deer hunting with bow and arrow, black powder, and bucks-only hunting with modern firearms. The Deer Management Assistance Program (DMAP) is available to hunting clubs and private landowners who desire a higher level of deer management. In 1993, nine hundred ninety-four cooperators enrolled 1,942,777 acres of land in this program. This generated $123,079 for the Department from enrollment fees.

While the success of the wildlife management programs and DMAP have demonstrated that proper deer management is effective, there is still more work to be accomplished. An example of this is the need for further development of either-sex hunting opportunities. Progress is being made along these lines because, in 1994, a regulation was passed that allows hunters to harvest one antlerless deer and one antlered buck per day on doe days. The daily limit had been one deer per day. It is hoped that this regulation will encourage hunters to shoot a doe since they would often pass them up in hope of seeing and shooting a buck.

MARYLAND

Maryland, often referred to as "America in Miniature", has four physiographic regions - the Coastal Plain, Piedmont, Ridge & Valley, and the Appalachian Plateau. The land uses vary from northern hardwood timber in the extreme western portion of the state to the loblolly pine forest in the Chesapeake Bay and coastal region. Central, southern and eastern sections of the state support agricultural uses. Forests cover 43 percent of the state with agricultural lands comprising 38 percent.

Maryland's deer population survived only in the remote mountain sections by 1900. Habitat destruction and uncontrolled hunting had eliminated deer from the rest of the state. Restocking deer began in the early 1900s when deer from Pennsylvania, Michigan and Wisconsin were released. Deer restocking accelerated after World War II with deer from the Aberdeen Proving Grounds (Maryland) being introduced throughout the state.

Western Maryland experienced its first deer season in the 1920s. With mandatory check stations instituted in 1931 thirty-one deer were reported taken in the Western Maryland counties of Allegany and Garrett. The first antlerless season was held in 1957 and by 1960 deer hunting occurred state-wide (except for Montgomery County).

Maryland's current deer seasons are as follows: Archery - Middle of September through end of January; Modern Firearm - Saturday after Thanksgiving through second Saturday of December ; Muzzleloader - three days in late October and two weeks covering late December and early January. One Saturday in mid-November is set aside for youth firearm deer hunting only. Antlerless permits are required only in three western counties. Antlerless permits are issued in these counties due to intense hunting pressure with the potential of an extremely high harvest.

Maryland's human population totals 5.1 million. Fifteen percent of the state is classified as development. This developed section of Maryland has expanded by 38 percent during the past 30 years. This section contains the most rapidly growing deer population. Conflicts between people and deer continue to proliferate within this area.

Maryland recently completed a statewide deer plan. The primary goal is to maintain healthy deer populations as a valuable component of Maryland's ecosystems, stabilize deer population numbers throughout the state, then gradually adjust populations to bring them into acceptable ranges for the social and environmental conditions of individual communities. The primary strategies are as follows: make deer population management decisions, including target population levels and selection of management options, based upon local management units, in consultation with local communities; directly support research and expanded application of non-lethal deer control methods, including birth control and behavior modification; change Maryland's hunting laws to give the Department greater flexibility in increasing deer bag limits, particularly antlerless deer; establish and use procedures that can safely and efficiently remove deer from specific areas through means other than regulated hunting.

MISSISSIPPI

As in most southeastern states, the historically abundant white-tailed deer population in Mississippi was virtually extirpated by the early 1900's. The absence of a regulatory agency with statewide authority to make and enforce state game laws compounded population declines which resulted from habitat changes associated with widespread deforestation. In 1929 Aldo Leopold reported isolated remnant deer herds existing only in limited portions of the Mississippi Delta and in the Pearl and Pascagoula River basins. This report was the catalyst which prompted the 1932 establishment of the Mississippi Game and Fish Commission by the state legislature. A successful deer restoration project, financed principally by federal funding through the Pittman-Robertson Act, was underway by 1940. Deer were initially imported from North Carolina, Kentucky, Texas, Alabama, and Mexico to refuges in Mississippi. With protection and public support, these populations flourished on Leaf River Refuge in the southeastern part of the state and Upper Sardis Refuge in north-central Mississippi. Hundreds of deer from these two sites were translocated throughout the state for restocking purposes.

The deforestation of the early 20th Century occurred throughout the eight physiographic regions of Mississippi. Rural, subsistence-level agriculture briefly became the dominant land use practice. But, subsequent second-growth forests created ideal conditions for exponential herd expansion. Currently, forested lands cover 18.6 million acres, or 62 percent, of the state's total land area. Major forest types include upland hardwood, bottomland hardwood, mixed-pine hardwood, and pine. The pine component is dominated by even-aged loblolly stands which are managed at varying degrees of intensity. Landowner objectives dictate management levels, with industrial landowners practicing the most intensive management. These practices range from natural regeneration of harvested stands all the way to mechanically and chemically site-prepared stands which are planted in bedded rows with genetically superior seedlings at excessive stocking rates and followed by additional herbicide treatments, fertilization, and pruning to release the crop trees. Browse abundance and species diversity decline as management level intensity increases. This perceived decline in habitat quality has caused criticism from both wildlife managers and hunters who lease the more intensively managed industrial and corporate landholdings. Private and public forest ownership in the state are 90% and 10%, respectively. In private ownership nearly two-thirds is individually owned, while industrial and corporate interests control the remainder.

The ability to manage an animal as adaptable as the white-tailed deer required information about species ecology and hunter objectives in all physiographic regions of the state. Baseline physiological indicators which allowed evaluation of population and habitat inter-relationships were unknown. Through a cooperative research program with Mississippi State University in 1976, the Mississippi Department of Wildlife, Fisheries and Parks gained information which provided biologists with the ability to evaluate population density relative to carrying capacity, using condition indicators rather than population estimates or browse surveys. This Cooperative Deer Management Assistance Program (DMAP) directly involved hunters in management through the collection of biological data. The interpretation of these data, in consultation with a biologist, is the guiding principle of DMAP. From a two-county pilot project in its first year, DMAP grew steadily until participation peaked in 1994 at almost 1,200 cooperators with over 2.7 million acres under management. Liberalized season structure and bag limits during the mid-

1990's allowed land managers the flexibility to meet harvest objectives outside DMAP guidelines, which resulted in a decline in DMAP participation. Current enrollment includes 850 cooperators with 1.9 million acres. The philosophy of the technical staff continues to be that it is imperative to provide sufficient harvest opportunity on private lands to allow accomplishment of individual management objectives.

Regulatory changes of significance in the last decade include the liberalization of antlerless hunting opportunity and the implementation of a "four point law" in the 1995-96 hunting season. Prior to these changes antlerless deer comprised only about 30% of the total harvest, while the percentage of 1½ year old bucks made up over 60% of the antlered buck harvest. As a result of these regulatory changes, statewide sex ratios have stabilized with equal numbers of bucks and does in the harvest. Concurrently, the percentage of 1½ year old bucks in the antlered buck harvest has improved to only about 20%.

Current issues that might impact existing management objectives and redirect future regulatory and management priorities include supplemental feeding and baiting, because of potential associated disease and ethical considerations. In addition, issues related to fencing may create dissension among hunters due to concerns about resource allocation and privatization of a public resource, and among both hunters and non-hunters about fair chase in sport hunting.

The continued success of the deer management program in Mississippi is related to the timely acquisition of adequate statewide harvest data which can be evaluated at the county level. Plans to implement a telephone-based harvest reporting and bag limit compliance system which can provide these data are in progress.

MISSOURI

Missouri has five distinct physiographic provinces. The Glaciated Plains, characterized by rolling hills and deep glacial till and loess soils, lies north of the Missouri River. Extant vegetation includes some native prairie and deciduous forest; however, much of the region has been altered by farming. The Ozark Plateau, located in southern Missouri, has thin soils and rocky terrain. Most of the area is forested with an oak-hickory cover type dominating and shortleaf pine common in the southeastern portions. Between these 2 largest provinces lie the Ozark Border and Osage Plain transition provinces. The Ozark Border is similar to the Ozark Plateau, however, its soils are richer and more productive. The Osage Plains is chiefly prairie in nature; however, most native prairie has been converted to cool season pastures. The Mississippi Lowland province, located in southeastern Missouri, is best described as a broad flat alluvial plain under intensive agriculture, with a small amount of bottomland hardwood forest.

Ninety-three percent of Missouri is in private ownership. Average farm size ranges from 183 acres in the Ozark Border to 484 acres in the Mississippi Lowland. The amount of land in crops varies from a low of 8% in the Ozark Plateau to 83% in the Mississippi Lowland. Leasing for hunting rights is uncommon but increasing throughout Missouri. Generally the better deer habitat occurs north of the Missouri River, although portions of the Ozark Border and Glaciated Plains offer excellent habitat. Deer densities, growth potential and reproductive rates are highest in these 3 regions. Deer abundance in the Ozark Plateau varies with habitat and hunter densities. Deer numbers are typically lower in the southeast Ozarks where productivity is lower and illegal harvest is high.

The history of deer in Missouri is similar to that in most Midwestern states. Prior to settlement, deer were abundant but populations declined rapidly from habitat loss and unrestricted harvest. In 1925 it is estimated there were only 395 deer left in the state. An aggressive program of public education, enforcement, reintroductions, and land acquisitions was successful in restoring the deer and in 1944 the first modern day deer season was held. It was a bucks-only season in a limited number of Ozark counties and 535 deer were taken. In 1951, the first any-deer season was held. Other major changes include the implementation of deer management units in 1970, an any deer quota system in 1975, and a bonus antlerless-only permit system in 1987.

Deer herd management in Missouri is accomplished on a unit basis. Quotas of permits that allow the harvest of antlerless deer are established annually for each of 57 management units. Antlered-only permits are unlimited. Quotas are based on population modeling, harvest statistics from mandatory check-ins, conservation agents' perceptions of populations and crop damage reports. Stabilization of deer populations in most parts of Missouri is desirable and emphasis in recent years has been on increasing doe harvests through liberal quotas.

NORTH CAROLINA

North Carolina has a diversity of habitat types ranging from the sounds and marshes of the Outer Banks coastal region to the highest mountains in the eastern United States. Regional habitat diversity also is evident in the state's 3 physiographic provinces. The lower Atlantic Coastal Plain region is comprised of marsh, flatwoods, and both lowland and upland swamps (pocosins). Many of the wetlands in this area have been drained and converted to pine forests and farms. The upper Coastal Plain is one of the major agricultural areas of the state. Primary forest types of the Coastal Plain are loblolly pine, oak-gum cypress, oak-hickory, oak-pine, pond pine, and longleaf pine. The Piedmont region is characterized by rolling hills and smaller farms and woodlots. Major forest types include oak-hickory, loblolly pine, oak-pine, Virginia pine, and shortleaf pine. The Appalachian Mountain region consists primarily of rugged mountains with shallow rocky soils in the highest areas to some fertile bottomlands and valleys in the lower elevations. Principal forest types of this region include oak-hickory, oak-pine, chestnut oak, white pine-hemlock, maple-beech-birch, and Virginia pine.

The history of deer management in North Carolina is similar to the other southeastern states. In the early 1900's it was estimated that only 10,000 deer were in the state. A buck law was established in 1927. The period from 1930 to 1960 was characterized by the restoration and recovery of deer herds. During this "buck management" phase, deer herds responded dramatically to the restoration efforts and protection they were afforded. By 1960, the statewide population was 250,000 animals and almost 30,000 were harvested. Either-sex seasons were established in 1959. The period of 1960 to 1980 was characterized by the "doe management" phase. Most management strategies involved the concept of trying to get more does in the harvest. Very little concern was given to the buck segment of the herds. The period since 1980 has been characterized by the "herd" management phase. Herd and habitat management schemes were established which attempted to make better utilization of both sexes and at the same time improve the quality of the deer harvested and the condition of the habitats. A Deer Management Assistance Program was initiated in 1981 to offer the concept of quality deer management to landowners and hunting clubs.

The 2001 pre-season population estimate was 1.1 million deer. During the 2001-02 hunting season, either-sex regulations allowed 6 does to be taken throughout the entire season (September-December). In the Coastal Plain, densities and buck harvests have stabilized somewhat and there have been accompanying increases in doe harvests (almost 50% of the total in many counties). Piedmont herds are being affected by urbanization, and conflicts between deer and people are becoming more evident. Work is ongoing to evaluate techniques for increasing antlerless harvests without adding to existing conflicts between hunters and landowners. Herds are continuing to increase in the good habitat of the foothills area of the upper Piedmont and lower Mountain regions. Mountain populations are relatively stable and either-sex hunting is being incorporated gradually into those areas where herds are sensitive to severe environmental conditions and fluctuations in high energy foods like acorns occur.

OKLAHOMA

Oklahoma's deer range provides sportsmen with varying topography, several different habitat types, and two species of deer to hunt. White-tailed deer occur throughout the entire state, while mule deer inhabit the panhandle and northwest counties.

Oklahoma slopes southeastward from an elevation of 5,000 ft at Black Mesa in the panhandle to 327 ft on the Red River in the southeastern corner. Topography is generally flat or rolling, exceptions being the Wichita Mountains in the southwest, the Arbuckle Mountains in the south-central section, and the Ouachita, Boston, and Ozark Mountains along the eastern border. Average annual precipitation ranges from a low of 15" in the panhandle to 45" in the southeast part of the state.

Four major forest types cover approximately 20% of the state. The most extensive forest type is the post oak-blackjack oak type, which occurs throughout the central region. Oak-hickory and oak-pine forests cover much of the eastern portion of the state. The pinon-juniper type is found only in the Black Mesa area of the panhandle, and represents an eastern extension of the Rocky Mountain flora. The remainder of the state is dominated by grasslands with tallgrass, mixed grass and shortgrass prairies occurring east to west. Sand sage and shinnery oak grasslands are common along the western border and in the panhandle.

A highly successful restocking program helped Oklahoma's deer herd rebound from a low of 500 animals in 1916, to an estimated 325,000 animals today. Antlerless deer harvests were implemented in the mid-1970's under a zoned permit system. In 1982, this system was dropped in favor of a system which offers varying numbers of antlerless days depending on the harvest zone. Initially, sportsmen had difficulty accepting the idea of harvesting does, but harvest results clearly show that antlerless hunting has benefited Oklahoma deer hunters. The deer harvest trend during the past decade has seen a remarkable increase of 146%, including a 121% increase in the antlered buck harvest.

Perhaps the greatest challenge in managing Oklahoma's deer herd is that over 95% of the land is privately owned. Coupled with this is the fact that much of this land is used for an agriculture-based economy which is not always compatible with deer production. Deer habitat is especially scarce in the southwest portion of the state and in many areas of eastern Oklahoma, where forest succession has advanced to the point of greatly reduced carrying capacity. A short nine-day gun season can also pose management problems if poor weather discourages participation of gun hunters, who typically account for 75% of the total harvest. Despite these obstacles, deer hunters have enjoyed record harvests four of the past five years.

SOUTH CAROLINA

South Carolina's deer herd reached an extremely low point around the turn of the century with deer becoming essentially non-existent in the piedmont and mountains (the upstate). Fortunately there were good residual populations associated with the major rivers in the coastal plain. Restoration efforts began in the 1950's and involved the capture and relocation of approximately 314 deer from the coastal plain to the upstate. All restocking efforts utilized native deer. Over the last 20 years, changes in agriculture and more importantly, changes in forestry related activities have created exceptional deer habitat in most parts of the state. Currently, huntable populations exist in all 46 counties and many areas have over 50 deer per square mile and annual harvest rates of around 20 deer per square mile.

Deer hunting in South Carolina is characterized by two distinct season frameworks. The coastal plain encompasses 28 counties where the deer season begins on August 15, September 1, or September 15 and continues until January 1. In this region, roughly two-thirds of the state, dog hunting is allowed; however the activity is declining significantly. Baiting is allowed in the coastal plain and although there are short buck only archery seasons in a few coastal plain Game Zones, special weapons seasons are generally lacking. In the 18 county piedmont and mountains deer season begins on September 15 and October 1 respectively and ends on January 1. There are liberal archery and/or primitive weapons seasons in all areas. Neither dog hunting or baiting is allowed in the upstate.

With the exception of Wildlife Management Areas, season dates statewide are set in statute. In the coastal plain methods of taking deer are set in statute as are bag limits for antlered deer. However, many coastal Game Zones have no season or daily limit on antlered deer. In the upstate and on Wildlife Management Areas, bag limits and methods of take are set by SCDNR regulation. SCDNR has statewide authority with respect to the harvest of antlerless deer and as deer populations have increased, programs have provided more opportunity for hunters to harvest antlerless deer on all lands. Currently, all parts of the state have designated either sex days and typically every Friday and Saturday from October 1 to Thanksgiving are either sex days with additional days near the end of the season.

SCDNR offers two optional antlerless deer tag programs for the entire state. The Antlerless Deer Quota Program (ADQP) began in 1965 and continues today as a means for private landowners/lessees to harvest antlerless deer. With the ADQP, qualified applicants are issued an antlerless deer quota based on the density and condition of the local deer population, the size of the tract of land, and the recreational and agricultural objectives of the property owner. Currently, approximately 2,000 properties encompassing over 4.2 million acres participate in the ADQP. In 1994 a second program, the Individual Antlerless Deer Tag Program was implemented. Unlike the ADQP which is property based, this program is hunter based and allows anyone to purchase up to 4 antlerless deer tags which can be used on any property they are permitted to hunt (including many WMA's). Individual tags cannot be used on properties already enrolled in the ADQP. Currently, over 46,000 hunters participate in the Individual Tag Program. With the liberalization of either sex days and the availability of two optional tag programs South Carolina deer hunters now harvest nearly equal numbers of bucks and does.

Department objectives continue to include stabilization (reduction in some areas) of the deer population and increased efforts to moderate the social costs of a high deer population, e.g. agricultural depredation, deer vehicle collisions, urban deer situations, etc.

TENNESSEE

Tennessee is comprised of 8 distinct physiographic regions, ranging from mountains in the east to wide swampy river bottoms in the west. Elevations range from 200 feet above sea level along the Mississippi River in the west to 6,642 feet at Clingman's Dome in the Great Smoky Mountains. The wide range in elevations, topography, and soil classifications has resulted in a complex diversity of forest types, vegetation, and productivity. Consequently, deer habitat quality is very diverse across the state. Tennessee's most abundant deer herds are found in the highly interspersed forested and agricultural areas of the middle and western portions of the state, from which approximately 75% of the harvest is taken. The deer herds of the Cumberland Plateau and eastward, although smaller than those in the western part of the state, have showed continued growth. The relatively low habitat quality in the mountainous far eastern portion of the state will likely inhibit the deer population from reaching the densities realized in middle and western Tennessee.

Tennessee is blessed with abundant public hunting opportunities. Over 2,000,000 acres are open for hunting to the public, including approximately 1.3 million acres which are managed by state and federal agencies to provide a variety of hunting opportunities. Another 300,000 acres are privately owned timberlands that are part of the state's Public Hunting Area program, which provides public hunting access to large acreages for a small fee ($15-$30).

The history of Volunteer State's deer herd is similar to that of other states. By the turn of the century population densities where extremely low when it was estimated that fewer than 2,000 deer remained in Tennessee. Restoration of the state's deer herd was begun in the 1930's and 40's and continued until 1985. During the initial years of restoration, most deer were obtained from North Carolina, Texas, and Wisconsin. In subsequent years, deer were moved within state to stock areas with lower densities. From 1940 to 1985, over 9,000 deer were stocked in 72 of Tennessee's 95 counties. Since the 1940's, herd growth has been substantial and consistent, with the herd now estimated at 999,000. The deer harvest has grown accordingly, from 113 in 1949 to over 157,599 in 2001.

Tennessee is divided into two major deer harvest management units. Unit A comprises the middle and western counties of the state and has the longest seasons and the most liberal bag limits. Unit B comprises the eastern counties and has shorter seasons and more conservative bag limits. Within each unit, county deer herds are managed separately. Population models as well as other biological parameters (age/sex structure, weights, antler dimensions) are used to assess the status of each herd, and establish desired doe harvests. Doe harvests are implemented through the issuance of quota permits allocated by drawing. Since 1975, the antlerless harvest in Tennessee has increased from 23% to over 38% of the total harvest in 2001.

Future deer management in Tennessee will continue to focus on the challenge of maintaining adequate doe harvests in the face of a stabilized or reduced hunter base. Also, the demand for quality/trophy deer opportunities is increasing in the state, and will have to be addressed in the near future.

TEXAS

Texas is comprised of 10 ecological areas. The Edwards Plateau is the limestone and granite "Hill Country" of west central Texas. The South Texas Plains, also known as the "Brush Country" is a level to rolling plain extending south and west from San Antonio to the Gulf of Mexico and the Rio Grande. The Cross Timbers and Prairies range from oak and mesquite savannah to dense brush. The Gulf Prairies and Marshes region, a slowly drained level area, is located along the Texas Coast. The Post Oak Savannah is a gently rolling area with elevations of 300 to 800 feet dominated by post oak and blackjack oak. The arid and mountainous Trans Pecos region is in the extreme western part of the state. The Blackland Prairies region is gently rolling to moderately rough and has agricultural and urban areas. The Rolling Plains and High Plains regions are located in the Panhandle where livestock grazing and irrigated farming dominate. The Pineywoods contains pines and bottomland hardwoods, much of which is in commercial forestry.

Early settlers found white-tailed deer in all areas of the state except the western and northwestern portions. Excessive harvest of deer for hides and meat to the feed the settlers and early city-dwellers cause the species to decline by the late 1800's.
Public concern prompted a series of protective measures. A five-month closed season was enacted in 1881, and the first bag limit was six bucks in 1903. Six game wardens were hired in 1919 to patrol the entire state. Deer increased dramatically by the 1930's thanks to protective regulations, law enforcement, invasion of woody plants into the prairies, and restocking efforts.

Deer have expanded their range in Texas and over 82 million acres of the state are occupied by whitetails. There is a major problem with deer-human conflicts in subdivisions near cities. Texas allows private trapping and moving of deer under permit to help alleviate the problem. Bag limits and seasons have become more liberal to deal with the burgeoning deer population and to pique hunter interest.

Research and management experience in Texas continues to demonstrate the wisdom of selective harvest to produce bucks with superior antlers. Targeting deer with the smallest antlers as early as possible helps to ensure better bucks at maturity. Currently, some of the wildlife management areas emphasize harvest of bucks with 4 points or less through regulation. Many landowners under the technical guidance programs have programs that allow the harvest of the low-end bucks and trophy bucks. Beginning in the 2002-2003 Season Texas began experimenting with mandatory antler restrictions in a 6 county area. In this area a legal buck must have a minimum of a 13" inside spread, OR at least one un-branched antler, OR at least 6 points on a side. These regulations will be evaluated over a 3-year period.

In 1998, Texas implemented a new program. Managed lands deer permits were made available to any landowner willing to follow guidelines provided by the local TPWD wildlife biologist or technician. If the landowner accepts the number of buck and doe permits that is biologically correct for the herd, then a special season and bag limit is designated for the property. That season is more than twice as long as the regular season to allow the landowner ample time to meet the objectives. The number of deer to be taken from the area is set by the number of permits issued, so the long season and increased bag will not mean an increased harvest. In fact,

the number of bucks allowed to be killed through managed lands permits should be less than that which the landowner would have allowed under the regular county season.

Additionally, TPWD biologists may make recommendations on related issues as livestock management, vegetation management, watering devices, and the like. The biologist will approve a wildlife management plan that considers all aspects of management and considers the effects of the management on other wildlife species as well as deer. The effect of the deer herd on the native habitat is the prime consideration for deer harvest recommendations. If a landowner fails to make significant progress toward the herd and/or habitat objectives, that property will be dropped from the program in succeeding years until significant progress has been made.

While there is no minimum acreage required for the Managed Lands program, small land holdings are not expected to be enrolled because of the strict limitations on the number of bucks that may be harvested. Properties under deer-proof fence are eligible, but a high fence is not required. Small landowners are encouraged to join together in a "cooperative" to apply for managed lands permits. In that case, permits are issued to the cooperative's officers, who are then responsible for distributing them fairly to the participating landowners. Landowners are encouraged to practice good management, regardless of the size of the place or the amount of money they have to invest in expensive management tools such as fencing or supplemental feeds.

Participating landowners must report the deer harvest to the Texas Parks and Wildlife biologist or technician who approved the plan. Managers are required to collect and submit data on the herd. Prior to the next season's issuance, biologists will review the biological data collected from the deer (weights and measurements), survey data, and the habitat improvement progress. If the landowner has made significant effort toward achieving the objectives, then permits can be issued.

A special hunting weekend for youth-only (under 17 years of age) was established and the Texas Youth Hunting Association was formed to encourage young people to enter the hunting fraternity. There were over 600,000 deer hunters of all ages in 1997 and they took over 371,000 deer from a herd estimated at 3,359,031.

VIRGINIA

The statewide deer kill during the 2001 hunting season was 215,872 (110,659 antlered males, 21,557 male fawns, 80,317 females (37.8%) and 3,339 deer of unrecorded sex). The archery and muzzleloading kill were 18,254 (9%) and 53,798 (25%) respectively. Deer kill data in Virginia represent an actual known minimum count. Data are obtained through mandatory tagging and subsequent checking at one of about 1,300 check stations located statewide. The mandatory check station system has been in operation continuously since 1947 and is operated by volunteers.

Deer season in Virginia begins with a 7-week either-sex archery season that begins the first Saturday in October. Concurrent with the last two weeks of the archery season east of the Blue Ridge Mountains and the last week of the archery season west of the Blue Ridge Mountains is an early muzzleloading season. The early muzzleloading season is full season either-sex east and one-day either-sex west. In-line muzzleloaders with scopes are legal.

Two distinct season frameworks characterize general firearms deer hunting, which begins the third Monday in November. East of the Blue Ridge Mountains, the firearms season runs through the first Saturday in January (42 days). West of the Blue Ridge and in the southwestern Piedmont, the firearms season is 12 days long. During the firearms season, either-sex deer can only be taken on prescribed either-sex days. West of the Blue Ridge the bag limit for all deer hunters (archers, muzzleloaders, and general firearms hunters) is 1 per day, 3 per season, one of which must be antlerless. Also during the early muzzleloading season west of the Blue Ridge, hunters are limited to one antlered buck. East of the Blue Ridge the bag limit for all deer hunters (archers, muzzleloaders, and general firearms hunters) is 2 per day, 4 per season, one of which must be antlerless. Bonus permits (for antlerless deer only) allow hunters to exceed the season bag limit statewide on private land(s) and designated public areas. No deer hunting is allowed on Sunday in Virginia.

In addition to the standard county seasons and bag limits, Virginia has several site-specific private land deer management programs including the deer management assistance program (DMAP) and the damage control assistance program (DCAP). Both programs were initiated during the 1988 season and continue to achieve wide acceptance. During the 2001 season, there were 654 DMAP cooperators encompassing 1,277,000 acres in 88 counties. These DMAP cooperators were issued a total of 20,701 antlerless tags and reported a total deer kill of 18,778. Biological data is collected from all these animals. Also during the 2000 deer season, there were 824 DCAP cooperators comprising 229,400 acres. These DCAP cooperators were issued 8,149 antlerless tags and reported a kill of 2,273 antlerless DCAP deer.

Virginia's deer management program has been noted for both its success and its simplicity. The overall mission of the deer program is to manage the deer resource in the best long-term interests of the citizens of the Commonwealth. Today, with the exception of several counties in far southwestern Virginia and on selected National Forest lands in western Virginia, the emphasis on deer management in Virginia has changed from establishing and expanding deer herds to controlling deer herd growth. This change in management direction has resulted in liberal harvest regulations and high antlerless deer harvest levels.

Over the vast majority of the Commonwealth of Virginia, current deer management objectives call for the deer herd(s) to be stabilized at their current level. Overall deer harvest levels for the past decade have been fairly stable. Deer harvest increases in 2001 suggests that changes in either-sex regulations have significant impacts on future deer harvest levels and that these changes typically take 3-5 years. Because of this, deer populations and regulations have tended to run in cycles. Liberal either-sex deer hunting regulations of the late 1980's and early 1990's were followed by harvest declines and subsequent reduction in either-sex deer hunting in some areas during the mid to late 1990's. These corrections have allowed deer populations to recover, and the cycle has already turned to more liberal regulations again.

WEST VIRGINIA

West Virginia, known as the "Mountain State", lies within the Allegheny Mountain Range. It is comprised of 3 major physiographic regions. The Eastern Ridge and Valley Section found in the far eastern portion of West Virginia is made up of oak-pine forests and has a drier climate. The Allegheny Mountains and Uplands make up the central portion of the state, and are comprised of a northern forest type with twice the rainfall of the eastern region. The remaining area, which is the largest in size, is the Western Hills Section. This section contains the Monongahela-Upper Ohio Province to the north and the Cumberland Mountains to the south. The region is characterized by the central hardwood forest type which is predominantly oak-hickory.

The average elevation of the state is higher than any other state in the east. The highest point in the state is Spruce Knob (4,862 feet), while the lowest is where the Potomac River flows out of West Virginia at Harpers Ferry (247 feet). Most of West Virginia is characterized by a branched (dendritic) drainage pattern.

West Virginia, with 12.1 million acres of forest land, is 79% forested. Most of the state's economy is associated with timber and other forest products. The oak-hickory forests, which are vital to the welfare of deer in West Virginia, cover 77% of the timberland.

Fertile soils are relatively uncommon in the state, so where they occur they are quickly adapted to farming. Bottomland soils are generally restricted to the floodplains of major streams. Terrace soils suited to farming are found along the Ohio River in the western portion of the state. Fertile upland soils containing limestone are found in eastern West Virginia.

West Virginia contains three national forests: the Monongahela, by far the largest, covering 901,678 acres; the George Washington, the second largest in the eastern portion of the state, covering 104,861 acres, and the Jefferson in southeastern West Virginia which covers 18,400 acres. In addition to this public land, the state owns or leases an additional 437,000 acres.

Deer in West Virginia reached their lowest level about 1910, following large scale logging operations and market hunting. Restocking programs were initiated in 1923 on a small scale, but as moneys were made available in 1939, restocking of deer escalated tremendously. Stocking of deer is no longer practiced in West Virginia with the exception of occasional releases of orphan animals from the Wildlife Center.

West Virginia sportsmen have experienced just about every type of season imaginable in the past, from bucks-only, to hunter's-choice, to permit hunting. In 1973, an antlerless deer permit system was established. West Virginia's deer harvest totaled 25,863 animals in 1981 under archery, antlerless permit, and bucks-only regulations. In 2001, West Virginia sportsmen harvested 215,777 deer under a 76 day archery season, 13-day bucks-only, 12-day antlerless , 3-day Youth Hunter deer season, and 6-day muzzleloader seasons. In 1970, the bag limit was 2 deer. Today, resident hunters may take as many as 8 deer. West Virginia offers a wonderful opportunity for deer hunter recreation and, with a progressive program, deer hunting in the mountains should remain excellent in the future.

Table 1. Southeastern deer harvest summaries for the 2001-2002 season.

State	Land Area (sq. mi)	Deer Habitat		Percent Forested	% Land Area Public Hunting	2001-2002 Harvest		
		(sq. mile)	(% Total)			Male	Female	Total
AL	51,628	48,014	93	66	5	N/A	N/A	N/A
AR	52,609	52,609	85	53	12	75,128	75,141	150,269
FL						N/A	N/A	N/A
GA	57,800	37,181	64	64	6	193,818	252,882	446,000
KY	40,395	39,654	97	59	9	68,913	64,604	133,518
LA	41,406	26,562	64	52	4	116,710	95,490	212,200
MD	9,837	8766	89	46	4	49,636	34241	83,787
MO								
MS	47,296	31,250	66	66	6	161,000	159,000	320,000
NC	48,794	36,714	75	61	6	138,218	88,060	226278
OK	69,919	37,425	54	19	2	57,114	44,521	101,635
SC	30,207	21,920	73	63	7.5	156,806	152,022	308,828
TN	42,246	25,770	61	49	9	96,434	61,165	157,599
TX	261,914	129,592	49	40	<2	219,434	175,726	395,160
VA	39,682	31,479	79	63	7	132,216	80,317	215,872
WV	24,064	22,889	95	79	9	135,967	81,110	217,416

Table 1. Continued.

State	Harvest/mi	Method of Data Collection[1]	Estimated Pre-season Population	Length of Season (Days)			Method of Setting Seasons[4]	% Land Area Open to Dog Hunting
				Archery[2]	Black Powder[3]	Firearms		
AL	N/A	A,B,C	1,750,000	110 (C)	17 (C)	70 (C)	A,B	70
AR	2.9	A,C	1,000,000	152	25	44	A,B	81
FL	NA							
GA	12.0	A,C,D	1,200,000	115	7	77-87	A,B,C	10
KY	3.4	A,C,D	850,000	122 (C)	9 (A,B)	10-16	A,B	0
LA	8.0	A,B,C	1,000,000	123(C)	14(A,B)	65	A,B,C	80
MD	9.6	A,B,C,D	240,000	87 (C)	5(A), 13(B)	C-13,+1 youth day	A, B	0
MO								
MS	6.7	A,B,C	1,500,000	47(A),15(B)	14(A),15(B)	47	A,B,C	90
NC	6.16	A,B,C,D	1,100,000	24-54	6	18-69	A,B,C	50
OK	2.7	A, C, E	475,000	98	9	9	A,B	0
SC	14.9	A,B,C	1,000,000	12(A)	12(A)	70-140	A,B,C	60
TN	5.9	A,D	999,000	47-52	10-14	27-39	A,B,C	0
TX	3.03	B,C	3,776,052	30	9	70-98	A,B	0
VA	6.9	A,B,C,D	900,000	37-43	12-30	12-42	A,B	55
WV	9.5	A	940,000	75(C)	6(C)	19(C)	A,B,C	0

Table 1. Continued.

State	Number of Hunters[5]	5-Year Trend	Hunting License Fees (Full Season)		Tagging System		
			Resident	Non-Resident	Physical Tag? License Tag? None?	Validation: Mandatory? Volunteer? None?	Bonus Tags Available?
AL	N/A	Stable	$16	$252	None	None	N/A
AR	250,000	Stable	$10.50 – 25	$100 – 225	License Tag	Mandatory	For Female Deer
FL	105,0000	Stable			None	Some WMAs	No
GA	292,209	Down	$19	$177	License Tag	None	WMA'S
KY	271,000*	Stable	$30.00	$130	Hunter Log	Mandatory	Yes
LA	168,300	Stable	$29-50	$300-352	None	None	None
MD	84,086	Down	$36.50	$180	Physical Tag	Mandatory	Yes ,antlered only
MO							
MS	146,000	Down	$17-32	$60-300	None	None	No
NC	235,000	Stable	$30	$120	License Tag	Mandatory	No
OK	171,445	Stable	$12.50	$201	Carcass Tag	Mandatory	No
SC	149,993	Stable	$20	$114-189	None	None	Yes
TN	228,517	Stable	$39-54	$105-156	License Tag	Mandatory	No
TX	511,340	Down	$19	$250	License Tag	None	Yes
VA	267,711	Down	$25-50	$122-174	Physical Tag	Mandatory	Yes (antlerless only)
WV	343,000*	Stable	$25	$110	Physical Tag	Mandatory	Yes

Table 1. Continued.

State	Mandatory Hunter Ed.	Mandatory Orange	Handguns Permitted	Crossbows Permitted	Drugged Arrows Permitted	# Fatal Hunting Accidents		Highway Kill[8]
						All	Deer	
AL	Yes	Yes	Yes	Handicap	No	4	3	10,000 (B)
AR	Yes	Yes	Yes	Yes	No	5	3	8,500(B)
FL				Yes*		2	2	
GA	Yes	Yes	Yes	Yes	No	10	10	51,000
KY	Yes	Yes	Yes	Season	No	2	2	4,000 (B)
LA	Yes	Yes	Yes	Handicap & >60	No	3	2	2,500(B)
MD	Yes	Yes	Yes	Handicap	No	1	1	4,229(A)
MO								
MS	Yes	Yes	Yes	Handicap & ≥65	No	5	4	7,500 A,B
NC	Yes	Yes	Yes	Handicap	No	4	4	13,000-14,000[B]
OK	Yes	Yes	Yes	Handicap	No	N/A	0	N/A
SC	Yes	Yes,WMA's	Yes	Yes, gun season	Yes (28/46 co.)	1	1	3,326
TN	Yes	Yes	Yes	Handicap	No	1	0	N/A
TX	Yes	WMAs only	Yes	Yes	No	3	1	N/A
VA	Yes	Yes	Yes	Handicap	No	5	4	N/A
WV	Yes	Yes	Yes	No	No	8	6	19,323

Table 1. Continued.

State	Limits			Antler Restrictions[6]	% Hunting Success			Avg. Leasing Fees/Acre
	Season	Antlerless	Antlered		Archery	Muzzleloader	Firearms	
AL	None	2 per day	1 per day	C (4 WMA's)	25	N/A	60	$5-16
AR	C	Up to 4	2	A, B				$4
FL	2/day	1or2/day	2/day	Some WMAs	NA	NA	NA	
GA	12	10	2	ONE BUCK MUST BE 4-	31	31	59	$5-15
KY		varies	1		25		40	N/A
LA	6	None	None	Yes (C)	29	29	54	$5-30
MD		Regional	Regional	No	61	33(A), 30(B)	55	$5-35
MO								
MS		3	3	A	45	47	65	$2–5
NC	6	up to 6	2/4*	NA				$2-6
OK	Gun	1	1	No	15	22	35	$2-5
SC	15+	10+	5+	C – 3 WMA's	N/A	N/A	75.7	$4-10+
TN	Varies	Varies	3	No	23	23	43	$3-5
TX	5	Up to 5	Up to 3	B – 6 counties	Unknown	Unknown	57.7	$5-7
VA	4 (east)& 3 (west)	4 (east)& 3 (west)	3 (east)& 2 (west)	On 2 WMA's	28	37	48	$4
WV	8	Up to 7	Up to 5	1 WMA	23	19	58	$1-5

* North Carolina -Up to 2 bucks in those areas in the Western Season, Northwestern Season, and those areas of the Central Season where hunting with dogs is not allowed. Up to 4 bucks in those areas in the Eastern Season and those areas of the Central Season where hunting with dogs is allowed.

Table 1. Continued.

State	Private Lands Programs				Trailing wounded deer with dogs legal?	Supplemental feeding legal?	Baiting legal?
	Type[7]	Min. Acreage Requirements	Fee	No. of Cooperators			
AL	A	None	Yes	421	Yes	Yes	No
AR	A, D	D=200 ac	D=$25	A=371,D=3,000	Yes	Yes	Yes
FL	A	640	None	1,250	Yes	Yes	Yes
GA	None				Yes	Yes	No
KY	B	None	None	364	No	Yes	Yes
LA	A	500	Yes	1372	Yes	Yes	Yes
MD	None				Yes	Yes	Yes, Private
MO							
MS	A,D	Variable	None	750	Yes, during dog seasons	Yes	No
NC	A	2000	$50	91	In dog hunting areas	Yes	Yes
OK	A	1,000	$200-400	153	No	Yes	Yes
SC	A	None	$50	2,000	Yes	Yes, 18/46 Co. no hunting	Yes 28 Co. No 18 Co.
TN	A	1,000	$1,000		With officer approval	Yes	No
TX	A, B, C	None	None	2,000+	Most of Texas	Yes	Yes
VA	DCAP DMAP	None	None	824 654	Yes(east) No(west)	Yes	No
WV	None				No	Yes	Yes

[1] A–Check Station; B–Mail Survey; C–Jawbone Collection; D–Computer Models; E–Telephone Survey.
[2] A–Early Season; B–Late Season; C–Full Season.
[3] A–Early Season; B–Late Season; C–Full Season.
[4] A–Harvest & Biological; B–Departmental/Commission Regulatory; C–Legislative.
[5] Asterisk if estimate includes landowner exempted hunters.
[6] A–Statewide Antler Restrictions; B–County Antler Restrictions; C–Region of Area Antler Restrictions.
[7] A–DMAP; B–Landowner tags; C–Antlered buck tags; D–Fee MAP.
[8] A–Actual number based on reports; B–Estimated road kill.

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