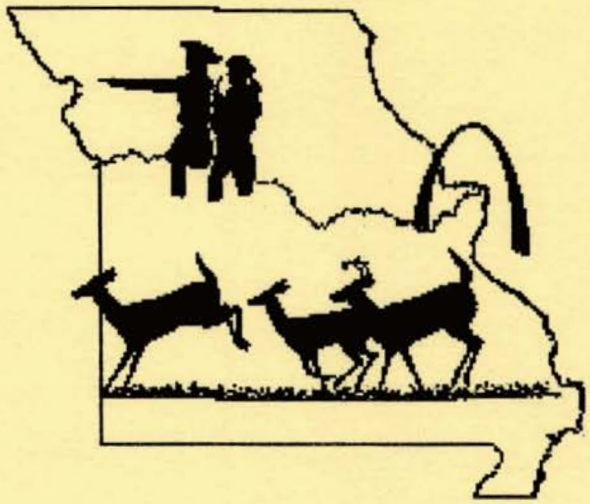
24th Annual Meeting

Southeast Deer Study Group



February 18-21, 2001
St. Louis, Missouri

Hosted By:
Missouri Department of Conservation
Missouri Chapter of The Wildlife Society

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Quality Deer Management Association, Watkinsville, Georgia

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

YEAR	LOCATION	MEETING THEME
1987	Gulf Shores, AL	Management: Past, Present, and Future
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 Antoino, 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

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
Robert E. Vanderhoof	Florida	Florida Game and Fresh Water Fish Commission
Stephen M. Shea	Florida	St. Joe Timberland Company
Kent E. Kammermeyer	Georgia	Georgia Department of Natural Resources
Jonathan W. Gassett	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
J. Scott Osborne	North Carolina	North Carolina Wildlife Resources Commission
Kenneth L. Gee	Oklahoma	Samuel Roberts Noble Foundation

Name	State	Employer
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
Derrell A. Shipes	South Carolina	South Carolina Department of Natural Resources
Ben Layton	Tennessee	Tennessee Wildlife Resources Agency
E. L. "Butch" Young	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

Southeast Deer Study Group Outstanding Student Presentation Award

1996 - Billy C. Lambert, Jr. (Texas Tech University)
1997 - Jennfier A. Schwratz (University of Georgia)
1998 - Karen Dasher (University of Georgia)
1999 - Roel R. Lopez (Texas A & M University)
2000 - Karen Dasher (University of Georgia)

PROGRAM AGENDA

SUNDAY, FEBRUARY 18, 2001

1:00 – 8:00 p.m.	Registration – 2nd Floor Coatroom
3:00 - 5:00 p.m.	Southeast Deer Committee Meeting - Directors Row 25
7:00 – 10:00 p.m.	Social/Dinner – Gateway Arch (Name Badge Required)

MONDAY, FEBRUARY 19, 2001

7:00 a.m. – 5:00 p.m.	Registration – 2nd Floor Coatroom
8:00 a.m.	Welcome - John Smith, Deputy Director -Missouri Department of Conservation

Plenary Session - From Lewis & Clark to the New Millennium - The Changing Face of Deer Management

Moderator: Ollie Torgerson, Wildlife Division Administrator - Missouri Department of Conservation

8:10 a.m.	Introduction - Ollie Torgerson
8:20 a.m.	*Hunting: History, Fair Chase, Democracy, and Philosophy.* Jim Posewitz - Orion the Hunter's Institute
8:50 a.m.	*Wildlife Management: Cropping to Manage or Managing to Crop?* R. Ben Peyton - Michigan State University
9:20 a.m.	*Human Dimensions and Hunter Ethics.* Dan Witter - Missouri Department of Conservation
9:50 a.m.	*A Continuous-time Analysis of Wildlife Observations Made by Lewis & Clark in 1804-1806: Implications for Whitetail Management.* Charles Kay - Department of Political Science, Utah State University
10:10 a.m.	**Break**

Technical Session I - Using New Information to Manage Deer For Today's Constituents

Moderator: Josh Millspaugh, Assistant Professor of Wildlife Conservation - University of Missouri

10:40 a.m. *Differential Mortality of Resident, Emigrant, and Migrant Female White-tailed Deer.* Kurt VerCauteren - USDA/APHIS/WS National Wildlife Research Center and Scott Hygnstrom - University of Nebraska at Lincoln

11:00 a.m. * *Mortality, Emigration and Home Range of a Maturing White-tailed Deer Population in the Coastal Plain of South Carolina.* Jay Cantrell - Georgia Department of Natural Resources, Timothy Fendley - Clemson University and Charles Ruth - South Carolina Department of Natural Resources

11:20 a.m. * *Unusual Summer Movements of White-tailed Deer in the Central Appalachians...is it in the Water?* Tyler Campbell, Benjamin Laseter, David Osborn, Parshall Bush and Karl Miller - University of Georgia and W. Mark Ford - USDA Forest Service

11:40 a.m. *Density-physical Condition Relationships in White-tailed Deer.* Patrick Keyser - Westvaco Corporation and David Guynn Jr. - Clemson University

12:00 p.m. **Lunch (on your own)**

Technical Session II - What Do Our Constituents Think About Today's New Management?

Moderator: Paul Shelton, Forest Wildlife Program Manager - Illinois Department of Natural Resources

1:30 p.m. *Trophy Hunting: Implications for the Changing Face of Deer Management.* Deborah Green - College of William and Mary and Johnny Stowe - South Carolina Department of Natural Resources

1:50 p.m. *Attitudes and Perceptions of Virginia DMAP Cooperators.* Bradley Howard, Jay Jeffries, Matt Knox and Dave Steffens - Virginia Department of Game and Inland Fisheries

2:10 p.m. *West Virginia Bowhunter Survey - a 5 Year Review.* Randy Tucker, James Crum, James Pack, Allan Glasscock and Scott Warner - West Virginia Division of Natural Resources

2:30 p.m. * *Use of Cluster-sampling Methodology to Survey Deer Hunt Club Members in Arkansas.* Bret Collier and Lynette Duncan - University of Arkansas

2:50 p.m. *The Future of Hunting in Texas Think Tank.* Robert Brown and Clark Adams - Texas A & M University

3:10 p.m. **Break**

Technical Session III - To Feed or Not to Feed?

Moderator: Jim Braithwait, Wildlife Damage Biologist - Missouri Department of Conservation

3:40 p.m. * *White-tailed Deer and Non-targeted Species Usage of Three Supplemental Feeds On An Intensively Managed Property.* Cristy Brown, B.J. Higginbotham, and R. D. Randel - Texas A & M University and C. Hamilton - International Paper

4:00 p.m. * *The Effect of Micronutrient Supplementation on White-tailed Deer Antler Size, Body Weights, and Immune Function.* Marc Bartoskewitz, David Hewett, and Jamie Laurenz - Texas A & M University at Kingsville, Fred Bryant - Ceasar Kleberg Wildlife Research Institute and John Pitts - MoorMan Feed, Inc.

4:20 p.m. *The Case Against Supplemental Feeding of White-tailed Deer.* Robert Brown - Texas A & M University

4:40 p.m. * *Estimating Percent Use of Supplemental Feed by Free-Ranging White-tailed Deer in South Texas.* Marc Bartoskewitz and David Hewett - Texas A & M University at Kingsville and Fred Bryant - Ceasar Kleberg Wildlife Research Institute

5:00 p.m. *Farmers and Hunters Feeding the Hungry.* C. J. Winand - Bowhunter Magazine and Farmers and Hunters Feeding The Hungry

5:20 p.m. **Dinner - (On your own)**

7:30 p.m. Shooting From the Hip: *What Role Should State Agencies Play in Legislating Hunter Ethics?* Jim Posewitz - Orion the Hunter's Institute and Dan Witter - Missouri Department of Conservation

TUESDAY, FEBRUARY 20, 2001

7:00 a.m. - 5:00 p.m. Registration - 2nd Floor Coatroom

8:15 a.m. Welcome/Announcements

Technical Session IV - Management of Deer Populations

Moderator: Scott Osborne, Survey's and Research Program Coordinator - North Carolina Wildlife Resources Commission

8:20 a.m. * *A Comparison of White-tailed Deer (Odocoileus virginianus) Population Estimation Methods in West Virginia.* Christopher Langdon and John Edwards - West Virginia University, James Crum - West Virginia Division of Natural Resources, and W. Mark Ford - USDA Forest Service

8:40 a.m. * *The Role of Computer Simulation Models in Management of White-tailed Deer.* Kevin Clarke, Alan Woolf and John Roseberry - Southern Illinois University and Paul Shelton - Illinois Department of Natural Resources

9:00 a.m. *Current Status of Fertility Control in Urban Deer Management.* Robert Warren - University of Georgia

9:20 a.m. * *Genetic Analysis of Mississippi White-tailed Deer Populations.* Randy DeYoung, Stephen Demarais, Rodney Honeycutt, Joel D. Anderson, and Robert Gonzales - Mississippi State University, and Kenneth Gee - Samuel Roberts Noble Foundation

9:40 a.m. *Estimating Population Trends in a Managed Deer Herd.* Raymond Winchcombe and Richard Ostfeld - Institute for Ecosystem Studies

10:00 a.m. *Genetic and Environmental Interaction in White-tailed Deer.* John D. Williams - Texas A & M University and William E. Armstrong, Donnie Frels, Donnie Harmel and Eugene R. Fuchs - Texas Parks and Wildlife Department

10:20 a.m. Break

Technical Session V - Quality Deer Management

Moderator: Steve Shea, Wildlife Biologist - St. Joe Timberland Company

10:50 a.m. *Setting Seasons to Enhance Hunting on QDM Lands.* Kim Tolson - University of Louisiana at Monroe

11:10 a.m. *White-tailed Deer Management in Florida: Balancing Quantity and Quality.* Jonathan Day and John Morgan - Florida Fish and Wildlife Conservation Commission

11:30 a.m. *Before, During and After QDM on a Wildlife Management Area in Georgia.* Kent Kammermeyer and Jerry Bearden - Georgia Department of Natural Resources

11:50 a.m. *MHC-associated Variation in Antlers of White-tailed Deer: Evidence For "Good Genes" Advertisement.* Steve Ditchkoff, Ronald Masters, Robert Lochmiller, Steven Hoofer and Ronald A. VanDen Bussche - Oklahoma State University and William Starry - McAlester Army Ammunition Plant

12:10 p.m. **Lunch (on your own)**

Technical Session VI - Habitat Management and Resource Techniques

Moderator: Matt Knox, Deer Project Leader - Virginia Department of Game and Inland Fisheries

1:30 p.m. * *The Potential Effects of a White-tailed Deer Parasite on an Eastern Elk Population.* Karen Alexy and David Guynn - Clemson University, Jonathan Gassett and Charles Logsdon - Kentucky Department of Fish and Wildlife Resources, David Maehr - University of Kentucky at Lexington and William R. Davidson - University of Georgia

1:50 p.m. *Effects of Herbaceous Competition Control Tank Mixes on Habitat Quality in Piedmont Pine Plantations.* Patrick Keyser and Vick Ford - Westvaco Corporation

2:10 p.m. * *Habitat Conservation Planning for Florida Key Deer.* Roel Lopez and Nova Silvy - Texas A & M University and Phil Frank - National Key Deer Refuge

2:30 p.m. *A Forage Yield Comparison Between Summer Annual Legumes Unprotected and Protected from Early Foraging.* R. Larry Corbett - University of Georgia Cooperative Extension Service

2:50 p.m. Break

Technical Session VII - Deer Physiology and Behavior

Moderator: Kurt VerCauteren, Research Wildlife Biologist - USDA/APHIS/WS/National Wildlife Research Center

3:10 p.m. *Noninvasive Measurement of Stress In White-tailed Deer.* Josh Millspaugh and Brian Washburn - University of Missouri, Tamara Meyer - University of Missouri and Missouri Department of Conservation, Brita Woeck and Chadwick Rittenhouse - University of Missouri, Jeff Beringer and Lonnie Hansen - Missouri Department of Conservation, Alex Bermudez and Mark Milanick - University of Missouri

3:30 p.m. * *Annual Survival and Mortality Rates of Captive-reared White-tailed Deer Fawns Released Back Into the Wild.* Preston Mabry - Southeast Missouri State University, Jeff Beringer and Lonnie Hansen - Missouri Department of Conservation, and Bill Eddleman - Southeast Missouri State University

3:50 p.m. *Deer-Vehicle Accidents at the Savannah River Site - Is Vegetation a Factor?* Rakesh Malhorta - University of Georgia and Paul Johns - Savannah River Ecology Laboratory

4:10 p.m. *Does Moon Phase Chronology Determine White-tailed Deer Breeding Dates?* David Osborn, K. V. Miller and R. J. Warren - University of Georgia, J. J. Ozoga - Michigan Department of Natural Resources, S. Demarais, B. Strickland and H. A. Jacobson - Mississippi State University, L. P. Hansen and J. Beringer - Missouri Department of - Conservation, C. R. Ruth - South Carolina Department of Natural Resources, R. J. Hamilton - Ducks Unlimited, E. L. Young and M. Traweek - Texas Parks and Wildlife Department, G. Lavigne - Maine Department of Inland Fisheries and Wildlife, and M. Lenarz - Minnesota Department of Natural Resources

6:00 p.m. **Social Hour**

7:00 p.m. **Banquet (Name Badge Required)**

WEDNESDAY, FEBRUARY 21, 2001

8:00 a.m. Field Trip – Shaw Arboretum and the World Bird Sanctuary

8:00 a.m. Field Trip - Lock & Dam, Riverlands Project and Columbia Bottoms

3:00 p.m. Return to Hotel

*** Indicates Student Paper**

ABSTRACTS

Monday, February 19, 2001

Plenary Session - From Lewis & Clark to the New Millennium
The Changing Face of Deer Management

Moderator: Ollie Torgerson, Wildlife Division Administrator -
Missouri Department of Conservation

8:20 a.m.

Hunting: History, Fair Chase, Democracy, and Philosophy. Jim Posewitz - Orion the Hunters Institute

"We have duties to ourselves and duties to others—we cannot shirk either." Thus began the full term of Theodore Roosevelt, America's conservation president. When his presidency ended, we were a nation richly endowed with a public land estate, a refuge system and a conservation philosophy that would guide us through a century of wildlife restoration.

The conservation philosophy of Roosevelt was the vision of a hunter who became president. It was also a philosophy anchored in American democratic principles. These principles, along with court decisions relative to the public nature of fish and wildlife, define a uniquely American institution. American wildlife management, including hunting for everybody, was a public institution powerful enough to launch a wildlife restoration effort unprecedented in human history. We are the progeny of those remarkable human events. We, the wildlife professionals, are among the trustees, for the people's interest in wildlife.

Wildlife biologists and managers rarely address contemporary issues in either an historical or philosophical context. However, when resource management solutions carry social, cultural, and political implications, they must be addressed with more than biological tools. The history of American wildlife conservation, and the philosophy of our predecessors, is relevant today. Current "hot" topics such as "high fence" issues, "quality" management, landowner incentives, diet supplements, artificial feeding, baiting, and fair chase hunting should be examined in the perspective of those events and ideas that brought us to our time. Just as those influences produced today's abundance, those same influences can provide guidance as we search for answers to contemporary problems.

8:50 a.m.

Wildlife Management: Cropping to Manage or Managing to Crop? R. Ben Peyton - Michigan State University

The social, political and ecological changes influencing wildlife management require us to periodically monitor our progress and practices and revisit our mission and vision for the future. For example, management agencies are faced with issues arising from the traditional need to serve consumptive users while expanding their mission to achieve holistic, ecosystem management. Is the

historical form of support provided by hunters for game species conservation sufficient for the broad ecosystem management required in the future? Are we helping deer hunters to understand and agree with the commitments involved with stewardship of ecosystems or are we teaching them simply to farm deer? Creation of stewardship has been one of the strongest justifications for the continuing relationship between hunting and wildlife management. This presentation suggests there is a need for the professional community to examine and perhaps nurture the relationship of stewardship, hunting and wildlife management.

9:20 a.m.

Competition's Winner and Losers: Case Studies from the "Outdoor Arena." Dan Witter - Missouri Department of Conservation

We are competitors, always asking, "Who is best?" Athletes, of course, are supposed to compete. What fun would college football be without each competitor on every team staring into the camera saying, first, "Hi mom!" and second, "We're number one." But we know that competition extends beyond athletics to entice us all in every facet of life, from the appropriate to perhaps less appropriate--our biochemistry and culture compel us to ask, who makes the best chili, which orchestra plays Mozart the best, which of us makes the most money,--who killed the biggest deer, who caught the most fish! Outdoor recreation stirs a competitive spirit within ourselves and other people with whom we participate--and here's at least one area where the presence of competition gets ever so dicey, because conventional wisdom might suggest that "outdoor *re-creation*" implies rest and refreshment enjoying nature, away from daily demands to position oneself to be the best. No doubt, the outdoor world clears our minds and calms our spirits, but outdoor pursuits also thrill, excite, and challenge us--perhaps not restful, but gratifying, satisfying, fun, and conducive to emergence of the competitive spirit. Good-natured and measured competition, tempered by humility, adds zest to outdoor recreative experience--a winning combination. But if the competitive spirit consumes us--that is, we trade measured thought and gracefulness for the scary mind set of "success at any or anyone's cost"--the resulting outdoor behavior is unbecoming of us and our activities, offensive to other participants and nonparticipants, usually unethical, often illegal, and sometime dangerous--a real losing combination, one which certainly doesn't encourage folks to come on back for a visit sometime. Arguably the most offensive outdoor-oriented examples of the competitive spirit turned ugly are from hunting, or much more accurately, abuses of hunting from the past. Horrors of the past, and thankfully so we all echo. But have we really rubbed as hard as we can to remove all that competitive tarnish from our modern hunting experience? And this so important in an activity in which today's American public will not tolerate any appearance of competitive swagger. We as outdoor participants need to consciously understand the effects of competition.

9:50 a.m.

A Continuous-time Analysis of Wildlife Observations Made By Lewis & Clark in 1804-1806: Implications for Whitetail Management. Charles Kay - Department of Political Science, Utah State University

Lewis and Clark's journals are often cited as an example of how the West teamed with wildlife before that area was despoiled by advancing European civilization. To test this hypothesis, I quantified all the observations of large mammals made by Lewis and Clark on their expedition across the continent in 1804 - 1806. For each day of their 863 day journey, I numerically recorded

game seen, game sign encountered, and herd size for bison, elk, mule deer, white-tailed deer, black-tailed deer, moose, pronghorn antelope, bighorn sheep, grizzly bears, black bears, and gray wolves. I also numerically recorded all occasions on which Lewis and Clark met native people. Those data (n=40,000) show that Native Americans controlled the distribution and numbers of wildlife throughout the West. The only places Lewis and Clark reported an abundance of game were in aboriginal buffer zones between tribes at war, but even there, wildlife populations were not food-limited. Bison, grizzlies, bighorn sheep, and wolves were seldom seen except in aboriginal buffer zones. Moose were most susceptible to aboriginal hunting followed by bison and then elk, while white-tailed deer were more able to elude native hunters because those animals had a more effective escape strategy. In fact, Lewis and Clark killed more whitetails than all other ungulates combined, while mule deer were rarely seen or killed, even in the far West. Moreover, Lewis and Clark were only able to complete their journey because of the food, horses, and above all else, knowledge that they received from native people. There was no wilderness. Finally, as noted by Lewis and Clark, the West was even more densely populated prior to the smallpox pandemic that decimated native people in 1780. Implications for modern whitetail management will be discussed.

Technical Session I - Using New Information to Manage Deer For Today's Constituents

Moderator: Josh Millspaugh, Assistant Professor of Wildlife Conservation - University of Missouri

10:40 a.m.

Differential Mortality of Resident, Emigrant, and Migrant Female White-tailed Deer. Kurt VerCauteren - USDA/APHIS/WS National Wildlife Research Center and Scott Hygnstrom - University of Nebraska at Lincoln

White-tailed deer (*Odocoileus virginianus*) in agricultural landscapes may establish permanent home ranges or move between summer and winter ranges. Differences in the fates of resident, emigrant, and migrant deer have implications for local management as well as population, metapopulation, and source/sink dynamics. We radiotracked 70 female white-tailed deer in the Missouri River Valley of Nebraska and Iowa, USA, from 1991 through 1998. Seventy percent of radiomarked deer were residents, 14% were emigrants, and 16% were migrants. Annual mortality rates for residents, emigrants, and migrants averaged 0.22 (SE = 0.00), 0.30 (SE = 0.02), and 0.39 (SE = 0.02), respectively. Human-related mortality factors (hunting, vehicles, and poaching) caused 85% of resident deaths, 100% of emigrant deaths, and 83% of migrant deaths. Residents and migrants were most likely to be killed by legal harvest while emigrants were most likely to be killed in collisions with vehicles. Local and landscape-scale population management may be facilitated by considering the various mortality factors and rates associated with the movement dispositions of deer. Managers may be able to reduce crop damage by timing local hunts to occur when primarily resident deer are available to be harvested by hunters. Management strategies to specifically target or protect residents, emigrants, or migrants will be proposed.

11:00 a.m.

*** Mortality, Emigration and Home Range of a Maturing White-tailed Deer Population in the Coastal Plain of South Carolina. Jay Cantrell - Georgia Department of Natural Resources, Timothy Fendley - Clemson University, and Charles Ruth - South Carolina Department of Natural Resources**

Fifty fawn (24 male and 26 female) and 14 yearling (3 male and 11 female) white-tailed deer (Odocoileus virginianus) were captured with rocket nets and radio-collared on Back Woods Quail Club in Georgetown and Williamsburg counties, South Carolina from January to March 1998 as part of a study to investigate mortality, emigration, and home range of maturing deer (9 to 19 months of age). The study site is in the coastal plain and deer are harvested under a quality deer management program. Cumulative mortality functions were estimated using the Kaplan-Meier product limit method for maturing male and female deer and compared using log rank and Chi square test statistics. Liberal and conservative emigration rates were estimated using the Kaplan-Meier product limit method for maturing male deer. Seasonal home ranges were calculated by the minimum convex polygon method for both male and female maturing deer. Comparisons were made using a split-plot analysis of variance to test for differences due to sex, season, or sex x season interaction. Mortality analysis was based on 48 deer. Seventeen (10 male, 7 female) died during the analysis period. Hunting and non-hunting factors accounted for 6 (35%) and 11 (65%) deaths, respectively. All hunting mortalities occurred off-site. Six of 11 (55%) non-hunting mortalities were attributed to deer-vehicle accidents. Cumulative mortality rates for males and females were 47.5% and 32.2%, respectively. No significant differences were detected between sex classes ($X^2 = 0.712$, $P = 0.4$). Emigration analysis was based on 48 deer. Nine deer, all yearling males, dispersed from their natal ranges during the breeding season. Five deer (emigrators) remained in their new use areas through the end of the analysis period, the remaining 4 (potential emigrators) were harvested off-site following dispersal. Conservative emigration analysis was based on emigrators and potential emigrators and resulted in a rate of 30.7%. Liberal emigration analysis was based on emigrators and potential emigrators and resulted in a rate of 55.4%. Thirty-eight (19 male, 19 female) maturing deer were used in home range analysis. Individual seasonal home ranges varied from 80.1 to 268.1 ha. Seasonal average ranges varied from 144.6 to 168.2 ha. No differences were detected in home range sizes due to sex, season, or sex x season interaction. These findings represent the first year of a four year study to document population dynamics in deer under a Quality Deer Management program in the Southeast.

11:20 a.m.

*** Unusual Summer Movements of White-tailed Deer in the Central Appalachians...is it in the Water? Tyler Campbell, Benjamin Laseter, David Osborn, Parshall Bush and Karl Miller - University of Georgia, and W. Mark Ford - USDA Forest Service**

White-tailed deer have been reported to move 3.2 km outside their home range boundaries to visit mineral licks. During a deer movement ecology study in the central Appalachians, we observed numerous sallies of individuals and social groups outside of their normal home range boundaries. We hypothesized that these peregrinations were in response to localized mineral sources and tested this hypothesis using radio-telemetry locations and motion activated video cameras. Between April and September 2000, 34.1% (28 of 82) of radio-collared deer made sallies > 1 km outside their home range boundaries (50% contour, Adaptive Kernel Method). Mean (range) distance of sallies was 3.5 km (1.0-6.8). Duration of sallies was between 1.4 and 25.9 days and sallies occurred most frequently

in May. Directionality was not random, and two sites with high deer activity were located via homing and observation. Both sites were active gas wells that produced effluent. Three deer made sallies to the vicinity of one well and 14 deer made sallies to areas surrounding the other well. During September 2000, motion activated video cameras at one of the wells revealed that deer were present an average of 49 min/day, and consumed well outflow during 71.4% of visits, which lasted an average of 6.6 minutes. Water samples collected from the outflow at the 2 wells had Na concentrations of 785.5 ppm and 23.2 ppm, respectively, whereas control wells (no observed deer activity) had Na concentrations between 0.2 and 0.6 ppm. Our data suggests that deer will travel up to 6.8 km in pursuit of Na, thus validating the premise that deer use of mineral licks depends on their distribution and availability across the landscape.

11:40 a.m.

Density-physical Condition Relationships in White-tailed Deer. Patrick Keyser - Westvaco Corporation and David Guynn Jr. - Clemson University

Nine harvest data sets from large contiguous properties in the Southeast were analyzed to examine density-physical condition relationships in white-tailed deer. Study populations had the following median attributes: 154 sq. mi., 25 years duration; annual harvest of 626; and densities that ranged from 5 to 113 deer/square mile. Buck densities were derived from harvest age-structure data using a Downing 2-age reconstruction. Doe and fawn densities were estimated using a Wisconsin reconstruction. Physical parameters (yearling and fawn buck weights, yearling and fawn doe weights, yearling antler beam diameter, beam length, number of points and spike rate) were correlated to 24 different densities for each data set. Densities utilized in the analysis included 4 population segments (adult bucks, adult does, total adults and total deer) each in the current year as well as those lagged one and two years. All twelve densities were examined pre- and post-harvest. Relationships were stronger for pre-harvest densities than post-harvest densities. Relationships were also stronger between current-year physical parameters and densities lagged two years than they were for densities lagged one year or current densities. The population segments most strongly correlated with densities were adult bucks and total adults. These patterns were generally consistent for all nine data sets. Yearling buck weight was the variable most consistently and strongly correlated to density. Among antler measurements, points, and/or spike rates were best. Overall, yearling buck weight versus total adult pre-harvest density lagged two years was the best indicator of density.

Technical Session II - What Do Our Constituents Think About Today's New Management?

Moderator: Paul Shelton, Forest Wildlife Program Manager - Illinois Department of Natural Resources

1:30 p.m.

Trophy Hunting: Implications for the Changing Face of Deer Management. Deborah Green - College of William and Mary and Johnny Stowe - South Carolina Department of Natural Resources

Although deer antlers have been revered since prehistoric times, attitudes toward hunting, especially trophy hunting, have become increasingly negative since Lewis and Clark reported Native Americans

impact on whitetail populations. Our purpose is to: 1) review relevant literature to identify biological, social, economic, legal and ethical issues concerning trophy hunting; 2) evaluate the implications of trophy hunting for deer management; and 3) provide recommendations for wildlife professionals regarding trophy hunting and the changing face of deer management. Our methods included searching biological, social science, legal and news databases to identify relevant journal articles, books, essays, legislation, news items, and Internet sites to evaluate the impact of trophy hunting on deer management. We review the definition and history of trophy hunting, then discuss concerns raised about the biological impact of trophy hunting, including the: 1) effect of animal vs. human predators on sex ratio and age structure of deer herds; 2) impact of habitat manipulations for trophy management on ecosystems; and 3) consequences of game-farming and high fence/breeding programs on whitetail genetics. With respect to social, economic and ethical issues, we consider concerns about trophy hunting, including: 1) reasons for public disapproval; 2) economic and legal implications of commercialization/privatization of deer management; and 3) ethical questions raised by hunters and managers focusing on trophy deer. Our recommendations for wildlife professionals include: 1) integrating trophy hunting with ecosystems management, wilderness protection and native ecosystem restoration; 2) supporting regulations that reinforce this goal, and 3) intensifying hunter education emphasizing proficiency, ethics, and responsibility.

1:50 p.m.

Attitudes and Perceptions of Virginia DMAP Cooperators. Bradley Howard, Jay Jeffries, Matt Knox and Dave Steffens - Virginia Department of Game and Inland Fisheries

In 1998 there were 549 Deer Management Assistance Program (DMAP) cooperators in Virginia with more than 1.2 million acres enrolled. In September 1999, the Department conducted a mail survey of all DMAP cooperators with >1 year participation (n=491) (mean=5.5 years). Eighty-nine percent (89%, n=437) of cooperators responded to the survey. Seventy-six percent (76%) stated they practiced voluntary Quality Deer Management. Sixty-seven percent (67%) have harvest restrictions on antlered bucks. Fifty-four percent (54%) restrict buck harvest by antler points and 50% used antler spread. Using a Leichert scale, 1 = poor to 7 = excellent, "better quality bucks" (Leichert mean = 6.0) was scored as the most important reason for entering DMAP followed by "learning more about deer and deer management" (5.5). On attributes associated with an excellent deer season, "being safe in the woods" ranked as the highest (6.6). Harvesting a deer was only somewhat important (4.9) to having an excellent deer season. Overall, cooperators were very satisfied with DMAP (6.3). Interpersonal relationships between biologists and deer hunters have never been more important to the future of deer management. Survey results in Virginia demonstrate that cooperative deer management programs like DMAP can play an important role in fostering these relationships.

2:10 p.m.

West Virginia Bowhunter Survey - A 5 Year Review. Randy Tucker, James Crum, James Pack, Allan Glasscock and Scott Warner - West Virginia Division of Natural Resources

Bowhunters are among the most avid sportsmen in West Virginia. Because they are predominately steathful hunters, a bowhunter's observations in the field can be a useful measurement of wildlife abundance and behavior. The West Virginia Division of Natural Resources (DNR) conducted a bowhunter survey to monitor population trends in deer and other wildlife species from 1995 to 1999. Bowhunters who volunteered to participate in the survey recorded daily counts of deer and other wildlife species seen while hunting. Other variables included date, county hunted, landownership,

bucks chasing does, rubs, scrapes, shots taken, deer hit, deer recovered, precipitation and wind. Observations were recorded on a standardized survey form to assure uniformity. Archers returned the survey to the DNR at the end of each archery season. During the 5-year survey period, cooperators logged 35, 071 trips and observed wildlife for 115,677 hours. Observation rates were standardized for each interest variable by dividing the observed value by the hours hunted. Observation rates for deer seen correlated significantly with bow harvest ($R^2 = 0.97$, $P<0.05$) and total deer harvest ($R^2 = 0.80$, $P<0.05$) tallied from mandatory check stations. A significant relationship was also found between numbers of bucks chasing does and Julian date ($R^2=0.88$, $P<0.05$). Numbers of rubs and scrapes increased throughout the survey period. Limited surveys utilizing volunteers to record daily observations can be an economical and efficient method to monitor population trends, evaluate management or collect hunter and animal behavior information from the field.

2:30 p.m.

*** Use of Cluster-sampling Methodology to Survey Deer Hunt Club Members in Arkansas. Bret Collier and Lynette Duncan - University of Arkansas**

Random mail surveys following the methods described by Dillman (1978) have been standard for gathering information on hunter's preferences, attitudes, opinions, and socioeconomic characteristics. In Arkansas, the growth of private lands leased for deer hunting and the impact that these private lands have on state deer management strategies has resulted in increased interest on the part of the Arkansas Game and Fish Commission (AGFC) in gathering information on deer hunter characteristics. While the Deer Camp Program in Arkansas was initiated in 1988 to facilitate collection of biological data from deer harvested on privately owned or leased lands, information concerning characteristics of this group of hunters is still based on random sampling methods when more applicable methods are available. The organization structure of the Deer Camp Program in Arkansas allows us to use a true probability of selection proportional to size cluster-sampling method, as outlined in Cochran (1977). This method enables us to direct our survey efforts to white-tailed deer hunters using privately owned or leased lands based on the number of elements (hunters per camp) in different cluster units (hunters per camp within an AGFC management district). Using this method also allows us to reduce the effect of non-response inherent in random mail surveys, decrease our sampling effort and sampling costs while insuring that we are sufficiently sampling hunters across the state.

2:50 p.m.

The Future of Hunting in Texas Think Tank. Robert Brown and Clark Adams - Texas A & M University

A 1996 study on the "The Future of Outdoor Recreation in Texas" suggested that hunting may decline in the state in future years. Texas has a rapidly growing, urban (82%) and Hispanic (>40%) population. There were nearly 30% fewer hunters in 1998 than in 1985, with a 10% decline in license holders who actually hunted. Hunters are aging faster than the general population, and there is little evidence that youth hunting programs actually recruit hunters. All forms of hunting, except waterfowl and mule deer hunting are declining. The general public supports hunting for meat or game management, but not for income or trophies. In 1998 Texas A&M hosted the "Future of Hunting in Texas Think Tank," wherein 40 invited stakeholders from state and federal agencies, landowners' and hunters' organizations, foundations and the sporting goods industry met to review

the data on the future of hunting in Texas. An executive committee and a technical advisory committee were formed. Funds were raised to produce 15,000 copies of a 14-page, 4-color brochure to inform the public and stakeholders about the issue. Plans and fund raising are underway to host six regional, facilitated workshops in Houston, Dallas, Lubbock, San Antonio, Corpus Christi and Lufkin to determine regional desires as to the future of hunting in those areas. Participants will be asked to reach consensus as to whether they want more/fewer hunters, younger/older hunters, more/less private land and public land access, changes in game species hunted, etc. The results will be tabulated and presented in by-invitation-only conference of 50 - 100 stakeholders who will develop a state-wide strategic plan to address the issue. This follows the model of the National Strategic Plan for the Future of Boating and Angling, sponsored by the Department of Interior. Our Texas effort should serve as a model for other states to follow.

Technical Session III - To Feed or Not to Feed?

Moderator: Jim Braithwait, Wildlife Damage Biologist - Missouri Department of Conservation

3:40 p.m.

*** White-tailed Deer and Non-targeted Species Usage of Three Supplemental Feeds On An Intensively Managed Property. Cristy Brown, B. J. Higginbotham, and R. D. Randel - Texas A & M University and C. Hamilton - International Paper**

Deer managers, hunters and landowners spend millions of dollars annually attempting to supplementally feed deer herds. However, an unknown amount of supplement is being used by non-target species. Rice bran is one product being marketed that is palatable to deer while reducing non-target species usage of deer feeders. The 3500-acre study area was high fenced in 1987 and managed for trophy white-tailed deer. To evaluate species selectively, eighteen open self-feeder locations were selected and randomly allocated into three treatment groups: whole corn (n=6), cracked corn/rice bran mixture (1:1, n=6), stabilized rice bran (n=6). All sites started with 10 pounds of the allotted feed type and were monitored by motion/heat sensitive cameras continuously for a two-week period. Cameras were checked every two days to monitor events and film. Feed usage was estimated and replaced every two days to return the total to 10 pounds per feeder. Pictures were reviewed and total animal visits per feeder were recorded (deer, racoon, opossum, crow, and feral hog). When all feeders were grouped, regardless of feed type, only 21% of total visits were by deer ($P<0.001$). Feeders visited by hogs (n=4) had fewer ($P<0.001$) visits by deer (<1%) compared to feeders not visited by hogs (n=9, 31.6%), suggesting deer avoidance of feeders frequented by feral hogs. Total pounds of corn consumed during the two week study period was greater ($P<0.05$) than for rice bran. Using stabilized rice bran in open self-feeders can reduce non-target species usage of feeders without decreasing utilization by white-tailed deer.

4:00 p.m.

*** The Effect of Micronutrient Supplementation on White-tailed Deer Antler Size, Body Weights, and Immune Function. Marc Bartoskewitz, David Hewett, and Jamie Laurenz - Texas A & M University at Kingsville, Fred Bryant - Ceasar Kleberg Wildlife Research Institute and John Pitts - MoorMan Feed, Inc.**

Diets with high concentrations of copper (Cu) and zinc (Zn) are reported to increase antler size and body weights of cervids. To study this effect in white-tailed deer we measured antler size, body weights, and immune function in 4 mature bucks receiving a standard feed (40 ppm Cu and 200 ppm Zn) and 4 mature bucks receiving a 200 ppm Cu and 1000 ppm Zn diet. Deer were assigned treatments in February 1999 and fed diets ad libitum through October 2000. Antlers were measured using Boone and Crockett criteria in 1998, before treatment, and in 1999 and 2000. Deer were weighed in spring and fall of 1999 and 2000. We collected blood from each deer in October 2000 for immune function assays. Inside spread, main beam length, circumference, and gross Boone and Crockett score did not differ ($P > 0.3419$) between treatments. Deer receiving the diet with high concentrations of Cu and Zn gained more weight from October 1999 to October 2000 than control deer ($P = 0.0183$). There was no difference between treatments in body weight change from April 1999 to May 2000 ($P = 0.1301$). Lymphocytes of bucks supplemented with elevated Cu and Zn were more sensitive to antigens ($P < 0.001$) and less sensitive to stress hormones ($P < 0.01$) than control bucks. Although supplementation with increased concentrations of Cu and Zn did not increase antler size, increases in body weights during fall and improved immune function may result in a higher quality deer herd that is less susceptible to disease.

4:20 p.m.

The Case Against Supplemental Feeding of White-tailed Deer. Robert Brown - Texas A & M University

The use of food plots, supplemental trough feeding, and baiting has been a common and legal practice in Texas for many years. There is now controversy as to whether Texas Parks and Wildlife Department should include this extra nutrition as part of their carrying capacity estimates used to determine harvest permits for private landowners. Managers should remember that nutrition is only one component of carrying capacity - which includes water, shelter, and space. Extensive data exists about the potential negative impact of feeding on deer. Studies in Texas (Murden and Risenhoover, 1993) have shown that fed deer degrade rangeland by over-consuming high quality plants and under-consuming low quality plants. Guiterrez (1999) did not find that effect when South Texas deer were offered winter food plots. Donier et al. (1997) found in Minnesota that winter supplementation increased browse pressure within 900 m of feeders. Other reports (Williamson, 2000) show increased browse pressure within a 1-mile radius of feeders, perhaps due to concentration of deer. Ginnett and Cooper (Uvalde, TX Ag. Expt. Stn. - personal commun.) found 50% kernal home range sizes of fed deer were half that of unfed deer and that browse pressure near the feeder was 7 times that of unfed deer. Supplemental feeding has been suspected of contributing to the spread of tuberculosis in deer, chronic wasting disease in elk and deer, and brucellosis in elk and bison (Williamson, 2000). Crowding due to supplemental feeding led to fighting and injuries in Michigan deer (Ozoga, 1972). Feeding has actually led to starvation in deer due to the increase in population when feeding was initiated (Schmnitz, 1990 and McCullough, 1997). Supplemental feed is consumed by non-target species, possibly leading them to pass disease and to attract predators. Cooper and Ginnett (2000) found decreased survivorship of simulated turkey nests within 400 m of

deer feeders in Texas. Wilkins and Brown (1998) found illegal levels of the toxin aflatoxin in 40% of 100 randomly purchased bags of "deer corn" in Texas. The ecological significance of feeding is only part of the issue. Feeding leads to ethical questions as well. Feeding is part of the domestication process, along with fencing, health programs, and deer breeding that may be leading to the push for private ownership of wildlife. Feeding likewise adds to the list of advantages of hunter over hunted, and may decrease hunter satisfaction and increase concerns of anti-hunters and the non-hunting public (Ortega y Gasset, 1942). Deer managers and agency personnel should review the data presented here and incorporate it into their decision making when considering food plots, trough feeding or baiting of deer.

4:40 p.m.

*** Estimating Percent Use of Supplemental Feed by Free-ranging White-tailed Deer in South Texas. Marc Bartoskewitz and David Hewett - Texas A & M University at Kingsville, Fred Bryant - Ceasar Kleberg Wildlife Research Institute and John Pitts - MoorMan Feed, Inc.**

Despite its extensive use, there is little known about patterns of supplemental feed use by white-tailed deer. The objective of this study was to estimate percentage of free-ranging white-tailed deer using supplemental feed and to compare body and antler size between deer that used feed and those that did not. We provided chlortetracycline (CT) laced feed on 3 south Texas ranches for 2 weeks each month from July - September 1998-99. Chromium oxide (Cr2O3) laced feed was fed from October-January 1999 on the same ranches. Jaws were collected from hunter harvested deer and analyzed for presence of CT which indicated consumption of feed during summer. Fecal samples from harvested animals were analyzed for Cr2O3 to indicate consumption of feed during winter. Supplemental feed use by male white-tailed deer ranged among ranches from 20-50% of the population during summer and 20-60% during winter. Feed use by females ranged from 0-30% during summer and 9-30% during winter. Logistic regression showed ($P<0.01$) feed use was greater in males compared to females and mature males compared to young males. Similar patterns, although not as strong ($P<0.05$) were observed during winter. Analysis of supplemental feed effects on antler size and female body weights will be presented. Our data indicated that feeding programs in Texas are good at providing feed to mature bucks, but are poor at providing feed for females. The patterns of feed use we identified will help managers set realistic expectations for benefits from supplemental feed.

5:00 p.m.

Farmers and Hunters Feeding the Hungry. C. J. Winand - Bowhunter Magazine and Farmers and Hunters Feeding the Hungry

Bag limits for white-tailed deer have been increasing liberal throughout the country. This creates a great opportunity to provide a low fat, high protein meat to the hungry, especially in urban areas. Most states have a venison donation program to feed the hungry, but the biggest obstacle these organizations encounter is the lack of funds for butchering costs. A nationwide, non-profit feeding ministry called Farmers and Hunters Feeding the Hungry (FHFH) is changing this and inviting the various state programs to affiliate together under one venison feeding umbrella. This program, which started in Maryland (1999), is unparalleled and very unique in that whenever a hunter purchases their hunting license they have an option to donate $1.00 to FHFH. All revenue is then transferred from the MD-DNR to FHFH to help cover the processing costs. FHFH has also partnered with many well-known corporations within the hunting industry. These partnerships have assisted FHFH to

take our feeding ministry nationwide. During the past year FHFH and 28 of its affiliate states have processed and distributed over 750 tons (6,000,000+ servings) of venison. This total could feed the entire population of Washington, D.C. for over a week. Most non-hunters will support hunting if the meat is used wisely. Although there are various programs geared toward hunter retention and our hunting heritage, FHFH is most likely our best tool in promoting hunting to non-hunters well into the next century.

Tuesday, February 20, 2001

Technical Session IV - Management of Deer Populations

Moderator: Scott Osborne, Survey's and Research Program Coordinator - North Carolina Wildlife Resources Commission

8:20 a.m.

*** A Comparison of White-tailed Deer (*Odocoileus virginianus*) Population Estimation Methods in West Virginia. Christopher Langdon, John Edwards, and James Crum - West Virginia University and W. Mark Ford - USDA Forest Service**

Determining white-tailed deer population density is fundamental to evaluate deer herd status and to formulate effective management plans. Answering the age-old question of "How many deer are there?" is especially critical in areas where deer numbers are high enough to impact forest regeneration and/or agricultural production, yet are questioned by sportsmen. Although exact enumeration of deer numbers is both logistically and financially prohibitive in rugged and heavily forested areas such as the central Appalachians of West Virginia, there are estimation techniques that may be accurate and relatively cost-efficient. The goal of our study was to simultaneously evaluate three white-tailed deer population estimation methods on the Westvaco Ecosystem Research Forest, located in the Allegheny Highlands of east-central West Virginia. We estimated deer density by pellet-group counts, spotlight counts, and automated camera estimates during 2000 on approximately 2,000 acres of forest and cut over areas. Automated camera estimates were derived using both antlered to antlerless ratios and a known marked deer population. We present results comparing methods within summer and fall sampling periods, and we identify biases associated with each method.

8:40 a.m.

*** The Role of Computer Simulation Models in Management of White-tailed Deer. Kevin Clarke, Alan Woolf, and John Roseberry - Southern Illinois University and Paul Shelton - Illinois Department of Natural Resources**

The growing popularity of Quality Deer Management (QDM) for white-tailed deer (Odocoileus virginianus) leaves state agencies with a decision of whether to alter their deer harvest strategies. We conducted a survey of biologists from 33 states to obtain information on deer harvest strategies. Sixteen of the 29 respondents (55.2%) indicated their agencies practice some form of QDM; the majority (56.3%) of which do so on special-use areas only. One reason for the limited application of QDM could be the uncertainty associated with these management decisions. Simulation modeling is an approach that can be utilized by wildlife managers to predict outcomes and provide criteria

necessary to judge the effectiveness of various management scenarios. Post-implementation modifications of management practices can then be made based on criteria for failure determined from modeling results. In addition, implementation of management scenarios allows uncertainties to be addressed and models can be refined. We developed the Illinois Deer Harvest Simulation Model (IDHSM) based on an antlerless and either-sex permit structure. The IDHSM incorporates antler restrictions and addresses uncertainties related to QDM including impacts of restrictions on populations and harvest, and levels of compliance to QDM regulations. The effect of QDM regulations on hunter satisfaction can also be addressed by examining model outputs provided by IDHSM related to changes in population and harvest numbers, sex, and age structure. Our objective is to illustrate how utilization of simulation models can assist in determining the feasibility and outcome of implementing a new management policy such as QDM.

9:00 a.m.

Current Status of Fertility Control in Urban Deer Management. Robert Warren - University of Georgia

The term "urban deer" is used to describe white-tailed deer (Odocoileus virginianus) that have adapted to urban and suburban habitats throughout North America. In many of these areas, public opposition, municipal ordinances, or concerns for human safety prohibit the use of lethal methods (e.g., hunting and sharpshooting) for controlling these deer populations. Therefore, public interest in the use of fertility control as a non-lethal method of deer control has increased dramatically in recent years. Fertility control may seem to be a logical alternative method for controlling urban deer populations; however, the practical and logistical difficulties of capturing and administering fertility control have limited the applicability of this method. This paper briefly reviews published research on deer fertility control methods (surgical sterilization, steroid hormone implants, immunocontraception, and contragestation), considers the applicability of fertility control methods to urban deer management, and discusses advantages and disadvantages of the different methods. Despite the interest in fertility control as a means of controlling urban deer populations, much more research is required before these methods can be used in routine management. It is important that the public be informed about the distinction between fertility control in individually treated deer versus controlling entire deer populations. The Professional Wildlife Management Committee of the American Archery Council recently published a question-and-answer brochure on this topic to assist wildlife biologists in answering questions from the public. It can be downloaded free of charge from the following website: www.amo-archery.org.

9:20 a.m.

*** Genetic Analysis of Mississippi White-tailed Deer Populations. Randy DeYoung, Stephen Demarais, Rodney Honeycutt, Joel D. Anderson, and Robert Gonzales - Mississippi State University, and Kenneth Gee - Samuel Roberts Noble Foundation**

Historical population declines and subsequent restocking programs may have altered genetic relationships of white-tailed deer (Odocoileus virginianus) populations in the southeastern U.S. We examined genetic similarity among Mississippi deer populations based on a panel of microsatellite DNA markers. Nineteen microsatellite loci were amplified and scored for each of 210 white-tailed deer from 10 populations within Mississippi. We estimated pairwise genetic distance values for all population pairs and constructed a parsimonious neighbor-joining relationship tree. Additional deer from 1 population each in northern Florida, southeastern Oklahoma, and southern Texas were

included in the analysis as presumed out crossing groups (n=30 for each area) to lend scale to the within-Mississippi distance estimates. We also estimated multi locus heterozygosity (H), $\bar{X}$ alleles/locus, polymorphic information content (PIC), and exclusion probability (P_e) for each population. In general, H, $\bar{X}$ allels/locus, PIC, and P_e values were similar across all populations, suggesting that the microsatellite panel should be informative and useful for fine-scale genetic research in these white-tailed deer populations. We found substantial interpopulation variation in the Mississippi deer based on genetic distance values. Populations did not all cluster together based on geographic proximity and population groupings did not reflect accepted subspecies boundaries.

9:40 a.m.

Estimating Population Trends in a Managed Deer Herd. Raymond Winchcombe and Richard Ostfeld - Institute for Ecosystem Studies

Reliable methods of monitoring white-tailed deer abundance are required in order to properly manage deer populations. We analyzed 19 years of fall spotlighting data to identify any trends in deer abundance on a 778 ha property in southeastern New York. We also compared 13 years of deer observation data by bowhunters with spotlighting counts to determine if any relationship existed. Spotlighting counts revealed an average 2% annual increase in deer numbers from 1981 to 1999 at our site (average coefficient of variation = 18%). Spotlight counts obtained from 2-4 nights of spotlighting were highly correlated ® > 0.94) with those obtained from 7-11 nights, suggesting that a modest spotlighting effort can suffice as a useful population index. Variability in acorn production appeared to influence the efficiency of spotlighting counts, as suggested by a nonsignificant (P = 0.08), negative correlation between a mast index and spotlighting counts. The number of deer observed per hour by bowhunters were significantly correlated with spotlight counts ® = 0.82; P = 0.001) for the same year but may exhibit a threshold effect regarding minimum hours of observation effort. Total annual counts of deer by bowhunters showed no trend through time. We conclude that both spotlighting counts and bowhunter observations can provide a reliable index to changes in local deer numbers, which can help direct and assess management decisions. Further, hunter observation data costs little to obtain and may be used to index deer abundance in areas where spotlighting is not feasible.

10:00 a.m.

Genetic and Environmental Interaction in White-tailed Deer. John D. Williams - Texas A & M University, William E. Armstrong, Donnie Frels, Donnie Harmel and Eugene R. Fuchs - Texas Parks and Wildlife Department

Research studies conducted by the Texas Parks and Wildlife Department have demonstrated that genetics affect body size and antler characteristics in white-tailed deer (Odocoileus virginianus). Further research in penned deer indicated that in the presence of an optimum ad libitum 16% protein diet, some deer consistently produced yearling offspring with spiked antlers while others consistently produced yearling offspring with forked antlers. Departmental check station data indicate that the incidence of spiked antlers increases during extended periods of drought and poor habitat conditions. But even during times of nutritional stress, some yearling bucks were able to produce antlers with 6 or more points. This supports the theory that yearling bucks under natural conditions can generally be categorized into 3 groups based on their genetic potential: 1) bucks able to produce good antler characteristics in the presence of severe nutritional stress 2) bucks which will produce poor antler characteristics regardless of available nutrition and 3) the most common group, those bucks which

produce good antler characteristics in periods of "good" nutrition and poor antler characteristics in periods of "poor" nutrition. This study was designed to determine the effects of selection or "culling" based on yearling buck antler development and was conducted at the Donnie E. Harmel White-tailed Deer Research Facility located on the Kerr Wildlife Management Area. From 1991 to 1999, pedigreed yearling bucks were placed with 8-14 pedigreed does to comprise single sire herds. In October of each year, their tagged offspring were removed from their dams, segregated according to sex and placed in 2 separate pens. Beginning each December, all buck fawns were placed on a limited 8% protein diet to simulate nutritional stress conditions. The following October, those 5 or 6 males which exhibited the best antler production and body size under these conditions were used as herd sires. Females producing spike offspring or related to spike yearlings were removed. Since the study was initiated, 41 single-sire breeding herds have produced 223 yearling males on this restrictive diet. One hundred thirty-four yearling bucks (60%) have produced antlers with 6 or more points while 29 (13%) have produced spiked antlers. The annual percentage of spike antlered yearlings has declined from 33% (in the 1992 cohort) to 3% (in the 99 cohort). These data suggest antler characteristics can be improved by selecting yearling bucks that perform well under adverse nutritional conditions as opposed to those that perform well under optimal conditions. Furthermore, these data support the opinion that antler characteristics of a deer herd can be improved through selective harvest strategies designed to remove those yearling bucks exhibiting lesser quality antlers.

Technical Session V - Quality Deer Management

Moderator: Steve Shea, Wildlife Biologist - St. Joe Timberland Company

10:50 a.m.

Setting Seasons to Enhance Hunting on QDM Lands. Kim Tolson - University of Louisiana at Monroe

Many clubs and landowners in Louisiana are voluntarily participating in QDM. Quality deer are being produced on these lands. Setting deer seasons to allow hunters to hunt during peak rutting times allow these participants to both see and harvest quality bucks. Hunters in northeastern Louisiana felt that their deer season ended too soon and they were missing out on this peak activity. A two-year study was conducted in this bottomland hardwood region for the 1998/1999 and 1999/2000 seasons. The buck population was monitored by documenting visits to scrape sites using sensor cameras. Does were harvested after the hunting season and reproductive tracts were collected to determine number of fetuses, fetal age, and number of corpora lutea. Breeding dates, fetus/doe ratios, and reproductive efficiency (#cl/#fetuses) were calculated. Scraping activity of bucks was found to be the highest prior to peak breeding with some scrapes being initiated as early as September. Breeding dates revealed that 54% of does (44/81) were bred between December 25 and January 10, with 33% being bred prior to these dates and 12% after these dates. One parish in this region, East Carroll, has been participating in QDM for twenty years and the annual doe harvest is 1/70 acres. Data from this parish thirty years ago documented a fetus/doe ration of 0.7. Today, the ratio is 1.94. QDM has not only improved buck quality but has helped produce a healthier deer herd. The deer season has been expanded in this area of the state from a closing date of January 1 to mid-January.

11:10 a.m.

White-tailed Deer Management in Florida's Wildlife Management Areas: Balancing Quantity and Quality. Jonathan Day and John Morgan - Florida Fish and Wildlife Conservation Commission

The history of deer management in Florida is similar to other southeastern states, without the recent impetus to increase doe harvest and reduce buck harvest. In the late 1970s, the Florida Game and Fresh Water Fish Commission began providing doe harvest opportunities through antlerless deer permits on some Wildlife Management Areas. Research has suggested, however, that some Florida deer herds may not be density dependent, and many habitats in Florida may naturally support low-density herds. Thus, few changes have been made to dramatically increase doe harvest on Commission-managed lands in the past 30 years while buck harvest has remained liberal. This traditional approach to deer management has led to a buck harvest on public land comprised of >50% 0.5 and 1.5-year-olds over the past 20 years. Florida hunters are now becoming more interested in quality deer hunting experiences. To meet this growing interest in a greater diversity of hunting opportunities, the Florida Fish and Wildlife Conservation Commission (FWC) has initiated new strategies on a select few management areas to provide hunters with more options on public land. Special-opportunity Deer Hunts limit the number of hunters and invoke a 4-points-on-one-side rule. Forked-antler WMAs limit buck harvest to those with at least one forked antler. Both strategies have been successful at producing an older age structure of harvested bucks and are increasing in popularity. Special-opportunity deer hunts have exceeded the quality standards of Florida hunters and produced first-year satisfaction levels of 90%. For several reasons, current deer management is Florida is different than in other southeastern states. However, as the FWC evolves to meet the changing desires of hunters, we are employing strategies on specific areas that mimic statewide strategies in other southeastern states, searching for a balance of hunter opportunity and quality deer.

11:30 a.m.

Before, During and After QDM on a Wildlife Management Area In Georgia. Kent Kammermeyer and Jerry Bearden - Georgia Department of Natural Resources

Crockford-Pigeon Mountain Wildlife Management Area is 17,000 acres in the Ridge and Valley Province of Northwestern Georgia with a long deer harvest history. Beginning in 1991, the area switched from traditional management to quality deer (QDM) regulations (4 points on one side minimum). In 1997, due to low quality buck kill and resulting lack of hunter support, the area reverted back to traditional management. We compared means for 6 years pre-QDM, 6 years during QDM, and years post-QDM. The QDM period (versus pre-QDM) was characterized by higher number of hunters (1253 versus 950), significantly lower ($P<0.01$) hunter success (7% versus 22%), significantly lower ($P<0.01$) deer harvest, lower quality buck harvest (0.7 versus 1.1/sq. mi.), and lower doe harvest (1.9 versus 3.3/sq. mi.). The area was unsuccessful at QDM because of temporarily low population numbers (in both pre-QDM and QDM periods) due to the combination of 5 consecutive poor acorn years, relatively high doe harvests (in pre-QDM and early on in QDM), low recruitment, and a blizzard. When taken out of QDM, there was one year of phenomenal buck harvest in 1997 with 78 quality bucks harvested (2.9/sq. mi.), then an immediate return to buck age structures and kill numbers reflective of the pre-QDM data. A reconstruction table revealed that over one-half of the bucks produced on the area during the 6 years of QDM disappeared from the age structure and were never accounted for. The adult doe age structure finally revealed cumulative doe

over harvest and population decline in 1995 several years after the fact. In addition to the unexplained loss of bucks in the harvest, an over harvest of does during poor mast years contributed greatly to the decline in the population, hunter success and recruitment that fueled reduced hunter support for the program. We recommend close examination of hunter success, recruitment rates and other parameters to avoid a potentially premature elimination of a QDM program due to over harvest of does and reduced hunter satisfaction.

11:50 a.m.

MHC-associated Variation in Antlers on White-tailed Deer: Evidence for "Good Genes" Advertisement. Steve Ditchkoff, Ronald Masters, Robert Lochmiller, Steven Hoofer, Ronald A. VanDen Bussche - Oklahoma State University, and William Starry - McAlester Army Ammunition Plant

"Good-genes" hypotheses predict that development of antlers in a honest advertisement of heritable male quality. We explored this hypothesis using adult male white-tailed deer to determine whether antler development could provide an honest signal of a male's genetic quality and condition to adversaries. We compared antler, morphometric, hormonal, and parasitic data collected from hunter-harvested deer with characteristics of the Mhc-DRB, the most widely studied gene of the major histocompatibility complex in Artiodactyla. We detected associations between genetic characteristics at Odvi-DRB and antler development and body mass suggesting that antler development and body mass may be associated with pathogen resistance in deer and hence may be an honest signal of genetic quality. We also detected associations between Odvi-DRB characteristics and serum testosterone during the breeding season suggesting that certain MHC characteristics may help deer cope with stresses related to breeding activity. We also observed a negative relationship between degree of antler development and overall abundance of abomasal helminths. Our observations provide support for the hypothesis that antler development in white-tailed deer in an honest signal of quality.

Technical Session VI - Habitat Management and Resource Techniques

Moderator: W. Matt Knox, Deer Project Leader - Virginia Department of Game and Inland Fisheries

1:30 p.m.

The Potential Effects of a White-tailed Deer Parasite on an Eastern Elk Population. Karen Alexy and David Guynn - Clemson University, Jonathan Gassett and Charles Logsdon - Kentucky Department of Fish and Wildlife Resources, David Maehr - University of Kentucky at Lexington, and William R. Davidson - University of Georgia

Following their absence for nearly 150 years, elk (Cervus elaphus) were restored to Kentucky in 1997. The potential of subjecting introduced elk to endemic diseases must be considered when restoring elk to the Southeast. Meningeal worm (Parelaphestrongylus tenuis) is a parasitic nematode lungworm that occurs throughout most of the Southeast. Its definitive host is the white-tailed deer (Odocoileus virginianus) and usually has no effect on this species. However, it can cause fatal neurologic disease in elk. Therefore, it is important to determine the extent of damage that meningeal worm could cause to the growth of an eastern elk population. To learn the potential

effects of this nematode, we determined the amount of meningeal worm infection in the intermediate host (snails and slugs) and the definitive host (white-tailed deer) from the elk restoration area. To survey the snails and slugs we placed 800 coverboards (2-ft x 4-ft x 3/8-in plywood) in eastern Kentucky and determined species composition, densities in different habitat types, and infection rates of meningeal worm in these species. To determine the infection rates in white-tailed deer we examined 150 deer heads from 14 counties in eastern Kentucky that have sympatric deer and elk herds. Meningeal worm infection has been diagnosed as the cause of mortality or morbidity in several restored elk in Kentucky. Therefore, it is important to determine the overall impact caused by this nematode so wildlife managers can use this information in harvest management decisions.

1:50 p.m.

Effects of Herbaceous Competition Control Tank Mixes on Habitat Quality in Piedmont Pine Plantations. Patrick Keyser and Vick Ford - Westvaco Corporation

Two different tracts in the Piedmont of Virginia were experimentally sprayed with seven different rates/combinations of imazapyr and sulfometuron methyl in 1991. Both tracts had been operationally harvested and site prepared mechanically by wind-rowing in 1990. In April 1991 the herbicide treatments were applied by backpack sprayer on 21 randomly assigned plots comprising three blocks per site. In addition, three controls were randomly assigned on each tract for a total of 24/block treatment combinations per site. Vegetation was measured in July 1991 and again in July 1992 using a line-intercept method. Data were analyzed using a two-way ANOVA with rate and location as factors. Results were highly significant for total herbaceous coverage, coverage by valuable food plants, and total species present by rate ($p<0.0017$) in year one. In year two total herbaceous coverage remained different ($p<0.01$) but not food or total species. Location effects were significant in year one for total species only ($p<0.1$), and in year two for cover only ($p<0.052$). In 1991, heavier rates of herbicides reduced total coverage, food, and plant species when compared to lighter rates and the control. By 1992, these effects were no longer evident except in total coverage. Except for the two heaviest rates, all coverage values were the same as the control. Where wildlife is a high priority, lower rates should be considered for herbaceous competition control.

2:10 p.m.

*** Habitat Conservation Planning For Florida Key Deer. Roel Lopez and Nova Silvy - Texas A & M University and Phil Frank - National Key Deer Refuge**

Florida Key deer (Odocoileus virginianus clavium) are endemic to the lower Florida Keys, with 75% of the deer population residing in Big Pine and No Name keys. Rapid development and urbanization in the Florida Keys has occurred in the last 30 years, altering the landscape and threatening the deer population with extinction. We conducted a population viability analysis to determined the population's risk of extinction under current conditions and several management scenarios. We developed a spatially based, state-structured, stochastic computer model using the programs RAMAS and ArcView. Model parameters were estimated using monthly road count data (1968-2000), radiotelemetry locations (1968-72, 1998-00, n=314), and necropsy data (1966-2000). Spatial data used in our analysis included vegetation, deer locations, ownership patterns, and habitat patch quality. Model results suggest that under current conditions the deer population is viable for the simulation's time horizon of 100 years. Furthermore, our model was used to identify and target areas important to deer, and areas where further development could occur. The most effective strategy to decrease the risk of extinction was to decrease highway mortality. Our model is currently being used

in resolving land use among stakeholders, and is a planning tool in a regional Habitat Conservation Plan for Key deer on Big Pine and No Name keys.

2:30 p.m.

A Forage Yield Comparison Between Summer Annual Legumes Unprotected and Protected From Early Foraging. R. Larry Corbett - University of Georgia Cooperative Extension Service

The use of food plots has become standard practice in southeastern deer management. Unfortunately many of the plots are small and deer use is intense soon after emergence. This study was designed to measure forage utilization of six summer annual legumes in an environment totally unprotected beginning at planting in comparison to plots protected by an electric fence for a 5 ½ week period. The six legumes utilized were alyceclover, cowpea, jointvetch, lablab, soybean, and velvetbean. Plots were arranged in a completely randomized design with each plot measuring 200 m^2. Forty percent of each plot was unprotected beginning at planting, 40% was protected for 5 ½ weeks and 20% was totally protected and used for harvest. Plots were replicated four times for each species. Unprotected and protected plots were hand-harvested weekly beginning twenty-six days and forty-eight days, respectively, after planting and continuing for 115 days after planting. Harvest was intended to duplicate forage utilization in a manner consistent with each treatment. Results show significant differences in yield for unprotected and protected plots of all species except alyceclover. Yields were used to estimate white-tailed deer carrying capacity per acre of plot adjusted to a 150-day basis. Carrying capacity estimates and plot costs were subsequently used to assign a cost per deer for each plant species in both treatments. Results suggest that some plants are suitable for planting in small unprotected plots. Other plants would be suitable if protected during early growth but possibly cost prohibitive in an unprotected environment.

Technical Session VII - Deer Physiology and Behavior

Moderator: Kurt VerCauteren, Research Wildlife Biologist -
USDA/APHIS/WS/National Wildlife Research Center

3:10 p.m.

Noninvasive Measurement of Stress in White-tailed Deer. Josh Millspaugh and Brian Washburn - University of Missouri, Tamara Meyer - University of Missouri and Missouri Department of Conservation, Brita Woeck and Chadwick Rittenhouse - University of Missouri, Jeff Beringer and Lonnie Hansen - Missouri Department of Conservation, Alex Bermudez and Mark Milanick - University of Missouri

Naturally occurring and human-induced stressors may compromise the well-being of individual animals and populations by reducing resistance to disease, survival, or reproductive output. Measuring stress in free-ranging vertebrates, such as white-tailed deer (Odocoileus virginianus), is very difficult and traditional invasive procedures (e.g., animal capture and blood collection) have been the only tools available to researchers. Noninvasive techniques, including fecal glucocorticoid measurements, are currently being developed that offer advantages over traditional techniques. We validated the utility of fecal glucocorticoid measurements as a measure of stress in the white-tailed deer using an adrenocorticotropin (ACTH) challenge. Two hand-reared captive female white-tailed

deer were independently housed in an outdoor pen for 72 hours. After an initial 24 hours, a 0.25 mg injection of ACTH (Cortrosyn™) was given intramuscularly. A second 0.25 mg ACTH injection was given about 1.5 hours later, resulting in a combined dose of ACTH at approximately 1 IU/kg of body weight. Every hour, all fecal samples were collected and frozen. In the laboratory, all fecal samples will be freeze-dried and fecal glucocorticoids will be extracted and assayed using a commercially available I-125 radioimmunoassay. If a significant, predictable increase in fecal glucocorticoids occurs about 15 - 20 hours post-injection, the assay's ability to detect biologically important changes in fecal glucocorticoid levels is validated. We will illustrate the type of information offered by such non-invasive techniques using a case study of elk (Cervus elaphus) in South Dakota. In addition, we will discuss some limitations of the technique and propose ideas regarding the refinement and application of the technique in field studies of white-tailed deer.

3:30 p.m.

*** Annual Survival and Mortality Rates of Captive-reared White-tailed Deer Fawns Released Back Into the Wild. Preston Mabry - Southeast Missouri State University, Jeff Beringer and Lonnie Hansen - Missouri Department of Conservation and Bill Eddleman - Southeast Missouri State University**

Each year fawns are "picked-up" by the public and brought to the Missouri Department of Conservation. Of these fawns, some are immediately released, some are euthanized and some are taken to rehabilitators. Twenty-five native fawns were raised at the Wildlife Rescue Center (WRC) in Ballwin, Missouri. Fawns were given fresh browse, fresh grain mix and formula daily until about 12 weeks of age. Rearing took place in 3 acres of the WRC, including an intensive care area, an indoor area with chainlink outdoor runs and an outdoor facility with 4448 ft^2 enclosed with 8' high solid walls. Fawns were monitored and weighed weekly, and health was assessed daily. A survey was sent to Conservation agents in Missouri to estimate the total number of fawns and fawn calls taken per year. Fawns were neck collared with expandable break-away mounts with motion sensitive radio transmitters on a 4-hour switch (Advanced Telemetry Systems, Inc., Isanti, Minnesota) and released at Mingo National Wildlife Refuge in Stoddard Co., and Wayne Co., Missouri. The average age at release was 15 weeks. Fawns were monitored with 4-element yagi antennas attached to vehicle or aircraft. Locations were taken daily for 2 weeks, and thereafter locations were taken 4 times per week. Estimation of tracking error was taken by methods delineated by Garret and White (1990). Date of mortality was noted, and for the first month tissue samples of the muscle, heart, kidney, spleen, and liver were taken if available and the cause of death was determined. Annual survival rates and movements will be determined later in the study.

3:50 p.m.

Deer-vehicle Accidents at the Savannah River Site - Is Vegetation a Factor? Rakesh Malhotra - University of Georgia and Paul Johns - Savannah River Ecology Laboratory

Deer-vehicle collisions are a common occurrence on highways of the Eastern United States. Several past studies have stated that factors such as traffic density and seasonal deer behavior influence the timing and spatial occurrence of collisions. Another factor that might contribute to such collisions is roadside vegetation. Types of vegetation present around roads might influence deer movement and behavior. This study analyzed vegetation maps created from 1:16,000 true colors aerial photographs and locations of deer collisions that occurred from 1995 to 1997 at the Savannah River Site. To control for seasonal variability in deer behavior, the analysis for each of the four seasons

was carried out separately. Collision and random points were buffered at several radii (820, 1640, and 3280 feet), and vegetation characteristics around these points were recorded using GIS. This information was then compared to the vegetation found around random points along roads. As our dependent variable had only two outcomes (accident or random point) we used binary logistic regression to analyze the various vegetation types to see whether any of them were significantly correlated with the spatial occurrence of accidents. Upon analyzing accidents that occurred in fall, we concluded that accidents are negatively correlated to built-up areas but positively correlated to open/grass areas.

4:10 p.m.

Does Moon Phase Chronology Determine White-tailed Deer Breeding Dates? David Osborn, K. V. Miller and R. J. Warren - University of Georgia, J. J. Ozoga - Michigan Department of Natural Resources, S. Demarais, B. Strickland and H. A. Jacobson - Mississippi State University, L. P. Hansen and J. Beringer - Missouri Department of Conservation, C. R. Ruth - South Carolina Department of Natural Resources, R. J. Hamilton - Ducks Unlimited, E. L. Young and M. Traweek - Texas Parks and Wildlife, G. Lavigne - Maine Department of Inland Fisheries and Wildlife and M. Lenarz - Minnesota Department of Natural Resources

Despite considerable speculation, the potential influence of moon phases on white-tailed deer breeding chronology has not received serious scientific inquiry. Previous reports relating moon phases to breeding dates have represented only a few deer or were based on fawning dates (i.e., range of gestation), which are highly variable. We examined relationships of moon phase chronology and known estrous dates of captive deer in Georgia, Mississippi, South Carolina, and Virginia. Because moon phase chronology varies among years, timing of estrus for individual does as well as mean breeding dates for populations of deer should vary among years if moon phase is an important controlling stimulus. Preliminary analyses of these data (n >100 captive deer, representing >170 known estrous events across >16 years) indicated no relationship between moon phase chronology and estrous dates. Because these studies on captive deer from southern herds might not adequately test the moon's influence on wild deer from throughout the species' range, we also examined deer conception data collected during multiple years from various geographical locations across the United States. Our data set included known breeding dates for >2,500 does from populations in South Carolina, Texas, Mississippi, Missouri, Maine, Minnesota, and Michigan, with between 3 and 19 years of data for each population. Our analyses revealed that the relationship between annual mean breeding dates and moon phase chronology was highly variable. Therefore, we believe it is not necessary to revise the conventional understanding among deer biologists that mean breeding dates are primarily influenced by photoperiod and are relatively consistent among years within a particular population. Our presentation compares conception dates among years for various captive and wild populations based on Julian date versus moon phase.

APPENDIX I
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 75-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 were 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%).

Approximately 1,500 Cooperators covering more than 3 million acres are currently enrolled in Alabama's Deer Management Assistance Program (DMP). 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 this continued need and desire for more opportunities to harvest antlerless deer, the lengths of either-sex seasons in many counties were again 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 raised to two deer a day, only one of which could be antlered, with no season limit applying to antlered or antlerless deer. These changes gave hunters in most of Alabama ample opportunity to harvest antlerless deer. This increase should provide the framework many landowners, hunting clubs, etc. need to manage their properties as they wish, without having to enroll in the DMP. It is also 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.

ARKANSAS

Arkansas is a very diverse state in terms of physical and biotic characteristics. In terms of topography, geological 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 Coast 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, shortleaf 33pine-upland hardwood, loblolly pine-bottomland 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 the 1950's, with a large number of record book bucks harvested in several areas of the state. 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. The highest populations of deer and heaviest hunting pressure occur in the West Gulf Coastal Plain division. The herd in this region is characterized by high numbers of antlerless deer and poor antler development. The largest deer and best quality deer occur in portions of the Mississippi Alluvial Plain division. Population levels in the Ozark and Ouachita Mountain divisions are classed as low to moderate with high densities in localized, highly protected areas. Age-class distribution, especially for bucks, and herd-quality indices are superior to those in the West Gulf Coastal Plain division.

Deer management zones are used for statewide herd management. Antlerless harvest is accomplished with the use of either-sex primitive weapons and modern firearms hunting seasons. Management efforts are directed toward increasing the antlerless harvest and reducing the antlered harvest. A more conservative antlerless harvest strategy is being taken in portions of the state where lower deer populations occur. For the 1998 deer season, Arkansas implemented a three-point rule statewide except for some wildlife management areas and federal refuges. Legal bucks must have at least three points (one inch or longer) on at least one antler. This regulation was implemented to to reduce the harvest of young bucks and improve the antlered to antlerless ratios in the state.

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 – 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 WMAs, 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

Mississippi contains 8 major soil regions that vary greatly in fertility and use. Predominate land uses are forestry and agriculture. Forests, which occupy 55% of the state, include natural stands of hardwoods, pines, mixed pine-hardwoods, and plantations of primarily pine. The majority (69%) of the forestlands are owned by private non-industrial landowners and about 10% is in public ownership. Primary agricultural crops are soybeans, cotton, sorghum and rice.

The history of the white-tailed deer in Mississippi has been very similar to that in many other southeastern states. Despite some sporadic attempts at protection in the late 1800's and early 1900's, the white-tailed deer was almost completely eliminated from the state. In 1929, Aldo Leopold reported that only small herds remained in limited parts of the Mississippi Delta and in the Pearl and Pascagoula River swamps. The Mississippi Game and Fish Commission was established by the state Legislature in 1932 and by 1940 a deer restoration project, funded principally by Pittman-Robertson moneys, was well underway. Deer were translocated from North Carolina, Texas and other states as well as Mexico to refuges in Mississippi. Due to these restoration efforts coupled with strict law enforcement, the state's deer herd has experienced tremendous growth and is now estimated at 1,750,000 animals. There are currently 139,000 resident deer hunters who harvested approximately 262,000 deer during the 1993 season.

With the success of Mississippi's deer restoration program came complex resource and people management problems. Through a cooperative research program with Mississippi State University, initiated in 1976, the Mississippi Department of Wildlife, Fisheries and Parks has gained information useful for both public and private needs in deer herd management.

Even though antlerless harvest was first allowed on private clubs as early as 1960, many hunters in Mississippi are resistant to following currently accepted, scientifically based harvest recommendations of biologists. Therefore, deer management in the state ranges from intensive "quality deer" strategies to bucks-only harvest on some areas. Much of the antlerless harvest and management objectives are currently being accomplished through the very successful Deer Management Assistance Program (DMAP). In 1990 there were about 900 cooperators in the program, encompassing 2.3 million acres. The harvest ratio of antlered to antlerless on DMAP land is about 1:1, while on a statewide basis antlerless deer make up only about 29% of the total harvest.

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, it's 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 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 1998 pre-season population estimate was 950,000 deer. During the 1999-00 hunting season, either-sex regulations in about two-thirds of the state 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 benefitted 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 200 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. 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 set the last two days 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/leesees 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 3,000 properties encompassing over 4 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 can not be used on properties already enrolled in the ADQP. Currently, over 30,000 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 composed 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. Deer habitat quality consequently 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 are less abundant, although they are increasing rapidly. The habitat in the mountainous eastern portion of the state is less productive than the rest of the state, and deer herds in these areas will probably not reach the densities that have been achieved in middle and western Tennessee.

Tennessee is blessed with abundant public hunting opportunity. Over 2,000,000 acres of land is available for hunting by the general public. About 1.3 million of these acres are managed by state and federal agencies, and provide a variety of hunting opportunities. Another 700,000 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 ($12-$25).

The history of Tennessee's deer herd is similar to that of other states. The low point in numbers of deer occurred at the turn of the century, when it is estimated that the herd numbered less than 2,000 deer. 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 activities, most deer were obtained from out of state, with the states of North Carolina, Texas, and Wisconsin providing the bulk of the deer that later served as in-state sources for subsequent stocking. 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 to be approximately 829,000. The deer harvest has grown accordingly, from 113 in 1949 to over 150,341 in 1997.

Deer management in Tennessee is conducted on a unit basis, with 2 major 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 desired doe harvests are determined. Doe harvests are accomplished through the issuance of quota permits allocated by drawing. Since 1975, the antlerless harvest in Tennessee has increased from 23% to over 41% of the total harvest in 1997.

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 composed 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 about 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 Piney Woods 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 feed the settlers and early city-dwellers caused 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 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 harvest of the low-end bucks and trophy bucks. Selective harvest seems to be a tool which will gain prominence in the state.

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 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 again 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 harvest during the 1999 hunting season was 190,043 (96,745 antlered males, 19,867 male fawns, 71,555 females (38.0%) and 1,876 deer of unrecorded sex). The archery and muzzleloading harvest were 15,370 (8.1%) and 40,638 (21.4%) respectively. Harvest data in Virginia represent an actual known minimum count. Data are obtained through mandatory tagging and subsequent checking at one of about 1,350 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 distant 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 southwester 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 lands (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 two site-specific deer management programs, 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 1999 season, there were 588 DMAP cooperators encompassing 1,212,000 acres in 83 counties. These DMAP cooperators were issued a total of 19,215 antlerless tags and reported a total deer harvest of 15,999. Biological data is collected from all these animals. Also during the 1999 deer season, there were 725 DCAP cooperators comprising 215,000 acres. These DCAP cooperators were issued 6,635 antlerless tags and reported a harvest of 1,619 antlerless DCAP deer.

Virginia 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. During the late 1980's and early 1990's, the total statewide deer harvest and the percent females in the harvest was increased dramatically through rapid liberalization of deer seasons, bag limits, and number of general firearms either-sex hunting days. This change in management direction was designed to increase antlerless deer harvest to levels necessary to stabilize and/or reduce the deer herd. Consequently, between 1988-92, total deer harvest levels increased 75% and percent females in the total harvest was increased from 33% to

40%. For the past eight seasons, deer harvest levels and percent females in the harvest have been fairly stable at 178,000-220,000 and 38-43% respectively.

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. Stable antlered male harvest levels and trends appear to indicate that deer regulations/seasons have been successful in controlling herd growth.

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 Virginina.

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 250,000 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 surplus 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. It wasn't until 1968, when unregulated hunter-choice seasons were curtailed, that the deer herd began to rebound at a tremendous rate to its' present day population. Twenty years ago, West Virginia's deer harvest totaled 25,863 animals under archery and bucks-only regulations. In 1993, West Virginia sportsmen harvested 169,014 deer under lengthy archery, 12-day bucks-only, 3-day antlerless and 6-day muzzleloader seasons. In 1970, the bag limit was 2 deer. Today, resident hunters may take as many as 7 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.

APPENDIX II
STATE DEER
HARVEST SUMMARIES

Table 1. Southeastern Deer Harvest Summaries 1999 - 2000

State	Land Area (sq. mi)	Deer Habitat (sq. mi.)	Deer Habitat (% Total)	Percent Forested	Deer Range Unoccupied	% Land Area Public Hunting	1999-2000 Harvest Male	1999-2000 Harvest Female	1999-2000 Harvest Total
AL	51,628	48,014	93	66	0	5	228,000	188,000	416,000
AR	52,609	44,677	85	53	0	12	92,586	102,101	194,687
FL	51,628	29,280	57	45	0	16	88,961	32,756	121,717
GA	57,800	37,181	64	64	0	6	200,788	196,748	404,000
KY	40,395	39,654	97	59	0	9	73,165	67,770	140,935
LA	41,406	26,562	64	52	0	4	141,775	125,725	267,500
MD	9,837	8,766	89	43	0	4	46,189	31,471	77,660
MO	69,561	21,396	31	31	0	4	127,605	90,255	218,059
MS	47,296	31,250	66	66	0	6	142,027[1]	133,565[1]	276,361[1]
NC	48,794	36,699	75	62	0	6	132,082	69,977	202,059
OK	69,919	37,425	54	19	0	2	55,099	27,625	82,724
SC	30,207	21,920	73	63	0	7	130,000	120,000	250,000
TN	42,246	25,770	61	49	0	9	88,811	54,686	143,497
TX	261,914	129,592	49	40	<10	<2	239,859	180,328	420,187
VA	39,682	31,479	79	63	0	7	116,612	71,555	190,043
WV	24,064	22,889	95	79	0	9	–[2]	–[2]	–[2]

Table 1. Continued

State	Harvest/mi² Occupied Habitat[3]	Method of Data Collection	Estimated Pre-season Population	Length of Season (Days)			Method for Setting Seasons[4]	% Land Area Open to Dog Hunting
				Archery	Black Powder	Firearms		
AL	8.7	1, 2, 3	1,750,000	109	17	73	1, 2	70
AR	4.4	1, 3	1,000,000	152	25	40	1, 2	81
FL	4.1	2	N/A	30	3	72	1, 2	20
GA	10.9	1, 2, 3, 4	1,200,000	35	7	70 – 80	1, 2, 3	10
KY	3.5	1, 3, 4	611,191	121	9	14	1, 2	0
LA	6.5	1, 2, 3	1,000,000	123	14	60	1, 2, 3	80
MD	7.9	1, 2, 3, 4	224,000	87	18	13	1, 2	0
MO	10.2	1, 2, 4	900,000	98	9	15	1, 2	0
MS	5.8	1, 2, 3	1,500,000	62	14	60	1, 2, 3	99
NC	5.5	1, 2, 3, 4	950,000	24 – 54	6	18 – 66	1, 2, 3	53
OK	2.2	1, 3	450,000	83	9	9	1, 2	0
SC	13.8	1, 2, 3	1,000,000	12	10	70 – 140	1, 2, 3	60
TN	5.6	1, 4	900,000	52	14	39	1, 2, 3	0
TX	3.2	2, 3, 4	3,722,621	30	8	16 – 123	1, 2	0
VA	6	1, 2, 3, 4	900,000	37 – 43	12 – 24	12 – 42	1, 2	55
WV	–[2]	1	–[2]	65	6	18	1, 2	0

Table 1. Continued

State	No. Deer Hunters	5-Year Trend	Hunting License Fees		% Hunting Success		Typical Fine Illegal Deer	Avg. Leasing Fees/Acre
			Resident	Non-Resident	Archery	Firearms		
AL	221,700	Down	$16	$202	25	50	$150 – 600	$4 – 15
AR	250,000	Stable	$10.50 – 25	$100 – 225	N/A	N/A	$150 – 1,000	$2 – 4
FL	N/A	Stable	$12	$151	N/A	N/A	$250 – 500	$2 – 5
GA	293,468	Down	$19	$177	27	57	$500	$5 – 10
KY	245,421	Stable	$33.50	$116	25	57	$350	N/A
LA	193,300	Stable	$29 – 50	$220 – 425	25	60	$500	$3 – 30
MD	77,000	Down	$24.50	$120.50	50	60	$500	$5 – 35
MO	425,000	Stable	$15	$125	20	40	$100 – 250	$2 – 5
MS	161,650	Down	$ 17 – 32	$ 105 – 225	40	63	$150	$3 – 5
NC	285,000	Stable	$25	$80	N/A	47	$200 – 500	$2 – 6
OK	190,000	Stable	$29	$201	13	28	$55 – 1,000	$2 – 5
SC	187,691	Stable	$20	$114 – 189	N/A	76	$200	$4 – 10+
TN	228,985	Stable	$39	$156	23	40	$50 – 500	$4
TX	516, 525	Down	$19	$250	18	61	$25 – 501	$5 – 7
VA	268, 216	Down	$25 – 50	$122 – 174	28	48	$50 – 850	$4
WV	345,000	Stable	$25	$110	– [2]	– [2]	$282 – 562	$1 – 5

Table 1. Continued

State	Mandatory Hunter Education	Number Fatal Hunting Accidents		Mandatory Blaze Orange	Handguns Permitted	Crossbows Permitted	Drugged Arrows Permitted	Highway Kill (Minimum)
		All	Deer					
AL	Yes	4	3	Yes	Yes	Handicap	No	10,000
AR	Yes	10	6	Yes	Yes	Yes	No	9,350
FL	Yes	1	1	Yes	Yes	Yes	No	N/A
GA	Yes	5	4	Yes	Yes	No	No	9,000
KY	Yes	0	0	Yes	Yes	Yes	No	4,000
LA	Yes	N/A	N/A	Yes	Yes	Handicap & > 60	No	2,500
MD	Yes	4	3	Yes	Yes	Handicap	No	3,000
MO	Yes	3	1	Yes	Yes	Yes - Firearms	No	8,138
MS	Yes	11	9	Yes	Yes	Handicap & ≥ 65	Yes	7,500
NC	Yes	5	5	Yes	Yes	Handicap	No	6,000
OK	Yes	Unknown	0	Yes	Yes	Handicap	No	728
SC	Yes	8	7	Yes (18 co.)	Yes	Yes	Yes (28 co.)	3,404
TN	Yes	2	2	Yes	Yes	Handicap	No	N/A
TX	Yes	6	1	WMAs only	Yes	Yes	No	N/A
VA	Yes	5	4	Yes	Yes	Handicap	No	N/A
WV	Yes	– [2]	– [2]	Yes	Yes	No	No	– [2]

[1] 1998-1999 Numbers
[2] Not available
[3] 1-Check Station; 2-Mail Survey; 3-Jawbone Collection; 4-Computer Models; 5-Telephone Survey
[4] 1-Harvest and Biological; 2-Department/Commission Regulatory; 3-Legislative

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2001 SOUTHEAST DEER STUDY GROUP
COMMITTEE ASSIGNMENTS

CO-CHAIRPERSONS
Lonnie Hansen, Jeff Beringer, and Bill Heatherly

PROGRAM AND AGENDA
Lonnie Hansen (Chair), Jeff Beringer, Kathy Yardley, and Barbara Ross

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Tom Kuloweic (Co-Chair), Kathy Yardley (Co-Chair), and Barbara Ross

HOTEL ARRANGEMENTS
Bill Heatherly (Chair)

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FIELD TRIPS/TRANSPORTATION
John Vogel (Chair), and Lia Bollmann

STUDENT PAPER AWARD
Steve Shea (Chair), and Lonnie Hansen

EXHIBITORS, VENDORS, MEDIA
John George (Chair) Aaron Jeffries, and Daryl Damron

SECURITY
Kurt Kysar (Chair), Terry Robinson, Mike Helland, Gary VanMatre, and Denise Hunsaker