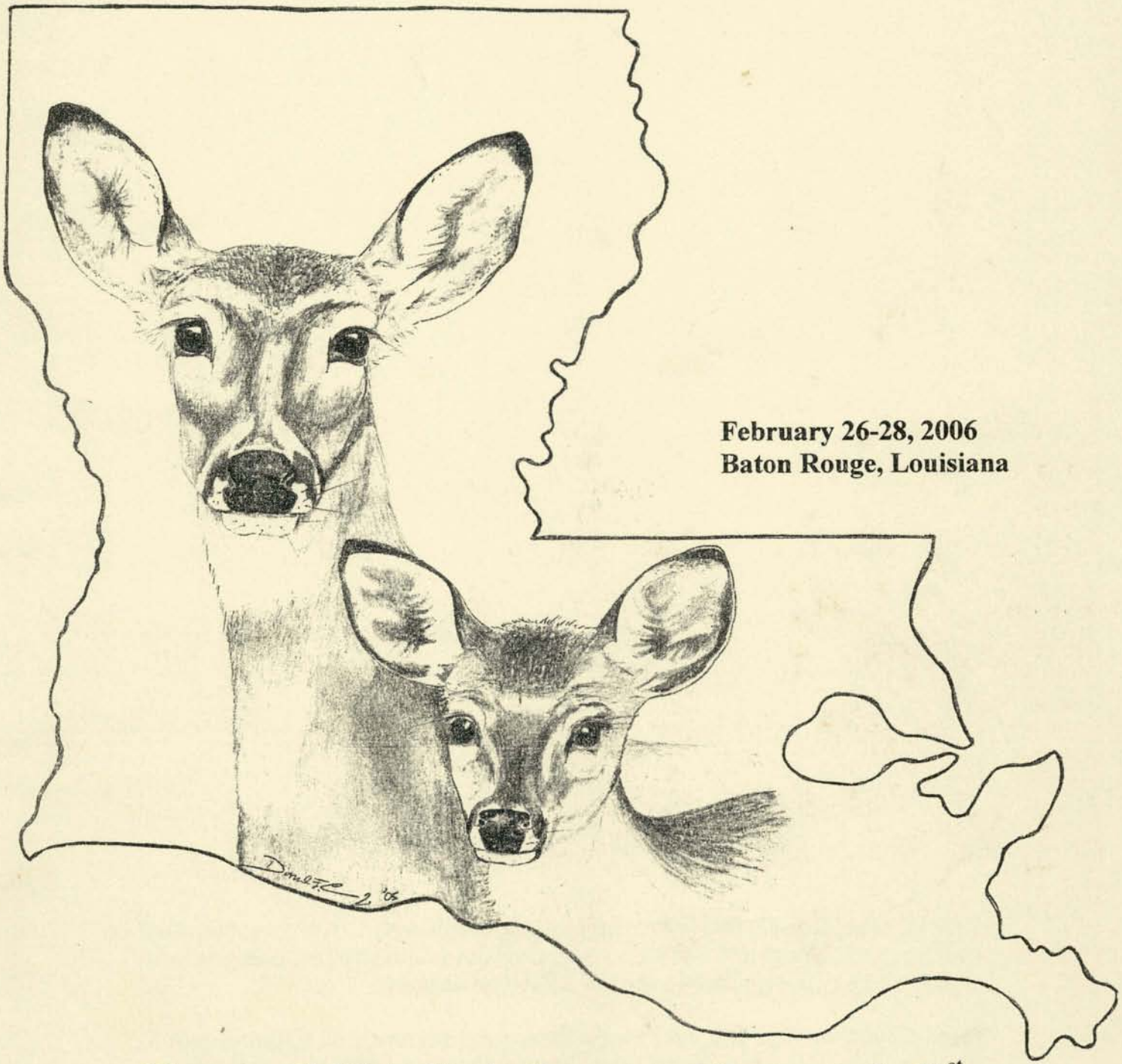
Southeast Deer Study Group
29th Annual Meeting



February 26-28, 2006
Baton Rouge, Louisiana

Managing Habitats, Herds, Harvest, and Hunters in the 21st Century Landscape. Will 20th Century Tools Work?

Hosted by the Wildlife Division, Office of Wildlife
Louisiana Department of Wildlife & Fisheries

Front Cover: Donald Locascio, biologist/forester with LDWF Forestry Section did this pencil drawing. Duck, as he is known to his friends, designs and draws all the cover pictures for the DMAP newsletter.

Back Cover: In 1953 the deer restocking program was just beginning in Louisiana; therefore, a Texas buck graced the cover of the *Louisiana Conservationist.* Lon Fitzgerald of the Texas Game and Fish Commission took the photo.

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The Louisiana Department of Wildlife and Fisheries would like to thank the following individuals, companies, and organizations for their generous donations and/or contributions of merchandise, products or services to the 29th annual meeting.

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The 29th Annual Southeast Deer Study Group meeting can be counted as contact hours for Professional Development/Certification. Each hour of actual meeting time counts as one credit hour (no social time credit). For more information about professional development, visit The Wildlife Society web site, www.wildlife.org.

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Special thanks to Emile LeBlanc, LDWF DMAP Coordinator, for designing and making the 29th Annual Southeast Deer Study Group commemorative longbow.

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	none
1979	Mississippi State, MA	none
1980	Nacogdoches, TX	none
1981	Panama City, FL	Antlerless Deer Harvest Strategies
1982	Charleston, SC	none
1983	Athens, GA	Deer Damage Control
1984	Little Rock, AR	Dog-Deer Relationships in the Southeast
1985	Wilmington, NC	Socio-Economic Considerations in Managing White-tailed Deer

1986	Gatlinburg, TN	Harvest Strategies in Managing White-tailed Deer
1987	Gulf Shores, AL	Management: Past, Present, and Future
1988	Paducah, KY	Now that we Got 'Um, What are we going to Do with 'Um?
1989	Oklahoma City, OK	Management of Deer on Private Lands
1990	Pipestem, WV	Addressing the Impact of Increasing Deer Populations
1991	Baton Rouge, LA	Antlerless Deer Harvest Strategies: How Well Are They Working?
1992	Annapolis, MD	Deer Versus People
1993	Jackson, MS	Deer Management: How We Affect Public Perception and Reception
1994	Charlottesville, VA	Deer Management in the Year 2004
1995	San Antonio, TX	The Art and Science of Deer Management: Putting the Pieces Together
1996	Orlando, FL	Deer Management Philosophies: Bridging the Gap Between the Public and Biologists
1997	Charleston, SC	Obstacles to Sound Deer Management
1998	Jekyll Island, GA	Factors Affecting the Future of Deer Hunting
1999	Fayetteville, AR	QDM: What, How, Why, and Where?
2000	Wilmington, NC	Managing Deer in Tomorrow's Forests: Reality vs. Illusion
2001	St. Louis, MO	From Lewis & Clark to the New Millennium: The Changing Face of Deer Management

2002	Mobile, AL	Modern Deer Management- Balancing Biology, Politics, and Tradition
2003	Chattanooga, TN	Into the Future of Deer Management: Where Are We Heading?
2004	Lexington, KY	Today's Deer Hunting Culture: Asset or Liability?
2005	Shepherdstown, WV	The Impact of Today's Choices on Tomorrow's Deer Hunters
2006	Baton Rouge, LA	Managing Habitats, Herds, Harvest, and Hunters in the 21st Century Landscape. Will 20th Century Tools Work?
2007	Ocean City, MD	

Members of the Deer Committee
Southeastern Section of The Wildlife Society

Dr. Steve Demarais, Chairman - Mississippi State University, MS

Alabama - Chris Cook, AL Dept. of Conservation & Natural Resources

Arkansas - Cory Gray, AR Game & Fish Commission

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Texas - Bob Zaiglin, Southwest Texas Junior College

Virginia - W. Matt Knox, VA Department of Game & Inland Fisheries

Virginia - Nelson Lafon (alternate), VA Dept. of Game & Inland Fisheries

West Virginia - Jim Crum, WV Division of Natural Resources

Southeast Deer Study Group Awards

Career Achievement Award

1996 - Dr. Richard F. Harlow

1997 - Dr. Larry Marchinton

1998 - Dr. Harry Jacobson

1999 - Dr. David C. Guynn, Jr.

2000 - Joe Hamilton

2002 - Robert L. Downing

2004 - Dr. Charles DeYoung

2005 - Kent Kammermeyer

Outstanding Student Presentation Award

1996 - Billy C. Lambert, Jr. (Texas Tech University)

1997 - Jennifer A. Schwartz (University of Georgia)

1998 - Karen Dasher (University of Georgia)

1999 - Roel R. Lopex (Texas A&M University)

2000 - Karen Dasher (University of Georgia)

2001 - Roel R. Lopez (Texas A&M University)

2002 - Randy DeYoung (Mississippi State University)

2003 - Bronson Strickland (Mississippi State University)

2004 - Randy DeYoung (Mississippi State University)

2005 -

Opening Plenary Session

Sunday, February 26, 2006

5:00 p.m.

Krewe of Sunday Night Live - David Moreland, Moderator

Introductions: W. Parke Moore, III
Assistant Secretary of the Office of Wildlife
Louisiana Department of Wildlife and Fisheries

Welcome: Dwight Landreneau
Secretary of the Office of Wildlife
Louisiana Department of Wildlife and Fisheries

Forestry Presentation: Bill Goodrum
Director, Non-Timber Resources
Temple-Inland Forest

Wildlife Presentation: Scott Durham
Deer Program Manager of the LDWF

Instructions & Door Prizes

Welcome Social

Abstracts

Monday, February 27, 2006

Technical Session I - Premier Room 3

8:00 a.m. Instructions & Door Prizes

Krewe of Forestry: Kenny Ribbeck - Moderator

8:20 - 8:40 a.m.

Effects of Intensive Pine Management on Deer Forage in the Coastal Plain of North Carolina

Douglas S. Hohman, Steven B. Castleberry, Karl V. Miller, University of Georgia; Rebecca L. Mihalco, Florida Fish and Wildlife Conservation Commission

Increased use of herbicides for site preparation has been documented across the Southeast. We compared forage production for white-tailed deer (*Odocoileus virginianus*) among six silvicultural treatments in the Southern Coastal Plain of North Carolina. Six sites (blocks) in Craven and Brunswick Counties were clear - cut in 2000, and divided into six treatment plots. Plots received a unique combination of silvicultural treatments including mechanical and/or chemical site preparation (imazapyr), different bed spacings, and banded or broadcast release applications of Arsenal®/Oust®. Sites were treated and planted in late 2001 and early 2002. Deer forage abundance was quantified using 1m x 1m quadrates and 30m transects during the growing seasons of 2002, 2003, and 2004. Plants were then ranked based on their forage quality (low, medium, and high) for summer and winter use. High quality forages were most common in the second and third year following treatment. Areas that were not chemically treated for site preparation produced abundant forage during the initial year's post-treatment, but in subsequent years the abundance of low quality woody forage increased greatly. Varying intensities of site preparation result in trade-offs between abundant initial forage production and subsequent forage production. Although removal of woody competition via chemical site preparation may result in reduced forage production at 1 and 2 years post-treatment, these treatments may prolong the availability of forages by delaying canopy closure.

NOTES:

8:40 - 9:00 a.m.

A Summary of Using Girdling, Herbicides, and Fire to Improve Hardwood Stands for Wildlife

Brad F. Miller, University of Georgia; Samuel W. Jackson, Ryan G. Basinger, Craig A. Harper, David S. Buckley, Lisa I. Muller, University of Tennessee

Private landowners and hunt clubs are becoming increasingly interested and knowledgeable about improving their deer herds and habitat through the use of food plots and appropriate deer densities. However, manipulation of hardwood forests is a critical component of habitat management that some landowners either overlook or are unsure how to implement. We have previously reported that "wildlife retention cuts" with or without the addition of prescribed fire is an effective technique for increasing hard and soft mast, as well as increasing light availability in the understory. Therefore a practical evaluation of the effects of girdling, herbicides, and fire on undesirable tree species found in oak - hickory forests is necessary. Two silvicultural treatments (wildlife retention cut, and wildlife retention cut with prescribed burning) were implemented in four mature oak-hickory stands in east Tennessee. The retention cuts were conducted in February and March, 2001 by using a chainsaw to girdle undesirable tree species and then spraying each cut with Garlon® 3A. Prescribed burning was conducted in April, 2001. In July and August, 2001 and 2002, we used random plots to survey the health, species, and diameter of treated trees. We found that at the end of the first growing season, the burned retention cuts had higher percent kill than the unburned retention cuts (25.5 and 9.8% respectively). At the end of the second growing season the percent killed increased for both the burned retention cuts and the unburned retention cuts (51.0 and 34.0% respectively), although the percent kill of the burned retention cuts remained higher. We found that some species including oaks (*Quercus spp.*) and hickories (*Carya spp.*) were more succeptible to the herbicide effects than other species such as American beech (*Fagus grandifolia*) and blackgum (*Nyssa sylvatica*). The use of fire added additional mortality to species such as yellow-poplar (*Liriodendron tulipifera*) and red maple (*Acer rubrum*). We believe that wildlife retention cuts with or without the addition of fire is a practical way for private landowners to manage their hardwoods to increase mast production and understory browse.

NOTES:

9:00 - 9:20 a.m.

Arsenal®/burn Effects on White-tailed Deer Forage in Mid-rotation Pine Plantations Enrolled in Cost-share Programs

Melinda J. Ragsdale, Mississippi State University; Stephen Demarais, Mississippi Department of Wildlife and Fisheries

The Natural Resource Conservation Service and the Mississippi Forestry Commission need evaluation of management alternatives relevant to habitat quality during mid-rotation management in cost-share program pine plantations (i.e. CRP). Mid-rotation pine plantations often have a significant hardwood midstory that limits growth of desirable understory forage species. Twelve thinned, 15 - 18 year-old pine plantations in cost-share programs in the Upper Coastal Plain (UCP; n=6) and the Lower Coastal Plain (LCP; n=6) of Mississippi were treated with an Arsenal®/burn treatment and sampled during the summers of 2003 and 2004, years 1 and 2 post - treatment. The hardwood midstory was reduced in both physiographic regions compared to untreated areas. Forb species preferred by deer increased in percent cover and biomass in the UCP and in biomass in the LCP. Growing season nutritional carrying capacity increased 180% in the UCP and 878% in the LCP. This treatment clearly improved the quality of deer habitat in both physiographic regions by year 2 post-treatment.

9:20 - 9:40 a.m.

Prescribed Fire and Selective Herbicides as Effective Management Tools for White-tailed Deer Forage in Intensively Managed Pine Stands of Mississippi

Raymond B. Iglay, L.T. Thomas, B. D. Leopold, Mississippi State University

Even though recent work has demonstrated benefits of selective herbicides and burning to deer forage quality and quantity in pine stands, intensively managed pine has been excluded. Our objective was to experimentally compare burning and herbicide treatments to provide forage for white-tailed deer in thinned, intensively managed pine stands. We used a randomized complete block design with 6 stands (blocks, replicates) on Weyerhaeuser Company lands, west of Scooba, Mississippi. We established 4 10-ha plots/stands with 50m buffers and assigned randomly each a treatment (burn, herbicide, burn*herbicide, control). We estimated Shannon-Weaver diversity and species richness of plants during winter and summer 2002 and 2003, 3rd and 4th year post - treatment, via line-transects at 9 points within each plot and biomass clippings (kg/ha) within random 1 - m^2 areas (10/ plot/winter; 20/plot/summer). Species diversity and richness were greatest in burn and burn/herbicide treatments. Control and herbicide only treatments resulted in more woody and semi-woody vines,

respectively, but burn or burn herbicide treatments increased forbs, grasses, and grass-like vegetation. Combining prescribed fire and selective herbicides was effective for increasing desirable plants for white-tailed deer in intensively managed pine stands. Additional non-game species, particularly songbirds, were positively impacted by these treatments allowing integration of deer management with non-game species management.

NOTES:

9:40 – 10:10 a.m. BREAK - Premier Room 2, Exhibit Room

Technical Session II: Premier Room 3

10:10 a.m. Instructions & Door Prizes

Krewe of Savage: Larry Savage, Moderator

10:30 - 10:50 a.m.

Efficacy of a Controlled Hunt at Reducing Deer Density

Regina L. Misiewicz, Jacob L. Bowman, Craig L. Rhoads, University of Delaware

As suburban sprawl expands, the deer populations in parklands surrounded by housing developments increase, which creates new challenges in deer management. In areas with heavy human traffic, a traditional harvest regime is often not possible. Instead, many managers use controlled hunts to reduce deer populations on suburban parklands. Our study was to determine the efficacy of a controlled hunt on Fair Hill Natural Resource Management Area, Cecil County, Maryland (0.52 deer/ha, 134 deer/mi^2). To examine the effect of the hunt on the deer population, we created a population model including age structured survival rates, mortality causes, and fecundity rates. Since 1995, the controlled hunt took place over 2 - 5 days each January and included approximately 100 hunters each day, selected through a lottery and required to pass a shooting proficiency exam. Starting in February 2004, we captured and tagged 158 deer (74 radio collared). The controlled hunt removed 25% of deer collared during the hunt. The most common mortality cause of yearling and adult does was harvest (55%), followed by deer auto collisions (15%). Survival rates for female adults, yearlings, and fawns were 0.691, 0.727, and 0.717, respectively. The average fecundity for adults, yearlings, and fawns were 1.69, 1.30, and 0.03 fetuses/doe, respectively. Using these characteristics, we created a population model for deer on Fair Hill NRMA and the population appeared to be relatively stable, with only a slight positive growth rate. However, due to the existing high deer density, changes should be considered to increase the effectiveness of the controlled hunt and further increase deer mortality.

NOTES:

10:50 - 11:10 a.m.

Evaluation of Deer Movements During a Controlled Hunt

Craig L. Rhoads, Jacob L. Bowman, Regina L. Misiewicz, University of Delaware

Habitat fragmentation and suburban sprawl are rendering traditional harvest practices unfeasible in many areas. In response, managers are implementing controlled hunts to address escalating deer populations. Effective controlled hunts require an understanding of deer responses to hunting pressure. Previous studies have produced contradictory results, leading to the need for more detailed investigation of deer movements during controlled hunts. We examined a deer population on Fair Hill Natural Resource Management Area (FHNRMA), Cecil County, Maryland. FHNRMA is highly fragmented and being encroached upon by suburban sprawl, making it a source of management concern. Deer on FHNRMA are currently harvested via a two day controlled shotgun hunt in early January. During the 2005 hunt, 44 collared deer (40 doe, 4 buck) were located twice daily, two days pre-hunt through two days post-hunt. Distances between successive locations were used to investigate differences in daytime and nighttime movements. Average daytime movement distances for does were similar before (mean = 398m) and during (mean = 431m) the hunt, but decreased noticeably on the two days following the hunt (mean = 277m). Daytime movements for bucks were similar before (mean = 439m) and after (mean = 325m) the hunt, but increased noticeably during (mean = 769m) the hunt. Nighttime movement distances showed a substantial peak the night following the hunt for both bucks (mean = 996m) and does (mean = 560m). During this period two does made long distance movements (2800m and 5500m) out of their established home ranges. We plan to monitor deer again during the 2006 hunt, but will extend the monitoring period to 4 days pre - hunt through 4 days post-hunt. Both years' data will be ready for report by conference time.

NOTES:

11:10 - 11:30 a.m.

Survival of White-tailed Deer Fawns in a Suburban Area of Alabama

Sarah T. Saalfeld, Stephen S. Ditchkoff, Auburn University

When managing a game species such as white-tailed deer, (*Odocoileus virginianus*) it is important to understand life history characteristics, such as survival, influence management decisions. Since a great deal of natural mortality occurs within the first few months of life, estimates of neonatal survival are critical when developing management decisions based on population estimates and mortality rates. While substantial research has been conducted on neonatal survival of white-tailed deer, these studies have been limited in geographic range and all have focused on rural populations. Few studies have been conducted in the southeastern United States, with fewer conducted in Alabama. Alabama is unique in that fawning occurs much later (~ 2 months later) than in most other states, which could have profound impacts on neonatal survival. In addition, few studies have focused on populations living in urban/suburban areas. As humans continue to move from the urban epicenter, management of deer populations in urban/suburban areas is becoming increasingly important. In this study we determined causes and timing of deaths of neonatal white-tailed deer in a suburban area of Alabama in 2004 and 2005, estimated survival rates, and determined factors that influenced survival for the initial 60 days of life. We found a 67% mortality rate during the two-year study, with the leading causes of mortality being predation by coyotes (50%) and starvation due to abandonment (25%). Additionally, we found that mortality rates were different between the two years of the study (76% in 2004 and 58% in 2005). Survival rates were associated positively with mass at birth and increased by a factor of 1.77 for each additional kilogram of birth mass. Most studies with rural populations have reported fawn survival rates greater than those reported here suggesting that population growth rates of high density white-tailed deer populations, such as those found in suburban areas, may be limited by increased mortality rates early in life.

NOTES:

11:30 - 11:50 a.m.

Survival of White-tailed Deer Fawns in Southern Illinois

John H. Rohm, Virginia Department of Game and Inland Fisheries; Dr. Clayton K. Nelson, Southern Illinois University

Few survival studies of white-tailed deer (*Odocoileus virginianus*) fawns have assessed the influence of intrinsic factors (e.g., fawn age and birth mass) and habitat on fawn survival. During 2002 - 04, 166 fawns were captured and radiocollared in southern Illinois to estimate survival rates, determine causes of mortality, and identify factors influencing fawn survival. A known fates model in program MARK was used to estimate survival rates and compare explanatory models based on AIC_c. Two candidate sets of a priori models were developed to quantify factors influencing fawn survival: model set 1 included intrinsic factors and model set 2 focused on habitat variables. Sixty-four mortalities were recorded and the overall survival rate was 0.59 (95% CI = 0.51– 0.68). Predation was the leading source of mortality (64%) and coyotes were the most prominent predators. For model set 1, model $\{S_{age*year}\}$ had the lowest AIC_c value indicating the age at mortality varied a.m.ong years. For model set 2, the model $\{S_{landscape+forest}\}$ had the lowest AIC_c value and indicated areas used by surviving fawns were characterized by a few large (i.e., >5ha) irregular forest patches adjacent to several small non - forest patches, and survival areas also contained more edge habitat than mortality areas. Due to the magnitude of coyote predation, survival areas could have represented landscapes where coyotes were less effective at locating and capturing fawns. This is the first account of habitat characteristics influencing fawn survival and this information could be used to help managers manipulate landscapes and map fawn mortality risk.

NOTES:

11:50 a.m. – 12:55 p.m. Lunch on your own

Technical Session III - Premier Room 3

1:00 p.m. Instructions & Door Prizes

Krewe of Don: Dr. Don Reed, Moderator

1:10 - 1:30 p.m.

Evaluation of the Severinghaus Tooth Wear Aging Technique Using South Texas White-tailed Deer

Mickey W. Hellickson, King Ranch Inc and CKWRI; David G. Hewitt, Fred C. Bryant, John S. Lewis, Ceasar Kleberg Wildlife Research Institute

The ability to accurately age deer is essential for management and research purposes. Present techniques do not allow accurate separation into individual age classes. Our objectives are to (1) obtain a large sample of known-age mandibles to test the accuracy of the Severinghaus technique; and (2) to refine this technique where inaccuracies are found. Study sites include 4 areas in Webb County, 1 in Brooks County, and 1 in Kleberg County, Texas. To date, 263 known-age mandibles have been collected from 135 wild deer ≥2 years old. A test of the Severinghaus technique using this set of mandibles and 6 experienced observers indicated an overall accuracy of 48%, while 86% were aged ±1 year of the actual age. Aging accuracy tended to decrease as mandible age increased and was 79, 60, 43, 27, 18, 27, and 33% for 2 -, 3 -, 4 -, 5 -, 6 -, 7- and ≥8-year-old mandibles, respectively. Observers assigned different ages to 31% of deer when both mandibles were present. Aging accuracy by observer varied from 43 to 51%. A directional bias was found that resulted in an increasing tendency to underage mandibles as age increased indicating potential to modify the technique to improve accuracy. An additional 231 known-age live deer ≥2 years old were aged by visual inspection at the time of capture using a modification of the Severinghaus technique. Aging accuracy of live deer was higher (71%) indicating that technique modification improved accuracy. Alternate criteria are being examined to modify the technique to improve accuracy.

NOTES:

1:30 - 1:50 p.m.

Promising New Technique for Estimating Deer Ages

David A. Osborn, Karl V. Miller, Robert J. Warren, University of Georgia; Brian P. Murphy, Quality Deer Management Association; Peter S. Ungar, Jonathan M. Bunn, University of Arkansas; Charles R. Ruth Jr., South Carolina Dept. of Natural Resources

Accurate estimates of deer ages at death are essential when using biological data to prescribe population management strategies, or to conduct scientific studies. Since 1949, age-related tooth eruption and wear patterns of mandibular teeth have provided the most useful and practical estimates of deer age. Unfortunately, estimating age based on current techniques might incorrectly assign deer to year-specific categories. Therefore, researchers must develop a more reliable technique for estimating deer ages. We tested the ability of computer-assisted digital technologies to measure age-related differences in surface topography of mandibular teeth (M1, M2, M3) from 29 non-captive and 39 captive deer of known ages. Tooth data (average slope, occlusal surface area, etc.) were analyzed by nearest neighbor discriminate analysis to determine which surface measurements provided the most reliable predictions of deer ages. Combined linear measurements of surface width and height of both cusps of M1 and M2, and the front 2 cusps of M3, were used to accurately predict ages of 98% of non-captive deer, which were either 2.5, 3.5, or 4.5 years old. We used these measurements to accurately predict ages of 93% of captive deer, which were 1.5, 2.5, 3.5, or $\geq$4.5 years old. However, when we separated data for captive deer into 1.5 to $\geq$8.5 year-old classes, our ability to accurately predict their ages dropped below 50%, suggesting increased variation in surface topography beyond 4.5 years of age. With further model testing, we believe computer-assisted measurements of tooth surface topography will provide a more reliable technique for estimating deer ages.

NOTES:

1:50 - 2:10 p.m.

Age-Specific Population Management: Challenging Dogma and Redefining Data Collection Methodology

Bret A. Collier, Texas A&M University; Stephen S. Ditchkoff, Auburn University; Tim Fendley, Clemson University; Charles Ruth, South Carolina Department of Natural Resources

Age-specific information used by managers for population monitoring and regulatory support has historically been based on data collected from harvested individuals, commonly described as the proportion of white-tailed deer harvested by age class. The recent focus towards age-specific population management, particularly for males, has relied on the assumption that the observed harvest age structure is proportionally related to population age structure, implying that age-at -harvest data has management value. However, age-at -harvest data are uncorrected counts leaving the relationship between harvest and population structure ambiguous. Using data on marked deer from a previously conducted study, we estimated age-specific harvest rates for white-tailed deer under a minimum antler point regulation. Age-specific estimates of harvest rate ranged from 0.11 to 0.18 for yearling males, 0.20 to 0.56 for 2.5-year-old males, and 0.45 to 1.00 for 3.5+ year old males. Harvest data from the same area and time frame ranged from 0.11 - 0.40 for yearling males, 0.28 - 0.61 for 2.5 year old males, and 0.12 - 0.47 for 3.5+ year old males. While age-at -harvest data are used to support regulations and management, our results suggest that age-at-harvest data may be inefficient for age-specific population monitoring and management evaluation. Thus, we question the longstanding practice of using age-at-harvest data alone for white-tailed deer regulatory decisions. As reconciliation of harvest data with population status is of the utmost importance for managers, we will discuss an approach for estimating and monitoring population size and age structure by combining estimated age-specific harvest rates with age-at-harvest data and other relevant demographic parameters.

NOTES:

2:10 - 2:30 p.m.

Visitation and Consumption at Feeder Sites by White-tailed Deer at Three Densities

Nathan A. Newman, Charles A. DeYoung, Timothy E. Fulbright, David G. Hewitt, Texas A&M University; Don A. Draeger, Comanche Ranch

Supplemental feeding of protein pellets is widely practiced in south Texas, but research has been limited. Also, feeder site visitation has implications for both the spread of disease and the treatment of disease through medication in the feed. We are conducting an experiment on effects of deer density on behavior of deer at feeder sites. Three 200-acre, high-fenced enclosures are stocked with a goal of 10 (low-density), 25 (medium-density), and 40 (high-density) deer, respectively. Feed pellets are provided free choice in each enclosure at a single feeding site. The design is replicated on 2 south Texas ranches. Reconyx digital cameras sample deer behavior with near-video capability. We recorded frequency of visits and frequency of feed consumption by immature and mature bucks as well as does and fawns for March - July, 2005. Visitation and consumption rates in low-density enclosures were low and did not provide enough data for analysis. Frequency of visitation was highest for does at both medium and high-density treatments. Doe visitation was slightly higher in medium density enclosures. However, mature bucks tended to have the highest visitation rates among deer that fed in both high and medium density enclosures. This suggested competition at feeder sites, possibly with mature bucks hindering does from feeding. All classes of deer fed mostly at night during the months we sampled. Our preliminary data suggests differences in frequency of visits and feeding by deer density and class of deer.

NOTES:

2:30 - 2:50 p.m.

Effects of Deer Density and Supplemental Feed on Fawn Growth in South Texas

Mark K. Richman, Charles A. DeYoung, Timothy E. Fulbright, David G. Hewitt, Texas A&M University; Don A. Draeger, Comanche Ranch

Supplemental feeding of deer (*Odocoileus virginianus*) has become a widespread practice in south Texas. Some managers advocate allowing deer density to increase in order to "force" deer to eat feed. Whereas many biologists are skeptical of this recommendation, there has been no research evaluation of the trade-offs between deer density and feed. Our objective is to examine the effects of density and supplemental feed on fawn growth. Six 81 - ha high-fenced enclosures were established with the following density treatments on each of 2 replicate ranches: 2 with 8.1 ha/deer, 2 with 3.2 ha/deer, and 2 with 2.0 ha/deer. Supplemental feed was provided in 1 enclosure of each density treatment. Fawns were sampled by a combination of drop net capture and harvesting. On 42 fawns we obtained mass, total body lengths, and femur: hindfoot length ratios. Fawn mass averaged 24.7, 29.0, and 30.9 kg in high, medium, and low density enclosures with feed, respectively, and 21.7, 19.7, and 25.3 kg without feed. Body lengths averaged 110.2, 113.4, and 128.9 cm in high-, medium-, and low-density enclosures with feed, respectively, and 98.4, 98.4, and 110.5 without feed. Fed enclosures showed no trends in femur: hindfoot ratios, averaging 0.76, 0.74, and 0.76 in high medium, and low-density treatments, respectively. Femur: hindfoot length ratios were 0.68, 0.71, and 0.78 in high-, medium-, and low-density enclosures without feed. We are in the 2nd year of a 5-year study and management recommendations would be premature. However, it appears that both density and supplemental feed are affecting fawn growth in our experiment.

NOTES:

2:50 – 3:10 p.m. BREAK - Premier Room 2, Exhibit Room

Technical Session IV - Premier Room 3

3:10 p.m. Instructions & Door Prizes

Krewe of Mike: Mike Olinde, Moderator

3:20 - 3:40 p.m.

Ineffectiveness of Wildlife Warning Reflectors for Altering White-tailed Deer Behavior Along Roadways

Gino J. D'Angelo, Joseph G. D'Angelo, David A. Osborn, Karl V. Miller, Robert J. Warren, University of Georgia; George R. Gallagher, Berry College

Deer-vehicle collisions are a significant concern to state and federal transportation departments and wildlife agencies. Although various techniques have been promoted to minimize deer-vehicle collisions few of these strategies have undergone extensive independent testing of their effectiveness prior to deployment in the field. Wildlife warning reflectors are marketed as an effective and humane technique for reducing wildlife-vehicle collisions, yet previous studies have provided little behavioral evidence for the purported efficacy of the reflectors. Wildlife warning reflectors are mounted on posts along roadsides and consist of a plastic housing with 2 reflective mirrors with plastic elements, which redirect light through colored lenses. The manufacturer claims that the reflectors deter deer from attempting road-crossings by altering and distributing light from oncoming vehicle headlights across the road and into roadside corridors to provide an "optical warning fence" to deer. We evaluated the effectiveness of 4 colors of wildlife warning reflectors (red, white, blue-green, and amber) for altering deer behavior that might help prevent deer - vehicle collisions. Using Forward-looking Infrared Technology, we observed 1,370 behavioral responses of white-tailed deer (*Odocoileus virginianus*) relative to roadways before and after installation of wildlife warning reflectors during 90 observation nights. Based on our observations, wildlife-warning reflectors were ineffective in changing deer behavior such that deer-vehicle collisions might be prevented. Our results provide no justification for the use of optical reflectors to minimize deer-vehicle collisions. Future deer deterrent techniques should be developed based on an understanding of deer sensory perception and demonstrated responses, and must be tested under controlled conditions using actual behavioral responses of deer.

NOTES:

3:40 - 4:00 p.m.

Comparison of Xylazine/ Telazol to Medetomidine/Ketamine/Telazol for Immobilization of White-tailed Deer

James W. Tomberlin, Richard A. Lancia, North Carolina State Univeristy; Mark C. Conner, Chesapeake Farms; Lisa I. Muller, University of Tennessee; David A. Osborn, Brad F. Miller, Robert J. Warren, Karl V. Miller, University of Georgia

Improvements in drug combinations for animal immobilization are necessary to increase efficiency, recovery, and safety of animals and handlers. Based on data from captive deer (to be presented), we immobilized 8 free-ranging, adult male white-tailed deer (*Odocoileus virginianus*) with a combination of either xylazine/telazol (XT; 2.5 mg/kg xylazine and 4.4 mg/kg telazol antagonized with 3 mg/kg tolazoline) or medetomidine/ketamine/telazol (MKT; 0.10 mg/kg of medetomidine, 2.0 mg/kg of ketamine, and 2.8 mg/kg of telazol antagonized with 0.50 mg/kg of atipamezole) to compare flight distances, sedation levels, and recovery times. Immobilizations were by intramuscular injection via a 3-cc telemetry dart using CO_2 powered dart rifles. We measured respiratory rate and body temperature at 15-minute intervals. At approximately 70 minutes after darting, we administered the corresponding antagonist drugs intramuscularly (IM). Flight distances for each treatment were not different ($p=0.7$) with a mean of 288.5m and 338.2m for XT and MKT, respectively. Both combinations provided lateral recumbence and acceptable physiological parameters. One capture event of XT required a supplemental booster of Ketamine (2.2 mg/kg) due to length of time locating the animal. Antagonist treatment in the MKT group resulted in a shorter ($p=0.007$) mean recovery time (8.8 min.) compared to XT (64.0 min.). Two of 4 deer darted with MKT exhibited hyperactivity after administration of atipamezole. We recommend administering the atipamezole half IM and half subcutaneously to allow for smoother recovery. The use of MKT antagonized with atipamezole in free ranging white-tailed deer provides rapid and safe sedation, acceptable physiological parameters, and quick recovery.

NOTES:

4:00 - 4:20 p.m.

A Study on the Occurrence of Bullet Ingestion by *Odocoileus virginianus*

Benjamin O. Oubre, Dr. Kim Marie Tolson, University of Louisiana at Monroe

During the 2003 - 2004 hunting season, thirteen white-tailed deer, *Odocoileus virginianus*, were necropsied for rumen analysis on Fort Polk Wildlife Management Area in Vernon Parish, LA. The management area consists of 110,000 acres encompassing the Fort Polk military base operation. Three of thirteen deer were found to contain lead bullets in all four chambers of the stomach. These preliminary findings led to the collection of tissue samples from eighty-four deer harvested during the 2004 - 2005 hunting season. Biopsies were taken from the liver, kidney and skeletal muscle for heavy metal analysis. Six out of eighty-four deer displayed elevated levels of lead. No whole bullets were present, but lead fragments were recovered from three of these deer. Two out of these three were found to have above normal lead levels (>1ppm; Lewis and others 2001) in the liver. The highest lead level recorded (8.58 ppm) was found in the liver of a deer where no lead bullets or fragments were recovered from the stomach. Elevated lead levels were not detected in any of the muscle tissue samples. Additionally, copper levels were elevated (>32 ppm; Lewis and others 2001) in the liver tissue for all eighty-four deer collected. Louisiana Department of Wildlife and Fisheries and The United States Army provided funds for this study.

NOTES:

4:20 - 4:40 p.m.

Comparison of Home Range Size on a Deer Herd in the Coastal Plain of South Carolina

Roxanne J. Smestad, Tim Fendley, Christopher J. Post, Clemson University; Charles Ruth, South Carolina Department of Natural Resources; David Rudisal, Ellington Agricultural Center

This paper examined data collected from 1998 - 2001 on a population of managed white-tailed deer on The Backwoods Quail Club located in the coastal plain of South Carolina. We specifically looked at differences in home range size with respect to yearly and seasonal variations as well as variations within age class and sex. 165 deer were trapped, radio collared and tracked, observing and recording locations at random throughout a 24-hour period for four years. From these observations we generated 138 annual home ranges and 324 seasonal home ranges (each containing a minimum of 40 locations per animal). ANOVA tests were used to determine if a significant difference existed and Least Significant Difference (LSD) tests were preformed to identify the classes/categories having a significant difference. 53 individual ANOVA and LSD tests were performed on the data. Over the study period annual male home ranges varied from 14.25 ha (1999) to 1,384 ha (2000). Female annual home ranges spanned from 37.35 ha (2001) to 1,496.40 ha (2000). The general findings of the study concluded that from 1998 to 2000 the home ranges became larger and in 2001 the home ranges began to decrease in size and were comparable to 1998 sizes. There was no significant difference between 1998 and 2001 annual home ranges. This change in home range size coincides with below average recorded rainfall for 1999 and 2000. This study provides an in-depth analysis of home range variations within the Backwoods Quail Club deer population and discusses management considerations.

NOTES:

4:40 - 5:00 p.m.

Biased Fetal Sex Ratios in High Density Deer Herds: Implications for Management

William Underwood, Dr. James B. Armstrong, Auburn University

Disparity in fetal sex ratios is a much-studied phenomenon among ungulates. Deviations from 50/50 in fetal sex ratios have been hypothesized to be a mechanism for maximizing potential reproductive output of offspring. Sons in general are more costly to produce than daughters, but have the potential for greater lifetime reproductive output than daughters. Maternal age, body condition, timing of conception, and a host of other factors have been suggested to be the driving force behind deviations from equality in fetal sex ratios. White-tailed deer fetuses were collected each spring from a large (approximately 1 sq. mile) high-fenced enclosure in the black belt physiographic province of Alabama over the course of a three year study. Deer within the enclosure were maintained at a high density (approximately 250/sq. mile) with the adult sex ratio skewed heavily towards males (approximately 2:1 bucks:does). Fetal sex ratios in the enclosure deviated considerably from parity, with male fetuses being more prevalent. We suggest that male biased fetal sex ratios could function to limit population growth in high density enclosed populations. Male biased fetal sex ratios could also result in a surplus of males and increased inter-specific combat. Implications for quality buck management in high-density herds could include increased fighting related mortality and decreased antler quality due to fighting related antler breakage.

NOTES:

5:00 p.m. Dinner on your own

7:00 p.m. **Shoot From the Hip** - Premier Room 3

Spikes, Antler Restriction Programs and QDMA: Finding Common Ground

Dr. Steve Demarais, Moderator
Dr. Mickey W. Hellickson, King Ranch
Patrick Durkin, National White-tail Association
Mississippi Department of Wildlife, Fisheries, & Parks
Louisiana Department of Wildlife & Fisheries

NOTES:

Tuesday, February 28, 2006

Technical Session V - Premier Room 3

8:00 a.m. Instructions & Door Prizes

Krewe of Jim: Dr. Jim Dickson, Moderator

8:10 – 8:30 a.m.

Chronic Wasting Disease Surveillance in North Carolina

Kelly E. Douglass, Vincent E. Stanford, David T. Cobb, North Carolina Resources Commission

Although Chronic Wasting Disease (CWD) has not been documented in North Carolina, the biological, economical, and sociological implications associated with this disease remain significant. The discovery of CWD in Wisconsin prompted the North Carolina Wildlife Resources Commission (NCWRC) to implement a preventative disease management strategy in May 2002. Substantial revisions to rules pertaining to captive cervids were implemented, including testing, tagging, and inspection requirements. A buyout program was established to provide monetary compensation to individuals voluntarily relinquishing their cervid herd and captivity license to the NCWRC. Additional actions included increased efforts to minimize the occurrence of illegally held cervids and revisions to North Carolina's fawn rehabilitation program. CWD monitoring and surveillance was expanded for free-ranging white-tailed deer, including a statewide systematic sampling of hunter- and road-killed deer. Additional surveillance has also included the testing of free-ranging deer located around facilities known to have imported cervids into North Carolina. Information was disseminated to increase public awareness of CWD and disease management actions implemented by the NCWRC. All management actions implemented by the NCWRC to date were designed to prevent the introduction of CWD into North Carolina or to increase likelihood of disease detection should it already exist within the state.

NOTES:

8:30 - 8:50 a.m.

A Qualitative Multi-State Chronic Wasting Disease Risk Assessment: the Virginia Perspective

David M Kocka, Nelson Lafon, W. Matthew Knox, Jonathan Sleeman, David Steffen, Virginia Department of Game and Inland Fisheries

The 2002 discovery of chronic wasting disease (CWD) in Wisconsin prompted many states to closely assess risk factors for CWD exposure and implement risk-reduction policies. Virginia Department of Game and Inland Fisheries (VDGIF) joined many other state wildlife agencies in prohibiting movement of live cervids and strengthening marking, reporting, and CWD surveillance requirements for captive deer. Following discovery of CWD in New York in 2005, VDGIF reevaluated CWD risks and preparedness, proposed additional regulations to prevent introduction of CWD, and finalized response and surveillance plans. Under the assumption that captive cervid movements continued to pose the greatest risk for CWD introduction, we developed risk definitions for each Virginia facility based on species held and movement histories. We then met with adjoining states to exchange information about captive facilities and disease surveillance programs. Based on the concentration of captive cervid facilities near Virginia's border, we identified a region of higher risk for enhanced CWD surveillance in Virginia. Subsequent to identifying this relatively high-risk area, West Virginia's report of its first positive case of CWD in an adjacent county seemed to validate our concern for this region of Virginia. Although the source of CWD in West Virginia remains unknown, a qualitative risk assessment based on captive deer as the potential route for introduction of CWD was useful in delineating an area of highest concern where surveillance efforts should be concentrated. We encourage all states to look across their borders and work with their neighbors to identify CWD risk factors.

NOTES:

8:50 - 9:10 a.m.

Tissue Sampling Techniques for Chronic Wasting Disease Surveillance

Kevin Keel, Southeastern Cooperative Wildlife Disease Study

Postmortem examination of tissues is the only currently accepted, convenient method to diagnose chronic wasting disease. Follicles of retropharyngeal lymph nodes and brainstem nuclei accumulate the prion protein earlier in the course of disease than other tissues and these are the preferred samples for examination. Both the retropharyngeal lymph nodes and the brainstem can be easily collected once the head is removed. The retropharyngeal lymph nodes are located to either side of midline just behind the pharynx, towards the base of the skull. Both lymph nodes should be removed and sectioned longitudinally. Care should be taken to differentiate salivary glands from lymph nodes. If samples are to be submitted for ELISA, half of each lymph node should be refrigerated or frozen till submission; the other half of each lymph node should be saved in formalin. The brainstem is removed by inserting a knife through the foramen magnum between the brainstem and the skull. A continuous circumferential cutting motion will free the brainstem so that it can be removed intact. The essential structure is the obex, a V-shaped structure on the dorsal surface. An intact section of the brainstem, including the obex, should be placed in formalin. If ELISA is to be used the sample can be hemisected by making a longitudinal cut such that one half can be placed in formalin and the other saved fresh. Photographs and drawings will be used to illustrate the location of the samples, their identification and the best methods to collect them.

NOTES:

9:10 - 9:30 a.m.

Effects of Two Site Preparation Techniques on Availability of White-tailed Deer Forage Plants

Michael J. Chamberlain, Louisiana State University; Darren A. Miller, Weyerhaeuser Company

Recently, concern has arisen regarding possible effects of site preparation treatments, particularly herbicide use, on availability and quality of forage plants for white-tailed deer (*Odocoileus virginianus*). To examine this concern, we quantified availability of deer forage plants in clear-cut site prepared with either prescribed fire (n = 5) or a combination of imazapyr and prescribed fire (n = 5) in eastern Louisiana during 2003 - 2005. We measured species-specific plant biomass (kg/ha) to evaluate relative effects of each site preparation technique on availability of deer forage plants. Here, we provide a qualitative assessment of our findings. More detailed analyses are ongoing and we will present statistical findings at the meeting. During 2003 (first year following site preparation), stands prepared with fire and herbicides were dominated by herbaceous vegetation, legumes, and *Rubus* spp., whereas stands prepared with fire only were dominated by woody and vine species. Biomass of preferred deer forage plants was greater in stands site prepared with fire only in 2003, but this trend was reversed during 2004. During 2005, biomass was qualitatively similar between the two treatments, but species composition was different. Stands site prepared with fire only were dominated (> 30% total biomass) by yaupon (*Ilex vomitoria*), whereas biomass in stands prepared with fire and herbicides was comprised of numerous vines, forbs, and woody species of forage value to deer. Our findings are similar to past studies that suggest different site preparation techniques have temporary effects on vegetation and that judicious use of herbicides can improve forage for deer.

NOTES:

9:30 - 9:50 a.m.

Cattle Grazing to Improve White-tailed Deer Habitat: Myth or Science?

Timothy E. Fulbright, J. Alfonso Ortega, Texas A&M University

Grazing by cattle (*Bos* spp.) is commonly recommended to reduce grass canopy cover and increase abundance of forbs and plant species diversity to improve white-tailed deer (*Odocoileus virginianus*) habitat. The assumption underlying this recommendation is that increased forbs and plant species diversity enhances nutritional status of deer. Increased forbs and increased plant species diversity resulting from cattle grazing has been documented in productive habitats; however, similar increases may not occur in arid and semiarid regions. Peer-reviewed literature does not support the assumption that nutritional status of deer increases because of these changes in plant composition. Positive effects of grazing on deer nutritional status have not been documented possibly in part because many forb species that increase in abundance in response to cattle grazing are annuals rather than perennials. Another possible reason for lack of documented improvements in deer nutritional status is that effects of cattle grazing on deer nutrition have been examined in relatively few studies. Of the studies that have been conducted, most suffered from experimental design problems, particularly lack of an experimental control and lack of replication. Our review of the peer-reviewed literature has led us to conclude that the idea that grazing is a useful tool to manipulate white-tailed deer habitat is an unproven hypothesis. Wildlife managers should be cautious in recommending grazing to manipulate habitat until the hypothesis that grazing improves the nutritional plane of deer is thoroughly tested by rigorous, peer-reviewed research with experimental controls.

NOTES:

9:50 – 10:10 a.m. BREAK - Premier Room 2, Exhibit Room

Technical Session VI - Premier Room 3

10:10 a.m. Instructions & Door Prizes

Krewe of Mike II: Dr. Mike Chamberlain, Moderator

10:20 - 10:40 a.m.

Potential Selective Harvest Criteria for Adult, Male White-tailed Deer in South Texas

John S. Lewis, Dr. David G. Hewitt, Dr. Fred C. Bryant, Caesar Kleberg Wildlife Research Institute; Dr. Mickey W. Hellickson, King Ranch

The practice of selectively harvesting inferior-antlered middle age and older bucks has become popular. Criteria are often established based on age and antler points; however, no research on wild deer has been conducted to determine the appropriateness of these harvest criteria. Our objective is to randomly capture and measure ≥500 bucks annually on 5 areas to estimate age, count points, and determine gross Boone and Crockett Club (GBC) score. Capture data will be used to relate GBC score of recaptured mature (≥5 years old) bucks to the number of antler points these same bucks had when initially captured at a younger age.

To date, 63 3-year-old bucks and 126 4- year-old bucks have been recaptured at ≥5 years of age. Only 3 of 52 (6%) 3-year-old bucks with ≤8 points had GBC scores ≥150 when recaptured, versus 9 of 30 (30%) 3 - year - old bucks with ≥9 points. Only 5 of 102 (5%) 4-year-old bucks with ≤9 points had GBC scores ≥150 when recaptured, versus 15 of 58 (26%) 4 -year-old bucks with ≥10 points. An additional 83 5-year-old bucks have been recaptured at ≥6 years of age. Only 2 of 37 (5%) 5-year-old bucks with ≤9 points had GBC scores ≥150 when recaptured, versus 14 of 52 (27%) 5-year-old bucks with ≥10 points. Our data indicate very few (≤6%) 3-year-old bucks with ≤8 points and bucks ≥4 -years-old with ≤9 points have GBC scores ≥150 at an older age. Therefore, these 2 categories may be useful criteria for the selective harvest of inferior-antlered bucks in south Texas.

NOTES:

10:40 - 11:00 a.m.

The Effect of Protection and Distance from the Forest Edge on Soybean Yield Due to White-tailed Deer Browsing

Greg Colligan, University of Delaware

Little is understood regarding the spatial and temporal distribution of white-tailed deer (*Odocoileus virginianus)* browsing on soybeans. A better understanding of the timing and the most effective application area for repellents is the first step to determining their feasibility in large-scale agricultural settings. In 2003 - 2004, we investigated spatially where browsing was most intense on soybeans and temporally when browsing had the greatest effect on yield. We examined browsing patterns within full-season and double-crop soybeans in Little Creek, Delaware. Each of your study fields was bordered on one side by forest. We systematically placed 4.6m^2 plots (2003 n=200, 2004 n=600) at 10 m intervals in 4 fields. During pre-selected plant growth stages, we protected each study plot with a fence for 7 days, which simulated a 100% effective repellent. To examine what impact deer had on wield, we harvested a 1m^2 centralized area in each plot. Spatially, deer browsing was most intense $\leq$ 20m of the forest edge. Browsing rates were most intense during the first 3 weeks after emergence. Yield in the unprotected plots did not differ from any of the 1-week protection treatments so short term protection did not increase yield. However, yield did differ between fully protected plots and unprotected plots. Due to their high application costs and short-term effectiveness, the use of chemical repellents does not appear to be a cost-effective technique for alleviating white-tailed deer damage to soybeans in large fields with one edge bordered by forest. Spatial and temporal browse data were also collected during the 2005 growing season and will presented.

NOTES:

11:00 - 11:20 a.m.

Can a Selective Buck Harvest Affect Free-ranging White-tailed Deer Antler Characteristics?

Mickey W. Hellickson, King Ranch and Caesar Kleberg Wildlife Research Institute; Charles A. DeYoung, Randy DeYoung, David G. Hewitt, Caesar Kleberg Wildlife Research Institute; Randy Fugate, E.L. "Butch" Young, Texas Parks and Wildlife Department

Selective breeding experiments with penned deer have documented rapid improvement in antler quality. Our objective was to determine if rapid improvement was possible in a free-ranging population subjected to selective harvest. The south Texas study included 9,500-acre treatment and control areas. Both received similar, conservative, sport harvest. The treatment area also received intensive culling of 1.5-year-old bucks with <6 antler points and bucks ≥2.5 years old with <9 points. Results were monitored annually by census and live capture. Treatment-area culling removed 145 bucks, including 66 yearlings, versus three removed from the control area. Census data indicated decreasing trends in deer density on both areas, an increasing adult sex ratio (F:M) on the treatment area, and a decreasing sex ratio on the control area. Six years of capture resulted in 182 and 125 bucks on the treatment and control areas, respectively. Contrary to expectations, a higher percentage ($P = 0.039$) of bucks captured and released on the treatment area (61%, 14/23) met the culling criteria versus the control area (34%, 10/29) during the latest live capture. No differences ($P = 0.287$) were found between areas when the data set was limited to bucks born after initiation of the selective harvest program, of which 59% (26/44) met the culling criteria on the treatment area, versus 48% (19/40) on the control area. Results suggest that decreasing the proportion of small-antlered bucks is difficult in a free-ranging population because of yearling buck dispersal, adult buck movements, low harvest rates, and low reproductive success.

NOTES:

11:20 - 11:40 a.m.

Modeling Antler Point Restrictions in Northwest Minnesota Deer Populations Using a Generalized Sustained Yield Model.

Marrett D. Grund, Farmland Populations and Research Group

A senate bill proposed during the 2004 legislative session would have mandated antler-point restriction regulations in northwest Minnesota. Although the bill failed to pass, the Minnesota Department of Natural Resources recognized the need to study impacts of innovative management strategies for white-tailed deer (*Odocoileus virginianus*) due to increasing public interest. I developed a population model to simulate effects point restrictions would have on deer populations and hunter harvests in northwest Minnesota. I used sustained yield theory as the foundation of the model so that density-dependent effects could be evaluated. A long-term study conducted in Minnesota provided a predictive equation to simulate effects severe winters have on deer mortality. Six management strategies were modeled under low and high deer densities. Buck:doe ratios increased under point restrictions and were maximized when these regulations were coupled with high harvest rates of adult females. Buck harvests were variable, but generally decreased under point restrictions. Antlerless harvests responded more to herd size management strategies than to point restrictions. However, fewer antlerless deer were required to be harvested under a 4-point restriction. This was due to density-dependent effects on population growth. The response in deer harvests differed depending on the simulated protection levels associated with yearling bucks, where the deer population was relative to its carrying capacity, and how deer population size was managed after the point restriction was implemented. Thus, I concluded that harvest patterns occurring in other states that have implemented point restrictions might not be comparable to those that could occur in Minnesota.

NOTES:

11:40 a.m. – 12:55 p.m. Lunch on your own

Technical Session VII - Premier Room 3

1:00 p.m. Instructions & Door Prizes

Krewe of Randy: Randy Myers, Moderator

1:10 - 1:30 p.m.

The Influence of Landscape Composition and Structure on Antler Size and Body Weight of White-tailed Deer in Mississippi

Bronson K. Strickland, National Wildlife Research Center at Mississippi State University; Stephen Demarais, Mississippi Department of Wildlife and Fisheries

The widespread availability of aerial photography and satellite imagery allows biologists to explore relationships between white-tailed deer (*Odocoileus virginianus*) populations and their habitat at greater spatial scales than previously possible. We used 203 populations in region-specific analyses across Mississippi to compare the average body weight and antler size of deer from Wildlife Management Areas and hunting clubs participating in the Deer Management Assistance Program to the composition and structure of vegetation types at and around these management units. We used interspersion, edge, and diversity indices to represent habitat structure and vegetation type to represent habitat composition at each location. Landscape composition was a much better predictor of deer population body weight and antler size than landscape structure. Percentage of the management unit in agriculture, bottomland hardwoods, upland hardwoods, and high- and medium-density pine trees were variables commonly found in the best predictive models. Agriculture and bottomland hardwoods were always positively related to deer weight and antlers, whereas pine forests were always negatively related. These results suggest that landscapes dominated by high- and medium-density pine forests do not provide optimal amounts of quality forages for white-tailed deer. High- and medium-density pine forest effects should be mitigated using a combination of increased harvest to lesser deer density, silvicultural practices that stimulate growth of high quality forages,and increased food plot production to improve herd quality.

NOTES:

1:30 - 1:50 p.m.

Physical Differences Among Mississippi Deer Populations: Genetics or Environment?

Randy W. DeYoung, Texas A&M; Bronson K. Strickland, USDA/APHIS/WS/ National Wildlife Center; Stephen Demarais, Mississippi Department of Wildlife and Fisheries

There has been considerable debate as to the relative contribution of genetic and environmental factors on the physical development (e.g., body mass, antler size) of white-tailed deer. Although answers to these questions would have important management implications, empirical studies are lacking. We took advantage of a natural experiment to examine the performance of similar genetic stocks in different geographical regions of Mississippi. During the restoration of deer in Mississippi (1931 - 1965), the Leaf River Refuge was a major source of stock for trapping and transplanting. The descendants of these deer are currently found statewide. We used genetic analyses based on 17 micro-satellite DNA loci to confirm the genetic similarity of deer at 6 sampling sites to Leaf River deer. We then compared mean body mass and antler size of deer harvested at the 6 sites to Leaf River. We found clear differences among populations in body mass of yearling (1.5 years) and adult (>2.5 years) does (range: 5 - 14 pounds). Furthermore, antler size of mature (>2.5 years) bucks in 4 of 6 populations differed from Leaf River (range: 14 - 20 Boone & Crockett inches). Due to the nature of the data, we are not able to identify the precise source of the physical differences among populations. However, the presence of biologically meaningful differences among these populations 30 - 50 years after restoration suggests that factors other than genetic ancestry (e.g., habitat and soil quality) play an important role in the physical characteristics of white-tailed deer populations.

NOTES:

1:50 - 2:10 p.m.

Deer Habitat in the Ozark Mountains of Arkansas
(What we learned from the 19- year study)

James G. Dickson, Louisiana Tech University; Mitchell J. Rogers, Arkansas Game and Fish; Lowell K. Halls, U.S. Forest Service

Two enclosures of 590 and 675 acres were constructed and stocked with white-tailed deer to determine the deer carrying capacity and evaluate the impact of winter food plots on deer survival and productivity. Deer diets varied considerably within and among years, and were closely related to habitat type and availability of acorns. Before food plots were established, the carrying capacity averaged only one deer per 45 to 100 acres, mainly because of a lack of high-quality, native forage during winter. Capacity was somewhat higher in the enclosure where cedar glades were more prevalent. Fawn production and winter survival of adult deer fluctuated widely and were positively correlated with acorn yields. After openings were established in the forest and planted with elbon rye, ladino clover, and Japanese honeysuckle, the carrying capacity increased to one deer per 21 acres, and population levels remained fairly stable from year to year. Food plots seemed beneficial only during years of low mast yields. Even with access to high-quality forage, the deer populations were limited by a low fawn survival rate due to predation, disease, parasites, and other unknown factors.

NOTES:

2:10 - 2:30 p.m.

Estimating Browse Utilization at Three Deer Densities with the Stem Count Index

Jimmy Rutledge, Ty Bartodkewitz, Daniel Kunz, Alan Cain, Evan McCoy, Texas Parks and Wildlife Department; Timothy E. Fulbright, Charles DeYoung, David Hewitt, Texas A&M University

The Stem Count Index is used by the Texas Parks and Wildlife Department to estimate use of browse plants. Our objective is to determine the effects of deer density and supplemental feed on intensity of use of browses based on the Stem Count Index. Six 81-ha high-fenced enclosures were established with the following density treatments on each of 2 replicate ranches: 2 with 8.1 ha/deer, 2 with 3.2 ha/deer, and 2 with 2.0 ha/deer. One enclosure of each density treatment is supplementally fed *ad libitum* with protein pellets. Use of browse species was estimated in February and August, 2004 and 2005. Browses were classed according to palatability with first choice plants the most palatable and third choice plants the least palatable. The percentage of browsed twig tips was estimated on a minimum of 100 twigs/plant species/experimental unit. Stem count index of first choice plants did not differ ($P = 0.455$) among densities. For second choice plants, stem count indices were highest ($P < 0.001$) at the highest deer density, and lowest at the low density. No differences ($P > 0.05$) existed between supplementally fed and unfed treatments. Stem count indices of second choice plants were more strongly related to deer densities in February ($R^2 = 0.79$) than in August 2005 ($R^2 = 0.62$). Stem count indices of second choice plants appear to reflect differences in deer densities, but the strength of the relationship may vary seasonally.

NOTES:

2:30 - 2:50 p.m.

White-tailed Deer Abundance and Herbivory in a Coastal Bottomland Hardwood Forest

John A. Nyman, Seth Bordelon, Daniel Scognamillo, Mike Chamberlain, Louisiana State University

We evaluated the effects of deer herbivory on forest plant communities, and used aerial thermal imaging to estimate white-tailed deer abundance and distribution at the Barataria Preserve of the Barataria National Park in southeastern Louisiana. Barataria Preserve consists of coastal bottomland hardwood forests and freshwater marsh. Browse surveys revealed little browse under the forest canopy. An exclosure study under the canopy indicated that herbivory decreased survival of planted *Fraxinus pennsylvanica* juveniles, but not of planted *Quercus nigra* juveniles or naturally occurring shrubs and juvenile trees. Juvenile trees were ten times denser in canopy gaps than under the canopy because the exotic *Triadica sebifera* proliferated in gaps. White-tailed deer might be consuming native species more than *T. sebifera* in gaps. Additional research throughout the range of *T. sebifera* could determine the effects of herbivore preference and density on *T. sebifera* success. Results of thermal imaging surveys during 2003 and 2004 suggested 389 deer and 355 white-tailed deer, respectively. The results of the 2004 survey also were analyzed to determine habitat use. White-tailed deer were not equally distributed among habitats; they appeared to concentrate within forested habitats (11.4 deer/km^2, or 1 deer/22 ac) rather than in marsh habitats (7.7 deer/km^2, or 1 deer/32 ac). Greater density in forested habitats indicated greater potential for herbivory of woody plants and plant regeneration in forests. Additional research to determine detection rates of white-tailed deer in southeastern habitats could allow the minimum estimates reported here to convert into actual population estimates.

NOTES:

2:50 - 3:10 p.m. Break - Premier Room 2, Exhibit Room

Technical Session VIII - Premier Room 3

3:10 p.m. Instructions and Door Prizes

The Finishing Krewe: Vic Blanchard, Moderator

3:20 - 3:40 p.m.

Detection Probabilities and Resulting Efficiency of Spotlight Surveys for Estimating Relative Abundance of White-tailed Deer

Jordan M. Smith, Stephen S. Ditchkoff, Auburn University; Bret A. Collier, Texas A&M; Joshua B. Raglin, Norfolk Southern Railway

As a first step in understanding structure and dynamics of white-tailed deer populations, it is essential that managers have knowledge of population size. While data collection methodologies vary, in almost all cases population surveys are conducted. Technology has afforded us several tools for conducting surveys (*e.g.,* aerial surveys, and infrared-triggered cameras), yet the most common tool for collecting abundance data has been the spotlight. As harvest management decisions are frequently based on spotlight surveys, it is imperative that managers have detailed knowledge of the efficiency of this technique. Using a closed mark-recapture design, we examined efficiency of spotlights for detecting deer by operating thermal imagers and spotlights simultaneously. Spotlights detected only 58.5% of the total number of deer detected by the thermal imagers. This trend was similar for all classes of deer (*e.g.,* bucks, does, fawns, and unknown). Five percent of the total deer seen were detected by spotlights but missed by the thermal imagers. Relative to the thermal imager, spotlights failed to detect 44.2% of deer groups (≥1 deer), and when a group was detected, spotlights failed to detect ≥1 animal in 25.6% of those groups. Because of their inefficiency at detecting white-tailed deer during surveys, we caution that spotlights alone cannot be used effectively to obtain accurate estimates of population abundance unless variation in detection probability is addressed. However, inefficiency of spotlights relative to more advanced technology for detecting white-tailed deer during surveys may not limit their applicability in analysis of population trends if appropriate sampling designs are applied.

NOTES:

3:40 - 4:00 p.m.

Seasonal Ranges and Fidelity of Adult Male White-tailed Deer in Southern Texas

Mickey W. Hellickson, Tyler A. Ca.m.pbell, Karl V. Miller, R. Larry Marchinton, University of Georgia; Charles A. DeYoung, Texas A&M

Investigations involving home range size and age-dominance relationships in male white-tailed deer (*Odocoileus virginianus*) have been few. The subdominant /dominant floater model (SDFM) predicts that home range sizes of young (1–2 years old) and mature (5–6 years old) male deer will be greater than middle-aged (3–4 years old) deer and that home range fidelity of young and mature deer will be less than middle-aged deer. However, this model has not been thoroughly examined. Our objectives were to characterize utilization distributions and fidelity, and evaluate the SDFM using an extensive radio-telemetry dataset collected from adult (>1.5 years old) male deer in southern Texas. We generated home ranges and core areas of 96 deer from 16,696 location estimates collected during January 1993–June 1995. Annual home range size did not differ among age categories. Deer maintained smaller home ranges during spring than during other seasons and old deer (>7 years old) displayed smaller seasonal home ranges than young or mature deer. Deer exhibited greater home range fidelity during summer than during spring, pre-rut, and rut seasons. We found limited evidence supporting the SDFM. The high level of home range fidelity within all age categories suggests deer were anchored to a substantial portion of their range. However, our observed home range size exceeds the acreage of most private landholdings and reinforces the benefit of establishing deer management cooperatives with adjacent landowners.

NOTES:

4:00 - 4:20 p.m.

Biases in Obtaining Deer Sex and Age Ratios

Nova J. Silvy, Roel R. Lopez, Texas A&M University

Deer sex and age ratios are used for both academic (*e.g.,* population models) and management purposes (*e.g.,* harvest management) and are obtained by a variety of sources (*i.e.,* vehicle kills, capture data, harvest, and population surveys). Each of these methods has potential biases and the question arises, "Do we really know deer sex and age ratios?" In an attempt to answer this question, we compared deer sex and age ratios obtained from vehicle kills, captures, and from morning, evening, and spotlight road surveys. We then used a population of marked deer to determine the probability of deer by 6 ages and sex classes being killed by vehicles and being seen along the 3 road surveys. Results indicated the probability of seeing individual sex and age class deer varied by method and season and was influenced by reproduction behavior. Data are presented as to biases by method and season.

4:20 - 4:40 p.m.

A Financial Analysis of Quality Versus Trophy Deer Management

David L. Genho, Mickey W. Hellickson, King Ranch, Inc.

The primary difference between quality and trophy deer management is the age at which bucks are targeted for harvest. Under quality deer management, the harvest of young bucks (1 - 2 years old) is discouraged to allow more bucks to reach middle age (3 - 4 years old). Therefore, harvest is shifted from young bucks to middle-aged bucks. Under trophy deer management, the harvest of both young and middle-aged bucks is discouraged to shift the harvest toward mature bucks (5+ years old). Under most management scenarios, more middle-aged bucks are present in the population than mature bucks due to natural mortality. However, mature bucks, due to their larger antler size, are of more economic value than smaller-antlered middle-aged bucks. Therefore, the question arises as to which management strategy results in higher profits. We used *Stella*, a computer modeling program, to model revenue generated from the two contrasting management strategies. Actual census and harvest data obtained from a commercially hunted private ranch in South Texas were incorporated into the model. Additional variables, such as supplemental feeding and coyote removal, were added to observe affects on revenue. Modeling results indicate higher gross revenue for trophy management. Revenues also increased when supplemental feeding and coyote removal were implemented. Highest gross revenue occurred when trophy management guidelines were used in combination with both supplemental feeding and coyote removal.

4:40 - 5:00 p.m.

A Modified Approach to Rocket Netting White-tailed Deer Using a Remote Video System

Gregory K. Batts, Marcella J. Kelly, Michael R. Vaughan, Virginia Polytechnic and State University; Nelson D. Lafon, Virginia Department of Game and Inland Fisheries

Capture of white-tailed deer (*Odocoileus virginianus*) is vital for telemetric studies of the species. A variety of methods such as drop nets, clover traps and rocket nets have been employed to capture deer; however, most methods require direct observation of the trap site, which has the obvious limitation of controlling human scent around the trap site. We describe a new technique for capturing deer with rocket nets coupled with wireless remote video. Capture rate using remote video was 0.09 deer/hour compared to 0.05 deer/hour using the traditional on-site observation method. We suggest that this technique is more efficient than other reported capture techniques for free-ranging white-tailed deer.

NOTES:

5:00 p.m. Deer Committee Business Meeting - Premier Room 3

6:30 p.m. Banquet: *A Taste of Louisiana* - Premier Room 1
Closing Remarks and Awards
Mardi Gras with Live Music

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 71-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. Bucks made up 65-70% of the annual harvest during this time. Age structure of harvested bucks is typically young, with the average age being approximately 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 can take one antlerless deer, in addition to one antlered buck, per day. The number of either-sex days was further increased in many counties during the 1999-2000 season, with some counties having as many as 45 days of either-sex hunting during the general gun season. With the additional opportunities for doe harvest, the total deer harvest for the 1999-2000 season was more closely balanced between bucks (55%) and does (45%).

Alabama's Deer Management Assistance Program (DMP) has been a very popular program since it's inception in 1984. By allowing the use of antlerless tags to meet harvest quotas, the DMP has given many landowners and hunting clubs the opportunity to manage their properties for better quality deer that the normal hunting seasons and bag limits could not offer. The DMP has been very successful in Alabama, but the need still exists for other options for managing deer herds on properties not enrolled in the program. In response to the continued need and desire for more opportunities to harvest antlerless deer, the lengths of either-sex season in many counties were increased for the 2000-2001 hunting season. For the first time, all 67 counties had an either-sex season during the general gun season. The length of these seasons ranged from 3 days to 75 days (the entire gun deer season). The bag limit also was raised to two deer a day, only one of which could be antlered, with no season limit applying to antlered or antlerless deer. As a result of the liberalized either-sex seasons, hunters harvested more does (243,180) than bucks (235,520) during the 2000-01 hunting season. These changes gave hunters in most of Alabama ample opportunity to harvest antlerless deer. This increase provides the framework many

landowners, hunting clubs, etc. need to manage their properties as they wish, without having to enroll in the DMP. It is hoped this increase in either-sex hunting opportunities will help stabilize expanding deer herds and correct out of balance adult sex ratios found in many parts of the state. The liberal either-sex opportunities remain in place.

ARKANSAS

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

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

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

A five-year Strategic Deer Management Plan was approved in 1999. Deer management units and zones are used for statewide herd management. Broadly, management efforts are directed toward increasing the female harvest and reducing the harvest of young males to improve buck-doe ratios and to also improve the buck age structure. Female harvest is accomplished with a liberal doe bag limit and special bonus doe permits. To reduce the harvest of young bucks Arkansas implemented a statewide antler restriction in 1998. Legal bucks must have at least three points on at least one antler. During the 1997-98 deer season in the West Gulf Coastal Plain Region, 1.5, 2.5, and 3.5-year-old bucks made up 44%, 30%, and 9% of the buck harvest. By the 2001-02 season, those percentages had changed to 13%, 44%, and 25%. Statewide, during the 1997-98 deer season, bucks, button bucks, and does made up 55%, 8%, and 37% of the total harvest. By the 2001-02 season, those percentages had changed to 40%, 10%, and 50% respectively. During the 2002-2003 season 67, 734 (54%) bucks and 56, 717 (46%) does were harvested. The statewide bag limit is 4 deer, no more than two of which may be bucks. Button bucks count toward the buck bag limit. Checking of deer in Arkansas is mandatory. Starting in 2001, a biological data collection initiative was implemented. During the 2001-02 season, biological data was collected from approximately 14% of the total harvest. In the 2002-2003 season, a total of 12,971 biological data records were collected, 10% of total the harvest.

FLORIDA

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

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

In the 1800s and early 1900s, 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 1920s to 1930s, 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. Possibly the most serious problem facing the white-tailed deer during this time in Florida history was the screwworm. An acute increase in deer numbers was evident immediately following the eradication of the screwworm fly by the U.S. Department of Agriculture.

Since the 1930s, Florida's white-tailed deer herd has increased dramatically as a direct result of enforcement of harvest restrictions and the screwworm 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 1960s. Today, the Florida Fish and Wildlife Conservation Commission (FWC) allows either-sex archery hunting, has a lottery drawing for antlerless deer permits on many wildlife management areas (WMAs), issues antlerless deer permits on private lands, and has a seven days antlerless deer season during the general gun season. The FWC manages several WMAs for higher-quality hunting, imposing antler restrictions and hunter quotas. Antler restrictions are also common on private hunting lands throughout the state. Although Florida is not known for large-antlered deer, such restrictions have led to an increase in higher-quality antlered deer harvest in recent years.

GEORGIA

Data on legally harvested white-tailed deer (*Odocoileus virginianus*) were compiled from July 1, 1978 through June 30, 2003. Population models were used in conjunction with hunter harvest estimates to calculate population size. Specific objectives were to determine population levels, monitor condition indices, and disease frequency in the state as well as for individual physiographic provinces, and deer management units (DMU). Included in this report are data from 1978-2002 for the statewide population.

Minimum population estimates increased every year from 1979 to 1991. This trend changed in 1992 when the statewide population estimate showed a decline for the first time. The rapid increases depicted during the period from 1981 to 1986 are reflective of reduced either-sex hunting opportunities. During this period the adult buck population increased by 79.4% while adult does increased by 94.1%. These higher adult populations contributed significantly to the observed population increase of 66.8% from 1985 to 1991. This population increase stimulated gradual increases in either-sex hunting opportunities (more either-sex hunting days). The additional days were added to existing seasons, primarily in the Piedmont and in the Upper and Lower Coastal Plains. Additionally, in 1991 the statewide bag limit was increased from 3 deer total, no more than 2 antlered bucks to 5 deer total, no more than 2 antlered bucks. The bag limit was increased again in 2001 to 12, 10 antlerless and 2 antlered deer. Another change added in 2002 requires that 1 of the 2 antlered deer must have a minimum of 4 points, 1 inch or longer, on one side of the antlers. There are no antler restrictions for the other antlered buck except in 9 counties with special antler restrictions.

The increases in either-sex hunting days and bag limit during the 1990's seemingly provided the necessary opportunity for hunters to harvest enough deer to stop or at least slow the rate of growth in the statewide deer population. However, in terms of the extent of the effect on the population, the increases in harvest and percent does seen during the last 10-12 years may be misleading. Comparing estimates of total harvest relative to concurrent estimates of pre-hunt statewide populations shows that the removal rate by legal hunting increased less than 30%. In other words, hunters removed an average of 26% of the "*standing crop*" during the decade of the 1980's versus 33% during the 1990's. Given that pre-hunt populations are reported as minimum estimates (i.e., assumed to be conservative) and that, at least in some years, evidence indicates that statewide harvests were overestimated, it appears that these removal rates have not been great enough to achieve a sustainable reduction in the statewide deer population.

According to model estimates, the statewide population averaged slightly more than 1.2 million deer over the 10- year period 1993-2002 with peaks occurring in 1991 (1.31 million), 1997 (1.39 million) and 2000 (1.31 million). Previous estimates had indicated that the statewide population was declining after the peak in 1991, however, since 1995 the population has shown an increase in 4 of the 8 years through 2002. Statewide the percent does in the harvest ranged from 48.3% to 63.3% over the last 10 years, and from 22.0% to 63.3% for 1978-2002. Percent does in the harvest for 2002-2003 (63.3%) was higher than the 10-year average (53.1%). Despite this high figure for percent does, total doe harvest for the 2002 season was similar to recent years. However, the adult buck harvest for 2002 was 30% lower than in 2001 and was 36% lower than the 15 year average (96,757 vs. 150,723). This represents the largest one-year decrease in adult

buck harvest on record. This likely is the result of the addition of a "4 points on one side" antler restriction. The adult buck harvest of 96,757 was 36% and 32% lower than the 15 and 20 year averages respectively. Further, the 2002 antlered deer harvest represents only 24% of the total harvest. This is the smallest proportion of the harvest recorded for antlered bucks in the 25 years of this study. The effects of this decrease in antlered harvest are unknown. The assumption is that many of the bucks that were not harvested as a result of the 4- point restriction will be available for harvest in future seasons. It is unlikely that the harvest of these bucks in subsequent seasons will offset the total decrease seen in the current harvest. However, if these passed over bucks are eventually harvested, they should be of somewhat better quality in terms of antler development.

KENTUCKY

Nestled among the Southeast, Midwest and Northeast, Kentucky is rapidly becoming known for its high quality deer herd. We have several luxuries in Kentucky including high quality soil, extensive agriculture and enthusiastic hunters. But the real reasons Kentucky's deer herd is in such good shape are timing and a little good luck. Restocking of whitetails in Kentucky was completed in 1999, much later than our southern counterparts. Therefore, Kentucky is dealing with a relatively young deer herd. Numbering about 800,000, Kentucky's deer population is well below carrying capacity and we intend to keep it that way. We have learned much from our neighbors: stay on top of herd growth, or you may never get control. Kentucky has promoted and instituted liberal antlerless harvest for over 10 years. In fact, 30% of the state has an unlimited bag limit on antlerless deer. Additionally, we are lucky to have a one buck limit, what we feel is the best approach to statewide QDM. We have consistently harvested more than 40% females over the past several years, and are often close to a 1:1 harvest sex ratio.

We do have problems, however. Kentucky is a small state with approximately 4.3 million residents and only 270,000 hunters. Annual hunter success rates in Kentucky are less than 40%, and of those successful hunters, the average number of deer harvested is 1.3. Despite liberal antlerless bag limits, our hunters are harvesting as many deer as they want. While annual harvest is currently around 110,000 deer, enough to slow growth combined with 40% doe harvest, we will soon have to do more with fewer hunters.

Kentucky continues to be one of the top states for quality deer hunting. During the 1992-1999 reporting periods, Kentucky was surpassed only by Illinois in the number of Boone & Crockett bucks produced per square mile of land area. We consistently harvest over 20 deer that qualify for Boone & Crockett recognition each year. Kentucky's deer management philosophy is simple. We intend to increase the quality of Kentucky's deer herd while achieving proper deer population levels.

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, 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 and in all sixty-four parishes. The present population is estimated at around one million animals.

The Louisiana deer story is similar to that of most southeastern 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 deer management programs. In the late seventies, LDWF began to assist hunting clubs and landowners with their deer management problems and needs.

The Wildlife Division of LDWF is divided into seven wildlife regions. The Deer Program Section coordinates the statewide program with the regions. Regional biologists are responsible for management of the herds on public and private lands within their region. Deer hunts are held annually, on the various wildlife management areas around the state (WMAs). During the 2002-03 either-sex deer season on the WMAs, a total of 2,993 deer were harvested with 31,524 hunter efforts. There were 1,425 cooperators enrolled in the Deer Management Assistance Program and these cooperators harvested 28,334 deer. The yearling buck harvest on these lands was 32% of the total buck harvest and is an all-time low for this age group. DMAP has been the tool that large clubs and landowners have used to increase the age structure of their buck population.

In 2002, an experimental antler program was established in three parishes in the area of the state known as the Atchafalaya Basin. This program came at the request of the local QDMA chapter who petitioned the Wildlife and Fisheries Commission to adopt this experiment. During the 2002 season the yearling buck harvest was reduced in these three parishes. The program was set to run for three years and may provide a means for both large and small landowners to increase the age structure of their buck population.

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

MISSISSIPPI

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

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

The ability to manage an animal as adaptable as the white-tailed deer required information about species ecology and hunter objectives in all physiographic regions of the state. Baseline physiological indicators, which allowed evaluation of population and habitat inter-relationships, were unknown. Through a cooperative research program with Mississippi State University in 1976, the Mississippi Department of Wildlife, Fisheries and Parks gained information which provided biologists with the ability to evaluate population density relative to carrying capacity, using condition indicators rather than population estimates or browse surveys. This Cooperative Deer Management Assistance Program (DMAP) directly involved hunters in management through the collection of biological data. The interpretation of these data, in consultation with a biologist, is the guiding principle of DMAP. From a two-county pilot project in its first year, DMAP grew steadily until participation peaked in 1994 at almost 1,200 cooperators with over 2.7 million acres under management. Liberalized season structure and bag limits during the mid-1990's allowed land managers the flexibility to meet harvest objectives outside DMAP guidelines, which resulted in a decline in DMAP participation. Current enrollment includes 850 cooperators with 1.9 million acres. The philosophy of the technical staff continues to be that it is imperative to provide sufficient harvest opportunity on private lands to allow accomplishment of individual management objectives.

MISSOURI

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

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

The history of deer in Missouri is similar to that in most Midwestern states. Prior to settlement, deer were abundant but populations declined rapidly from habitat loss and unrestricted harvest. In 1925, it is estimated there were only 395 deer left in the state. An aggressive program of public education, enforcement, reintroduction, and land acquisition was successful in restoring deer, and the first modern day deer season was held in 1944. 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-in, 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.

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

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

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

NORTH CAROLINA

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

The history of deer management in North Carolina is similar to the other southeastern states. In the early 1900's it was estimated that only 10,000 deer were in the state. A buck law was established in 1927. The period from 1930 to 1960 was characterized by the restoration and recovery of deer herds. During this "buck management" phase, deer herds responded dramatically to the restoration efforts and protection they were afforded. By 1960, the statewide population was 250,000 animals and almost 30,000 were harvested. Either-sex seasons were established in 1959. The period of 1960 to 1980 was characterized by the "doe management" phase. Most management strategies involved the concept of trying to get more does in the harvest. Very little concern was given to the buck segment of the herds. The period since 1980 has been characterized by the "herd" management phase. Herd and habitat management schemes were established which attempted to make better utilization of both sexes and at the same time improve the quality of deer harvested and 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 2002 pre-season population estimate was one million deer. During the 2002-03 hunting season, either-sex regulations allowed 6 does to be taken throughout the entire season (September-December). In the Coastal Plain, densities and buck harvests have stabilized somewhat and there have been accompanying increases in doe harvests (almost 50% of the total in many counties). Piedmont herds are being affected by urbanization, and conflicts between deer and people are becoming more evident. Work is ongoing to evaluate techniques for increasing antlerless harvests without adding to existing conflicts between hunters and landowners. Herds are continuing to increase in the good habitat of the foothills area of the upper Piedmont and lower Mountain regions. Mountain populations are relatively stable and either-sex hunting is being incorporated gradually into those areas where herds are sensitive to severe environmental conditions and fluctuations in high-energy foods like acorns occur.

OKLAHOMA

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

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

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

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

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

SOUTH CAROLINA

South Carolina's deer herd reached an extremely low point around the turn of the last century with deer becoming essentially non-existent in the piedmont and mountains (the upstate). Fortunately there were good residual populations associated with the major rivers in the coastal plain. Restoration efforts began in the 1950's and involved the capture and relocation of approximately 314 deer from the coastal plain to the upstate. All restocking efforts utilized native deer. Over the last 20 years, changes in agriculture and, more importantly, changes in forestry-related activities have created exceptional deer habitat in most parts of the state. Currently, huntable populations exist in all 46 counties, and many areas have over 50 deer per square mile with 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 or September 1 and continues until January 1. In this region, roughly two-thirds of the state, dog hunting is allowed; however that activity is declining significantly. Baiting is allowed in the coastal plain and although there are short buck only archery seasons in a few coastal plain Game Zones, special weapons seasons are generally lacking. In much of the coastal plain there is no daily or seasonal limit on antlered deer. In the 18 county piedmont and mountains, deer season begins on September 15 and October 1, respectively, and ends on January 1. There are early archery and/or primitive weapons seasons in all areas. Neither dog hunting nor baiting is allowed in the upstate and the limit on antlered deer is 5.

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. In the upstate and on Wildlife Management Areas, bag limits and methods of take are set by SCDNR regulation. SCDNR has statewide authority with respect to the harvest of antlerless deer, and as deer populations have increased, programs have provided more opportunity for hunters to harvest antlerless deer on all lands. Currently, all parts of the state have designated either sex days and typically every Friday and Saturday from October 1 to Thanksgiving are either sex days with additional days near the end of the season.

SCDNR offers two optional antlerless deer tag programs for the entire state. The Antlerless Deer Quota Program (ADQP) began in 1965 and continues today as a means for private landowners/lessees to harvest antlerless deer. With the ADQP, qualified applicants are issued an antlerless deer quota based on the density and condition of the local deer population, the size of the tract of land, and the recreational and agricultural objectives of the property owner. Currently, approximately 2,000 properties encompassing over 4.1 million acres participate in the ADQP. In 1994 a second program, the Individual Antlerless Deer Tag Program was implemented. Unlike the ADQP which is property based, this program is hunter based and allows anyone to purchase up to 4 antlerless deer tags which can be used on any property they are permitted to hunt (including many WMA's). Individual tags cannot be used on properties already enrolled in the ADQP. Currently, over 46,000 hunters participate in the Individual Tag Program. With the liberalization of either sex days and the availability of two optional tag programs, South Carolina deer hunters now harvest equal numbers of bucks and does.

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

TENNESSEE

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

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

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

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

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

TEXAS

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

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

Deer have expanded their range in Texas and over 82 million acres of the state are now 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 technical guidance programs have programs that allow the harvest of low-end bucks and trophy bucks. Beginning in the 2002-2003 Season Texas began experimenting with mandatory antler restrictions in a 6 county area. In this area a legal buck must have a minimum of a 13" inside spread, OR at least one un-branched antler, OR at least 6 points on a side. These regulations will be evaluated over a 3-year period.

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

Additionally, TPWD biologists may make recommendations on such 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 native habitat is the prime consideration for deer harvest recommendations. If a landowner fails to make 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 property or the amount of money they have to invest in expensive management tools such as fencing or supplemental feeds.

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

A special hunting weekend for youth-only (under 17 years of age) was established, and the Texas Youth Hunting Association was formed to encourage young people to enter the hunting fraternity. There were approximately 545,000 deer hunters of all ages in 2002, and they took almost 437,000 deer from a herd estimated at 3,826,146.

VIRGINIA

The statewide deer kill during the 2002 hunting season was 213,918 (102,761 antlered males, 22,171 male fawns, 86,133 females (40.8%) and 2,853 deer of unrecorded sex). The archery and muzzleloading kill were 18,593 (9%) and 48,648 (23%) respectively. Deer kill data in Virginia represent an actual known minimum count. Data are obtained through mandatory tagging and subsequent checking at one of about 1,250 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 starts the first Saturday in October. Concurrent with the last two weeks of the archery season east of the Blue Ridge Mountains and the last week of the archery season west of the Blue Ridge Mountains is an early muzzleloading season. The early muzzleloading season is full season either-sex east and one-day either-sex west. In-line muzzleloaders with scopes are legal.

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

In addition to the standard county seasons and bag limits, Virginia has several site-specific private land deer management programs including the deer management assistance program (DMAP) and the damage control assistance program (DCAP). Both programs were initiated during the 1988 season and continue to achieve wide acceptance. During the 2002 season, there were 717 DMAP cooperators encompassing 1,320,000 acres in 89 counties. These DMAP cooperators were issued a total of 23,209 antlerless tags and reported a total deer kill of 20,238. Biological data is collected from all these animals. Also during the 2002 deer season, there were 1,104 DCAP cooperators comprising 286,352 acres. These DCAP cooperators were issued 10,560 antlerless tags and reported a kill of 3,078 antlerless DCAP deer.

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

Over the vast majority of the Commonwealth of Virginia, current deer management objectives call for deer herds to be stabilized at their current level. Overall deer harvest levels for the past decade have been fairly stable.

WEST VIRGINIA

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

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

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

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

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

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

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

APPENDIX II
STATE DEER
HARVEST SUMMARIES

Table 1. Southeastern deer harvest summaries for the 2004-2005 or most recent available season.

State	Land Area (sq. mi)	Deer Habitat		Percent Forested	% Land Area Public Hunting	Harvest		
		(sq. mile)	(% Total)			Male	Female	Total
AL	51,628	48,014	93	71	5	247,000	288,000	535,000
AR	52,609	44,718	85	53	12	72,563	47,733	131,639
FL	51,628	29,280	50	45	16	78,400	38,300	116,700
GA	57,800	37,181	64	64	6	138,000	211,000	348,000
KY	40,395	39,654	97	59	9	78,494	83,684	162,178
LA	41,406	26,562	64	52	4	139,095	113,805	252,900
MD	9,837	8,766	89	46	4	45,244	48,624	93,868
MO	69,561	21,396	31	31	4	156,915	156,529	314,986
MS	47,296	31,250	66	66	6	132,682	144,800	277,492
NC	48,794	35,213	72	58	6	129,565	84,605	214,170
OK	69,919	37,425	54	19	2	57,614	42,988	100,602
SC	30,207	21,920	73	63	7.5	126,550	124,655	251,205
TN	42,246	25,770	61	49	9	99,360	80,182	179,542
TX	261,914	129,592	49	40	<2	242,616	190,771	433,387
VA	39,675	37,232	94	66	9	126,733	94,759	221,492
WV	24,064	22,889	95	79	9	93,989	84,566	179,066

Table 1. Continued.

State	Harvest/mi² Deer Habitat	Method of Data Collection[1]	Estimated Pre-season Population	Length of Season (Days)			Method of Setting Seasons[4]	% Land Area Open to Dog Hunting
				Archery[2]	Black Powder[3]	Firearms		
AL	11.1	A, B, C	1,750,000	110 C	22 A,B,C	73 C	A, B	70
AR	2.9	A,C	750,000	C 138	C 7	C 40	A,B	70
FL	4.0	B	800,000	30	9	72	A,B	20
GA	9.0	A,C,D,E	1,100,000	111-121	7	77-87	A,B,C	10
KY	4.1	A,C,D	900,000	136 (C)	11 (A,B)	10-16	A,B	0
LA	9.5	A,B,C	1,000,000	123(C)	14(A,B)	65	A,B,C	80
MD	10.7	A, B, C, D	242,000	C-87	A3+9, B-13	A-13, B-2, + 1 Jr. day	A, B	0
MO	14.7	A,B,C,D	1,000,000	98	10	25	A,B	0
MS	8.9	A,B,C	1.5-1.75 million	50A, 12B	14A,12B	47	A,B,C	90
NC	6.1	A,B,C,D	1,111,000	24-54	6	18-67	A,B,C	50
OK	2.7	A, C, E	500,000	107	9	16	A, B	0
SC	12.0	A,B,C	800,000	16 A	10 A	70-140	A,B,C	60
TN	6.9	A,D	881,500	52	14	39	A.B.C	0
TX	3.3	B,C	3,915,862	30	9	81-94	A,B	0
VA	5.9	A,B,C,D	~950,000	42-72	12-31	13-43	A,B	55
WV	7.8	A	901,000	66 C	6 C	21 C	A,B,C	0

Table 1. Continued.

State	No. of Hunters[5]	5-Year Trend	Hunting License Fees (Full Season)		Tagging System		
						Validation	
			Resident	Non-Resident	Physical Tag? License Tag? None?	Mandatory? Volunteer? None?	Bonus Tags Available?
AL	234,700	Stable	$16	$252	None	None	N/A
AR	250,000	Stable	$10.50 – 25	$100 – 225	Physical Tag	Mandatory	Female/Mgt buck
FL	150,000	Stable	$12	$151	Some WMAs	Mandatory	No
GA	268,561	Down	$19	$210	License Tag	NONE	WMA'S
KY	271,000*	Stable	$40.00	$140	Hunter Log	Mandatory	Yes
LA	189,991	Stable	$29-50	$300-352	None	None	None
MD	80,000	Down	$36.50	$130	Physical Tag	Mandatory	Antlered only
MO	475,000	Stable	$17	$145	License Tag	Mandatory	Antlerless only
MS	145,994	Down	$18.85-33.85	$303.85-382.70	None	Volunteer-Telchek	Antlerless, DMAP & FMAP
NC	195,000	Down	$25	$120	License Tag	Mandatory	No
OK	170,275	Stable	$20.00	$201	Carcass Tag	Mandatory	No
SC	139,437	Down	$25	$225	None	None	Yes
TN	217,000	Stable	$56	$251	Physical	Mandatory	Quota permits
TX	529,465	Down	$23	$300	License Tag	none	MLDP permits
VA	~260,000	Stable	$25-50	$140-190	License Tag	Mandatory	Unlimited, private, antlerless only
WV	269,000*	Decrease	$25	$110	Physical Tag	Mandatory	Yes

Table 1. Continued.

State	Mandatory Hunter Ed.	Mandatory Orange	Handguns Permitted	Crossbows Permitted	Drugged Arrows Permitted	# Fatal Hunting Accidents		Highway Kill[6]
						All	Deer	
AL	Yes	Yes	Yes	Yes	No	6	5	10,000 (B)
AR	Yes	Yes	Yes	Yes	No	2	2	Unknown
FL	Yes	Yes	Yes	Yes, gun	No	0	0	Unknown
GA	Yes	Yes	Yes	Yes	No	1	1	50,000
KY	Yes	Yes	Yes	Season	No	1	1	3,087(A)
LA	Yes	Yes	Yes	Handicap & >60	No	NA	1	2,500 (B)
MD	Yes	Yes	Yes	Handicap, 4 wks; >65	No	1	0	4300(A)
MO	Yes	Yes	Yes	Yes, Firearms	No	3	1	8,648
MS	Yes	Yes	Yes	Handicap, >64; all seasons	No	4	4	7,500 B
NC	Yes	Yes	Yes	Handicap	No	6	4	15,500
OK	Yes	Yes	Yes	Handicap	No			Unknown
SC	Yes	WMA's only	Yes	Gun, handicap, >62	Yes (28/46 co.)	1	1	1,401
TN	Yes	Yes	Yes	Yes	No	2	0	Unknown
TX	Yes	WMAs only	Yes	Yes	No	4	3	Unknown
VA	Yes	Yes	Yes	Yes	No	7	4	Unknown
WV	Yes	Yes	Yes	Yes	No	2	2	14,739 (A)

Table 1. Continued.

State	Limits [7]			Antler Restrictions [8]	% Hunting Success			Avg. Leasing Fees/Acre
	Season	Antlerless	Antlered		Archery	Muzzleloader	Firearms	
AL	None	2 per day	1 per day	C (5 WMA's)	25	N/A	60	$5-16
AR	3	1	2	A	?	?	?	$5.50
FL	2/day [7]	1or2/day [7]	2/day [7]	C	23	20	57	$2-4
GA	12	10	2	One buck must be 4-points/side	27	21	49	$5-15
KY		varies	1	7 WMAs	----------	37% Combined	----------	N/A
LA	6	None	None	Yes (C)	27	32	57	$5-30
MD		Regional	Regional	No	32	C-32	44	$5-35
MO	varies	varies	3; 1 with firearms	Yes, 29 counties	15	-	40	$5–10
MS		3+2 Archery	3	A	55	54	69	$2–10
NC	6	up to 6	2/4 [7]	NA	?	?	?	$2-6
OK	Gun	1	1	No	16	23	41	$2-5
SC	15+	10+	5+	C-6 WMA's	N/A	N/A	73.5	$5–10+
TN		Varies	3 statewide	None	----------	46% Combined	----------	$4.50
TX	5	Up to 5	Up to 3	B – 6 counties	55%	27%	62%	$6-$9
VA	6 (east) & 5 (west)	3	3 (east)& 2 (west)	On 2 WMA's	~30	~40	~50	$4
WV	9	Up to 8	Up to 5	1 WMA	19	17	51	$1-5

Table 1. Continued.

State	Private Lands Programs				Trailing wounded deer with dogs legal?	Supplemental feeding legal?	Baiting legal?
	Type[9]	Min. Acreage Requirements	Fee	No. of Cooperators			
AL	A	None	Yes	200	Yes	Yes	No
AR	A,C,D	200 ac	$25	A=264,D=3,000	Yes	Yes	Yes
FL	A	640	None	1,250	Yes	Yes	Yes
GA	None				Yes	Yes	No
KY	B	none	None	444	Yes	Yes	Yes
LA	A,D	40	Yes	A=1033,D=530	Yes	Yes	Yes
MD	none				Yes	Yes	Yes, Private
MO	B	5	None	150,000	Yes	Yes	No
MS	A,D	Variable	None	712	Yes, dog seasons	Yes	No
NC	A	Regional; 1,000/500	$50	99	Yes, in dog hunting areas	Yes	Yes
OK	A	1,000	$200-400	154	No	Yes	Yes
SC	A	None	$50	1,780 3.9 mil ac.	Yes	Yes, 18/46 co. no hunting	Yes 28 co. No 18 co.
TN					With officer approval	Yes	No
TX	A, B, C	none	none	3,500+	Most of Texas	yes	Yes
VA	DCAP DMAP	None	None	803 1074	Yes(east) No(west)	Yes	No
WV	NONE				No	Yes	Yes

Explanation of Tables

[1] A–Check Station; B–Mail Survey; C–Jawbone Collection; D–Computer Models; E–Telephone Survey.
[2] A–Early Season; B–Late Season; C–Full Season.
[3] A–Early Season; B–Late Season; C–Full Season.
[4] A–Harvest & Biological; B–Departmental/Commission Regulatory; C–Legislative.
[5] Asterisk if estimate includes landowner exempted hunters.
[6] A–Actual number based on reports; B–Estimated road kill.
[7] FL- A total of two deer may be harvested per day, both may be anterless deer during archery season and if taken with antlerless deer permits, only one/day may be antlerless during the 7-day antlerless deer season.; NC - Up to 2 bucks in those areas in the Western Season, Northwestern Season, and those areas of the Central Season where hunting with dogs is not allowed. Up to 4 bucks in those areas in the Eastern Season and those areas of the Central Season where hunting with dogs is allowed.
[8] A–Statewide Antler Restrictions; B–County Antler Restrictions; C–Region or Area Antler Restrictions.
[9] A–DMAP; B–Landowner tags; C–Antlered buck tags; D–Fee MAP.

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