Ecology and Management of Deer in Oklahoma

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The white-tailed deer (*Odocoileus virginianus*) is the most popular big game animal in Oklahoma. Accounts from early explorers venturing into Oklahoma were filled with descriptions of white-tailed deer in abundance. Deer remained relatively abundant through 1876. However, shortly after Oklahoma Territory was opened for settlement in 1889, unregulated market and subsistence hunting and changes in land use practices drastically reduced size of the deer population. By 1916, Oklahoma's deer population was relegated to four isolated pockets and barely totaled 500 animals. Deer season was closed in that year and was not reopened until 1933.

The current success of Oklahoma's deer management program is a tribute to modern wildlife management. Since 1933, management efforts using such techniques as trapping and transplanting deer into unoccupied but suitable habitat, regulation of season length, regulation of bag limits, and habitat management have resulted in significant increases in Oklahoma's deer herd. From 1947 to 1972, almost 9,000 deer were trapped and relocated within the state. Most of these were from the Wichita Mountains Wildlife Refuge and McAlester Army Ammunition Plant. Currently, white-tailed deer occur in every county, with an estimated statewide population of about 325,000.

Natural History

Oklahoma has two species of deer inhabiting the state, the more common white-tailed deer (*Odocoileus virginianus*) and the less abundant mule deer (*Odocoileus hemionus*).

The white-tailed deer occurs in all 77 counties and is quite adaptable, preferring a wide range of habitats. They occur in all the major habitat types including bottomland forests, commercial pine forests, upland hardwoods (including the Cross Timbers), and all of the major prairie and shrubland habitat types. Generally, they are associated with a mosaic of several different types of habitat, particularly where adequate brushy cover is available.

White-tailed deer tend to be smaller in body size than mule deer and lighter in color. They have smaller ears and exhibit the characteristic white tail, which they flash when alarmed. Average hog-dressed weights of male yearling and adult white-tailed deer are 92 and 103 pounds, respectively. Females generally weigh in around 85 pounds hog-dressed. One of the largest white-tailed deer taken in Oklahoma dressed out at 294 pounds. White-tailed deer antlers typically have a main beam on either side from which individual points or tines arise. Most of the white-tailed deer harvested are between 1 1/2 and 3 1/2 years of age.

Mule deer occur mostly as scattered populations in the panhandle counties of Cimarron, Texas, and Beaver and the northwestern counties of Harper, Ellis, Woods, and Woodward. Preferred habitat is rangeland composed of brushy areas in a mosaic of short- and mid-grass prairie. Mule deer have large ears (hence the name), a black-tipped tail, and a large white rump patch. Antlers of male mule deer exhibit Y-forked branching rather than points arising off a main beam as in the white-tail. Average hog-dressed weights of male yearling and adult mule deer are 123 and 170 pounds, respectively. Females generally weigh in around 110 pounds. Most of the mule deer harvested are between 1 1/2 and 2 1/2 years of age. About 250 mule deer are harvested in Oklahoma each year.

Home Range and Carrying Capacity

Seasonal and annual movements of white-tailed deer vary greatly. In a given landscape, deer movements are influenced by land use practices, amount of protective cover, temperature, and seasonal changes in food supplies. Deer movements and patterns of habitat use are influenced most by food availability. In good deer habitat in Oklahoma, annual movements of does are usually contained within 100 to 300 acres. Current research indicates that bucks may have considerably larger home ranges.

In the Cross Timbers area of Oklahoma with closed tree canopy and very little forage production (i.e., poor habitat conditions), home ranges of 2,420 acres have been recorded. However, on Cross Timbers sites in central Oklahoma treated with herbicides and fire to reduce tree canopy, the annual home range was 247 acres; summer and winter home ranges were 204 and 304 acres, respectively. In southeastern Oklahoma commercial pine forests, deer home ranges were 311 acres or less. Current research in mixed prairie, Cross Timbers, and bottomland habitats of southeast Oklahoma indicate that trophy class white-tails may move several miles daily. Annual home ranges of does in southwest Oklahoma ranged from 100 to 134 acres. Fall and winter home ranges

were from 30 to 50 acres in size. Deer in southwest Oklahoma have been shown to alter movements because of high hunting pressure. Deer also tend to restrict movements on windy days because of their reduced ability to detect danger.

The daily home range of does declines prior to fawning to between 12 and 58 acres. Fawns one week old range over about eight acres, and by 12 weeks their home range encompasses 128 acres. Healthy fawns, without high tick loads or other disease problems, range over about three times the area of unhealthy fawns.

Carrying capacity for white-tailed deer in Oklahoma ranges from one deer per 15 acres on highly productive sites with deep rich soils to one deer per 125 acres on low productivity sites with shallow droughty soils. The assumption is that greater soil fertility supports a higher carrying capacity and more favorable population conditions. Across the state, the average carrying capacity for white-tailed deer is one deer per 35 acres. Local deer populations may vary greatly from the average of one deer per 35 acres because of surrounding land use, hunting pressure, amount of suitable habitat, degree of poaching, and general health of the deer herd in that vicinity.

Antler Development

Antlers are shed during winter each year, and a new set is grown during late spring through early fall. Antler development begins in late April or early May. Initially, growth is rapid with developing antlers covered with hairy skin called velvet (Figure 1). During the velvet stage antlers are soft, porous, and filled with blood vessels and will bleed if wounded. Ticks are sometimes seen attached to the velvet at this time. Antlers begin hardening in late August, followed by the drying up of their blood supply and shedding of velvet. After antlers harden they are polished by continual rubbing on sapling or pole sized trees. In late September, development is completed, and mature polished antlers become evident. Shedding of antlers occurs from mid-December until early March. Antlers are retained longer by bucks in good physical condition than those in poor condition.

Antler size and shape are determined by nutrition, age, and genetics. Age and nutrition are the primary influencing factors. Antler development is delayed when spring range condition is poor and diet is inadequate. This may be caused by a late spring or an early summer drought. Deer can recover from a hard winter without any detrimental effects on antler growth if spring and summer rainfall amounts are adequate and distributed to maximize plant growth.

Antler size is a good indicator of overall habitat quality. Unbranched or spiked antlers may indicate poor nutrition or may occur on bucks that were born late the previous year and did not have time to develop sufficiently. In young deer, body growth and the development of bone and muscle tissue takes precedence over antler development. The basal circumference of antlers and the number of points in yearling bucks are a good general indicator of habitat condition. Large antlered or trophy class deer are generally 4 1/2 to 6 1/2 years of age. Occasionally, 3 1/2-year old deer will have trophy class antlers. Most white-tailed deer that make the record books have at least 10 typical points.

Reproduction

The reproductive cycle begins with the onset of rut, or the mating period. The rut is triggered by decreasing day length, or photoperiod, and occurs in several phases. In late August as antlers harden, bucks begin sparring with each other. As days grow shorter bucks become more aggressive, constantly pushing and rubbing on trees and sparring with bucks in the vicinity. This physical activity induces swelling of neck muscles.

Bucks establish a dominance hierarchy in October and begin scraping activity. The scrape is formed by pawing the ground until leaf or grass litter is removed from a spot and bare ground is exposed. The animal then urinates on the bare spot, often allowing urine to run down the inside of its legs over scent glands, thereby marking its territory. The dominant or alpha male will generally do most of the breeding in a given area.

Most fawns are born in May and June in Oklahoma after a gestation period of 187 to 222 days. Gestation is prolonged when habitat quality is poor. Twins are commonly born to adult does when range conditions are favorable for providing adequate nutrition (Figure 2). However, in some years habitat quality, and thus diet quality, may be low because of low rainfall in the spring; then, single fawns are born. Rarely, triplets may be born when a mild winter is followed by abundant spring rainfall and suitable growing conditions for plants.

Figure 1. Deer shed their antlers every year. Developing antlers are covered with velvet until they begin hardening in late August. Photo by Ron Masters.

Figure 2. Twin fawns are commonly born to adult does when range conditions are favorable to provide adequate nutrition. Photo by Ron Masters.

Habitat Requirements

Cover

Cover is often overlooked as an important component of deer habitat. Habitat use by deer has been associated with seasonal changes in protective cover. Adequate cover provides shelter from weather and predators (including humans), and provides bedding and loafing areas where they feel secure. Woody plants arranged densely enough to conceal deer provide this element. Early- to mid-successional stage forests and prairies with riparian zones or a shrub component usually provide adequate cover. Tall grasses three to five feet in height can also provide loafing, bedding, and concealment cover. Well dispersed young pine plantations (six to 10 years old) and naturally regenerated forests also provide adequate screening and bedding cover in eastern Oklahoma. These areas receive the greatest use when located adjacent to mature forests and burned open areas in early stages of succession.

Eastern redcedar and Ashe juniper thickets also meet thermal, screening, and escape cover requirements in the Cross Timbers, but dense stands provide little herbaceous forage and mast production. However, junipers are not compatible with prescribed fire, an important tool for white-tailed deer management. Cover requirements are best met by woody plants native to the site and compatible with the historical fire cycle.

The amount of protective cover required for deer varies according to the density and height of woody plants, herbaceous plants, and topography. Hilly or rolling country generally requires less cover than flat country. In central and western Oklahoma, optimum brush management for cover is approximately 40 percent brush and 60 percent open area. In forested eastern Oklahoma, about one-third of the area should be open for optimum conditions.

Little work has been done in the southeast or midwest regarding minimum cover requirements of deer. However, deer densities are high in areas of tallgrass prairie with rolling terrain and only limited brushy cover and scattered timber in prairie draws and drainages. Leaving these brushy draws may well be the most important management practice that can be done in these areas. Retaining at least one core area of permanent, thick brushy cover per 160 acres is optimum. If prescribed fire is used as a management tool, this area should be burned half as often as the remainder of the habitat.

Food

Food is often the weakest element in the white-tail's habitat. A 150-pound deer in good condition eats an average of 10 to 12 pounds of green forage per day. From early spring to early fall, a mature deer must consume over 2,200 pounds of forage (including warm season forage, soft mast, and browse) (Figure 3).

Food habits and browse preference studies indicate that white-tailed deer may eat over 100 different plant species in a given locality. However, all vegetation that grows within a given home range is not potential food. Some plants are fair, others good, and a few provide excellent food. Both mule deer and white-tailed deer eat many kinds of plants, but the bulk of their diet in any one area may be made up of relatively few foods. Deer are primarily browsers, feeding on woody twig ends and leaves during most of the year, but will preferentially use forbs (weeds) spring and to a lesser extent in summer.

Figure 3. Persimmon fruits are a soft mast relished by deer. Photo by Ron Masters.

Warm season grasses (such as native bluestems) are used only to a limited extent by white-tailed deer. Slightly increased use of warm season grasses has been noted in spring following a winter burn. Mule deer browse on the twigs, buds, and fruits or mast of sumac, oaks, plums, mesquite, and other woody plants, and generally have a higher proportion of grass in their diet than white-tails.

When hard mast (e.g., acorns, pecans) is available in the fall and winter, it is the most preferred white-tailed deer food and may compose 50 percent or more of the diet. Approximately 450 pounds of acorns will meet fall and winter requirements to carry one deer per 20 acres. However, abundant acorn crops are infrequent, and the balance of food must be provided by browse and cool season forage. Hard mast includes the nuts of oaks, hickories, beech, and walnuts and is usually considered a component of the overstory. In general, the greatest hard mast yields are from older trees greater than 10 inches in diameter at breast height (DBH) with a well developed crown. For most species of oaks, acorn yields are negligible for trees younger than 19 years or having a DBH smaller than 12 inches. Trees with a DBH greater than 26 inches often exhibit decreased acorn production. When hard mast is unavailable, browse, cool season grasses such as panicums and razor sedges (*Scleria* spp.), and the developing basal rosettes of forbs become the staple of the winter diet.

In eastern Oklahoma, available late summer and winter forage is often low and may be a factor that limits white-tailed deer populations. Mortality of adult white-tailed deer, reproductive success, and spring fawn mortality have been related to mast failure and may be compounded by the lack of evergreen browse in winter. Research in the Ozarks with deer in large enclosures with and without food plots showed that in years of mast shortfall, winter mortality was reduced in enclosures with food plots.

A portion of the annual forage production must be unused for the range to remain productive. Heavy browsing of leaves and twigs by white-tailed deer or livestock can reduce plant vigor so that the plant is unable to sustain normal growth and loses its ability to manufacture food. The degree of use that most plants can tolerate without detriment is between 40 and 65 percent use of current annual growth. Certain browse species such as elms may continue to live with overuse, but their foliage often develops a browse line just above the reach of deer. When deer begin using emergency foods heavily,

such as eastern red cedar, you can be sure that adequate food is in short supply. Introduced forages such as tall fescue, bermuda grass and "Old World" bluestem are undesirable for a food source. Single species plantings of these and almost all other introduced forages are detrimental to deer and other forms of native wildlife. Locally adapted clovers and alfalfa provide the only exceptions.

Light intensity is the single most important factor influencing browse production. Both quantity and quality of forage increases as the forest canopy is opened up. Species composition of understory browse is also dependent upon canopy closure, with shade-intolerant species being replaced by shade-tolerant plants as stand density increases. The majority of plant species preferred by white-tailed deer associated with forested habitats are moderately tolerant to intolerant of shade. Light becomes a limiting factor for understory forage production when canopy closure is greater than 20 percent. Maximum forage production occurs with a completely open forest canopy or no canopy.

Some Preferred Native Foods

Asters	*Aster* spp.
Blackberry	*Rubus* spp.
Blackgum	*Nyssa sylvatica*
Coralberry	*Symphoricarpus orbiculatus*
Dogwoods	*Cornus* spp.
Elms	*Ulmus* spp.
Grapes	*Vitis* spp.
Greenbriar	*Smilax* spp.
Fungi, Mushrooms	
Hackberry, sugarberry	*Celtis* spp.
Hawthorns	*Crataegus* spp.
Huckleberry	*Vaccinium* spp.
Lespedezas	*Lespedeza* spp.
Maples	*Acer* spp.
Mare's tail	*Conyza canadensis*
Oaks (mast)	*Quercus* spp.
Panicums (low)	*Panicum* spp.
Persimmon	*Diospyros* sp.
Poison ivy	*Toxicodendron radicans*
Plums	*Prunus* spp.
Tick-clover	*Desmodium* spp.
Sumac	*Rhus* spp.
Sunflowers (some)	*Helianthus* spp.

Food Quality. A balanced diet for white-tailed deer must contain a variety of available foods during all seasons. Protein requirements of white-tailed deer fawns have been estimated at 14 to 22 percent, and for yearling deer 11 percent. However, as little as seven percent protein intake is sufficient for reproduction. Recent research in central and southeastern Oklahoma indicates that forage quality and diet varies considerably from one year to another because of varying range conditions. White-tailed deer are selective feeders and choose a higher quality diet when a large number of different forage plants are available. Therefore, managers should seek to provide a wide variety of plants for optimum conditions. Livestock occupying the same range as deer may compete with deer for available forage, if either deer or livestock are exceeding their respective carrying capacities.

Water

Watering sites are frequently the centers of deer home ranges, and presence or absence of water may noticeably affect daily activities. White-tailed deer can survive for relatively long periods without free water, such as ponds, as long as succulent plants are available. The amount of water required varies seasonally with summer requiring the most and winter the least. From late July through September when drought is common, special attention should be given to providing water. Water requirements are particularly high for does that are lactating, and permanent water sources in mid- to late summer are important. A minimum of four permanent water sources per square mile should be provided during all seasons. One water source per 60 acres is considered optimum.

Interspersion

Deer require the habitat components of food, cover, and water in close proximity for survival. The closer one habitat element is to another, the less distance deer must travel to meet their needs. Optimal white-tailed deer habitat includes well interspersed grassland or early stages of succession, brushy thickets, and woodlands with adequate water supplies (Figure 4). Agricultural plantings are considered early stages of succession.

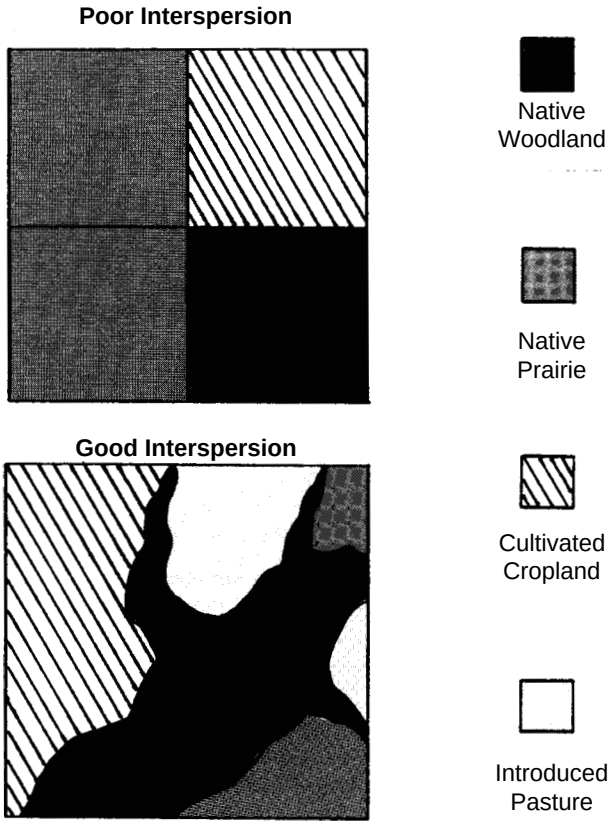

Figure 4. Good deer habitat has a high interspersion of different habitat types.

Habitat Management

High forage quality is important for optimum growth and productivity of deer. Timber harvest, thinning, use of some herbicides, and prescribed fire are techniques that have successfully been used in forested areas to increase the nutritional quality, quantity, and diversity of forage plants in late summer and early fall. Deer diets consist of higher quality forage when more diverse forage is available. Generally, areas to be harvested or treated with herbicides should be between 10 and 50 acres and irregular in shape to maximize habitat interspersion and for easy access to escape cover. Somewhat larger areas may be treated without detriment to deer if an irregular shape is emphasized with easy access to cover.

Both even-aged and uneven-aged approaches to timber management can be of benefit to deer. However, we recommend retaining mature oak-pine stands for acorn production and habitat for other species within a mosaic of harvested and burned sites. Clearcuts should be regenerated as mixed oak-pine stands rather than pure pine stands to retain hardwoods for mast production. Forest openings created through commercial timber harvest have been successfully maintained in early successional stages using prescribed fire to provide forage. Thinnings are also beneficial. Thinning around selected mast-producing trees has been shown to increase acorn production. Management treatments should be scheduled in different years to provide optimal forage for deer seasonally and between years.

Prescribed fire is an excellent tool that can be used economically and effectively to manage deer habitat across the state. In prairie lands, it can help halt brush encroachment and cedar invasion, as well as increase plant diversity and improve the quality of the forage. A prescribed burning rotation at three- to five-year intervals is generally recommended across the state to maximize herbaceous forage and soft mast production. A single burn can increase forage production from two to four times. We have seen cases where annual burning was conducted in tallgrass prairie interspersed with Cross Timbers without detriment to deer.

A mosaic of several burns in different years should be used rather than burning all deer habitat at one time. Just remember, when using fire you should always retain an unburned core area of permanent cover. Never burn without attending a burning workshop and gaining practical experience with someone who is already experienced in using prescribed fire. For more information on the use of prescribed fire, see OSU Extension Circulars E-927, *Using Prescribed Fire in Oklahoma*; and E-941, *Fire Prescriptions for Vegetation Management*.

Brush control practices that reduce or break up extensive areas of cedar or other types of thickets in central and western Oklahoma are beneficial to deer. These practices are generally best if used in conjunction with fire. However, extensive weed control practices with herbicides should be avoided because the weeds (forbs) are often important deer foods.

Moderate grazing pressure can also be of benefit to deer. Cattle will remove grass cover that is not used by deer and make forbs more easily accessible. However, continuous grazing under high stocking rates can be detrimental to deer if cattle begin competing with deer for forage. Protection of riparian areas from grazing is also a good management strategy for deer. For advice on proper grazing management in your specific area consult the State Extension Range Management Specialist at OSU and see Circular E-926, Gra*zing Management on Rangland for Beef Production*.

In some areas that historically had woody cover, woody plantings for cover may be an option. Note that deer do not need extensive forest cover to do well. Some of Oklahoma's highest deer densities are in prairie areas. We do not recommend tree or shrub plantings outside of their native ranges on appropriate sites. Nor do we recommend the planting of non-native plants for cover or food. Oklahoma's deer are adapted to native vegetation, and more often than not, introduced plants have proven to have a negative impact on most wildlife species.

On intensively farmed land, there are several options that can benefit deer. Leaving the outer several rows of a crop may provide additional food or cover. Also leaving odd corners unplowed and letting fence rows grow up in herbaceous or woody vegetation will be of benefit.

Food Plots

Food plots have both negative and beneficial aspects. When planted with high-quality agricultural crops, food plots may be one way to provide additional food for deer, especially during late summer and winter stress periods. Plantings made on marginal croplands may also provide some food and cover for turkey, quail, other small birds and mammals as well as deer. Food plots provide easily accessible forage and when used as an attractant may increase hunter success, but they should never be viewed as a substitute for proper habitat management and/or population management. Their value to deer has been established only in unique emergency winter situations. Although establishment and maintenance of scattered plantings may provide supplemental forage during periods of natural food shortage, concentrating animals in small areas can encourage disease and poaching problems.

There are other problems with food plots also. Food plots will usually be limited in distribution and numbers over a given property by the cost of establishment and maintenance, limited personnel, and time constraints. Food plots lack plant diversity, and available forage may be limited to one season, or the crop may be present when deer do not need additonal forage, depending on the crop planted. Food plots are often looked upon as a panacea for deer management, when population management or other habitat management techniques such as prescribed fire would better serve the land manager.

However, in years when mast shortfalls occur in areas of extensive forest cover, food plots can reduce mortality. Cool season forages such as wheat, rye, barley, and ryegrass that are planted as crops do well in food plots for deer when mixed with Ladino or Arrowleaf clover. If you are considering a summer forage crop, cowpeas, soybeans, or mungbeans planted in combination with alfalfa will provide some variety. Be aware that legumes, other than alfalfa, do not fair well in central and western Oklahoma. Also, if deer density is high, small plots may be completely utilized in a short period, thus providing little long-term benefit. If you choose to plant a food plot, have a soil test conducted, prepare a seedbed just as if you were farming a crop, and fertilize at the recommended rate. However, stands of native forage (grasses, forbs, and

browse) are preferred because of greater plant diversity and sustainability, and because they are better adapted to Oklahoma growing conditions.

Management of forested habitats by conventional timber harvest, selective thinning of hardwoods, and use of prescribed fire in native grassland or forested habitats provides a more cost-effective and ecological approach to managing food supplies. Application of these treatments improves forage standing crop, forage quality, and plant diversity without the costs associated with traditional food plots. In southeast Oklahoma, deer use of harvested and burned sites was equal to or greater than use of adjacent food plots in all seasons.

Population Management

Population management is the most important aspect of deer management because deer have the capability to degrade their habitat if numbers are not kept at or below carrying capacity. Population management and habitat management should be considered at the same time, because efforts directed at improving habitat will be wasted if deer numbers are not controlled. While many of the preceeding techniques can be used to improve deer habitat, these improvements are only temporary, because deer numbers will eventually increase until habitat again becomes limiting.

Historically, large predators played a major role in controlling deer herds, but with the removal of the gray wolf and near elimination of the mountain lion, the only effective means of controlling deer numbers is through regulated hunting. When most game and fish agencies first began managing deer herds, population management consisted of protecting does and only allowing antlered bucks to be harvested. Because deer have a high reproductive potential on good range, deer populations across the United States, including Oklahoma, expanded rapidly. Regulations that permitted the harvest of antlered bucks only were insufficient to curb herd growth, because it is difficult to remove more than 10 to 15 percent of the population annually through buck-only harvest. Healthy herds can increase by 30 percent or more each year, so when herds approach carry capacity, it is desirable to implement antlerless harvest to keep numbers from exceeding habitat limits. Doe harvest was controversial at first, and it remains so in some areas, but it has proven to be a necessary and effective herd regulation tool. Either-sex harvest allows more hunter opportunity and results in a more natural ratio of bucks to does in the herd. Balanced sex ratios allow most of the breeding to take place during the first estrus cycle by dominant bucks, favor an older buck age structure with better trophy potential, and promote a healthier deer herd.

Managing a deer population on a given tract of land requires an adequate harvest of both bucks and does and depends on the goals of the manager, because different goals will require different harvest prescriptions. Harvest recommendations for a property managed for maximum sustained harvest will be quite different than recommendations to produce trophy bucks. Goals should always be clearly defined and be reasonable with respect to the property. For example, it would be unreasonable to set a goal of managing for trophy deer on 300 or even 3,000 acres. Production of trophy bucks requires that some bucks are protected until they become 4 1/2 to 6 1/2 years old. On small properties, it is impossible to afford bucks the necessary protection required, because bucks may sometimes use adjacent lands and be subject to harvest. For trophy production, large properties are recommended, and the land manager must provide control over the number and age of bucks harvested.

The appropriate level of deer harvest can be determined only after a variety of information on the population is gathered. It is impossible to manage a population without having some knowlege of the sex ratio, productivity, mortality, age structure, and condition of the herd. Time, money, and the fact that deer are difficult to count often prevents the manager from conducting a true census to determine each of these factors. Fortunately, estimates of these factors can often be obtained through careful observation of the population habitat and keeping good records. Evening or nighttime counts conducted in late summer, after fawns are big enough to accompany the does and the bucks' antlers are well develped, can provide estimates of the population size, sex ratio, and productivity. Other clues to the size of the deer population can be obtained by observing the extent of deer browsing on various plants. If plants ranking high on the deer food preference list show light to moderate browsing, you can be sure that the herd has not exceeded carrying capacity. Conversely, if poor quality foods exhibit heavy browsing, chances are deer numbers are too high. Other indices can be determined from accurate records of all deer harvested on the property. Deer condition can be determined by monitoring yearling buck weights, antler points, antler beam diameters, and the percentage of spikes. Although these parameters will vary from one part of the state to another because of differences in habitat, an examination of the trend and comparison of the indices will be helpful in determining optimum deer density. Technical assistance with population management is available through several sources including the Game Division of the Oklahoma Department of Wildlife Conservation, Oklahoma Cooperative Extension Service, and the Samuel Roberts Noble Foundation.

Several problems may arise when deer herds approach or exceed carrying capacity in a given area. Deer-vehicle collisions often increase to unacceptable levels. Unfortunately, noisemaking devices and reflective systems designed to keep deer off the roadway are either ineffective or cost prohibitive and better ways of reducing these losses are needed. Agricultural crops such as soybeans, peanuts, alfalfa, wheat, vegetables and fruit trees may suffer extensive damage. In rural areas and some suburban neighborhoods, deer may cause damage to ornamental plantings and home vegetable gardens. Several alternatives exist to deal with potential problems. Wherever possible, regulated hunting is the best alternative to control deer numbers. Other alternatives for controlling deer damage are described in OSU fact sheet F-6427, *Ornamental and Garden Plants: Controlling Deer Damage*. The Oklahoma Department of Wildlife Conservation offers several programs for prevention and control of deer damage to agricultural crops, including special DCAP permits (Damage Control Assistance Permits) issued to farmers to harvest antlerless deer. For more information about assistance with agricultural depredation contact the Game Division, Oklahoma Department of Wildlife Conservation.

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