

Managing Desert Mule Deer

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Desert mule deer (*Odocoileus hemionus crooki*), also known as "black-tails" or "muleys," are important big game animals in the Trans-Pecos and Panhandle regions of Texas. For the period 1978-88, the number of mule deer in Texas ranged from a low of 149,000 in 1983 to a high of 245,000 in 1986. The average figure is about 207,000, with about 90 percent being found in the Trans-Pecos region.

Mule deer are found throughout the Trans-Pecos and along the western portion of the Edwards Plateau near the Pecos River. During the 1950s and 1960s, mule deer were transplanted into the Palo Duro Canyon and surrounding areas of the "caprock" and have since become well established. In the Panhandle, mule deer are found in disjunct populations along the rolling hills and canyons associated with tributaries of the Brazos, Canadian and Red Rivers and along the caprock escarpment.

Mule deer are an important resource because the demand for hunting is high and the income generated from hunting leases has been an important component of ranch income for most ranchers in the Trans-Pecos region. Their economic value has prompted many ranchers to become more aware of the management needs for mule deer. Indeed, many land use decisions (for example, livestock stocking rate, water developments and brush control) can have a major impact on mule deer. The extent of the impact, and whether it is positive or negative, depends primarily on the degree to which wildlife requirements were considered.

Deer management, like livestock management, varies from one ranch to another depending on land characteristics and the rancher's objectives. Just as some areas have a higher grazing capacity for cattle, some areas have a higher carrying capacity for mule deer, antelope, etc. In its simplest form, deer management involves three principles: (a) habitat management; (b) population management; and (c) people management. Obviously, each of these will affect the others.

First and foremost, the presence of suitable habitat determines where and in what abundance mule deer will be found. Generally, habitat management involves plant management, the two key points being: (a) knowing what plants are important for mule deer food and cover; and (b) knowing how to manipulate them. For rangeland habitats

in West Texas, management tools may include grazing practices, brush management, water development, prescribed burning and reseeding operations.

Next in importance is population (herd) management. This means keeping the population in balance with the habitat's carrying capacity. It also involves manipulating the age and sex ratios, herd density and other factors affecting population growth (predation, migration and competition with white-tailed deer and exotics). Generally, population management centers around regulating harvest levels. Problems have arisen in the past when biologists and ranchers tried to apply white-tailed deer management (specifically Hill Country deer management) to desert mule deer. Such strategies have caused concern regarding (a) spike buck management, (b) doe management, and (c) overall harvest rates. There is a lack of definitive research on harvest strategies, recruitment rates, movement patterns and other population-related phenomena (natural mortality, competition with livestock) which continues to hamper mule deer management in west Texas. Recognizing this, the state legislature recently appropriated funds for the Texas Parks and Wildlife Department for additional research on mule deer.

Finally, people management is important because it is the means for managing populations (i.e., sport hunting). Working with the public, even the paying public, is often a real headache. However, as sport hunters are the primary consumers, it's important to understand their needs.

Mule deer biology

Description

Desert mule deer are generally smaller and lighter in color than the Rocky Mountain subspecies of mule deer located farther north. Likewise, their antlers are not as massive as those of the Rocky Mountain subspecies. A mule deer can be distinguished from a white-tailed deer by differences in antler characteristics, size of ears, appearance of tail and the size of the metatarsal gland. When frightened, mule deer tend to escape in bounding leaps, as opposed to the whitetail's more traditional running gait. Mule deer tend to run with tails held down, whereas whitetails hold their tails ("flags") up when flushed.

Mule deer become reproductive at about 2 years of age and attain maximum body size at about age 6. A mature buck can weigh up to 200 pounds on the hoof, whereas a mature doe may weigh up to 120 pounds. Typical field-dressed weights in the Trans-Pecos area range from 100 to 130 pounds for bucks and from 60 to 80 pounds for does. Weights may be somewhat larger in the Panhandle area as a result of better forage availability (winter wheat, alfalfa).

In captivity mule deer may live as long as 15 to 20 years, but few wild deer live more than 8 years. Bucks attain maximum antler development at 5 to 7 years of age. Antler size is influenced by age, level of nutrition and, to a lesser degree, genetics. A diet consisting of 16 percent crude protein is recommended for maximum antler development and reproductive performance.

Does generally breed at age two and yearlings may breed if in excellent condition. The breeding season or rut extends from mid-November through mid-February, with December being the peak. The gestation period is about 7 months (210 days), with most births occurring in July and August. Does generally give birth to single fawns the first time they breed, but twins are common thereafter if forage conditions are adequate. Fawn crops generally average about 45 percent, depending primarily on seasonal weather conditions, forage availability and predation. Mule deer may have somewhat lower reproductive potential (lower fawn crops, fewer twin fawns, fewer yearling does breeding) than white-tailed deer. However, this may be related more to the environment than to the species' characteristics. In areas with both white-tailed and mule deer, productivity is similar.

Diet

Nutrition is a critical factor in deer management, whether management objectives call for trophy antlers or high numbers of deer. Mule deer diets center around two vegetative components—forbs and browse. Forbs are annual or perennial broadleaf herbs ("weeds") and are generally highly preferred when available. Forbs comprise from 20 to 40 percent of the annual diet, especially during spring and summer. The staple of the mule deer's diet, however, is browse leaves and stems of woody plants. Browse comprises from 40 to 70 percent of the annual diet and is especially important in fall, winter and early spring. During droughts browse may contribute up to 90 percent of the annual diet. Grasses generally make up less than 5 percent of the annual diet. Fruits and nuts (acorns, mesquite beans, cacti tunas, etc.) are seasonally important items, as are succulents such as lechugilla and prickly pear. Common forage plants for different locales are listed in Tables 1 and 2. Deer readily accept most farmed forages (e.g., small grains, alfalfa) and damage to fields can be severe during fall and winter if deer densities are high.

Harvest management

The proper age-class distribution of the harvest depends on the manager's objectives. If increased antler size is a goal then the majority of bucks harvested should be at least 4 years old. The annual harvest rate should not exceed 15 percent of the available bucks. Harvesting of does is warranted where population levels are approaching or have surpassed carrying capacity, or when deer are causing crop damage, but harvesting should be carefully regulated. Doe harvesting may be desirable to correct the sex ratio if the buck to doe ratio is less than one buck per four does. A desirable buck to doe ratio may vary from one to two to one to four, depending on the manager's objectives. Currently, doe harvests are closely regulated and available on a permit basis only. In areas where natural mortality is high, a larger number of does may be necessary to maintain the population at the desired level.

Controversy has arisen recently regarding the harvest management of spike bucks. Much of this debate has resulted from applying whitetail management to mule deer. Deer from a 12-inch rainfall zone are typically on a lower nutritional plane than those from a 30-inch rainfall zone. Spike bucks are products of youth and/or poor nutrition and/or poor genetics. In recent years, some deer managers have advocated "spike eradication programs." Such "vendetta management" should be approached cautiously, especially with regard to mule deer.

Spike mule deer bucks are probably largely the result of poor nutrition, so removal of all spike bucks during a dry year would essentially remove an entire age class. Always consider past weather conditions when contemplating spike management plans. In dry years spikes may constitute up to 80 percent of the yearling bucks, whereas in "good" years only about 25 percent of yearling bucks are spikes. Preliminary results of ongoing research indicate that a substantial number of yearling spike bucks will produce desirable antler growth as age increases. If spikes are to be culled, try to do so in a "good" year and select for the "trophy spikes" (i.e., those with spikes more than 12 inches long). These trophy spikes are more likely to be older than yearlings. They may be a result of poor genetics and should be culled from the herd. If survey data indicate more than five does per buck, do not harvest spike bucks at all.

Mule deer densities vary from one site to another. Numbers may range from fewer than two deer per section (640 acres) to as many as 30 deer per section. The greatest densities are generally found in Brewster, Pecos and Terrell counties. Each ranch has a certain carrying capacity or maximum sustainable population that should serve as an upper threshold for deer density. The carrying capacity for any particular ranch varies with the kinds and amounts of livestock present, plant species present, soil fertility and precipitation patterns. When deer numbers become too high

they can damage desirable browse plants, thus reducing

Table 1. Forage Plants Used by Mule Deer in the Trans-Pecos Region.						
Class	Species	Season of Use				Preference
		Spring	Summer	Fall	Winter	
Rating						
FORBS						
	Euphorbias	X	X	X		High
	Bladderpods	X			X	High
	Globemallow	X	X	X		Medium
	Filaree	X			X	High
	Milkwort	X	X			Medium
	Plantains	X		X	X	High
	Sagewort	X	X			Medium
	Goldeneye	X	X	X		Medium
	Daleas	X	X			Medium
	Bluets	X			X	Medium
BROWSE						
	Apache plume	X		X	X	Medium
	Acacias	X		X	X	Medium
	Ceanothus	X	X	X	X	Medium
	Ephedra	X		X	X	Medium-High
	Hackberry	X	X	X		High
	Oaks	X	X	X	X	Medium-High
	Mesquite	X	X	X		Low
	Redberry juniper	X			X	Medium-Low
	Skunkbush sumac	X	X	X		Medium-High
	Saltbush	X	X		X	Medium-High
	Littleleaf sumac	X	X	X		Medium
	Snowberry	X	X		X	Medium-High
	Tarbush				X	Low
	Mt. Mahogany	X	X	X	X	High
	Creosotebush				X	Low
SUCCULENTS						
	Lechugilla	X	X	X	X	Medium
	Pricklypear		X	X		Low-Medium
	Sotol	X			X	Medium-High
	Candelilla	X			X	Medium-High
	Yucca	X			X	Medium-Low

the long-term carrying capacity of the range. It's best to try to keep the deer population somewhat below the carrying capacity as a means of "drought insurance."

Population trends should be monitored annually by conducting some form of deer survey during October and November. Surveys can be made by spotlight counts, aerial counts (helicopter or fixed-wing), and/or incidental counts in which all deer observed during routine ranch activities are recorded. Each of these methods has certain advantages and disadvantages; some provide good information on densities but not on age/sex data and vice versa. Determining the most appropriate survey technique depends upon labor availability, time, topography, road network and costs. Consult your local county Extension agent or Texas Parks and Wildlife Department personnel for the method recommended for your area.

Harvest records should be maintained as a method of determining animal condition and evaluating progress in

deer management. Typical records include ages, weights, antler measurements and some estimate of body condition. For more information about collecting deer harvest records, ask your county Extension agent for "Interpreting Deer Harvest Records" (8-1486) and "The Age of a Deer" (8-1453).

Herd movements

The typical home range (that area where a deer spends the majority of its life) for desert mule deer varies from 2 to 5 square miles, with bucks having larger home ranges than does. Recent research on mule deer bucks in the Texas Panhandle reported an annual home range of about 25 square miles. The size of a deer's home range is determined in part by the quality of the habitat, i.e., how well the necessary components are interspersed throughout the range. Desert mule deer are not generally considered to be

Class	Species	Season of Use				Preference
		Spring	Summer	Fall	Winter	
Rating						
FORBS						
	Bladderpods	X			X	High
	Globemallow			X	X	Medium
	Primrose		X	X		High
	Ratany	X	X	X		High
	Doveweed	X	X	X		Medium
	Camphonweed	X	X	X		Medium
	Ragweed	X	X			Medium
BROWSE						
	Skunkbush sumac	X	X	X	X	High
	Hackberry	X	X	X		High
	Oaks	X	X	X	X	Medium-High
	Sandsage	X			X	Medium-Low
	Redberry juniper	X			X	Medium-Low
	Mesquite	X		X		Low
	Mt. mahogany	X	X	X	X	High
	Saltbush	X			X	Medium
SUCCULENTS						
	Pricklypear	X		X		Low
	Yucca				X	Low

migratory, although there may be occasional transient movements of several miles. Deer also may shift their home ranges in response to the seasonal availability of water, supplemental feed (small grain fields) and/or the presence of mountain lions.

Habitat Management

Because of climatic constraints, habitat management for mule deer is generally extensive (livestock management, brush management) rather than intensive (food plots, supplemental feeding, etc.). Although forbs are an important and highly preferred component of the diet, their abundance is often a function of seasonal rainfall and therefore outside the realm of active management. Identifying the key browse plants and knowing how they respond to livestock grazing herbicides, burning spot fertilization and other practices can help to improve the quantity and quality of browse available to deer.

The ability to identify and "read" deer use on key plant species is the best way to evaluate deer range relative to population level. Generally, such key species include perennial browse plants that are locally common, such as lechugilla, shinoak or skunkbush. By judging deer use on these key species, in key sites, information about range trends can be accumulated. Such data, when accompanied by census and harvest data over a period of years, will help you to make informed management decisions relative to harvest levels.

Water is a critical component of mule deer habitat. Deer habitat, no matter how attractive, will not be utilized if it is not near a source of water. Water sites should be no more than 2 to 3 miles apart and even closer in rough terrain. Constructing stock ponds or wildlife "guzzlers" or developing natural streams is an effective way to enhance wildlife use of areas in the arid southwest. Contact your local Soil Conservation Service office or get "Water Development for Desert Mule Deer" (Booklet 7000-32) from the Texas Parks and Wildlife Department for additional information on the construction of watering facilities. When designing watering facilities, keep the troughs low enough to be used by fawns. Windmills should remain operational even when livestock are absent from the pasture, because these watering points are important to deer and other wildlife.

Other Concerns

Predation

Predation can be a locally important factor affecting herd density. Predation by mountain lions, coyotes and bobcats can be a serious mortality factor, especially in fawn survival. Studies in mountain lion country, such as parts of Brewster and Culberson counties, indicate that a mature lion will kill a deer about every 2 weeks if deer are sufficiently abundant. Likewise, studies on fawn survival have shown that predators, especially coyotes, may kill up to 70 percent of the fawns before they are 2 months old.

Intensive predator control efforts can reduce losses, but such efforts are generally expensive and must be repeated periodically. Cost effectiveness can be enhanced by short-term, intensive efforts, especially during late winter. Generally, the cost of predator control programs can be justified only if the deer harvest level can be increased enough to compensate for the additional deer produced; otherwise, overpopulation and range deterioration could result. If you suspect serious predation problems, contact the local office of the Texas Animal Damage Control Service for advice and assistance.

Supplemental feeding

Providing additional feed, whether poured from a feed sack or planted in a field, can be an effective way of improving deer antler growth, overwinter survival and visibility of deer to hunters. However, such feeding programs are expensive and may be cost-prohibitive for most ranchers. The distinction between supplemental feeding and baiting should be made. Baiting involves feeding whole corn from October through December in order to increase the visibility of deer, whereas a supplemental feeding program involves feeding a balanced ration whenever foraging conditions dictate. If a supplemental feeding program is desired, contact a wildlife specialist for the proper ration. Research on the pros and cons of supplemental feeding have not been studied sufficiently to recommend the practice at this time.

Deer will readily use most cultivated forage crops such as small grains, alfalfa, forage sorghums, etc. Where these crops can be planted, they serve as excellent sources of supplemental feed for mule deer, especially during winter months when other forages are limited. Small grains are especially attractive to mule deer and provide the bulk of the winter diet in some areas of the Panhandle. Fields developed specifically for mule deer should be no larger than 20 acres and should be planted to wheat or triticale. Having a number of small plantings is preferable to a few large plantings. Plantings should be adjacent to woody cover for maximum use by deer.

White-tailed versus mule deer

Considerable concern has arisen in recent years regarding the relative proportions of mule deer to white-tailed deer, especially in the Trans-Pecos region. Whitetails have successfully expanded their range and population densities into some areas that were once inhabited only by mule deer. White-tailed deer are now common on much of the mule deer range in Texas, and whitetails have essentially the same diet as mule deer when the two species share common vegetation types. The expansion of whitetails is correlated with an increase in brush density over the last 25 years. As the habitat becomes more brushy, it becomes more suitable for whitetails than for mule deer. The two species tend to segregate themselves somewhat, as mule deer prefer the

rougher canyons and breaks while the whitetails are more common in the brushy draws.

Mule and white-tailed deer can and do hybridize. Both parental matings (i.e., mule deer buck crossed with a white-tailed doe, and mule deer doe crossed with a white-tailed buck) have been documented, but the former cross seems to be most common in the wild. Hybrids can sometimes be recognized by intermediate antler characteristics and tail coloration, or by the appearance of the metatarsal gland. This gland, which is located outside the rear hock above the hoof, is typically about 3/4-inch long in whitetails and about 3 inches long in mule deer. Hybrids tend to have glands about 2 inches long. Hybrids appear to have at least a limited degree of fertility. Most hybrid deer are apparently absorbed into the mule deer's gene pool. Most ranchers with mule deer want to protect the genetic integrity of the mule deer and deter cross-breeding. However, other than implementing higher harvest rates for whitetails, there is little that can be done. Clearing large areas of the brush to promote more mule deer is not generally economically feasible because of high treatment costs. A good range management program that slows the encroachment of brush may be the best solution to the problem.

Interactions with other herbivores

Mule deer commonly share their range with other grazing animals such as domestic livestock, other big game (white-tailed deer, pronghorn antelope, elk) and/or exotic game species such as aoudads. An understanding of the diets of each of these herbivores is important in determining the potential for competition between different species of animals. Mule deer eat primarily browse and forbs with grass important only in the early spring. Cattle consume primarily grass, with forbs and browse as secondary but seasonally important components. Sheep eat more browse and forbs than cattle, but less than deer. Goats have essentially the same diets as do deer. Therefore, the potential for competition with deer is greatest from goats, less from sheep, and least from cattle. During dry years, however, all kinds of livestock tend to consume more browse, thus compounding the degree of competition with deer.

In some areas, elk and aoudads are also common neighbors of the mule deer. Elk and aoudads have broad feeding niches, consuming grass, forbs and browse as they are seasonally abundant. Therefore, these big game species can be quite competitive with mule deer for forage. A disconcerting fact is that elk and aoudads have the flexibility to shift their diets from forbs to browse to grass as the more preferred forage class becomes limited. Mule deer lack such flexibility in their diets. Pronghorn antelope have diets similar to domestic sheep, but tend to inhabit more open country than do mule deer; thus the potential for competition is minimal.

Diseases and parasites

Research on desert mule deer indicates that diseases and parasites are of little management concern at the present time. Evidence of exposure to blue-tongue and epizootic hemorrhagic disease (EHD) have been documented in mule deer. The most common disease agent among mule deer appears to be warts. Mule deer from the Trans-Pecos and Panhandle regions have not shown any incidence of brucellosis, leptospirosis or infectious bovine rhinotracheitis (IBR).

Mule deer commonly harbor light infestations of ticks and nasal bots, but not at levels high enough to present a health problem to the deer. Likewise, internal parasites, especially stomach worms, are common but are not at sufficient levels to cause clinical symptoms. However, the concentration of individuals at feeding sites increases the potential for disease transmission. Because disease-causing organisms can be transmitted through the soil, supplemental feed should not be placed on the ground. Some type of trough should be used and, ideally, the feeding site should be relocated every year or two.