

Mule Deer



Mule deer buck

The mule deer is a symbol of wide-open spaces. It's found from the prairie foothills and deserts to alpine meadows and mountain forests. From extremely low numbers of deer at the beginning of the 20th century, mule deer peaked in numbers in the 1960s. Numbers of mule deer have declined in the early years of the 21st century in the face of drought, land use changes, past effects of excessive numbers of mule deer, mineral and industrial development, competition with livestock, and blocking of migration routes. There is no question that numbers of mule deer now are much lower than numbers from the 1950s to 1970s, but Wyoming still boasts 500,000 mule deer and some of the best hunting for mule deer in the world. Licenses to hunt mule deer are in high demand by both residents and nonresidents, and many consider a large buck mule deer to be one of the

most difficult trophies to acquire. Over 75,000 deer licenses are sold each year, and over 350,000 days are spent hunting mule deer in Wyoming each year. Mule deer licenses provide a great deal of the Department's income each year, with over \$6 million in license revenue and an additional \$30 million added to the state's economy by mule deer hunters.

General Biology

The mule deer (*Odocoileus hemionus*), named for its large mule-like ears, is also characterized by its white rump patch and tail with a black tip. A mule deer's coat ranges from a reddish brown in summer months to a dark gray in winter. Mule deer can be identified by their unique gait that consists of a stiff-legged walk or four-footed bound called 'stotting'. Mule deer males are easily distinguished from white-tailed

deer bucks, as their antlers are “double forked”. Each main beam divides again to form two “Y” formations. Mature bucks typically carry four points per side but may develop additional points. Males can weigh in excess of 250 pounds, with adult females weighing approximately 150 pounds.

Mule deer begin their breeding season in late October, with most breeding activity complete by late November. This period is known as the “rut”. During this period, bucks will establish a territory and defend it as a strategy to mate with as many does as possible. Does remain in heat for approximately 24 hours, cycling every 28 days until bred. Fawns are born from late May

through the month of June, a 200-210 day gestation period. At birth, spotted-colored fawns are hidden in protected areas for a week to ten days. After that time, fawns are usually strong enough to follow their mothers. Nourishment during the first couple months comes from mother’s milk.



Mule deer fawn

Reproductive success in mule deer does is highly dependent upon body condition, which is directly attributed to transitional (late fall and early spring) and winter range habitat conditions. Although mature does typically produce twins, habitat conditions, inadequate milk production, and predation among other factors, often lead to slightly less than one fawn per doe



Mule deer buck



White-tailed deer buck

by the on-set of winter. Fawns are typically weaned at three months of age. The weaning period is a critical one for fawns and does. Lactating does require high protein forage that comes from lush, green forbs, grasses and shrubs in order to support the nutritional demands for fat deposition associated with the post-fawning period. Green succulent forages also must be available as the fawn’s diet shifts from milk to vegetation. The fawn must continue to put on weight and store energy reserves prior to the on-set of winter. Sexual maturity in



High protein green forage is critical habitat component

deer is attained at the age of 18 months, but young bucks are usually not an active participant in the rut until age three or four.

The Last 200 Years

Prior to western settlement, approximately five million deer occupied the Great Plains. Unregulated hunting, land clearing for farming, and overgrazing by livestock in the 1800’s decimated western deer herds. By 1900, deer were scarce across Wyoming and other western states.

In the 1900s, restrictive hunting seasons and regulations were initiated by state wildlife agencies. About the same time, habitat-modifying activities such as logging, burning, and changes in livestock grazing management created major shifts in vegetation on range and forest lands.

These shifts favored shrub habitat types and mule deer. Between the 1930s and 1960s, mule deer numbers across the West increased substantially. Numbers had improved so much by the 1960s they had actually caused habitat degradation in some areas. Since the 1960s, deer herds in Wyoming have been cyclic, with overall numbers in a downward trend. Climatic conditions, including drought and several severe winters, aging habitats, predation, competition with other wild ungulates and domestic livestock, habitat loss, habitat conversion, habitat fragmentation from development and resource extraction, and disease have all contributed to these fluctuations.

General Habitat Preference

Mule deer in Wyoming are found in a wide variety of habitat types. Typically, good mule deer habitat consists of rough, steep canyons vegetated with a diversity of browse species and open grasslands. They can be found using such diverse habitats as irrigated and dryland croplands; deciduous tree/shrub riparian bottomlands; desert shrublands; sagebrush-grasslands; mixed-mountain shrublands; foothills grasslands; mountainous forests; and sub-alpine meadows.

Low elevation riparian bottomlands can provide habitat for mule deer, especially when found adjacent to irrigated and dryland croplands or rangelands. Deciduous trees and shrubs such as cottonwoods or willows with various understory species typically dominate these riparian areas. Some non-migratory deer herds may live their entire lives in this habitat type while other deer herds may only utilize this area during the winter.

Some of the most preferred habitat types include desert shrublands, sagebrush-grasslands, and mixed-mountain shrublands. These types are found at elevations from 4,500 feet up to 11,000 feet. Shrubs found in desert shrubland and shrub-grassland habitats include Antelope bitterbrush, juniper, black sagebrush, basin and Wyoming big sagebrush, fourwing and Gardner's saltbush, shadscale, true or curleaf moun-

tain-mahogany, and rubber and green rabbitbrush.

The mixed-mountain shrub habitat type usually occurs in higher precipitation zones in foothill areas and may include shrubs and trees such as quaking aspen, boxelder, ceanothus, chokecherry, hawthorn, maple, mountain big sagebrush, Gambel's or bur oak, red-osier dogwood, serviceberry, silver buffaloberry, silver sagebrush, snowberry, skunkbush, water birch, various willow species, and woods rose. Mule deer may use these types of habitats year-round in some regions while only during the fall, winter, and spring in others.

Mountainous area habitats often are comprised of quaking aspen forests with a variety of understory grasses, forbs and/or shrubs, and various types of coniferous dominated forests with species such as Englemann spruce, Douglas fir, limber pine, lodgepole pine, ponderosa pine, and whitebark pine. Although use varies by region and elevation, deer may be found in these habitat types during the late spring, summer, and early fall. Hiding cover and thermal cover are two necessary habitat components. Acceptable hiding cover is any amount of vegetation that will hide up to 90 percent of a mule



Mixed shrub communities

deer from a human at a distance of 200 feet. Forested areas or dense shrub stands can easily meet this requirement. Thermal cover assists mule deer in reducing the energy demands necessary in hot and cold air temperatures. Shrubs on winter range can provide thermal cover as well as quality food. Evergreen trees and deciduous shrubs can provide thermal cover from spring through fall, to keep deer body temperatures from becoming too high, requiring energy output to cool the animal down.

Migratory Vs. Non-Migratory Mule Deer Herds

Depending on where you are in the state, mule deer may have a relatively small home range at lower elevations, or may be part of a migrational herd that may travel from 11,000 feet elevation in summer to 6,000 feet to crucial winter ranges. Mule deer in Wyoming have been known to travel more than 50 miles from summer ranges to winter ranges,



Transitional habitat

particularly in the western portions of the state. Migratory deer typically use three to four seasonal ranges throughout the year:

1) *Summer Range*: As snowmelt continues at



Summer habitat

higher elevations, deer tend to move up the mountain following the green-up to summer range. This is typically high elevation forested land with diversity in vegetation.

2) *Transitional Range*: Commonly mid-elevation lands that encompass a mixture of forest, shrub and grassland that is important in spring and fall. As springtime begins, migratory deer herds that wintered at lower elevations with less snowfall begin to leave for higher elevation habitats. Depending upon the region, sought after spring habitat types include sagebrush-grasslands, mixed-mountain shrublands, foothills shrublands and lower elevation montane forests. Deer migrate to these areas in order to replenish spent fat reserves from the winter and to seek out areas of secure fawning cover. Vegetation in these habitats must be adequate to meet the high nutritional requirements of does during the fawning and early-lactation periods, antler growth for bucks, and overall body development. Spring fawning areas are commonly mesic (wetter) areas with greater shrub densities and taller residual vegetation. Succulent vegetation and available water is very

important during this critical period. During the fall months, mountain shrub communities and sagebrush-grasslands are preferred for food and cover. Shrubs are heavily used as grasses and forbs dry out.

3) *Winter Range*: As the high country begins to receive snow and fall begins, mule deer herds typically begin to migrate to low to mid-elevation, shrub-dominated landscapes comprised of sagebrush-grassland and mountain shrub communities. Shrub stands of mixed age classes and species are preferred.

4) *Crucial Winter Range*: These areas are lower in elevation, areas where winter snow levels do not drastically impede the animal's ability to forage and are dominated by important browse species that have adequate nutrient levels to aid deer through the toughest of conditions. The amount and quality of winter range is typically the limiting factor for mule deer herds in Wyoming. Mule deer often move to west- and south-facing exposure areas, where air temperatures are often higher, snow levels are minimal, and



Shrub winter habitat

browse species may be available.

Diet

A mule deer's dietary preferences shift throughout the year. Browse shrub species (i.e. mountain mahogany, sagebrush, bitterbrush, quaking aspen, and chokecherry) comprise at least 50% of the mule deer's diet year-round. In spring, grasses and forbs comprise nearly half of the deer's diet. Forbs are perennial or annual broadleaf, flowering plants. They can be very succulent when actively growing and are high in nutrient content. Grasses and sedges, when actively growing are also high in nutrients and are easily digested by ruminant animals such as mule deer. This time of year requires higher quality diets with nutrients and minerals such as crude protein, calcium, ash, magnesium, nitrogen, phosphorous, and potassium. Grasses such as alkali grass, basin wildrye, bluebunch wheatgrass, Indian ricegrass, needleandthread, prairie junegrass, sandberg bluegrass, tufted hairgrass, and slender, thick-spike and western wheatgrasses are preferred forages. Some of the preferred forbs in these habitats include; American vetch, bluebells several types of clovers, cow parsnip, elephanthead, paintbrush,



Crucial winter habitat can be limited

penstemon, and scarlet globemallow. Summer ranges include grasses such as alpine timothy, bentgrass, Columbia needlegrass, Idaho fescue, mountain brome grass, mutton bluegrass, danthonia, and spikefescue. Some of the most sought after forbs in these areas include agoseris, balsamroot, buttercup, columbine, and geranium. Sufficient amounts of quality forage are important at this time of year as does continue to produce milk to nourish fawns.

As grasses mature, much of their nutrient content is lost, causing deer to shift their diets more to shrub species, which may hold their nutrient values for longer periods throughout the summer and into fall and winter. Shrub consumption by mule deer may be as much as 90% of the forage ingested. Browsing becomes a large part of the diet from early fall, through winter, and into early spring as grasses and forbs become less available, and are lower in palatability and nutrient content. Deer rely on browse species (shrubs and trees) to provide protein and other nutrients in order to meet the nutritional requirements associated with the fall and winter seasons. This time of year places additional dietary stresses on animals as they spend extensive amounts of energy going through the breeding season, immediately followed by the need to rebuild fat stores to survive the winter. In most winters, mule deer slowly decline in body condition and overall health, as most forage consumed does not meet the nutritional values necessary to carry the animal. During this time period, they rely heavily on fat reserves to meet their energy demands. Shrub quality and quantity on winter ranges has a great impact on mule deer herds.

As winter takes over, deer begin to limit energy expended in order to survive thermal stresses. Pregnant does especially become vulnerable to disturbance, as they require additional nutrition to support fetal development. Deer also can, and do, eat farm-raised crops such as small grains and alfalfa. Crop damage can result if deer densities become too high.

Forage Competition With Livestock and Other Wildlife

Cattle primarily consume grasses, with forbs and browse as secondary, yet seasonally important components of their diet. Sheep eat more browse and forbs than cattle, but still less than mule deer.

Elk inhabit many mule deer ranges in Wyoming. Elk are "opportunistic" feeders, consuming a wide diversity of vegetation. They can be quite competitive with mule deer, particularly in winter range situations. Pronghorns consume a diet relatively similar to mule deer, but direct competition is considered to be fairly minimal, when populations are kept in balance with available habitats. Recent research studying the potential for competition between white-tailed deer and mule deer, found that in most areas the two species are able to co-exist due to different habitats used, utilization of different food sources, different behavioral responses to avoid predators, differences in population characteristics and their aptness to maintain a certain amount of natural separation.

Predation, Disease, and Poaching

Coyotes, mountain lions, wolves, and even avian predators such as golden eagles have the ability to impact mule deer populations. Broad-scale predator control efforts are generally not cost-effective, nor do they result in long-term population increases. Intensive predator control can be effective, if done annually and may result in slight increases in mule deer populations in



Deer confiscated in the "Sagebrush Outfitter Case"

the short-term. However, cost-effective, long-term solutions to mule deer management continue to revolve around improving habitat quality and quantity, indirectly reducing the effectiveness of predators. Better habitat improves mule deer fawn survival and adult deer condition. It also improves hiding cover and habitat for other predator prey species.

Diseases affecting mule deer include blue tongue, Epizootic Hemorrhagic Disease (EHD), and Chronic Wasting Disease (CWD). Abnormal concentrations of animals may cause increased disease transmission. Poor or inadequate habitat conditions or high populations may contribute to these concentrations. Information on these diseases and their impacts to mule deer can be acquired through the Wyoming Game and Fish Department.

Poaching of trophy mule deer occurs in Wyoming, particularly on winter ranges where animals are vulnerable due to high visibility in somewhat open terrain. Winter range patrol efforts have been stepped up along with severe penalties, which has reduced, but not eliminated illegal hunting activity.

Herd Management

The Wyoming Game and Fish Department manages 48 different herds of mule deer across the state. Wildlife biologists, game wardens, and habitat biologists, coordinate and consult with private landowners, land management agencies, and sportsmen, when considering herd unit population objectives, hunting seasons, and habitat conditions. Herd numbers must coincide with available habitat, so herd health and productivity can be optimized. Predation, disease/parasites, hunting, drought, winter severity, and changes in habitat all have an impact on mule deer herd management.

Antler Development

Mule deer antler development is influenced by the buck's age, level of nutrition in forage, and genetics. As a wildlife management agency, the Wyoming Game and Fish Department has the ability to control age structures of

deer herds through population management and hunting seasons. Private landowners and land management agencies play a key role in forage



Mule deer buck in velvet

management. Crude protein levels greater than 16%, and other nutrients such as calcium and phosphorous are necessary for maximum antler development as well as reproductive performance.

Peak antler development usually occurs in years 5 through 8. While mule deer may live longer, antler development tends to decline, as tooth wear and mobility reduce their ability to obtain high quality forage.

Habitat Requirements and Habitat Improvement Techniques

General Considerations

Careful consideration must be given to what type of mule deer habitat range (i.e. winter, transitional, etc.) is being planned for treatment. Depending on location and season of use, the amount of treatment must be considered as well. Other wildlife species such as sage grouse, pronghorn antelope, or a wide diversity of non-game animals should also be considered while planning treatments. For example, large-scale treatments of shrubs or trees across mule deer crucial winter range will be detrimental to wintering herds that require a certain quantity and quality of browse above snow-line. As shrub seedling establishment typically takes several years to occur, too large of an area treated will eliminate any winter value for deer. However,

treatment sizes in most instances must be large enough that small “ice cream patches” of highly desirable forages are not created. Concentration of wild and/or domestic animals grazing on these small areas will cause more harm than good, by quickly damaging any growth, especially to new shrubs or trees.

Grazing Management

Livestock grazing management can be one of the more effective management tools for improving mule deer habitat. Timing, duration, and intensity of use by livestock can positively or negatively affect mule deer habitat. Grazing management practices such as deferred grazing, rest-rotational systems or periodic livestock exclusion from crucial habitats may reduce the effects of competition.

Properly designed grazing management schemes aimed at improving rangeland health and plant diversity can benefit mule deer as well as livestock by increasing the quantity and quality of forage. Careful monitoring of plant utilization by livestock and other herbivores, particularly in crucial habitats such as riparian areas and mountain shrub stands can result in improved habitat conditions for mule deer during all seasons of the year.

Grazing management practices such as deferred grazing, rest-rotational systems, or livestock exclusion from crucial habitats for short periods of time may reduce the effects of competition. Practices such as water development, pasture cross-fencing (utilizing fence wire spacing that allow passage by wildlife), range renovations such as prescribed burning, brush chopping, or herbicide application, when properly applied, may all provide benefits to mule deer.

Mule deer forage preferences shift throughout the year, and livestock competition during the changes of seasons should be considered. Light to moderate livestock grazing allowing for plant regrowth will increase the diversity of vegetation and improve forage quality for mule deer. As overall range improvements occur in areas where livestock and mule deer overlap, higher quality diets will positively affect animal weights, health and reproduction.



Proper grazing management can improve habitat

Prescribed Fire

Fire is considered one of the better habitat management tools as it is most often a cost effective, natural and proven way to manage mule deer habitats statewide. A number of shrub and tree species respond to fire by resprouting or re-seeding. Properly applied prescribed burns conducted during the spring (cooler) or fall



Fire promotes resprouting of many shrubs, enhances herbaceous productivity and recycles old decadent shrubs

(warmer) seasons eliminate older, less nutritional shrubs or trees. As fire removes shrubs and trees, reduced competition for water, sun, and nutrients encourages rapid growth of preferred grasses, forbs, and regeneration of fire-tolerant shrubs. It also sets the stage for recolo-

nization and rehabilitation of less fire-tolerant species important to mule deer.

Habitat managers design burn plans to treat specific vegetation types in a random or "mosaic" pattern. This ensures a diversity of vegetation age classes and cover types will be available within close proximity of one another.

Post-treatment management is critical to the overall success of any applied habitat treatment, especially prescribed burning. Adequate rest from grazing by domestic animals of the treated area can help the landowner or land management agency achieve desired future vegetative objectives for wildlife and livestock. Grazing burned areas during early plant development will damage the valuable root systems of newly established grasses and forbs and increase the prevalence of weeds and other non-desired plants to take hold.

Chemical and Mechanical Treatments

Herbicide application, fertilization, brush chopping, chaining, cutting, harrowing, or ripping are other treatments that can be used to rejuvenate unproductive stands of shrubs and trees. All treatments should be applied utilizing a mosaic pattern, to provide for a diversity of vegetation types and wildlife. Prior to using chemical or mechanical treatments, careful cost:benefit analysis should be conducted, as many treatments are cost ineffective when compared to prescribed fire or other practices. Seeding of desired herbaceous or shrub species may need to be considered post-treatment. Use of herbicides on rangeland may have long-lasting impacts to grass and forb communities, as well as the shrub communities. The use of herbicides should be carefully considered, particularly to amounts applied and the location and season of application.

Timber and Quaking Aspen Management

Timber management can be used to improve mule deer habitat in dense stands of conifers. By creating small clear cut patches, less than 5 acres in size, the diversity of vegetation can be increased as a result of reducing competition for resources between trees and understory plants.

Clear-cut patches are typically more useful if they are irregular and elongated in shape.



Proper management of quaking aspen stands can have significant benefits for mule deer. Quaking aspen communities provide mule deer with hiding, thermal, fawning, and feeding areas. Quaking aspen stands in optimum condition can be described as having multiple ages of trees, and a healthy understory comprised



Mowed mosaic treatment pattern

of shrubs, grasses, and forbs.

Most aspen require some sort of disturbance to stimulate re-sprouting from their roots. Cutting, ripping or burning can achieve this.

Many quaking aspen communities across the West are threatened with elimination by encroachment of conifer trees. Fire suppression has allowed significant growth of pine trees into aspen forests, which out-compete them for sunlight and available nutrients.

Browsing by big game and domestic livestock post-treatment can have major impacts on the re-sprouting success of aspen stands. Their potential impacts need to be considered prior to proceeding with treatment.



Aspen treatment to reduce conifer invasion and provide aspen regeneration

Water Development

Water availability has a tendency to impact mule deer distribution. When forage is succulent, water requirements are often met through their diet. Other times of the year, free water must be available. Free water can be found in the form of stock tanks, guzzlers, springs, streams, or ponds. Deer are able to travel great distances to water, but water within 2 miles is preferred. During fawning periods in late spring/early summer, increased distances to water can increase a doe and her offspring's vulnerability to predators. Having all necessary habitat components within close proximity is critical during this period. Properly designed and spaced water guzzlers can improve watering options for mule deer especially in more arid areas with sporadic precipitation events.

Preventing Habitat Loss

Habitat for mule deer and other wildlife is being lost across the West at an alarming rate. Housing developments and oil/gas exploration are just a couple of the activities that impact the amount and quality of habitat. Also affected is our ability to utilize a wider variety of habitat management and treatment options, adjacent to or within these developed areas. Important

browse communities are becoming old and unproductive due to fire suppression efforts over the last 100 years. Stands of shrubs are also being lost due to heavy concentrations of browsing big game animals on reduced winter range areas as well. It has become increasingly more important to find ways to preserve open spaces and protect crucial wildlife habitats and migration routes.

Methods for preservation may include implementation of cooperative management agreements, conservation easements and finding ways to improve the economic viability of agricultural operations throughout the state and by reducing the threat of subdivision or other development resulting in habitat loss and fragmentation.



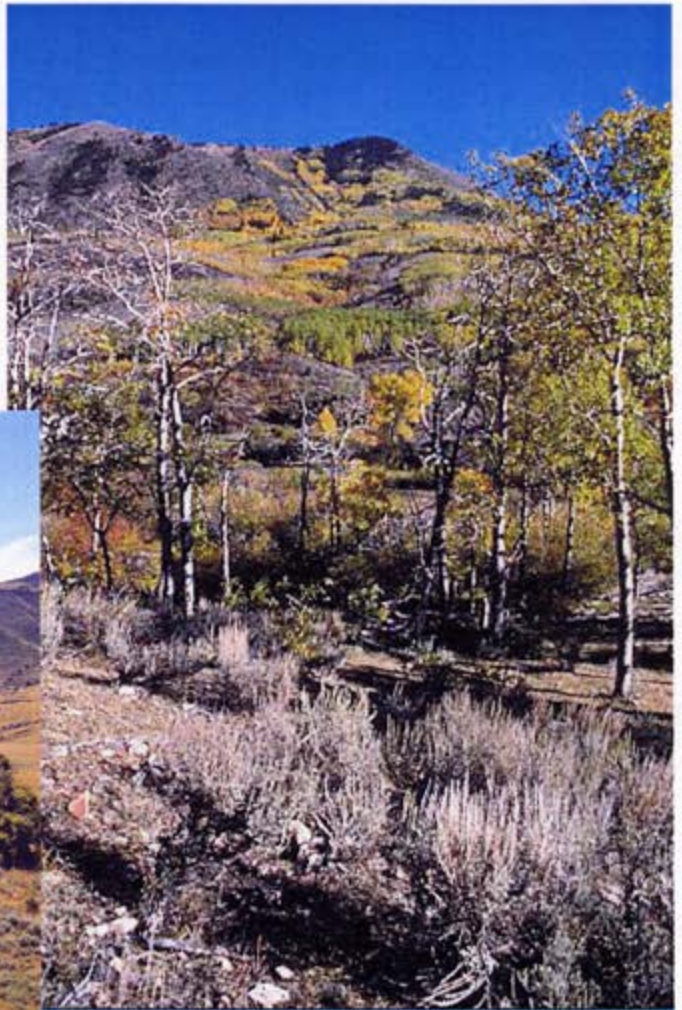
Technical and Financial Assistance Available

The Wyoming Game and Fish Department offers private landowners and land management agencies with technical assistance to assess condition of mule deer habitats in Wyoming. When and where feasible, habitat enhancement projects can be initiated and may utilize a wide variety of conservation funding assistance from federal, state, or private conservation agencies and organizations.



Water guzzler

**Photo Gallery of Mule Deer and
Mule Deer Habitat in Wyoming**



Additional Informational Sources on Mule Deer Herd Management and Habitat Management:

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