Managing Rangelands for Mule Deer

Jerry L. Holechek

Mule deer (*Odocoileus hemionus*) are the most important big game animal in the eleven contiguous western states of the United States. The first part of their name comes from the fact they have large ears which resemble those of a mule. Today mule deer exist in greater numbers in many localities than under pristine conditions. They inhabit practically all the rangeland of western North America from the desert country of central Mexico to the woodlands of northern British Columbia and Alberta.

In the United States mule deer range extends eastward as far as central South Dakota and westward to the Pacific Ocean. Highest densities of mule deer occur in the juniper brushland zones of Oregon, Idaho, Utah, Wyoming and Colorado. Black-tailed deer, found along the Pacific coast from central California to Alaska, are similar enough to mule deer to be included as part of the species. Black-tailed deer are smaller and occupy a somewhat different habitat than mule deer, which justifies their different common names.

Every year over two million Americans hunt mule deer and harvest approximately a half million animals. Total meat harvested on a dressed carcass basis is about 50 million pounds. Mule deer hunters annually spend about 300 dollars each on their sport contributing a total of 600 million dollars to the economy. These figures tell nothing of the pleasure derived from the viewing of mule deer by the non-hunting segment of society.

It is now recognized that range and wildlife management are inseparable. Range management practices such as brush control, predator control, water development, burning, fertilization, reseeding and controlled livestock grazing all have the potential to harm or benefit mule deer. The intent of this paper is to discuss how these practices can be applied for mule deer enhancement.

**The Historical Perspective**

Estimates by Ernest Thompson Seton, William T. Horna-

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...day, and others indicate about four million mule deer occurred in the western United States just prior to the arrival of white man in large numbers in the early 1800's. Mule deer numbers in the United States reached a low of less than one-half million around 1910 primarily due to unrestricted hunting. This was a time when populations of most other big game species in the United States were also at an all time low. Between 1910 and the early 1960's mule deer populations rapidly increased as a result of restrictive (bucks only) hunting regulations that were first applied in 1910's, habitat change, and possibly predator control. The mule deer population peaked about 1963 when numbers were estimated between six and seven million. In 1981 there were about 4.5...
million mule deer in the United States. The mule deer decline since 1962 is primarily attributed to habitat losses from urbanization and related uses, fire suppression, and deterioration of winter ranges from excessive populations. Poorly designed range improvement projects and plant successional changes from brushland to grassland, in some cases, have also contributed to the decline.

**Livestock Grazing and Mule Deer**

Little competition exists between mule deer and domestic livestock when ranges are lightly or moderately stocked. In most cases they usually benefit each other. This is particularly true with cattle. Mule deer and cattle generally use different parts of a range. Cattle prefer the flatter, lowland areas while mule deer readily use the more rugged, inaccessible portions. Cattle are primarily grass feeders while deer prefer forbs and browse. Social antagonism between the two species is minimal. Sheep have a strong preference for forbs and less aversion to rough, rocky terrain than cattle. Therefore sheep have greater potential to compete with mule deer than cattle, particularly under heavy grazing.

The increase in mule deer during the first half of this century is partly explained by vegetation changes that resulted from grazing by cattle and sheep. Under pristine conditions, lack of winter food in the form of browse appears to have been the primary factor limiting mule deer populations in the Intermountain West. Heavy grazing by livestock between 1880 and 1930 resulted in a large scale increase in several shrubs and trees because of reduced understory competition and fire. Many of these woody plants provide critical deer cover and winter food. Examples of such plants are big sagebrush, cliffrose, mountain mahogany, rabbitbrush, and the various junipers. This increase in woody plants permitted mule deer to greatly exceed numbers occurring under pristine conditions. Research conducted by Odell Julander in Utah during the 1950's confirmed this plant and mule deer relationship.

Summer ranges are as critical to sustain mule deer production as winter ranges because they enable deer to restore their body condition and develop energy reserves needed for lactation and winter survival. Deer depend quite heavily on perennial forbs for summer forage. These forbs are generally higher in nutritive value than shrubs or grasses during the same period. Deer reproductive and winter survival rates have been found to be much lower on summer ranges with few perennial forbs compared to summer ranges where perennial forbs are abundant. Heavy grazing by domestic livestock, particularly sheep, results in perennial forb depletion and poor mule deer productivity. Light to moderate grazing by cattle favors some forbs preferred by mule deer such as arrowleaf balsamroot and western yarrow. In parts of the Intermountain West livestock grazing has been drastically reduced from 1950 to the present. On many of these ranges vegetation composition has changed from predominantly shrubs and forbs to grassland. Such changes have been detrimental to mule deer, and have generally been unrecognized by biologists concerned over the mule deer decline.

Controlled grazing by cattle and sheep can be a useful for improvement of mule deer range. Studies in Utah and Oregon have shown that early summer grazing of mule deer winter range by cattle or sheep can be effective in reducing understory competition and increasing browse production. Care must be taken to insure livestock are removed from these ranges by mid-summer or they will start to consume the browse. In the early spring and fall mule deer depend heavily on early growing grasses as a source of high quality feed. Previous livestock grazing improves the value of these plants to deer by removal of old growth which makes green growth more available. Sandberg's bluegrass is very important to mule deer in the spring on Intermountain ranges because it greens up two to three weeks earlier than other perennial grasses. Moderate grazing by cattle or sheep will increase this grass on spring ranges.

The influence of specialized grazing systems on mule deer and other wildlife has not been well studied. It does appear that rotation systems can be beneficial if heavy use does not occur on any pasture. In Oregon mule deer preferred deferred pastures over those grazed season-long. It was thought that this resulted because deer had greater forage selectivity in the ungrazed deferred pasture. Rest rotation grazing, in contrast, may cause reduced deer habitat productivity because in order to rest one pasture, use must be increased on the others. Grazed pastures under this system often have reduced forb availability to deer in the summer compared to those grazed season-long at moderate rates. Both grazing timing and intensity should be carefully considered when grazing systems are designed to benefit mule deer.

**Brush Control and Reseeding**

Since World War II brush has been controlled chemically, mechanically, or with fire on around 18 million acres of western rangeland. Shrub and tree types commonly involved have included sagebrush, pinyon-juniper, mesquite, and chaparral. After brush removal treatment areas are often seeded to perennial grasses. Crested wheatgrass has been used more than any other species. Initially wildlife was a minor consideration when these projects were designed. Such projects often resulted in large blocks of homogenous grasslands of little value to mule deer or other wildlife. The Vale Project implemented by the Bureau of Land Management in southeastern Oregon in the 1960's demonstrated that properly designed brush control projects can be highly beneficial to both wildlife and livestock when an interdisciplinary approach between range and wildlife managers is used. Sagebrush was controlled on more than a half million acres of deteriorated rangeland. After completion of the Vale Project mule deer and other wildlife numbers were substan-
tially higher than on surrounding rangeland and than prior to
initiation of the project. Properly designed brush control
projects may have more potential to increase mule deer
populations than any other management practice.

On forested, mountain browse and chaparral ranges,
dense stands of brush often develop that retard mule deer
movement. These stands provide little forage because deer
cannot reach the leaves and buds. Prescribed burning has
been effectively used to open up these stands and increase
browse availability. Patchy burns that result in a mosaic of
brush and openings have the greatest value to mule deer.
Herbicides such as 2, 4-D have been effective in achieving
the same objective as fire. Where palatable browse species
grow in more open stands, top pruning can be useful for
increasing lateral production of many browse species such as
bitterbrush or mountain mahogany that tend to grow out of
reach.

Mule deer use of areas declines when brush is completely
removed from large areas of 500 acres or more. When
enough brush remains to meet mule deer cover require-
ments and provide browse during periods of heavy snow and
drought, the quantity and quality of understory vegetation is
the second most limiting factor to mule deer. By opening up
tall, dense stands of brush with fire, mechanical treatment or
herbicides, the availability of forbs and palatable browse
species to deer can be substantially increased. Crested
wheatgrass seedings are important to mule deer in the sage-
brush type because they provide nutritious fall and spring
feed. Seeded blocks or strips of 500 acres or less scattered
through sagebrush stands generally benefit mule deer.
Larger seedings are often detrimental because they lack
cover. The value of any seeding to mule deer is enhanced if
legumes, other forbs, and browse are included with the
grasses. It is important to recognize that increasing the her-
baceous forage available to livestock often reduces their
impact on browse. Usually the browse removed has less
value than that saved from livestock consumption.

Several guidelines have been useful when brush control
and reseeding projects are directed towards improvement of
mule deer habitat. Removal of over 50% of the brush on a
large area is generally detrimental. A diversity of food and
cover over short distances provides the most optimal mule
derer habitat. Brush control in long, narrow strips is more
effective than in blocks because of greater edge effect. Mule
der will seldom venture more than 400 yards into open areas
without brush. Burning is generally better than spraying with
2, 4-D in sagebrush areas because spraying results in a
temporary loss of forb species. Usually at least five years are
required for reestablishment of forbs to prespray levels.
Brush control should not be conducted on mule deer winter-
ing areas with a good stand of desirable browse species; on
sites where soils, slope or precipitation are inadequate to
insure establishment of desired vegetation; and on ridgetops
or riparian zones that provide critical cover corridors. If the
primary goal of brush control is improvement of mule deer
habitat, small openings or seedings of five to 40 acres scat-
tered through the woody vegetation are most effective.
Whenever an area is reseeded, mule deer as well as livestock
numbers should be controlled to insure stand establishment
and maintenance. Hunting is the most efficient way to con-
trol mule deer numbers and provides both recreation and
meat.

Water Development

Water development on arid or desert ranges over the past
50 years has permitted deer and domestic livestock to use
many ranges from which they were previously excluded. Few
areas now remain where free water greatly restricts mule
der distribution. Mule deer use on a range generally
decreases when distances are more than one mile to water
during hot, dry periods. Water development is most benefi-
cial when distances between watering points exceed two
miles. Mule deer have shown no aversion to artificial water-
ing devices developed for livestock. On year-long ranges
where stocking rates are high, water development can adver-
sely affect mule deer by increasing livestock grazing on
areas previously receiving light or moderate use.

Fertilization

Recently, fertilizer has gained importance as a manage-
ment tool for mule deer ranges. It can be used to increase
forage quantity, quality and improve mule deer distribution.
Fertilization is most practical in deer winter ranges where
browse is in short supply. Nitrogen is the element most
limiting to browse growth and gives the greatest response.
Fertilizer has also been effectively used to attract deer away
from tree farms or overused winter ranges to unused areas
such as north facing slopes or seedings. This is because
fertilized plants are usually more palatable than those unfer-
tilized. If livestock also use fertilized mule deer ranges, they
may excessively use the fertilized areas to the detriment of
the deer. Fertilized areas may be used as a tool to attract
livestock away from key deer areas.

Predator Control

Predator control applied by ranchers and game manage-
ment agencies has in some cases increases mule deer popu-
lations. These increases usually have been temporary and
sometimes detrimental because they have contributed to
further degradation of overstocked ranges. A recent confer-
ence in Utah on the mule deer decline identified habitat loss
and deterioration as the primary cause. During the peak
years of the 1950's and early 1960's many ranges were over-
stocked with mule deer, and this condition continues to
exist. Predator control on overstocked ranges has seldom
resulted in higher deer numbers, and, when effective, it has
only contributed to greater habitat degradation. Further pre-
dator control, particularly for coyotes, is very expensive.
Recent research indicates that over 70% of a coyote popula-
tion must be removed to obtain any lasting results. This level
of control is very difficult to achieve. Conditions under which
predator control can be effective for increasing mule deer
numbers are when the ratio of predators to mule deer is high
and, more importantly, where mule deer are not fully utilizing
available forage. Predator control is not economically justifi-
able unless the increase in mule deer will be used by hunters.
For many years in some localities, underharvest has been a
major mule deer management problem. In most cases,
money and effort spent on habitat improvement will yield a
much greater and more lasting return than predator control.

Conclusion

In the future, land available for producing mule deer will
undoubtedly shrink due to increased urban, industrial,
energy, and recreational development. The demand to hunt
and view mule deer will continue to increase. Vast acreages
of public lands remain in the United States and Canada that
can be managed much more intensively if the goal is to
maintain or increase mule deer herds. Domestic livestock and mule deer, particularly cattle, complement each other in forage preferences under light or moderate grazing. Recent research has shown both cattle and sheep, when controlled, can be an effective tool for enhancement of mule deer habitat. Range management practices such as brush control have great potential for increasing mule deer populations if knowledge of habitat requirements is used in project design. At all times, it is critical to keep mule deer and domestic livestock numbers in balance with their forage resource.

Remounts

James A. Young and Dave Mathis

On public rangelands in the Western United States a major concern for all people interested in natural resources is the management of wild, free-roaming horses. In this age of freeways and rockets to the moon it is difficult to remember that we recently were a nation largely dependent on horses for transportation and agricultural power. Western range- raised horses were the source of much of this power. These horses, a major portion coming from the western range from 1920 through World War II, were bred, raised, and marketed as horses of war or as they were known, remounts. The remount program was financed by the federal government and carried out under the direction of the Quartermaster Corps of the U.S. Army. This program greatly influenced the numbers and type of horses on the western range. The influence of the remount program may still be a factor in the ecology and population genetics of feral horse populations.

Origin of the Remount Program

It has often been stated that the remount program came about because American troopers and officers were the worst mounted troops in World War I. That Americans were poorly mounted was undoubtedly true, but the plans for the remount program were being formulated well before America became involved in the European War.

In 1910 George M. Rommel, Chief of the Animal Husbandry Division of the Bureau of Animal Industry, published a detailed analysis of the remount needs of the United States. He pointed out that America was the only major nation that did not pay a subsidy to farmers to ensure production of war horses. He noted that the Kingdom of Prussia supported five breeding farms and 18 stallion depots to insure a supply of remounts. Even England, which had always depended on her colonies for horses of war, had started a grant program to increase domestic horse production. The English system was prompted by the failure to find sufficient remounts, even in the United States, during the Boer War.

Congress established a series of remount depots at abandoned military bases in 1908. Early remount depots were Fort Reno, Oklahoma, Fort Keogh, Montana, and Fort Royal, Virginia. The Regular Army was supplied with horses which were bought young, developed and trained at the remount depots, and issued to troops at 4-1/2 to 5 years of age. The average remount horse in 1910 stood 15.1 hands and weighed close to 1,000 pounds when ready for service.

The weak point in the original remount program was the scarcity of horses of the correct quality. Next to Russia, the pre-WW I United States had more horses than any other country, but there was a preponderance of draft horses in the Eastern States and the mustangs of the western range were considered too light for military horses. The War and Agriculture Departments argued before Congress in the pre-WW I period for the establishment of a breeding program to insure an abundant supply of the correct type of remounts. It was suggested that 50 Thoroughbred, 25 Standardbred, 15 Saddlebred, and 10 Morgan stallions be purchased to initiate the program.

In 1911 private enterprise got the jump on the government remount program when August Belmont of New York offered the Quartermaster Corps the use of two of his best known Thoroughbred stallions, Henry of Navarre and Octagon. The stallions were available at Front Royal, Virginia, for service of qualified mares. The mares were required to be straightbred trotters without faulty conformation, such as corky hocks, and free from heredity unsoundness such as bone spavin or ringbone. About 50 mares were bred with the army taking options on the colts at $150 each at 3 years of age. This small beginning served as a model for the program which spread across the western range after World War I.

The American army was thoroughly embarrassed by its lack of quality light horses during the World War. On May 17, 1919, the War Department appointed a remount board composed of army officers, representatives of the Department of Agriculture, and civilian horsemen and breeders. The purpose of the board was to encourage the breeding of quality light remount horses. Congress appropriated $250,000 to purchase stallions. During fiscal 1920, 183 stallions were purchased or obtained by donations. During the 1921 breeding season, 4,129 mares were bred to 159 stallions.

During 1923 the remount board distributed 279 stallions to horse breeders in 42 states and the Hawaiian Islands. Additional stallions went to the remount breeding depots at Fort Robinson, Nebraska; Front Royal, Virginia; and Fort Reno, Oklahoma. A large percentage of these stallions went to ranchers on the western range. Most of the stallions were Thoroughbreds with an occasional Standardbred, Arabian, Saddlebred, Morgan, Quarterbred, and even one Hackney.

Note that two parallel programs were developed by the remount board. One program consisted of the breeding depots where outstanding stallions were bred to top quality mares under the care of the Quartermaster Corps. These depots were located at Fort Reno and Robinson in the West.

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