BY DR. CHARLES KAY

RANGE REFERENCE AREAS

and the Condition of **Shrubs** *on Mule Deer Winter Ranges*

After predator control, range management is the key to maintaining healthy populations of mule deer and other wildlife. ***It is not just habitat, but the condition of that habitat.*** *For instance, how do you tell if a range is being overgrazed?*

One way is to establish what are called range reference areas. There are a few places that have never been grazed by livestock, such as steep-sided mesa tops, where the vegetation can be compared with nearby grazed areas. Unfortunately, there are very few places in the West that have never been grazed by livestock and there are even fewer that deer and elk cannot reach. So in most areas, it is necessary for managers to create their own range reference areas by building exclosures; which they have been doing for years.

If you are working in a national park or on a winter range where livestock use is prohibited, it is a relatively simple matter to build an 8-foot tall fence around a representative plant community such as willows, aspen, grasslands, or upland shrubs. Then, by measuring the vegetation inside and outside the exclosure on permanent sampling plots over time, you can determine what, if any, impacts wildlife are having on the range. It is also important to establish permanent photopoints when the exclosure is first erected.

If on the other hand, you are working on BLM or Forest Service lands that are grazed by livestock and wildlife, the design of the exclosure is a little more complicated. One part, termed the total-exclusion plot, is still high-game fenced to exclude both livestock and wildlife, while an adjacent area, called the livestock-exclusion plot, is fenced in such a manner that livestock are excluded but mule deer and/or elk can jump the low fence and graze/browse by themselves.

Unfenced adjoining areas are grazed by both livestock and wildlife. Thus by measuring the vegetation in all three areas—total exclusion, livestock-exclusion wildlife-only use, and joint use—you can determine, what vegetation changes, if any, are being caused by wildlife separately from those caused by livestock. The total-exclusion portion of the exclosure can also be used to tell if climatic variation, disease, or insects are causing certain plants to decline.

As you might have guessed, the latter type of range reference area is called a three-part exclosure because vegetation conditions are measured under three different grazing treatments. During the 1950's and 1960's when mule deer populations were at all time highs, a series of three-part exclosures were built on BLM and Forest Service allotments throughout the West. Unfortunately, the federal land management agencies have no nation-wide program to maintain those exclosures and many have fallen into disrepair, which is extremely shortsighted. Because without long-term range reference areas there is no way to determine what is happening on our public lands.

Why, for instance, has it been widely reported that shrubs, such as bitterbrush, serviceberry, chokecherry, cliffrose, birchleaf and curlleaf mountain mahogany, mountain maple, and even sagebrush, are declining or have declined on mule deer winter ranges? Too many cattle? Too many sheep? Too many elk? Too many deer? Climate change? Insects? Disease? This is why I and others have spent a great deal of time measuring and evaluating range reference areas. It is also something I encourage every sportsman to do. Start by

A typical three-part exclosure on mule deer winter range. To the left, the shrubs are protected by an 8 foot fence that excludes both wildlife and livestock, while the plants behind and to the right of the sign are protected by a low fence that excludes only livestock.

Photo ~ Sam Zierke

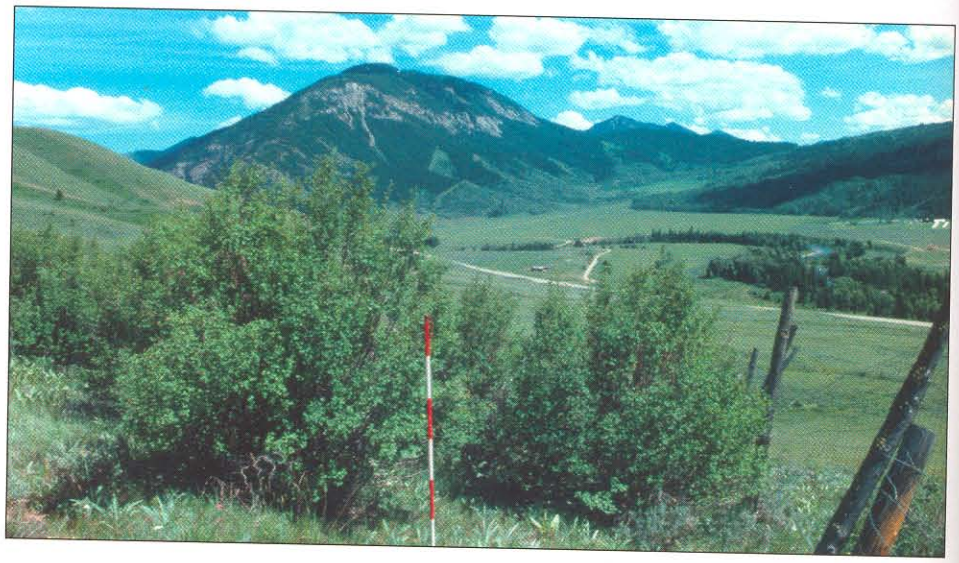
contacting your local BLM or Forest Service Range Con and having him or her tell you everything they know about the exclosures on the ranges of your local mule deer herd. Better yet, go to the field with them and have them explain the changes that have happened and are happening on these all-important range reference areas. The wildlife community may be all abuzz about habitat, but what is really important is range condition and management. For without proper management, habitat is of little value.

In addition, most wildlife managers and sportsmen have the mistaken belief that wildlife can not overgraze a range because mule deer and elk are native species. Well, nothing could be further from the truth. Mule deer, and especially elk, can really hammer a range and cause major changes in plant species composition—changes that are very detrimental to mule deer. I have had people tell me how can there be too many elk or deer? That is like saying you have too much money in the bank! But that is not a valid comparison, because the animals have to eat, money does not.

Just look at what has happened in national parks and other areas where elk populations have not been properly controlled. As part of my research in Yellowstone, not only have I measured all the existing willow and aspen exclosures, but I measured chokecherry and serviceberry plants inside and outside long-term upland exclosures. Shrubs protected from the ecosystem's 100,000 elk had significantly greater canopy cover, were significantly taller, were larger sized, and produced up to 20,000 times more berries than repeatedly browsed plants!

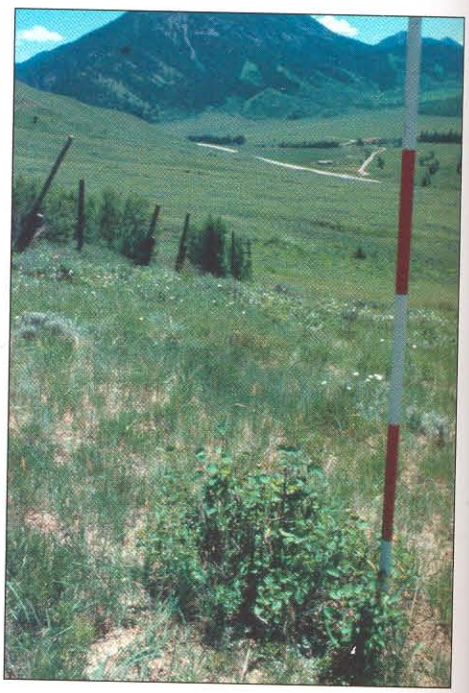
Now everyone knows that bears, both black and grizzly, eat berries. However, the bears in Yellowstone do not. Why? Because the abnormally high elk population has destroyed all the berry-producing shrubs. Unlike conditions today, early explorers reported that berry-producing shrubs were common in the Yellowstone ecosystem during the late 1800's. Shrubs that mule deer must have if they are to survive on inter-mountain winter ranges. As you might expect, there are very few mule deer in Yellowstone today because the deer's habitat has been destroyed by elk. As I have explained in earlier articles, elk can survive on grass winter ranges, mule deer can not. Similar conditions exist in other western states. I spent a number of years working in Utah's Book Cliffs for a private rancher who was battling BLM and the Utah Division of Wildlife Resource (DWR) over too many elk. Lost in that cattle-elk conflict were mule deer. In fact, mule deer numbers were so low that DWR closed the mule deer hunting season for a number of years—something that seldom happens in the West. Back in 1964, BLM and DWR, then the Utah Department of Fish and Game, built a series of three-part exclosures in the Book Cliffs to monitor range conditions, including one on Lower McCook Ridge identified as an important mule deer winter range.

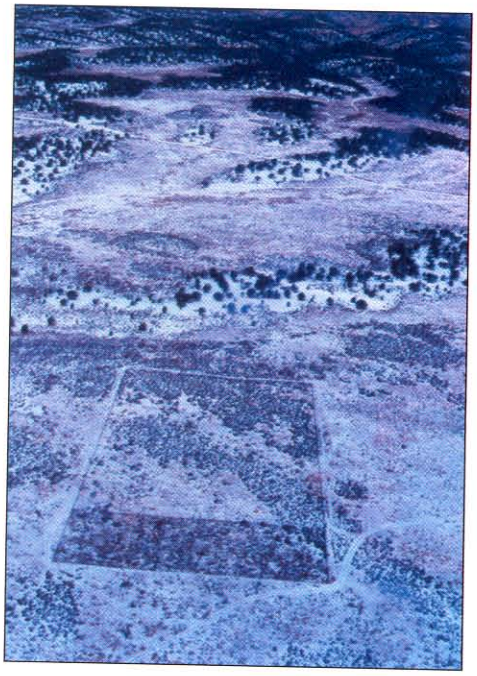
At the time the exclosure was built, the site was a mosaic of two shrub communities—four-wing saltbrush and sagebrush. Both shrubs are eaten by mule deer but four-wing is the preferred species. Four-wing is also eaten by cattle and elk. More importantly, four-wing has been in decline for many years. When the exclosure was first constructed, there were no elk in the Book Cliffs, while today Lower McCook is overrun with wintering elk. There is even a special, late-season cow elk hunt designed to limit elk use on what was once a key mule deer winter range.



Above: Typical serviceberry plants protected by a high fence on a wildlife only winter range in western Wyoming. Note the six foot, red and white survey pole for scale.

Below: A typical serviceberry plant subjected to repeated elk browsing on that same Wyoming winter range. The exclosure in the earlier image is in the distance. Heavy elk use has changed what was once an excellent shrub-forb winter range for mule deer into a grassland where elk can survive, but mule deer can not.





As can be seen in the photo above, the density of shrubs is greatest in the total-exclusion part of the exclosure on Lower McCook Ridge. This is because four-wing is still present inside that part of the exclosure, while four-wing is dead most every place else, even inside the low-fenced area where livestock are excluded. This suggests that four-wing has not declined due to drought, insects, or disease because if that was the case, four-wing should also have died-out inside the high-fenced area, which it has not. Instead, it appears four-wing has declined first due to high deer numbers—mule deer were extremely abundant in the Book Cliffs before mountain lions were declared a game animal and effective predator control eliminated—and more recently due to an ever increasing elk population. This, however, did not sit well with BLM and DWR who wanted to triple the number of elk in the Book Cliffs.

Now some people claim that the area inside high-fenced exclosures is "unnatural" because all grazing is excluded. According to this view, the condition of the vegetation inside the high-fenced area is an improper benchmark because large herds of deer, elk, and other native ungulates always grazed the West. Unfortunately this is circular reasoning, having either assumed the conclusions or concluded the assumptions. Instead, in two or three-part exclosures you have various points on a continuum from no grazing to heavy grazing and other data must be used to determine which condition is closest to the level of herbivory that those plant communities were subjected to prior to European settlement.

Three independent lines of evidence can be employed to address this question. These include the condition of the vegetation in the earliest historical photographs. Second, wildlife sighting rates recorded in first-person journals of western exploration. And third, archaeological data on ungulate faunal remains dating back 10,000 years or more. I am the only ecologist who has worked with and published on all three types of data.

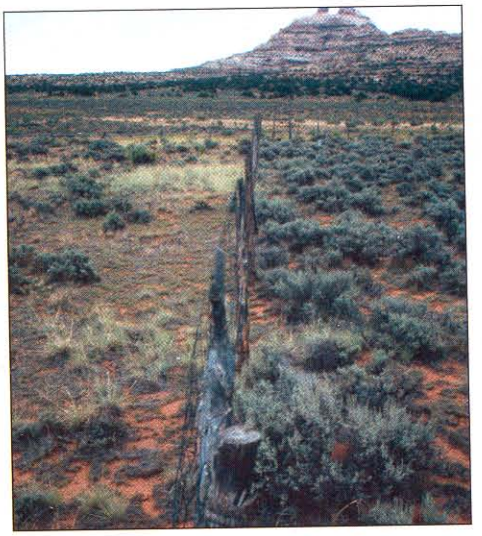
There are only five sets of western photographs that depict range conditions prior to the onset of livestock grazing. Now if shrubs and other woody plants in the earliest pictures were as heavily grazed as they are today, especially in national parks, that would indicate high numbers of elk and deer existed during the early to mid 1800's. I and my colleagues in Canada have checked all the earliest historical photographs and the woody plants in those images show absolutely no browsing by wildlife. None. Similarly, I have analyzed all published, first-person journals of western exploration and elk, mule deer, and other wildlife were seldom encountered from 1780 to 1880, except in buffer zones between tribes at war. And finally, archaeological data indicate that mule deer, and especially elk, were rare to non-existent on intermountain ranges over the last 10,000 years. That is to say, the area inside high-fenced exclosures is closest to the norm, while the more heavily grazed areas are not. This, of course, does not mean that western ranges should not be grazed, but that grazing by both livestock and wildlife must be properly managed to avoid major changes in plant communities. Recently, I have been consulting on wildlife issues for San Juan County in southeast Utah, as both BLM and the Forest Service are in the process of revising their resource management plans. Of particular interest is the mule deer herd on Elk Ridge. From 1950 to 1970, more than 2,500 deer a year were harvested on Elk Ridge, about 1,500 bucks and 1,000 does. Shortly after mountain lions were declared a game animal and effective predator control eliminated with the ban on 1080, the herd began to decline and by 1980 the population was so low that DWR closed the hunting seasons. Elk Ridge reopened to hunting in 1984 as a permit-only, bucks-only area. Despite the restrictive harvest, mule deer have not recovered and in 2007 only 35 permits were issued for the entire unit. This is an exceedingly remote part of the third largest county in the United States with few roads, lots of wilderness, and virtually no private property. Moreover, the large ranch on the north is owned by The Nature Conservancy, while the Southern Ute Tribe has not had any cattle on its Forest Service allotments for at least the last five years.

When I drew my limited-entry mule deer tag for this unit back in 1986, there were virtually no elk. Elk Ridge is really E.L.K. Ridge named after an early cattle outfit, not because elk were there historically, which they were not. Rather elk were transplanted to the area during the 1980's. But while the deer population has remained low, elk numbers have boomed. Mule deer that summer on Forest Service lands on Elk Ridge winter on lower-elevation BLM lands. One of those winter ranges is in the Beef Basin, where BLM and DWR built a three-part exclosure in 1958 just south of Canyonlands National Park. A range reference area with an interesting story.

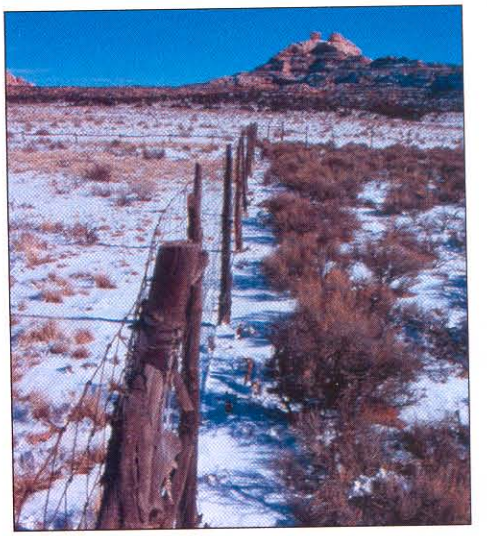
When the exclosure was first erected and when I first visited the area in 1986, Beef Basin was dominated by sagebrush and those plants were heavily browsed by wintering deer. But now, sagebrush has died-out over the entire basin. According to BLM, sagebrush has been eliminated in Beef Basin by the recent prolonged

drought, insects, and disease, which sounds reasonable until you look inside the total-exclusion part of the Beef Basin exclosure where sagebrush is as healthy as ever! So clearly, drought, insects, or disease cannot be the primary cause for sagebrush's decline. Since sagebrush has died-out inside the part of the exclosure where cattle are excluded and only deer graze, it looks like too many deer might be to blame?

But how can you have too many deer when the mule deer population is in the tank and why did much higher deer populations during the 1950's to 1960's not kill out the sage? I do not know for sure, but I can think of at least two possibilities. The sagebrush plants were stressed by years of overgrazing making them susceptible to being killed by the recent extended drought in combination with insects and disease. However, heavily-browsed sagebrush plants on other mule deer winter ranges in San Juan County have not been killed in recent years, so this hypothesis is suspect. A more likely scenario is that increasing predation fueled, in part, by elk as an alternative prey, has forced the remaining mule deer to concentrate in the non-forested parts of Beef Basin where the deer are less likely to be attacked by mountain lions, which need pinyon, juniper, or topography for stalking cover. At present there are few elk in Beef Basin, but now that it has changed from a shrub community to a desert grassland, can the elk be far behind?



The three-part exclosure in Beef Basin as it looked in 1986. Sagebrush on the right had not been grazed since the exclosure was built in 1958, while plants on the left and in the distance had been repeatedly browsed by mule deer.



The same view as the 1986 photograph but taken 20 years later in 2006. Sagebrush is as healthy as ever where it is protected on the right, but repeated use by mule deer has eliminated sagebrush on the left, as well as in the distance.

What is clear, though, is that without the range reference area in Beef Basin, or on other key mule deer shrub winter ranges, managers would never be able to figure out why things have changed. More importantly without a true understanding of what may have happened and why, there is no way of making intelligent management decisions to correct the situation. This is why range reference areas are the gold standard of management and why range reference areas should be maintained at all costs and new ones established. Finally, every range reference area should be monitored and photographed on a regular basis, say every five years. For without accurate data there can be no understanding, and without knowledge, management is nothing more than a crap shoot! And I for one do not want to risk the future of our mule deer herds to a roll of the dice.

Photo ~ Ryan Hatch