

Six Grazing Enclosures with a Message

Lee E. Hughes

Public lands in the West are dotted with enclosures to prohibit livestock—and sometimes wildlife—from grazing within their fences. These enclosures were established to allow vegetation succession of the “fenced in” site to go its natural route, unaffected by grazing of livestock.

The Arizona Strip District of the Bureau of Land Management has six enclosures fenced to prevent livestock from grazing on 1-acre areas (one enclosure is $\frac{1}{3}$ of an acre). These six enclosures had line point transects established both inside and outside the enclosures. Photo points also were established at these transects. Only vegetation data (species composition and density) were noted at establishment, and only the same vegetation data were re-recorded in 1978 and 1979.

Note: Many other enclosures exist on the Strip; however, no studies were done when they were established.

Time, Location, and Environment of Enclosures

Three enclosures are located in the desert grass/shrub zone. They were established in 1951 when grasses were dominant. The grasses were mostly galleta, sacaton, and blue grama. Scattered in the grass were shadscale, snakeweed, fourwing saltbush, and winterfat. Today, shadscale and snakeweed dominate.

The desert grass/shrub zone is in an area of erratic rainfall, averaging 8 inches per year, with a range of 5.4 to 11.5 inches over the years. Summers are hot and winters are mild. Livestock management until 1966 were continuous yearlong use. A 3-pasture rest-rotation system was implemented in 1966. This system has shown a slight upward trend since 1970.

The other three enclosures are located in the sagebrush zone. Two of these enclosures were constructed in such a way to include half the enclosure area as sagebrush and the other half in a railed and seeded area. The third enclosure was placed entirely in a railed and seeded area.

Dominant vegetation in the railed and seeded areas was blue grama, galleta, western wheatgrass, Indian ricegrass, and needlegrass in 1953 and 1954. The dominant vegetation in the unrailed areas was sagebrush with an understory of galleta and blue grama.

Today, the three sagebrush enclosure areas are dominated by sagebrush both inside and outside the enclosures.

The sagebrush zone is subject to the same erratic precipitation patterns as the desert grass/shrub zone. However, average precipitation is 11 inches per year with an 8 to 16-inch range. The summers are hot with mild winters occasioned by very short cold spells.

Management of areas around the sagebrush zone enclosures has been season-long grazing since the 1940's from June to November. Cattle graze around all six enclosures in the above-



This photo, taken in 1953, shows treated area and untreated area inside one of the sagebrush zone enclosures.

mentioned time periods. Sheep also grazed the areas in the early 1930's and 1940's.

The Message

Desert Grass/Shrub Zone Enclosures

As described above, all three enclosures were dominated by grass in 1951, inside and outside the enclosures.

Today—28 years later—shrubs dominate by a larger margin on the outside (where a 3-pasture rest-rotation system has been in effect since 1966), than on the inside of the enclosure, where



The same area in 1975. Note sagebrush takeover.

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Editor's Note: Surprises never ceases—the same day I received this grazing enclosure story from Lee Hughes I also received an article from R.S. Kalmbacher on portable enclosures. You will find that one in this same issue of *Rangelands*.



Railed area inside enclosure, in 1953.



The same area in 1975. Sagebrush has increased.

no grazing has occurred for 28 years.

Snakeweed is twice as thick on the outside than on the inside of one enclosure. Snakeweed increased at the expense of galleta and blue grama; however, snakeweed increased only by 10% on the inside.

Shadscale has become the dominate species on the outside of a second enclosure, increasing from nearly nothing to 80% of the species composition. Here, the increase of shadscale is at the expense of galleta and alkali sacaton. Shadscale also invaded inside the enclosure; however, galleta remained the dominate species in the composition.

The third enclosure, located on a clay flat, revealed little change on the inside. In 1951 there were three hits on vegetation, all galleta grass. In 1978 there was one hit on vegetation, and it was a cactus. The transect on the outside was destroyed by contour furrowing in the early 1960s and relocated in 1978. Contour furrowing, cattle grazing, and succession changed the transect area's species composition from 50 percent galleta and 50% horsebrush to 20% galleta, 60% fourwing saltbush, and 20% snakeweed.

Sagebrush Zone

All three enclosures in the sagebrush zone showed one distinct trend: sagebrush increased significantly both inside and outside the enclosures. Sagebrush increased most dramatically in the railed areas from less than 10% in 1953 to 80% in 1979 both inside and outside the enclosures in the 25-year period, while grass decreased at the same rate.

Sagebrush increased both in and out of the enclosure in unrailed areas. Grass occupied 30 to 50% of the composition in 1953 and, after 25 years with grazing and without grazing, sagebrush increased 30 to 40% and grass showed a similar decrease.

One of the three enclosures maintained a better species composition, as occurred in two of the desert grass/shrub zone enclosures, on the inside as compared to the outside. Litter also accumulated slightly more in the sagebrush enclosures than outside the enclosures.

Implications to Grazing Management

The desert grass/shrub zone enclosures indicated exclusion

from grazing maintained a better species composition where snakeweed and shadscale invasion is occurring, even where rest rotation is employed. However, the rest-rotation system is showing upward trend and the snakeweed invasion occurred in the 1950's prior to the rest-rotation system implementation.

The enclosure with the shadscale invasion maintained a grass dominance inside; however, shadscale increased outside the enclosure from 1951 to 1978. Again, exclusion from grazing maintained a better species composition than occurred outside. The outside is managed under rest-rotation grazing; however, the shadscale invasion was occurring in 1960, 6 years before rest-rotation grazing was implemented. Trend is currently static on the outside since 1970.

The third enclosure on an arid clay flat showed a change on the transect site from grass to cactus, but remained mostly bare ground. Exclusion from grazing was for the worse in this case, in species composition. Trend is upward since 1970 under rest-rotation grazing on the outside, where contour furrowing occurred in the 1960's.

Rest-rotation grazing is making small improvements in increasing desirable species (galleta, Indian ricegrass, fourwing saltbush, and winterfat) in the species composition in the desert grass/shrub zone. However, how much rest would equal the effect on species composition as inside the enclosures is unknown and gives the impression now of being economically unattainable, due to the large amount of rest from livestock grazing.

Grazing systems (rest-rotation, deferred) in arid sagebrush zones by all appearances seem to be a waste of money unless land treatment (chaining, burning, etc.) is a recurring event with the grazing system to keep the sagebrush canopy very open and patchy. A grazing system would keep grasses vigorous; however, it would not slow sagebrush reinvasion, as demonstrated in two of the sagebrush grazing enclosures. These two enclosures, over a 25-year period, showed no difference in the rate of sagebrush invasion under grazing and no grazing, or in land treatment areas and untreated areas.

Thus, it would appear that grazing systems in arid sagebrush zones would work best where recurring fire or alternative land treatments would occur with the rest cycle of the grazing system.