Species Richness Has Not Increased After Long-Term Protection from Grazing on Sagebrush, Aspen and Tall Forb Rangelands

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Recent conservation biology and environmental literature contains claims that livestock grazing has caused and continues to cause reduction in species diversity on Western rangelands, especially public rangelands. This paper present quantitative data on species richness (number of species) inside and outside 24 long-term exclosures; 8 exclosures in aspen vegetation in Utah, 8 in sagebrush and salt desert shrub vegetation in Wyoming and 8 in tall forbs and other high elevation vegetation in Montana. The areas inside and outside the exclosure were sampled in the mid 1990s and comparisons made of the number of species found inside versus outside. Any effect of grazing or protection from grazing on species richness should be revealed by these comparisons.

For the average of all exclosures, there was no significant difference in species richness inside and outside the exclosures. Seven of the sites had slightly more species inside the exclosure than outside, fifteen sites had more species outside than inside and two sites had the same number of species. Average number of species for each vegetation type were:

	Aspen	Sagebrush	High Elevation
Exclosure	9.3	14.0	31.9
Grazed Area	9.1	14.5	35.9

Overlap of species (those occurring both inside and outside the exclosures) was high; 69% in the aspen communities, 72% in the sagebrush communities and 70% in the high elevation communities. The species found either only outside or only inside the exclosures did not reveal any trend in terms of ecological significance related to grazing or successional status.

The areas inside and outside the 8 shrub exclosures in Wyoming were sampled by the same methods and by the same person in both 1993 and 1994. Growing season (late spring and early summer) precipitation was high (9.70 cm) in 1993 and low (2.77 cm) in 1994. Number of shrub species sampled did not change from 1993 to 1994. However, the number of herbaceous species sampled during this period dropped from an average of 11.9 to 7.0 inside the exclosures and from 12.5 to 7.3 outside the exclosures in 1993 and 1994 respectively. Species sampled in 1993 but not found in 1994 included grasses, perennial forbs and annual forbs. Except for the annuals, the species not found in 1994 certainly had not disappeared from the community, but simply did not grow or did not grow enough foliage to be recognizable in 1994.

The rather small difference in species richness inside and outside the exclosures (4% more species outside than inside) indicates that neither grazing nor lack of grazing has much long-term influence on species richness. However, less growing season precipitation in 1994 had a significant effect, i.e., a 40% reduction in the number of species sampled. This indicates that any comparison of species richness over time must take precipitation patterns in the years of sampling into account or the results can be highly biased.

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