observed only for minor forage species in most cases. Similarity (%) between fecal samples evacuated rumen samples, and non-evacuated rumen samples varied with seasons and with the particular techniques being compared. The similarity was lowest in fall between fecal samples and evacuated rumen samples (74%), and highest in summer (1989) between fecal samples and non-evacuated rumen samples (93%). Differential digestion, sampling procedures and observer errors might explain these differences. For practical purposes, fecal analysis might be the best technique to evaluate diet composition of large herbivores.

ANALYSIS OF GRASSLAND VEGETATION IN CENTRAL NEW MEXICO

R. D. Pieper

(Key Words: Plant Distribution, Vegetational Descriptions)

Much of central and eastern New Mexico is characterized by grassland vegetation. Although these grasslands occupy substantial rangeland areas, they have not been studied extensively. They are considered part of the short-grass type of the western Great Plains, but differ in species composition from those grasslands further north. The data set for this paper became available as a result of a larger study concerning pronghorn antelope habitat on several pastures approximately 50 miles north and south of Roswell, NM. Vegetational standing crop by species was determined by the weight-estimate method at four seasons during a three-year period on 37 different locations. These data were subjected to cluster analysis to determine similar plant communities. The analysis identified 7 plant communities, 3 of which included *Hilaria mutica* on fine textured soils and 4 with *Bouteloua gracilis* forming an important component on coarser soils. Surprisingly *Bouteloua gracilis* dominated on only one community. In the other communities, species such as *Bouteloua curtipendula, Bouteloua eriopoda, Erioneuron pilosum,* and *Lycurus phleoides* were abundant. *Bouteloua eriopoda* and *Aristida* were surprisingly well distributed across most plant communities. Plant communities were distributed according to soil type in some cases, but across several soil types in other instances.

LIVESTOCK GRAZING INFLUENCES SNAKEWEED DENSITY

R. D. Pieper

(Key Words: Environmental Influences, Species Composition)

Although broom snakeweed and threadleaf snakeweed have been a part of the natural vegetation in New Mexico from historical times, these populations increased on most New Mexico rangelands following several drought periods in the 1970s and early 1980s. Studies by the Department of Animal and Range Sciences indicated that livestock grazing influenced density of snakeweed on these rangelands. For example, early management recommendations suggested deferred grazing in the spring to favor cool-season grasses that could offer competition against

snakeweed.

Studies at Fort Stanton indicated that rest from clipping during June or July and July reduced snakeweed population densities compared to other grazing and rest patterns. Near Roswell, snakeweed production was less on pastures historically grazed by sheep than on pastures grazed historically by cattle. In southern New Mexico, snakeweed densities and cover were higher on areas grazed by cattle than on protected areas. On the College Ranch and Jornada Experimental Range, snakeweed frequencies differed little between grazed and protected areas.

Recent studies at the Corona Range and Livestock Research Center showed that snakeweed densities were greater than 0.5 plants per square meter on ungrazed areas and less than that on areas grazed by rams.

If livestock graze snakeweed, then grazing tends to reduce densities and stature of the plants. If livestock do not graze snakeweed and instead graze grass plants, then snakeweed may increase in density because grass plants may not be able to compete with snakeweed for water and nutrients in the soil. Thus, livestock grazing apparently has different influences on snakeweed populations depending on stocking levels and other environmental factors.

USE OF GEOGRAPHIC INFORMATION SYSTEMS TO INTEGRATE VEGETATION, SOILS, AND TOPOGRAPHIC DATA FOR RANGE SURVEYS

R. G. Harrington and R. D. Pieper

(Key Words: Vegetation Analysis, Plant Distribution)

Geographic information systems offers a powerful tool for range managers to utilize information on range vegetation, soils, topography, and other factors in management and research applications. The present study was conducted in central New Mexico on grassland vegetation. Vegetational cover by species was sampled using a point contact method on 192 separate sampling locations in a grid pattern (located with a global positioning unit in UTM coordinates) across the 11,500 ha Corona Experimental Ranch. Cluster analysis identified 5 plant communities. These plant communities and locations were entered into the GIS system. Soils maps (SCS) and U.S.G.S. topographic maps were scanned, digitized and entered as separate layers. Vegetational patterns appeared to be a mosaic with *Bouteloua gracilis* community the dominant background type with inclusions of communities dominated by *Lycurus phleoides, Bouteloua curtipendula, Stipa neomexicana*, and a mixed community with *Bouteloua gracilis, Aristida purpurea*, and *Gutierrezia sarothrae*. The *Stipa neomexicana* community was strongly associated with the Deama Pastura soils while the *Bouteloua curtipendula* community was surprisingly distributed across several soil types. The *Bouteloua gracilis* and the mixed community was distributed across several soil types but more strongly associated with the Darvey Pastura and the Tapia-Dean loam. These distributions suggest that the mixed community is a disturbance condition allowing *Gutierrezia sarothrae* and *Aristida purpurea* to increase in abundance.