

SUMMER USE BY CATTLE ON FOOTHILL RANGELANDS IN NORTHEASTERN OREGON

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Forested foothills in northeastern Oregon have been used as summer cattle range for many years. Besides providing an important forage resource these lands also provide timber, water, recreation, big game and fish. The purpose of this study was to evaluate the importance of several plant communities for summer cattle use. To effectively manipulate the development of vegetation we need to know where cattle are feeding, and what and how much they consume. The major objectives were to determine forage production of plant species and the amount utilized by cattle in specific plant communities; to define environmental factors influencing the use of different plant communities by cattle; and to evaluate the importance of seeded clearcut communities for summer cattle range.

EXPERIMENTAL PROCEDURE

Plant communities were delineated by frequency transects placed throughout the study area. Soils, percent tree canopy cover, distance to water and salt, slope, aspect and production of palatable species were also measured in each of eight plant communities. Production and utilization were measured by the ocular weight estimate method with periodic clipping to check for accuracy. Exclosures were also set up in each community to measure production and utilization not apparent from ocular estimates. Cattle were turned onto a 360 acre pasture July 31. The herd was composed of 94 cows and 90 calves. The cattle were removed from the pasture August 21 to wean calves. On August 27, 88 cows were turned back on the pasture until September 12.

RESULTS AND DISCUSSION

Plant communities in the study area were typical of those found in northeastern Oregon, eastern Washington and northern Idaho. The bunch-grass communities were represented by a Sandberg's bluegrass-kellogg onion (Poa sandbergii-Allium anceps) stand and a ponderosa pine-bluebunch wheatgrass (Pinus ponderosa-Agropyron spicatum) stand. Production averaged 312 pounds per acre, and tree canopy cover was less than four percent (Table 1). The forested communities were made up of a ponderosa pine-snowberry (Pinus ponderosa-Symphoricarpos albus) stand, a Douglas fir-elk sedge (Pseudotsuga menziesii-Carex geyeri) stand and a grand fir-adenocaulon (Abies grandis-Adenocaulon bicolor) stand. Production ranged from 63 to 125 pounds per acre with a tree canopy cover of 55 percent or greater. Prior to logging the clearcut contained three major plant communities which included ponderosa pine-snowberry, Douglas fir-elk sedge and grand fir-adenocaulon stands. The clearcut communities were logged in 1969, broadcast burned and seeded to timothy (Phleum pratense), orchardgrass (Dactylis glomerata), blue wildrye (Elymus glaucus), tall oatgrass (Arrhenatherum elatius), smooth brome (Bromus inermis), and Dutch white clover (Trifolium repens). Production ranged between 513 and 565 pounds per acre.

Table 1. Production and utilization for each plant community.

	Production (LBS/A)	Utilization (LBS/A)
Bunchgrass Communities		
Sandberg's bluegrass-kellogg onion	314	63
Ponderosa pine-bluebunch wheatgrass	311	41
Forest Communities		
Ponderosa pine-snowberry	124	20
Douglas fir-elk sedge	123	8
Grand fir-adenocaulon	63	4
Clearcut Sites		
Ponderosa pine-snowberry	513	56
Douglas fir-elk sedge	564	63
Grand fir-adenocaulon	565	209

On these foothill communities moisture and light were the two most important environmental factors determining forage production. Soil depth and canopy cover accounted for 96 percent of the variability in understory production. Soil depth was assumed to be an indirect measure of soil water potential. As soil depth increased and canopy cover decreased, forage production increased. Forested sites on these foothill rangelands had a high potential for forage production after cutting. The grand fir-adenocaulon communities had the greatest potential for producing high yields of seeded forage. Moisture availability was relatively higher on these sites, and competition from established species lower than on other forested communities. Success of establishment and production of timothy and orchardgrass was very high. However, on the logged ponderosa pine-snowberry and Douglas fir-elk sedge sites, establishment of seeded species was lower than on the grand fir-adenocaulon site. This was probably a result of increased competition from already established plants and lower water availability on these two sites as compared to the more mesic grand fir-adenocaulon site. Production of preferred forage species was also highly correlated with soil depth and canopy cover. Forage production on the non-logged communities was greatest on both bunchgrass sites.

Utilization of forage by cattle was variable among communities. Forage use ranged from three pounds per acre in the grand fir-adenocaulon stand to 209 pounds per acre on the logged and seeded grand fir-adenocaulon site (Table 1). The heaviest levels of utilization by cattle were on the seeded clearcut sites. The three logged sites provided about 64 percent of the forage consumed by cattle (Table 2). The most important forages on these communities were seeded grass species. Seeded grasses accounted for 55 percent of the cows' diet. Grass and grasslike species made up almost 96 percent of the forage consumed from the pasture. Forbs were less than one percent and browse about four percent of the animals' diet. Forbs were generally unavailable at this time and browse only made up five percent of the understory composition. Cattle removed about 50 pounds of herbaceous forage per acre on the bunchgrass communities and less than 50 pounds per acre on the forested communities. Bunchgrass stands provided 30 percent of the forage consumed. The most important species in the cows' diet on bunchgrass communities were Sandberg's bluegrass and bluebunch wheatgrass. Although forested communities accounted for 41 percent of the study area, they provided only six percent of the total forage consumed.

Environmental characteristics that accounted for most of the variability in pounds of forage removed from a community were distance to water, distance to salt, soil depth, and percent tree canopy cover. Distances to salt and water facilities strongly influenced the amount of forage used in plant communities by cattle. As distances to salt and water decreased, forage intake increased. The relationship of soil depth and tree canopy cover to forage use were probably indirect through their affects on forage production. Cattle use was probably influenced more directly by the amount of available forage in a community which related to soil depth and tree canopy cover. Communities with high levels of understory production received the heaviest use.

Table 2. Percent forage consumed by cattle from each plant community (July 31 - September 12, 1973)

	<u>Percent Forage Contributed</u>			<u>Total</u>
	<u>Grasses</u>	<u>Forbs</u>	<u>Browse</u>	
Bunchgrass Communities				
Sandberg's bluegrass-kellogg onion	9.6	0.0	0.0	9.6
Ponderosa pine-bluebunch wheatgrass	18.2	0.0	0.8	19.0
TOTAL				28.6
Forested Communities				
Ponderosa pine-snowberry	2.9	0.0	0.8	3.7
Douglas fir-elk sedge	2.8	0.0	1.0	3.8
Grand fir-adenocaulon	0.1	0.0	0.1	0.2
TOTAL				7.7
Clearcut Sites				
Ponderosa pine-snowberry	9.0	0.1	0.2	9.3
Douglas fir-elk sedge	18.3	0.0	0.6	18.9
Grand fir-adenocaulon	34.7	0.6	0.2	35.5
TOTAL				63.7
TOTAL	95.6	0.7	3.7	

Cattle diets were determined from utilization measurements. Preference of cattle for each plant species was evaluated with a relative preference index. This was a ratio between the percent composition of a plant in the animals' diet to percent composition of that same plant on the range. Grass species made up almost the entire diet (Table 3). By late summer availability of forbs was very low. Plant species generally did not reflect high palatability during late summer. Availability played a primary role in what and how much animals consumed of each plant species. Forbs would probably be more important for cattle during the spring and early summer on foothill rangelands when availability is high.

CONCLUSIONS

Factors related to distribution of livestock on foothill rangelands were availability of salt and water, soil depth and percent tree canopy cover. Forage production and utilization were greatest on clearcut communities. Seeded grasses made up 55 percent of the cows' diet. Timothy and orchardgrass were the most productive seeded grass species. Forage production and utilization were low in forested communities. Utilization can be increased on the less preferred forested communities by strategically locating water and salt facilities. Additional work with big game did not indicate forage competition between deer and elk, and cattle.

Table 3. Percent composition of plant species in the diet of cattle and their preference rating (July 31 - September 12, 1973).

SPECIES	% DIET	RPI ¹
GRASSES		
Orchardgrass	28	2.4
Timothy	16	1.7
Kentucky bluegrass	11	1.5
Sandberg's bluegrass	7	1.2
Tall oatgrass	6	1.5
Elk sedge	6	0.5
Idaho fescue	6	1.3
Blue wildrye	5	2.3
Bluebunch wheatgrass	4	1.8
Field woodrush	2	2.6
Ross sedge	2	0.8
Foxtail	1	0.6
Smooth brome	T	
Northwestern sedge	T	
Rattail fescue	T	
Cheatgrass	T	
Tall trisetum	T	
FORBS		
Douglas knotweed	T	
Bull thistle	T	
Prickly lettuce	T	
Yarrow	T	
Wyeth buckwheat	T	
Goldenrod	T	
Sheep sorrel	T	
Canada milkvetch	T	
BROWSE		
Shinyleaf spiraea	1	0.7
Snowberry	1	1.6
Ninebark	1	1.2
Redstem ceanothus	T	
Oceanspray	T	
Scouler's willow	T	
Big huckleberry	T	

¹RPI = $\frac{\% \text{ Diet}}{\% \text{ Range Composition}}$