

In contrast to other studies, our results indicate that increased grain yields do not reflect changes in the number of heads produced per acre. We observed no differences in heads/plant, plants/yard, or heads/yard of row on grazed compared to ungrazed plots. We must conclude, therefore, that grazing did not promote increased tillering of wheat plants, as previously believed. In our case, increased grain yields resulted from more seeds produced per head of wheat. This appears to be caused by more clusters of flowers (spikelets) being produced per head on grazed plots rather than from more seeds per cluster (seeds/spikelet). The exact mechanism which produces this effect is unclear. Further investigation in this area obviously is needed to gain a clearer understanding of how early grazing effects subsequent ear development of winter wheat.

Experience gained in this study, together with reports from scientists working in other geographic areas, indicate that wheat may be grazed by livestock without reducing grain yields if grazing is terminated before the plant begins to elevate the immature wheat head (before jointing) and if an adequate length of growing season remains for the plant to recover after grazing. These conditions may be easily met west of the Cascades in Oregon and Washington. East of the Cascades, however, length of growing season may be too short to safely accommodate grazing except on very moist sites.

#### FOOD HABITS OF DEER AND CATTLE GRAZING IN COMMON ON A SAGEBRUSH-BUNCHGRASS RANGE IN NORTHEAST OREGON

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#### STUDY AREA AND PROCEDURES

The study area, in the Keating Valley of Baker County, Oregon, historically was heavily grazed by cattle and sheep but not by mule deer. However, in the last 30 years there has been an increase in the number of mule deer and approximately 5,000 now use portions of the area between December and April. Cattle use occurs each spring and fall under Bureau of Land Management permits.

Three known areas where deer concentrated during the winter and cattle were grazed during the spring and fall were investigated. The vegetation of the three areas consisted of relic stands of three habitat types: (1) big sagebrush/bluebunch wheatgrass, (2) mountain big sagebrush/Idaho fescue, and (3) stiff sagebrush/Sandberg's bluegrass. Crested wheatgrass was an introduced seeded grass species and comprised more than 60 percent of the total herbaceous production where the seedings were successful. Cheatgrass brome, medusahead, Sandberg's bluegrass, and many weedy forbs such as white top, mullein, and mustards have invaded large portions of the area because of uncontrolled livestock grazing in the past and unsuccessful establishment of crested wheatgrass seedings.

Microhistological examination of feces was used to determine the botanical composition of deer and cattle diets. Deer pellet groups were collected tri-weekly during the early winter (November, December, January) and late winter (February, March, April) periods of 1978 - 1979 and 1979 - 1980. Cattle fecal groups were collected monthly during the spring (April, May, June) and fall (October, November, December) of 1979 and 1980. Kulczynski's similarity index was used to identify the extent of dietary overlap of grass species consumed by deer and cattle during the fall and spring of 1979 and 1980. Snow did not accumulate during the winter of 1979-1980 but averaged 2 to 6 inches during the winter of 1978-1979.

## RESULTS AND DISCUSSION

Browse (predominately sagebrush) was the dominant forage consumed by deer during the early winter period of 1978-1979. Grasses (predominately Sandberg's bluegrass) were the dominant forage consumed during the late winter period of 1978-1979. During the winter of 1979-1980, total browse and grasses consumed were approximately 34 percent and 48 percent of the deer diets, respectively, and there was not a significant seasonal diet change between the early and late winter sampling periods. A comparison between mean yearly differences of total grasses and browse consumed by deer revealed a significant change that can be attributed to forage availability. Cattle diets consisted of approximately 92 percent grass during the spring and 93 percent grass during the fall. There was not a significant difference between seasons and years. Dominant grasses consumed by cattle were crested wheatgrass, cheatgrass, and Sandberg's bluegrass. Forbs comprised less than 20 percent of the diets of both deer and cattle. Table 1 summarizes the dominant forages consumed by deer and cattle on the Keating study areas.

Fall dietary overlap for 1979 and 1980 was 35 percent and 34 percent, respectively, while spring overlap was 32 percent and 34 percent for the two years. Most of the dietary overlap occurred on Sandberg's bluegrass.

A 35 percent and 34 percent similarity index during the fall periods indicated that the potential for competition between deer and cattle could exist, especially when cattle and deer occur on the range together. A 31 percent and 33 percent similarity index during the spring periods was difficult to interpret because deer had migrated from the area before the time cattle were turned onto the range. However, the potential for competition could exist because less forage would be available to cattle where deer had concentrated the previous late winter period.

If intensive range/habitat management is practiced on the Keating rangelands, deer and cattle use could be compatible rather than competitive. Improved utilization of crested wheatgrass by cattle could be attained if a one-crop, two-crop system of grazing were implemented on fenced, crested wheatgrass seedings. If cattle were excluded from native range pastures and only grazed on crested wheatgrass seedings during the fall, diet overlap

Table 1. Selected plant species occurring in deer and cattle diets pooled across three study areas on the Keating rangelands

Species <u>1/</u> <u>2/</u>	Deer				Cattle			
	1978-1979		1979-1980		1979		1980	
	Early	Late	Early	Late	Spring	Fall	Spring	Fall
crested wheatgrass	1	4	3	2	12	20	15	14
cheatgrass brome	1	14	24	25	17	24	23	30
Sandberg's bluegrass	1	2	4	4	23	24	23	24
Total grasses	4 <sup>a</sup>	32 <sup>b</sup>	47 <sup>c</sup>	50 <sup>c</sup>	91 <sup>d</sup>	93 <sup>d</sup>	94 <sup>d</sup>	95 <sup>d</sup>
Total forbs	20	19	18	17	7	3	5	3
sagebrush	56	40	27	31	2	3	-	1
rabbitbrush	7	5	2	1	-	-	-	-
Total browse	76 <sup>a</sup>	49 <sup>b</sup>	32 <sup>c</sup>	36 <sup>c</sup>	2	4	1	2

1/ means with different letters are significantly different.

2/ statistical tests apply only across columns.

should be minimized because deer appear to show a preference for Sandberg's bluegrass rather than crested wheatgrass. Early spring diet overlap could be minimized by grazing cattle on the crested wheatgrass pastures early and allowing time for native range to recover from late winter deer use. Late spring grazing on native range by cattle should remove the current year's herbaceous growth thereby stimulating fall regrowth and subsequently providing a palatable, seasonal nutritious forage for deer during the early winter period.

## THE EFFECT OF TRACTOR LOGGING ON UNDERSTORY PRODUCTION IN EASTERN OREGON'S BLUE MOUNTAINS

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The economy of eastern Oregon relies heavily on its forested lands to provide renewable resources in the form of timber and forage for livestock and big game. The passage of logging vehicles and skidded logs over the forest floor has the potential of profoundly modifying soil properties which, in turn, affect the growth of marketable trees and forage species beneath them. Timber harvesting also can alter runoff, erosion, and sedimentation characteristics of the forest watershed.

In the Pacific Northwest, research into the impact of logging on soils and plant growth, particularly tree growth, has focused on the Douglas-fir (*Pseudotsuga menziesii*) region. There has been little investigation of timber harvesting's impact on understory and soil properties east of the Cascades. Tractors have been, and will continue to be, the principal method of timber yarding in eastern Oregon.

The objective of this study was to determine the extent to which tractor logging and follow-up slash disposal influence understory production, composition, and soil features in the mixed-conifer forest. This plant community occupies extensive areas in the Blue Mountains and is economically important as a source of harvestable timber and summer range for livestock.

### THE STUDY SITE

This study was conducted on a 5-acre stand near Crane Prairie on the Malheur National Forest in the southern Blue Mountains. Soil consisted of a loam and silt loam surface layer derived from recent volcanic ash, and a gravelly loam and clay loam subsoil derived from basalt and andesite. Natural mixing of these layers had occurred. Soil depth ranged from 12 to 36 inches. The site was situated on an east aspect with a slope averaging 15 percent. Elevation was 6,500 feet.