

## CONCLUSIONS

1. Each treatment or combination of treatments directed plant succession toward a different mixture of plant species. To some degree, plant succession can be managed to produce a predetermined plant community.
2. Habitat type influences directed development of plant communities independent of other treatments but more than half the species were not differentially influenced by habitat type.
3. Big game grazing had more influence on succession than cattle grazing probably because of the interaction with shrubs and their domination of the Douglas-fir/ninebark habitat type.
4. Seeding of introduced species did not reduce distribution of shrubs or most forbs and only tall oatgrass moved into unseeded areas in large amounts.

### CATTLE GRAZING POTENTIAL ON CLEARCUTS

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Previous reports have indicated the need for integrating forest and livestock production in the Northwest. This study was conducted to evaluate potentials for beef cattle production on clearcuts. The clearcut studied has been described by Wheeler, Krueger, and Vavra in a previous paper. The 5-acre pastures had been grazed by cattle since 1966. Cattle were stocked at the rate of five yearlings per pasture per month. Grazing was initiated each year from June 25 to July 15 and lasted for one month. In this study, Pasture I (big game excluded) and Pasture II (grazed in common by cattle and big game) were used.

### EXPERIMENTAL PROCEDURE

Five steers, two with esophageal fistulas and two trained to carry total fecal collection devices grazed each pasture. The grazing season lasted from July 6 to August 9, 1972, and from July 13 to August 10, 1973. The grazing period was shorter in 1973 because of drought conditions. Two esophageal fistula collections and two 24-hour fecal collections were made per week during the grazing periods. Diet samples collected from esophageal fistulated animals were analyzed for crude protein, acid detergent fiber, lignin, and *in vitro* digestibility. Total fecal collections were used in estimating dry matter intake. Additionally, diet samples were analyzed for plant species composition to determine animal preference.

## RESULTS AND DISCUSSION

Clearcutting mixed coniferous forests followed by reseeding forage species commonly results in a 20-fold increase in forage production. With a dense overstory, mixed conifer sites normally produce about 50 pounds per acre of understory vegetation. After logging and reseeding, 800 to 1,000 pounds per acre may be produced. Of this, about 60 percent is grass, 30 percent forbs, and 10 percent shrubs. This mixture of grasses, forbs, and shrubs is maintained by the combination of cattle and big game grazing. When big game are excluded, shrubs may increase 15 fold. Grass production suffers from the increased competition by the shrubs.

Quality of the diet of grazing cattle is influenced by forage availability. Crude protein content of the diet was adequate to meet requirements on both pastures during both years (Table 1).

Table 1. Diet quality and intake of steers

	Protein (%)	Fiber (%)	Lignin (%)	Digestibility (%)	Dry matter intake (lb/day)
1972					
Pasture I	9.7	48.3	15.0	53.8	14.1
Pasture II	9.1	47.8	13.8	54.6	15.0
1973					
Pasture I	9.8	52.5	20.9	44.7	13.0
Pasture II	7.9	53.0	14.1	52.8	15.8

Lignin is an indigestible compound found in plants which increases as the plant matures, in the case of herbaceous vegetation, and increases with age of the stem in woody plants. Shrubs have much higher lignin levels than do grasses. In 1973, cattle in Pasture I consumed 45 percent of their diets as shrubs (Table 2). Lignin levels were correspondingly higher in Pasture I (20.9 percent vs 14.1 percent in Pasture II). Consumption of this much indigestible material decreased digestibility of the diet and dry matter intake.

Because Pasture I contained more shrub and less grass biomass, the available preferred forage of cattle (grasses) becomes limiting toward the end of the grazing period. This becomes particularly acute in drought years like 1973. Cattle were forced to consume more shrubs in Pasture I in 1973 (Table 2) and diet, intake and, therefore, average daily gain suffered. When stocking rates are heavy or during drought years when forage becomes limiting, cattle normally shift their diets to increased shrub consumption. Production in yearlings can decrease because energy intake becomes limited. Cattle, however,

shift their diets to increased shrub consumption. Production in yearlings can decrease because energy intake becomes limited. Cattle, however, normally consume some shrubs in the diet particularly as the grasses become more mature and dry. Shrub consumption of 20 to 25 percent (Table 2) is considered about normal and has been noted in other studies.

Table 2. Percent of each forage class found in steer diets

	Grass	Forb	Browse
1972			
Pasture I	67	10	23
Pasture II	65	11	24
1973			
Pasture I	45	10	45
Pasture II	68	10	22

Quality of cattle diets will also be influenced by the time of year the clearcut is grazed. Initiation of grazing the clearcut has varied annually. Cattle may be turned out in late June, but in some years this has been delayed until mid-July. In years of earlier turnout gains have approached 2 pounds per head per day. Later turnouts onto a more mature and hence lower quality forage results in gains of 1.25 pounds per day.

At no time during the study did cattle diets contain evidence of conifer consumption. During the drought year of 1973, in Pasture I, where preferred forage was limited, cattle increased consumption of shrubs but still avoided any consumption of the tree needles or buds even though branches and lateral buds were available.