

Seasonal Dependence on Federal Forage in Colorado

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Abstract

Thirty-six percent of Colorado is federal land administered by the U.S. Forest Service or Bureau of Land Management, which provides approximately 2.4 million AUM's of grazing for domestic livestock. This represents 28% of the total forage resources used by the 2200 ranchers that use federal forage in Colorado. Seasonal dependence on federal forage is greatest in summer, averaging over 50%. High seasonal dependence where few viable alternative forage sources exist makes federal forage critical to Colorado ranchers. Dependence on federal forage also varies with ranch size. Dependence varies inversely with size of cattle ranches, but varies directly with size of sheep ranches.

There are approximately 24 million acres (9.7 ha) of federal land in Colorado, comprising 36.2% of the total land area of the state. With the exception of the Pawnee and Comanche National Grasslands, National Forest (FS) and National Resource (BLM) lands are concentrated in the western portion of the state. The Public Land Law Review Commission (PLLRC, 1970) estimated that 85.2% of this federal land is allocated for grazing. In reviewing the PLLRC study Neilsen and Workman (1971) stressed the seasonal importance of federal forage, suggesting spring and fall seasonal forage as being particularly critical.

Estimates have been made concerning amounts of federal forage utilized by livestock but little has been reported about seasonal use and the utilization of other forage and feed sources. The importance of federal forage is a function of seasonal use and alternative forage sources rather than the actual amount used.

Methods

To examine the importance of federal forage as it integrates into the forage needs of federal grazing permittees, forage budgets were compiled from interviews of a random sample of permittees throughout Colorado who use the federal forage resource (both FS and BLM). Five regions were delineated within the state so that ranches with similar adaptations to ecological and economic factors could be aggregated (Fig. 1). From the sample data 25 ranch models were constructed. Each model represents a specific size and type (sheep, cattle, or both sheep and cattle) of federal grazing permittees in each region of the state. A complete description of sampling methods and details of various ranch models were reported by Bartlett et al. (1979). By expanding the forage budget for each model by the number of ranches represented by that model, regional and state estimates of forage utilization were made.

AUM's of forage utilization were computed by the sample

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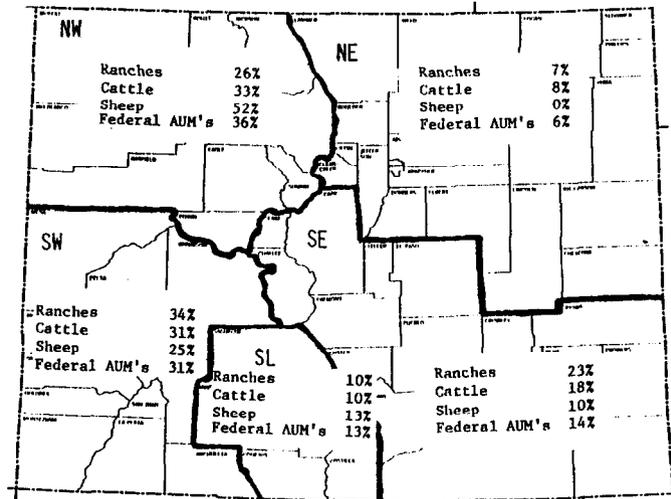


Fig. 1. Grazing regions of Colorado and the percentage of federal permitted ranches, cattle and sheep raised on those ranches and federal AUM's in each region.

ranches by surveying the number and duration of use by each livestock class on each forage type. Livestock class was weighted by the respective annual average animal unit (AU) conversion factor (ewe-lamb, 0.19; cow-calf, 1.06; yearling, 0.63 [Cook et al. 1976]). Such a computation procedure was necessary because the various state and federal agencies do not use standardized AU factors and more importantly because forage data on AUM's are not obtainable for deeded and leased forage in any feasible questionnaire survey.

Forage use was delineated into 4 seasons. The beginning of each season was defined as: (1) spring, the end of the winter feeding period; (2) summer, the start of the FS grazing season; (3) fall, the ending of the FS grazing season; and (4) winter, the beginning of the winter feeding season. These dates vary by region and by type of operation (sheep, cattle, or both sheep and cattle). Sheep operations had no defined winter feeding period; feeding was done to supplement winter range forage and during lambing. For sheep, the distinction between fall and winter feeding was only that feeding was more frequent approaching lambing time. Winter feeding of crops or purchased feed was included in deeded range and irrigated pasture forage.

Results

There are approximately 2209 federal permittees in the state, including 145 sheep ranches, 1901 cattle ranches and 163 ranches having both cattle and sheep. These ranches raise about one-third of the cattle (400,000 mother cows) and essentially all the sheep (500,000 ewes) in the state. Ranching operations, livestock and federal forage are distributed among the 5 regions as shown in

Table 1. Total (AUM's) federal forage (Forest Serv. and BLM) by region in Colorado.

Region	Federal forage (BLM, FS)	Total forage and feed (federal, state, leased deeded)
Northwest		
Cattle	572,118	2,375,437
Sheep	278,424	635,711
Northeast		
Cattle	155,541	793,236
Southeast		
Cattle	301,193	1,171,861
Sheep	28,644	117,312
San Luis		
Cattle	218,928	875,008
Sheep	91,576	228,168
Southwest		
Cattle	575,559	2,067,683
Sheep	157,124	327,331
Total	2,379,107	8,571,747

Figure 1. The two western regions of the state produce nearly 70% of the federal forage. Accordingly, 60% of the ranches with federal grazing permits are headquartered in these 2 regions.

To support the present level of livestock production approximately 8.6 million AUM's of forage are needed of which 2.4 million or 28% are obtained from federal land (Table 1). Some of this federal forage is located outside the boundaries of the state. Of the total forage utilized in the state, 15% is consumed by sheep and 85% by cattle. Sources of total forage for cattle and sheep are shown in Figures 2 and 3. For cattle approximately 63% of the total forage requirement is obtained from deeded sources, 10% from leased, 2% from state lands and 25% from federal land. For sheep the same categories are 42% deeded, 11% leased, 5% state, and 42% federal. Sheep ranches are decidedly more dependent on federal forage than are cattle ranches.

The dominance of other forage sources belies the seasonal critical nature of federal forage. Federal land is usually tightly coupled with other forage sources. The carrying capacity of a ranch opera-

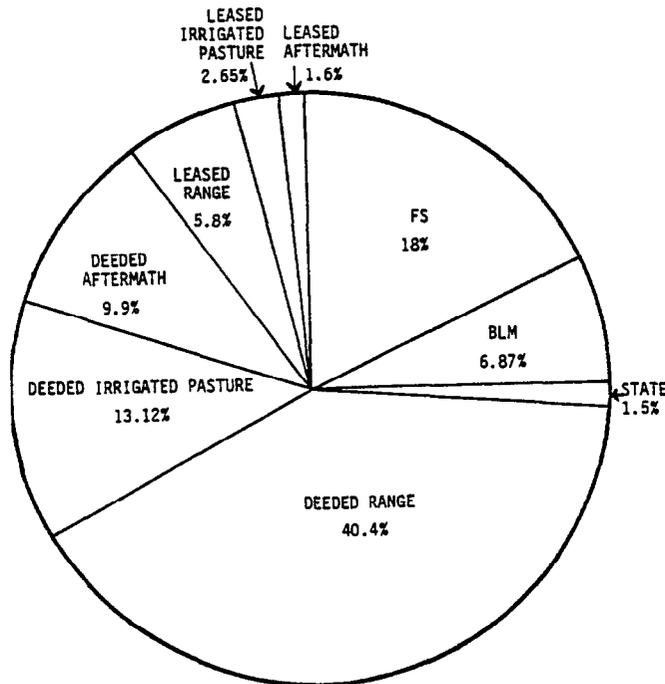


Fig. 2. Forage use by cattle in Colorado, 1977 (percent of the total AUM's used).

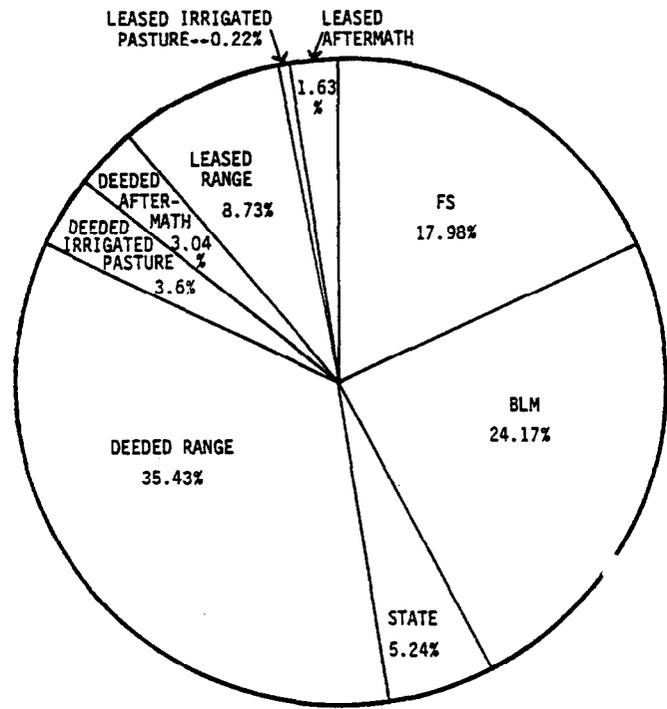


Fig. 3. Forage use by sheep in Colorado, 1977 (percent of the total AUM's used).

tion cannot exceed the maximum capacity of the season when forage is most limiting. Thus, the lack of federal forage for even a short time, when no economically viable alternative exists, can reduce the number of livestock on a ranch. However, the management of the nonfederal resources can be adjusted to fully utilize those resources freed by changes in federal grazing. Stocker ani-

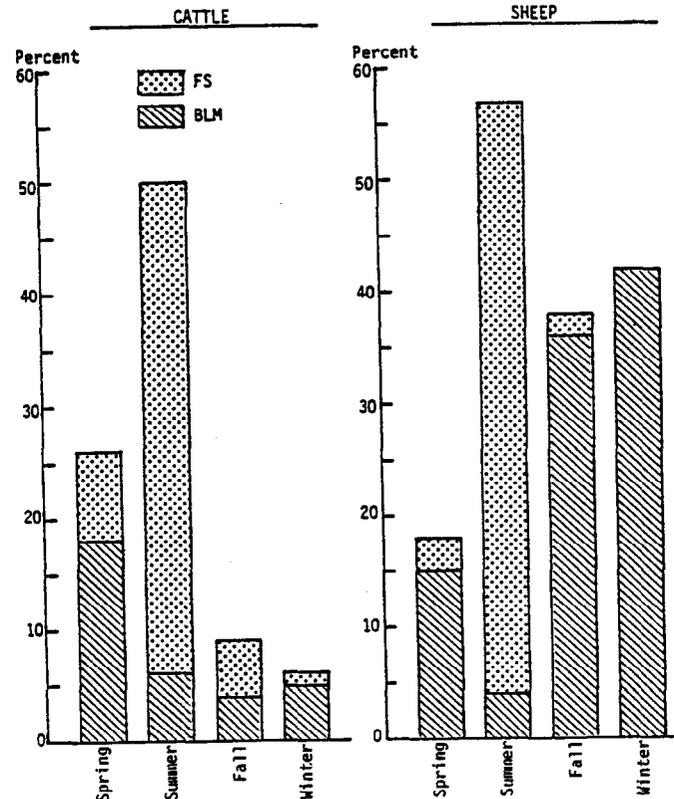


Fig. 4. Federal forage as percent of seasonal forage utilization for sheep and cattle in Colorado.

Table 2. Supplemental feed in AUM's (purchases plus crops) for Colorado public land ranches by region and species.

Region	Cattle	Sheep
Northwest	629,939	58,814
Northeast	155,829	—
Southeast	506,127	14,340
San Luis	210,256	21,704
Southwest	606,969	60,842
Total	2,109,120	155,700

als can be bought for short periods, hay raised on the ranch can be sold, or excess pasture and rangeland leased. Figure 4 illustrates the seasonal dependence on federal forage of both BLM and FS grazing. For cattle, federal forage constitutes only 25% of annual forage requirements; yet, over 50% of summer season forage is obtained from federal grazing. Sheep are dependent on federal forage a greater portion of the year, extending throughout summer, fall, and winter.

Dependence on federal forage varies not only by season and livestock species but also by ranch size. Sheep ranches in general are more dependent on federal grazing than are cattle ranches (Figure 5). In addition, as ranch size increases sheep operations rely more on federal forage to complete feed needs, whereas the opposite occurs with cattle ranches. Regional variation also occurs; federal forage constitutes a greater proportion of the forage budget for ranches in the western three regions of the state than for the Northeast and Southeast. Contemporary sheep ranches are but a remnant of the large herds that once seasonally migrated using solely the public domain. Cattle ranches, by contrast, were traditionally formed around a core of private land where winter feed was raised. With ranches having both sheep and cattle, the overwhelming majority of ranches fall within the size classes that are most heavily dependent on federal forage. In all regions of the state, more than half of the cattle ranches using federal grazing are less than 150 AU in size. Alternatively, sheep operations are more frequently greater than 300 AU's.

The proportion of winter forage obtained from private pastures, purchased or raised feed depends on the intensity and duration of the winter season. All feeding must be done on private lands since regulations prohibit feeding on federal lands. The 1977 winter followed a severe drought, necessitating purchasing additional feed or transporting livestock long distances to winter. Such extraordinary feeding was excluded in an attempt to reflect an average winter feeding season (Table 2). Of the 6.2 million AUM's obtained from sources other than federal grazing, approximately 37%, or 2.3 million AUM's, were supplemental feed (2.1 million AUM's cattle, 0.2 million AUM's sheep). Since the amount of

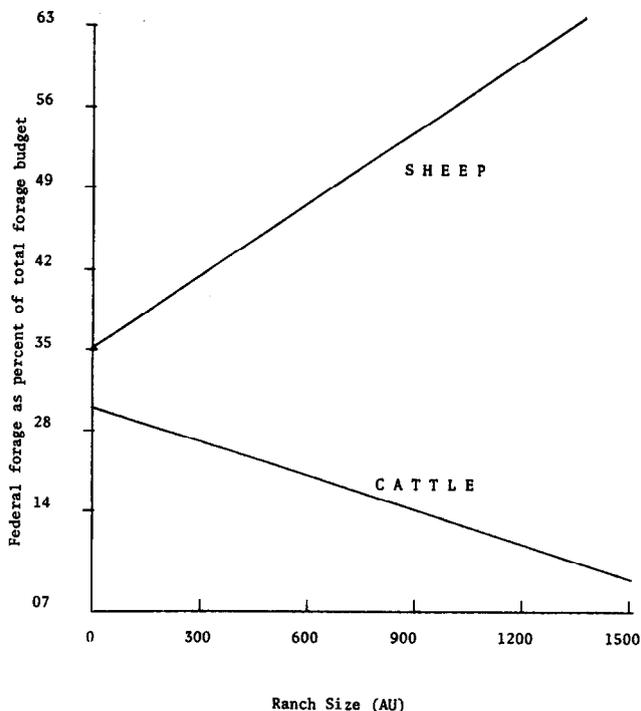


Fig. 5. Federal forage as percent of the total forage budget vs. ranch size in animal units (AU) for sheep and cattle.¹

¹Cattle: % federal forage = .3051 - .0000877 cattle AU correlation coefficient = 0.594;
 Sheep: % federal forage = .354 + .0001906 sheep AU correlation coefficient = 0.854.

feeding from year to year is in constant flux, depending on the severity of the winter, supplemental feed has been the primary short-term alternative to forage shortages at very high costs per AUM.

Literature Cited

- Public Land Law Review Commission. 1970.** The forage resource, Vol. 3, Chapters IV and V: Analyses-alternatives. Univ. Idaho with Pacific Consultants, Inc. Washington, D.C.
- Neilsen, D.B., and J.P. Workman. 1971.** The importance of renewable grazing resources on federal lands in 11 Western states. Utah Agr. Exp. Sta. Circ. 155. 44 p.
- Bartlett, E.T., R.G. Taylor, and J.R. McKean. 1979.** Impacts of federal grazing on the economy of Colorado. Dep. Range Sci., Colorado State Univ., Fort Collins. 227 p.