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ALONG AN EPHEMERAL CHANNEL**

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Cattle behavior, including distribution patterns, selection of habitats, and differential utilization of forage species, provides a basis for grazing management and range improvement planning. Cattle usually prefer perennial stream riparian zones over upland range sites because of available water and greater quality and abundance of forages. Increasing attention is being paid to grazing in riparian zones. Concerns about grazing effects on water quality and nonpoint pollution have intensified the need to understand these relationships.

Ephemeral channels cover more area and have less vegetative cover potential than perennial channels. Overgrazing has long been assumed to cause ephemeral channel alteration (Bryan 1925). Sediment yield from rangelands may be influenced more by grazing management along ephemeral channels than along perennial channels. We could find little information concerning grazing relationships with and impacts to ephemeral channels.

We studied seasonal habitat selection by cattle along an ephemeral channel and adjacent upland. Forage quality, standing crop, and utilization of vegetation were also determined. We used small seasonal pastures where dis-

tance to water was assumed to have a minor influence on grazing distribution and 2 replicate areas of a large allotment where water sources could be up to 4 miles distance away from potential grazing sites.

We assumed that ephemeral riparian zones would be preferred over uplands because of more and higher quality forages. However, water availability could modify the degree of preference expressed.

The study area and methods used are described in Smith et al. (1992). We determined the distribution of cattle by activity in channel, flood plain, and adjacent upland habitats in spring, summer, and fall for 3 years along the ephemeral 15-Mile Creek in the Big Horn Basin of northcentral Wyoming. The study site had three 28-acre small pastures, 1 used in each season, and a large surrounding allotment. Plant species occurrence, productivity, forage quality, and utilization by cattle was determined in the small pastures.

Results and Discussion

Small Pastures

Cattle Use

Cattle use observed in channel and floodplain habitats exceeded percent of the pastures occupied by these habitats (Table 1) except floodplain in fall when use was proportional to floodplain area. Uplands were always used in lesser proportion than suggested by proportional area of the habitat (Table 1). The floodplain habitat had a greater

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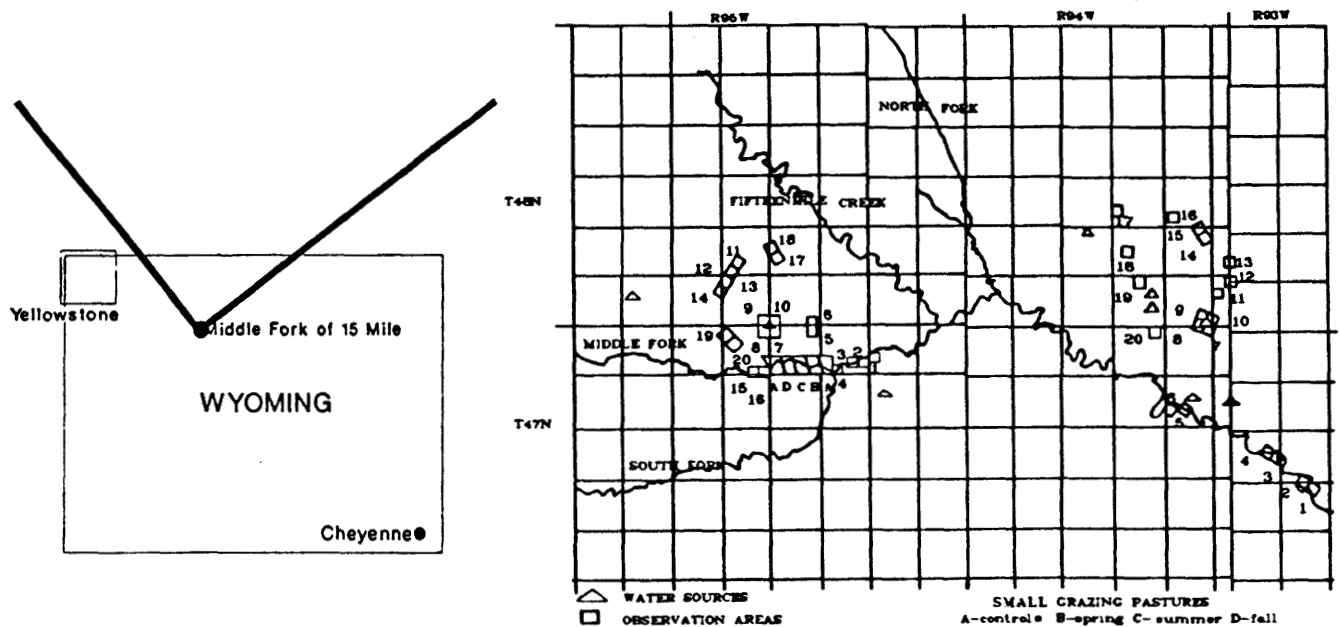


Fig. 1. Fifteen Mile Creek study area showing small seasonally grazed pastures (A-D) and large allotment observation sites (1-20) on Middle Fork (replicate 1) and on Main Channel (replicate 2). Grid lines, surveyed section lines from USGS 1:24,000 scale maps, are nominally 1.6 km (1 mile) apart.



15-Mile Creek near Worland, Wyo.

percent of resting cattle than other habitats. Uplands had a greater percent of grazing cattle, but not as great as the percent of the habitat in the area.

In the small pastures, maximum distance to water and shade was only 760 yards and 430 yards, respectively. Shade and water occurred only in the channel and floodplain habitats and probably led to the higher incidence of resting behavior (Table 1) in those habitats.

Table 1. Percentage of total cattle observed in, percent of area occupied by in 3 habitats of the seasonally grazed pastures on Middle Fork of 15-Mile Creek and surrounding large allotment.

	Habitats		
	Channel	Floodplain	Upland
	----- % -----		
Small Pastures			
Habitat Area %	2	15	83
% Cattle: total	13	34	52
grazing	11	29	60
resting	11	47	42
Large Allotment			
Habitat Area %	5	26	70
% Cattle	24	41	36

Forage Quality

Since water and shade were apparently not limiting and topographic variation was minor, forage abundance and quality should be closely related to cattle selection of habitats for grazing. The channel habitat produced the most herbaceous vegetation (Table 2). Current annual growth of greasewood, occurring only in the floodplain, likely increased forage for cattle above that available in uplands.

Forage Protein

Annual grasses, most abundant in the floodplain and scarce elsewhere, had the least protein and greasewood, particularly new growth, had the highest amounts (Table

Table 2. Forage, quantity, crude protein content, dry matter content, and utilization in 3 habitats of seasonally grazed pastures on the Middle Fork of 15 Mile Creek in years 2-3, 1984-85.

Habitat and forage class	Quantity -lb/ac-	Protein ----- % -----	Dry matter	Utilization
Channel Perennial Grass	342	9	51	43
Floodplain Perennial Grass	135	8	65	41
Annual Grass		6	72	23
Greasewood		16	35	52
Upland Perennial Grass	189	10	60	40

2). Perennial grasses had intermediate protein levels.

Forage Succulence

Succulence, indicated by dry matter content of forages (Table 2), was greater in channel and upland area than in flood plains. However, greasewood in flood plains was the most succulent forage (Table 2).

Forage Characteristic Effects on Habitat Selection

Forage availability, crude protein, and succulence are generally known to favorably influence habitat selection by cattle. Forage productivity was greatest in the channel, with intermediate crude protein content, and high succulence compared to grasses in other habitats. Channels were preferentially selected in our study, suggesting the influence of such forage characteristics on selection. Greasewood quality appears to provide the only reason for grazing cattle to show preference for the floodplain areas because quantity and quality of other floodplain forages were either similar or inferior to those of uplands. Greasewood had the highest protein and succulence values of any forage and was relatively abundant.

Upland areas had relatively low amounts of forage, dominated by short statured blue grama. All upland species were of relatively low succulence but crude protein levels were comparable to or higher than herbaceous forages in other habitats.

Effects of Habitat Selection on Utilization of Forages

Even though disproportionately more grazing cattle were found in channel and floodplain habitats, forage utilization did not correspondingly increase. Utilization of channel and upland forages (perennial grasses, Table 2) was similar. The preferred floodplain habitat contained the forage class with lowest use (annual grass) as well as the class with highest use (greasewood). The higher use of greasewood appears to be the only case where preference for the habitat and increased use of a forage class occurred simultaneously.

Higher greasewood utilization levels illustrated the effect high forage quality can have on increasing selection by grazers. Less variation occurred in utilization dur-

ing spring, when forage quality was more uniform, than in other seasons when more variation in quality among species occurred.

Free Ranging Cattle In the Large Allotment


In general, habitat preferences were similar in the small pastures to those in the large allotment (Table 1). These findings verify the applicability of the small pasture studies to larger areas of similar vegetation and landforms and emphasize the importance of water developments to grazing management. Water location influenced cattle selection of habitats in the large allotment. A slightly greater proportion of cattle selected channel and flood plain habitats near water, and fewer cattle used uplands than in the small seasonal pastures (Table 1).

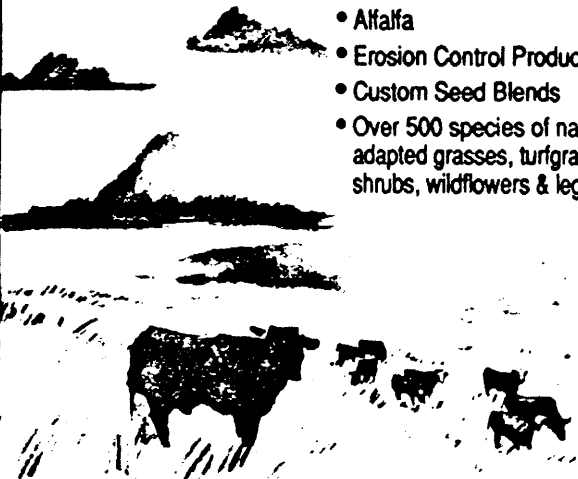
Use of the channel where water was present increased in summer while use declined in the floodplain. Similar changes did not occur in seasonal pastures, probably because the ephemeral channels of seasonal pastures did not contain water. When no water was available at upland reservoirs, cattle reduced selection of uplands from 46% to 14%.

We conclude that when adequate livestock water is present, grazing cattle will be more likely to select areas of higher forage quality and quantity. Where we controlled numbers and length of time in the pasture, increased selection did not result in increased utilization in the preferred areas. Limited water distribution in large allotments probably increases utilization closer to water. Since channel areas are important in maintaining habitat diversity and trapping sediment, grazing management plans should emphasize maintenance of channel vegetation. No particular season of grazing in our study resulted in more detrimental utilization of channels when water was not limited. Based on our studies, vegetation in or near channels can be best protected by developing water points in adjacent uplands while monitoring utilization of channel areas.

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