Altering Beef Cattle Distribution within Rangeland Pastures with Salt and Water

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Introduction

Most of the problems associated with grazing animals in extensive rangeland pastures are related to their uneven patterns of landscape use. Several landscape factors affect distribution, including distance to water, composition of plant communities, degree of slope, dense woody vegetation, mineral sources, and even tides and prevailing winds. Animal factors affecting distribution include species, breed, sex and age, requirements for escape or hiding cover, and knowledge of the area. Fencing, water, and salt are three of the most frequently used tools for altering cattle distribution in large pastures. Cattle are attracted to water in arid regions, but mixed results have been obtained with salt and mineral supplements. The goal of this study was to evaluate the effectiveness of moving salt and water within large (2,000+ acre) pastures to modify livestock distribution.

Experimental Protocol

The research was conducted in the three largest (2,000+ acres each) pastures on the Northern Great Basin Experimental Range near Burns, Oregon. Forty Hereford X Angus cow/calf pairs simultaneously grazed each pasture in June and July, with two animals in each pasture wearing a global positioning system (GPS) collar configured to acquire the animal's position at 20-minute intervals (Fig.1). This schedule collected 72 positions for each animal each day. The collars also contained motion sensors that let us ascertain whether cattle were resting or grazing at each position. One of three treatments was applied to each pasture at weekly intervals. These included 1) salt and water together at a central point, 2) water moved to a distant locale with salt remaining in its original location, and 3) salt moved to a distant point with water remaining at its original location. Cattle were herded to each new site whenever salt or water was moved. Data that were analyzed included average distance of cattle to salt, average distance to water, total distance traveled per day, daily resting and grazing times, and the location of cattle centers of activity.

Figure 1. Beef cow no. 126 wearing a GPS (global positioning system) collar used to determine her precise location and activity at programmed intervals on the Northern Great Basin Experimental Range near Burns, Oregon.

Results and Discussion

All indications were that cattle moved their centers of activity more (1,541 yards) when water was moved in a pasture than when salt (1,094 yards) was moved (Fig. 2). On average, cattle stayed within about 1,274 yards of water regardless of the resource moved (Table 1). This suggested that they followed the water tank to its new locale and remained nearby. Whenever salt or water was moved, the average distance of cattle from salt always increased, again suggesting there was little inclination to remain near salt.

If salt and water shared a common locale, cattle were found within 250 yards of salt and water 191 and 192 times within a week, respectively. When water was moved away from salt, cattle were near water 284 times and within 250 yards of salt

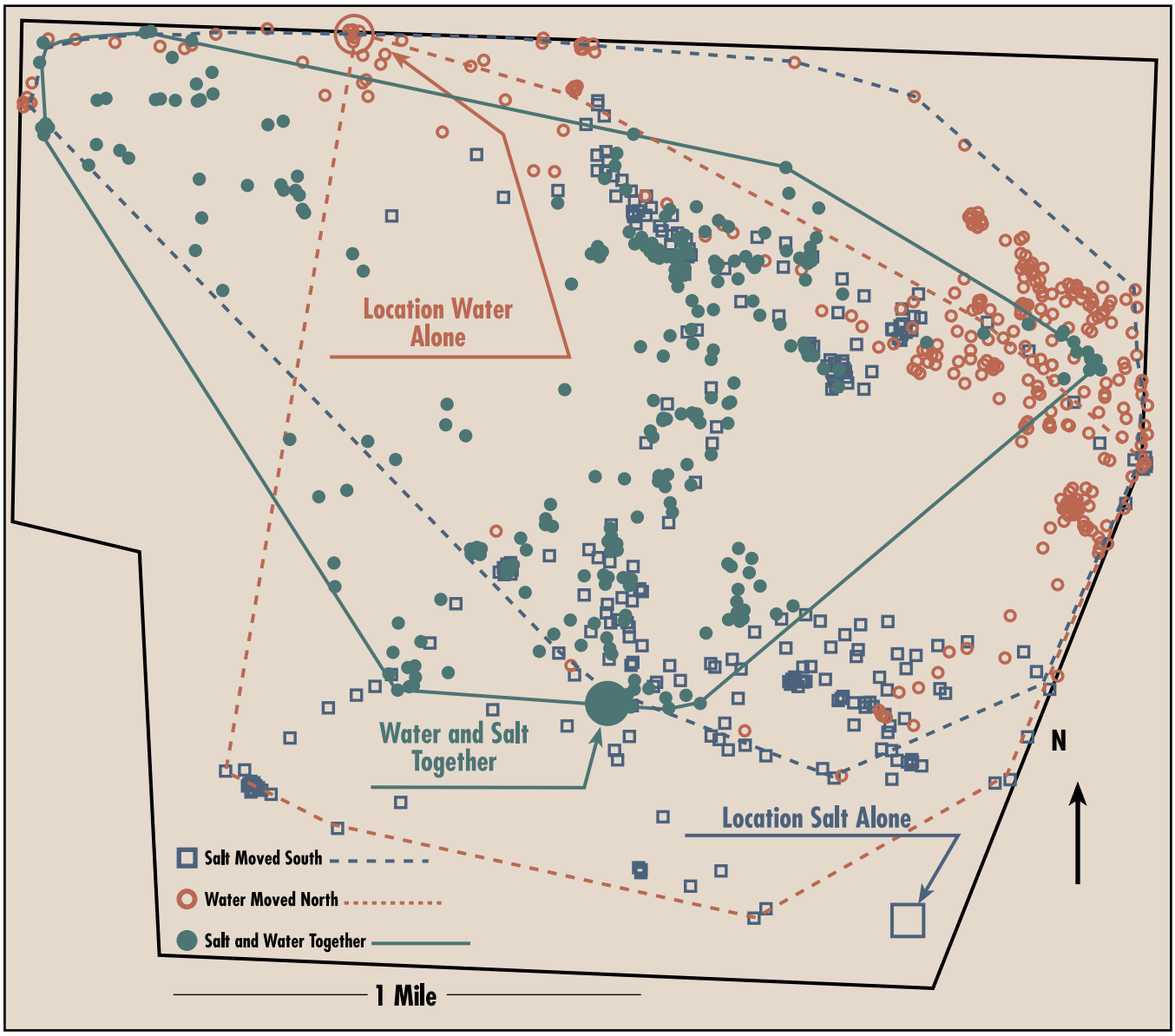

Figure 2. Locations of one cow in a 2,000-acre pasture sampled at 20-minute intervals with a collar-borne GPS (global positioning system) unit in June and July 1999 near Burns, Oregon when water and salt were moved to different locations within the pasture at weekly intervals.

only twice. Distance traveled per day (average = 3.59 miles), grazing time (11 hours per day), and resting time (10.1 hours per day) were unaffected by movements of salt or water. This implied that cattle did not increase their travels, or alter their time spent grazing, when water and salt were separated.

Management Implications

The movement of portable stock tanks or closing access to specific watering points is very effective at altering the distribution patterns of beef cattle on our arid rangelands. Cattle do not simply travel to distant water and return to their habitual foraging locations, but will alter their spatial distribution to remain in the vicinity of water. This practice may be used to 1) ensure more uniform use of forages across large pastures over time, 2) attract cattle to areas not habitually used, 3) temporarily lure cattle away from seasonally sensitive portions of a

pasture (overgrazed areas or nesting or strutting grounds) without the expense of fencing, or 4) facilitate the gathering of herds in large pastures. Separations of salt and water sources will not cause cattle to alter their grazing times or expend more energy traveling each day. Finally, salt appears to be ineffective at markedly altering cattle distribution and most likely will not rectify a large-scale livestock distribution problem. Due to several mineral deficiencies in our forages, however, trace mineral salt should still be provided to cattle on a year-round basis, and its dispersal in a pasture will certainly not cause harm. Mineral intake, however, probably will be highest if it is provided near water sources.

Table 1. Average distance of cattle from water and salt, distance traveled per day, time spent grazing and resting per day, and area covered per day when water and salt occurred at a common locale and when water or salt were moved to a distant area in pastures in June and July 1999 near Burns, Oregon.

Variable	*Treatment*			
	water and salt shared location	***water moved to distant area***	***salt moved to distant area***	***water and salt separated***
distance to water (yd)	1,142[1]$_a$	1,078$_a$	1,601$_a$	1,340$_a$
distance to salt (yd)	1,126$_a$	2,209$_b$	1,648$_c$	1,928$_{bc}$
distance traveled per day (miles)	3.61$_a$	3.43$_a$	3.72$_a$	3.58$_a$
grazing time (hr/day)	10.7$_a$	10.8 $_a$	11.3$_a$	11.0$_a$
resting time (hr/day)	10.2$_a$	10.6$_a$	9.5$_a$	10.0$_a$
area occupied (acres)	785$_a$	573$_a$	1,055$_a$	812$_a$
shift of center of activity (yd)	- -	1,541$_a$	1,094$_b$	- -

[1] Values within rows sharing a common letter are not significantly different ($P \leq 0.05$).