Elk Habitat Use within a Rest-Rotation Grazing System

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Competition between wildlife and domestic livestock on public lands has long been of concern to the public and to wildlife and land managers. As a result, resource managers in Montana and other states have conducted a number of studies to define the relationship between livestock and wildlife range use patterns. Studies in Montana have documented conflicts in wildlife and domestic livestock range use of public lands.

While these studies define conflicts between cattle and wildlife, they do not adequately identify practical approaches to resolve that conflict. To address this issue, the Montana Department of Fish, Wildlife and Parks began a program in 1977 to combine existing research with sound range management principles. The goal is to design a grazing system that resolves conflicts between domestic livestock and wildlife on summer ranges with specific emphasis on providing abundant, high quality habitat for wildlife, principally elk. The system implemented by the Department on the Mount Haggin Wildlife Management Area incorporates grazing principles described by Hormay (1970). The system was fully operational in 1984. This paper is a status report on project findings to date.

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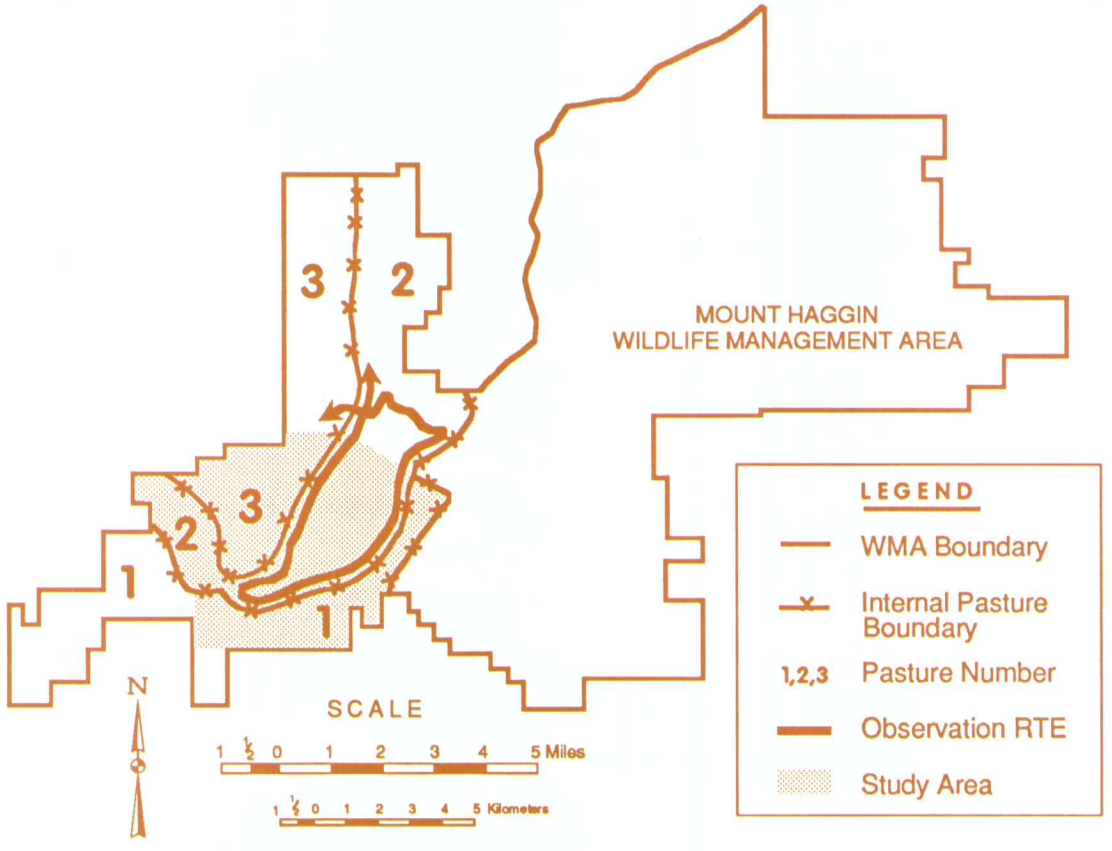
Study Area

The 9,514-acre study area is located approximately 10 miles southeast of Anaconda, Montana, and lies within the Mount Haggin Wildlife Management Area managed by the Montana Department of Fish, Wildlife and Parks.

Approximately 85% of the study area consists of a combination of wet and dry meadow types. Willow are common along numerous stream courses and wide riparian areas created by beaver damming activities. Lodgepole pine is the most common cover type, occurring in small patches throughout the study area. Engelmann spruce is also present in limited quantities near riparian areas. A significant portion of the lodgepole pine and spruce on the drier, less precipitous sites has been clearcut recently.

Elevation of the study area is approximately 6,600 feet; annual precipitation is about 20 inches.

Substantial populations of Rocky Mountain elk and moose inhabit the study area. Mule deer and black bear are common. A small population of pronghorn antelope



and whitetail deer are present during spring, summer, and early fall. Beaver and sandhill cranes are the most common nongame species of general interest.

Livestock Grazing System

The Mount Haggin grazing program consists of a three-pasture rest-rotation system incorporating approximately 18,000 acres based on principles described by Hormay (1970). The entire study area lies within this system, but the system includes lands not encompassed by the the study area (Figure 1). The pastures contributed the following proportions to the study area: Pasture 1—29% (2,057 acres); Pasture 2—40% (3,391 acres); and Pasture 3—31% (2,615 acres).

The three pastures, varying in size from 4,430 acres to 8,037 acres, designated as 1, 2, and 3 in Figure 1, are approximately equal in livestock grazing capacity and are fenced off from each other. The fencing allows for control of livestock grazing while permitting access to free-roaming elk.

Cattle were grazed on the study area pastures from approximately June 15 through October 15 each year. The grazing level is set at 4,000 Animal Unit Months (AUMs) annually.

Under the Mount Haggin rest-rotation system, each pasture receives one of three grazing treatments annually (Figure 2). The treatments are:

A Treatment—Available to livestock throughout the entire grazing season; grazing by livestock primarily during growing season; range also available to free-ranging wildlife.

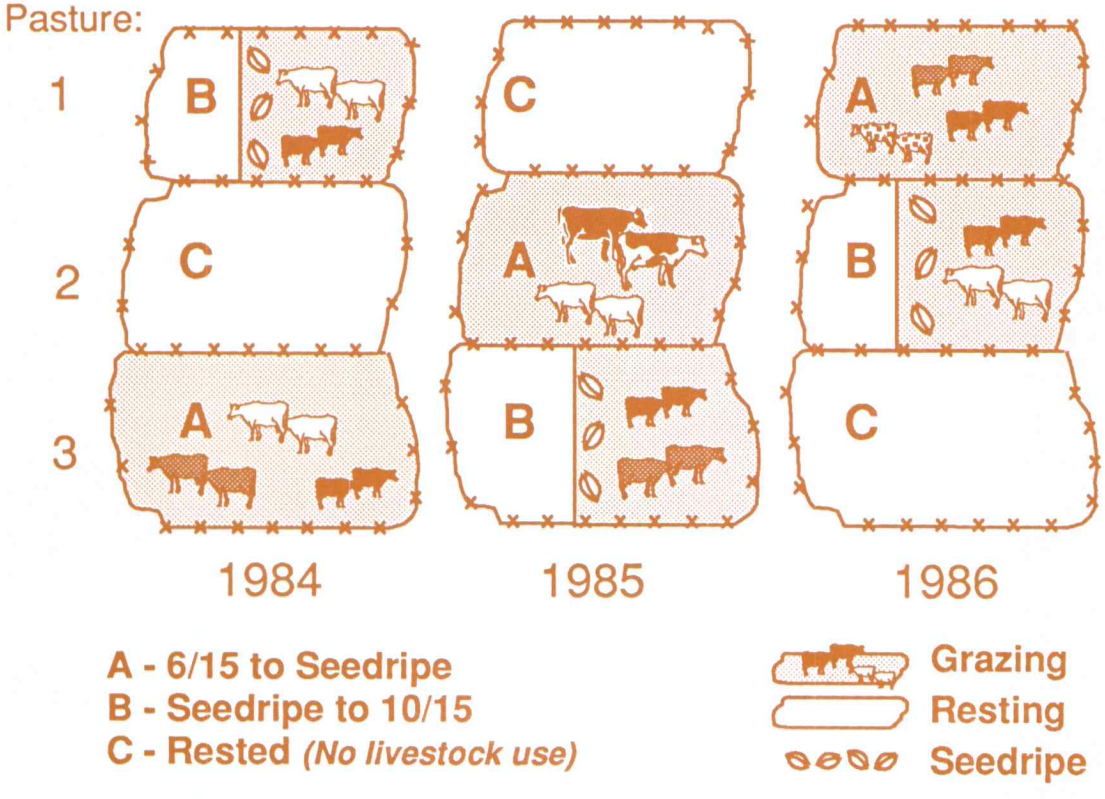
B Treatment—Grazing by livestock *after seedripe;* range also available to free-ranging wildlife.

C Treatment—Rested. Available for wildlife use only.

Each pasture received one "treatment" annually. In effect, two-thirds of the system is grazed during a single *grazing* season, but only one-third is grazed during a single *growing* season. Following livestock grazing of a pasture during the growing season (A Treatment), that pasture is rested from livestock grazing for two consecutive growing seasons by following the A-Treatment with B and C Treatments, respectively.

The rationale for this approach is as follows: The B and C Treatments provide vegetative rest, which maintains maximum plant vigor and food storage, and enables plant seedlings to become established, thus encouraging plant diversity and "fill-in" of bare soil areas with new vegetation. B Treatment pastures are not grazed until the end of the growing season when seeds are developed on the slowest maturing plants. On Mount Haggin, this plant species was determined to be bluebunch wheatgrass. Using this species as an indicator, we can generally assure that most plants will be at or will have reached seedripe.

At seedripe (mid to late August), cattle are allowed access to the B pasture from A pasture and their hoof action tramples seeds into the soil. This trampling creates microenvironments (depressions) conducive to moisture retention and protection of seedlings through germina-



tion. The C Treatment (total rest) always follows the B Treatment to enable seedlings to establish root systems and to grow before livestock grazing begins.

In principle, this approach enables plants to maintain maximum vigor and food storage, which enables rapid, post-grazing recovery. Grazing rotation thus allows for the maintenance of healthy, diverse and vigorous rangeland vegetation.

Methods

I observed elk from an established 11-mile vehicle route (Figure 1). Binoculars and a spotting scope were used to observe elk from various vantage points along the route. Morning observations were made 1/2 hour before sunrise until two hours after sunrise; evening observations were made from two hours before sunset until 1/2 hour after sunset. I attempted to travel the route at least three times each week during July and August, and as often as the weather permitted during May and early June. Elk sitings were plotted using USGS quad maps (scale - 1:24,000) and the Universal Transmercator System. Pasture use by elk was compared using a 2×2 chi-square contingency test following procedures described by Snedecor and Cochran (1967).

Results

Elk distribution in the study area was analyzed by two time periods—July-August and May-early June.

Elk Distribution during July-August

During the time elk were observed, the A Treatment pasture was occupied by cattle. The B and C Treatment pastures were not occupied by cattle and are referred to as "rested" pastures. Ninety-four percent of observed elk were in pastures not occupied by cattle during July and August (Table 1).

Table 1. Elk use of pastures receiving various cattle grazing treatments during 1984-85.

	Elk Use of Grazing Treatment (%)[a]			
Year	A	B	C	N
1984	9	5	86	895
1985	1	96	3	528
Mean	6	39	55	1423

[a]See Figure 2.

Since cattle are moved onto the B Treatment pasture between August 18th and 22nd (depending upon seed maturation), and elk become less observable due to habitat change, it was not possible to compare pasture use by elk after seedripe. During July and early August, elk prefer to feed in wetter sites and riparian areas. By mid August the vegetation is beginning to "cure" and elk begin to select for habitats in the forest type and dry parks in upslope areas. This shift in habitat use by elk occurs in both rested and non-rested pastures. However, it appears the B Treatment is less disruptive to elk distribution than the A Treatment. When the B Treatment begins, the entire pasture has a full season's growth of standing vegetation. Since cattle prefer the abundant vegetation in lower, highly productive bottom areas and elk have naturally moved to drier sites in the forest type, there appears to be a naturally occurring separation of elk and cattle during late summer and early fall.

During July-August 1984 most observed elk were in pastures that received the C Treatment. During 1985 the majority of observed elk were in the pastures that received the B Treatment (Table 2). Reasons for this are unclear, but monitoring over time will determine if preferential use by elk exists between the B and C Treatment pastures.

Although average use of the A Treatment pasture by elk was small (6%), it was higher than use of the B Treatment pasture during 1984 (Table 2). Elk observed in this pasture were usually using or seeking hiding cover, seeking cattle salt blocks, or moving through the pasture. Very little elk feeding activity was observed in the A Treatment pasture.

Table 2. Elk use during May and early June 1985 of pastures receiving various cattle grazing treatments in 1984.

	Use of Grazing Treatments (%)[a]		
A	B	C	N
28	68	4	171

[a]See Figure 2.
96% of the observed elk were in pasture receiving livestock grazing during 1984 ($P<0.005$).

Although elk use of the A Treatment pasture was probably limited both by presence of cattle and the heavy removal of vegetation by livestock feeding, elk appeared to be tolerant of cattle. This is supported by the common observation of large numbers of elk grazing near cattle in an adjacent pasture, separated only by a pasture fence. These observations were made during a time when approximately two-thirds of the lands in the grazing system were *not* occupied by cattle. Therefore, I feel that the removal of vegetation by livestock has a greater influence on elk use in A Treatment pastures than a social intolerance of cattle by elk.

During July and August cow elk are rearing calves and the abundant vegetation in the rested pastures provides essential security cover for those calves. Also, available forage is more abundant in the rested pastures as the grazing season progresses.

Elk Distribution during May and Early June

Since cattle are not present on the areas until approximately mid June, elk distribute themselves throughout the study area uninfluenced by the presence of cattle during early spring. When elk distribution during May and early June 1985 is compared to grazing treatments applied during 1984, the results are just the opposite of that found in July-August (Table 2).

Only four percent of the observed elk used the 1984 C Treatment pasture which contained standing cured vegetation. Although more elk were observed in the 1984 B Treatment than the A Treatment pasture, elk were generally observed grazing on similar sites within those pas-

tures. These sites received intensive cattle grazing during 1984 and were therefore very green with little of the previous year's cured growth. This rapidly growing, abundant and very nutritious green growth in the previously A and B treated pastures was very attractive to elk.

From mid to late June, elk with new calves are secretive and are difficult to observe in substantial numbers. For this reason, insufficient data were collected for analysis during this time period.

Discussion

While the A Treatment, and to a lesser degree the B Treatment, negatively effect elk use of these pastures during application of the treatments, they help establish high quality early spring foraging habitat for elk the following spring. During spring a high level of nutritious vegetation is critical just prior to and after calving.

The preference of elk for habitats not occupied by cattle appears to be related to intensive removal of vegetation by cattle rather than a social intolerance of cattle.

Although approximately two-thirds of the study area is grazed by cattle each year, two-thirds of the area is *not* occupied by cattle from mid June to late August, when plentiful vegetation in wet meadows and riparian areas is critical to the maintenance of a healthy, productive elk population. This system allows the vegetation to be improved and creates a complimentary rather than a competitive relationship between cattle and elk habitat use.

Management Implications

- A well-designed grazing system incorporating the principles of rest-rotation can actually improve rangeland over time and thus improve the quantity and quality of habitat available for both wildlife and cattle (Hormay 1970).
- Conflict between wildlife and cattle use of summer range can be eliminated by designing and implementing grazing systems that take into consideration habitat preferences of both cattle and wildlife in combination with proven grazing principles.
- By taking advantage of elk spring preference for pastures grazed by livestock the previous year, elk can be directed to public game ranges and away from adjacent private lands, thus reducing depredation conflicts.

Literature Cited

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Photo by David N. Olsen, courtesy of the Rocky Mountain Elk Foundation.