LIVESTOCK SYSTEMS COMPLEMENTARY OR COMPATIBLE WITH WILDLIFE

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SUMMARY

Literature relevant to livestock grazing systems complementary or compatible with wildlife is reviewed. Four ways that grazing systems can impact wildlife habitat are discussed with examples. Case histories used to benefit broad categories of wildlife are presented. An array of systems, seasons of use, stocking rates, and classes of livestock are advocated. The most consistent theme is the need for flexibility and tailoring of a system to fit site specific needs.

INTRODUCTION

The concept of grazing cattle to benefit wildlife, or at least not diminish the suitability of habitat for wildlife is volatile, controversial, and challenging to anyone trying to implement such a system or even write about it! To deny that conflicts between livestock grazing and wildlife occur would be akin to burying our heads in the sand. These conflicts have grown from an obscure regional issue to one of national prominence (Severson and Medina 1983). We need research that identifies specific areas of conflict and also develops techniques for compatible or complementary relationships between livestock and wildlife. It is important to recognize that grazing is an action that changes habitat. By changing habitat on an area, wildlife species that thrived under previous conditions will be negatively impacted, while others may benefit from the change.

Grazing systems in this paper means grazing by livestock as part of a specific plan, or under some set of controls to achieve a specific set of objectives. Bryant (1982) in a review of 214 studies of grazing systems and wildlife concluded that generally a system, any system, as opposed to season- or year-long grazing, is better for wildlife than none. Grazing systems on a piece of ground directly and indirectly influence plant life on an area for both the short- and long-term. Changes in plant life also affect wildlife using the area. Wildlife use of the area (particularly large herbivores) ultimately cause an effect back on the grazing system as well. In this paper I will address four ways livestock grazing systems can influence wildlife habitat to benefit a variety of wildlife species, and provide some specific examples. Just as the physics law says for every action there is an equal and opposite reaction, there are reactions by wildlife species other than those targeted. In many cases, a program or grazing system designed to help one wildlife species will have a negative impact on another. Consideration for non-target species should be inherent in any plan design. For example, Bock et al. (1984) found in adjacent grazed and ungrazed blocks, that the grazed area had significantly higher numbers of birds in the summer, while rodents were significantly higher in the ungrazed area.
Mechanisms of Habitat Alteration

Livestock grazing systems affect wildlife directly and indirectly; only the direct affects will be covered here. The most obvious direct influence of grazing systems is upon vegetation, a primary component of wildlife habitat. Grazing systems can alter wildlife habitat in four ways by affecting the structure, composition, nutritive quality, and productivity of vegetation (Severson and Urness 1994). Putting the needs of wildlife species together with knowledge of the desired grazing system can result in a compatible or complementary product.

**Altering Plant Composition:** Specific locations on rangelands often provide critical habitat to individual species. Livestock can be used to alter plant composition to provide an essential component, such as browse for wintering mule deer (Odocoileus hemionus). Smith (1949) was one of the first authors to document how summer grazing by cattle affected the composition of vegetation by increasing the abundance and vigor of shrubs over 11 years improving the site for wintering mule deer. Spring grazing of forage around bitterbrush (Purshia tridentata) plants by cattle provided favorable conditions for establishing bitterbrush and increasing big and low sagebrush (Artemisia tridentata and *A. arbuscula*). Neal (1981) noted that periodic heavy spring grazing with removal of 75-100 percent of the annual bunchgrass production, produced changes in vegetation favorable to wintering mule deer. In particular, he found increased establishment of bitterbrush and big sagebrush. He recommended removing cattle before bitterbrush seeds reached the red-juice stage (mid-July) annually and heavy grazing only periodically (15-20 yr. intervals) to maintain the bitterbrush productivity. The use of cattle to lightly graze moist meadows in northern Nevada delayed phenological progression and supported desirable forage species for sage grouse (*Centrocercus urophasianus*), most notably common dandelions (*Taraxicum officinale*) (Evans 1985).

**Altering Productivity.** In some cases, a primary land management objective might be to increase the productivity of a desirable species, such as bitterbrush. Spring and summer horse grazing improved production of bitterbrush in a northern Utah study (Reiner and Urness 1982). Horses were observed to graze around bitterbrush plants, but left the shrubs unbrowsed. Austin and Urness (1995) found that horse grazing in the spring reduced plant competition and shifted the growth advantage to shrubs, benefitted shrub survival, seedling recruitment, and reduced winter injury to some shrub species.

Anderson and Scherzinger (1975) described a controlled grazing system that increased the quality and quantity of winter forage for elk and resulted in a 2.6-fold increase in AUMs and an increase in wintering elk from an average of 120 head (1948-60) to 1191 head in 1974. Rhodes and Sharrow (1983) found that spring and summer sheep grazing in Douglas fir (*Pseudotsuga menziesii*) plantations resulted in lower October standing crop, yet by March there was generally a higher standing crop of herbaceous plants in the grazed areas than in the ungrazed, which greened-up earlier, and was favored by black-tailed deer (*Odocoileus hemionus columbianus*). Spring grazing by sheep reduced competition to bitterbrush and increased the available browse for mule deer (Jensen et al. 1972, Smith et al. 1979).

**Altering Plant Nutritive Quality.** Several studies have addressed the concept of increasing the quality of forage through livestock grazing systems. Vavra and Sheehy (1996) described how the nutritive quality of winter forage for elk may be improved through spring livestock grazing by conditioning forage. They contended that grazing at the boot stage, followed by livestock removal, causes grasses to regrow and then cure with plant nutrients in the
above-ground portion of the plant. Pitt (1986) found clipping bluebunch wheatgrass (*Agropyron spicatum*) late in the spring increased fall growth of higher nutritive quality. Bell (1971) and McNaughton (1984) described grazing (in this case, by wild ungulates) as a positive force in improving forage quantity and quality in the Serengeti of Tanzania and Kenya. Anderson and Scherzinger (1975) applied these principles to cattle grazing on elk winter range in Oregon. Livestock grazing systems to improve forage quality should recognize, and be designed to benefit, the desired ecological status of the area. This process should include adherence to moderate utilization (Anderson et al. 1990). In this case, grazing should be heavy enough to “top-off” the vegetation, yet leave enough for quick, sufficient re-growth.

**Altering Plant Structure.** Manipulating the structure of vegetation to benefit wildlife is a relatively simple concept. Schulz and Guthery (1988) found bobwhite quail use increased in pastures with rapid-rotation type grazing systems. They attributed this to the increased bare ground and decreased amount of perennial grass. Sedivec et al. (1990) compared four grazing systems and a control in North Dakota, and found that although upland duck and sharp-tailed grouse (*Tympanuchus phasianellus*) nest density was higher in ungrazed sites in North Dakota, nest success was higher in plots with twice-over rotation grazing systems in place. They cautioned, however, that grazing should not commence until the third or fourth week of May, to allow ducks to initiate nesting. One of the two primary goals of Anderson and Scherzinger’s (1975) work was to reduce the amount of old vegetative material, and prevent the formation of wolf plants on the Bridge Creek Management Area in Oregon. Spring grazing accomplished this objective and also conditioned the forage for winter grazing by elk (see Altering Plant Nutritive Quality).

**Response of Wildlife Groups to Grazing Systems**

**Small Mammals.** Small mammals, such as smaller rodents and lagomorphs, can constitute the largest number of vertebrates on an area. Small mammal abundance and species richness was found to be higher in long-term (30+ years) ungrazed sites in Utah, over comparable actively grazed sites by Rosenstock (1996). He cautioned that small mammal community composition varied almost as much within treatments as among them, and thus, his results should be considered cautiously. Bock et al. (1984) also found small mammals more abundant inside a large, long-term exclosure than immediately outside in a southeast Arizona study. Johnson (1981), studying small mammal abundance and composition in southeastern Idaho, noted few significant differences by individual species between grazed and ungrazed sites, but believed that overall differences were more likely attributable to plant cover differences than other factors.

**Upland Birds.** Guthery (1986) recommended creating small overgrazed areas within pastures to create bobwhite quail (*Colinus virginianus*) feeding habitats. Salt or supplementary feed areas were suggested to create these sites. Sage grouse males are known to strut on areas of bare ground or low statured vegetation (Batterson and Morse 1948, Willis et al. 1993). Some of these areas have been maintained by heavy livestock use around water developments and salt grounds. Rest-rotation grazing improved sage grouse habitat by increasing forb abundance in the summer (Neel 1980), moderately grazed meadows were more attractive than protected meadows, and overgrazed meadows were unused by sage grouse.
Guthery (1996) proposed a theoretical approach to grazing as a tool for upland birds, which considered the usable space to a bird (i.e., structural habitat) and usable time (the portion of the year space is available). Grazing decisions should consider: 1) the vegetation status of the management area; 2) whether grazing could improve the status; 3) if grazing is useful, developing stocking rate and season in order to maximize space and time, or provide acceptable residual cover at a critical time; and 4) how to accomplish proper grazing distribution or pressure.

**Nongame Birds.** Nongame birds, those not generally hunted, comprise a large proportion of the wildlife species occupying rangeland. Response of nongame birds to grazing is likely the most variable of any wildlife group. Knopf (1996) noted that aquatic bird species are relatively unaffected by grazing, birds of prey are mainly affected by grazing impacts on their prey, wetland-associated species are influenced by grazing affects on nesting cover, and terrestrial species are affected by how grazing alters food and cover.

**Waterfowl.** An abundance of papers have been written on waterfowl and grazing. Kantrud (1990) summarized many papers addressing livestock grazing and fire impacts on waterfowl. Generally, moderate grazing commencing after most ducks have initiated nesting has been considered beneficial to the waterfowl by opening up closed stands and reducing height and density of tall, emergent plants. Braun (1978) warned, and Kantrud (1990) reaffirmed, that livestock grazing has been detrimental when not well planned and controlled.

**Big Game.** Skovlin et al. (1968) and Sheehy (1987) pointed out that deferred or rotational systems provided elk and cattle the opportunity to graze without social interactions. Vavra and Sheehy (1996) pointed out temporal separation was the most important factor separating elk and cattle use of common range, and also that natural factors such as distance to hiding cover contribute to spatial separation of elk and cattle. Among 12 generalizations from the studies of elk and cattle interactions presented by Wisdom and Thomas (1996), perhaps the most important was their last: “Perception is rarely reality when judging competitive interactions between elk and cattle.” They proposed monitoring, research, and professional expertise to provide objectivity in addressing potential conflicts. Peek and Krausman (1996) reported sufficient information is available to make livestock grazing and mule deer compatible, and described deferred grazing; high-intensity, short duration grazing; and rest-rotation systems. They pointed out however, that many of these systems required extra fencing and water development to work.

**CONCLUSIONS**

A recent symposium was held to assess using livestock as a tool to enhance wildlife habitat (Severson 1990). All six of the papers, which covered theoretical and species accounts, discussed the proper timing of grazing as a critical element in successfully using livestock as a tool. In some cases, deferral was beneficial, and in others early grazing was prescribed.

Variety of habitat, either by patchy distribution of plant community types, or by a variety of conditions within a plant community tends to support a broader array of wildlife than monocultures. Grazing animal behavior tends to promote among-site heterogeneity of vegetation, especially when coupled with periodic fire (Glenn et al. 1992). Of all the research studies reported in this paper, only two supported “heavy” grazing. Even in those situations, the prescription was for localized areas of disturbance, to promote habitat diversity.
The role of livestock grazing on rangelands, particularly the public rangelands of the West, is changing rapidly and is subject to increased scrutiny. Constraints on wildlife are increasing as well, through urban sprawl and other rural developments, which are at a time an all time high for consumptive and non-consumptive uses. Current public interest and involvement regarding livestock and wildlife is a motivational factor to develop better, closer relationships, and better overall management of public lands. Obviously, closer working relationships are necessary to make livestock and wildlife habitat use more compatible or complementary. It is not enough in this day and age to revel in the glories of the past. As Connolly and Wallmo (1981) noted, even if mule deer habitats have gained from past livestock grazing, those benefits were purely by coincidence, not by planning.

LITERATURE CITED


