

RESULTS FROM THE USE OF A SYSTEM OF “REST ROTATIONAL GRAZING” FOR LIVESTOCK TO IMPROVE WILDLIFE HABITAT IN MONTANA

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Abstract - Rest rotation grazing is a forage management system that utilizes livestock grazing to improve forage vigor, reduce erosion and improve range conditions. Cyclic movement of livestock through pastures allow plants to carry out photosynthetic processes and assist in seed dissemination and seedling establishment. Elements of such a grazing system are discussed, as are the benefits to plants and soils. An example of a system that has been in operation since 1980 is also described, as are the benefits to livestock producers and the area's wildlife.

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1. Introduction

Montana lies within the temperate zone of the north-western United States. The state ranges in elevation from 4,260 meters to 500 meters. It covers 376,555 square kilometers, and is home to 878,810 individuals and a little over 2.6 million cattle. In Montana the co-existence of livestock and wildlife is a fact of life.

Approximately two-thirds of Montana is privately owned, and roughly 65% of the land base in the state is managed as rangeland and pasture (Peterson & Frisina, 1993). Much of the private land, as well as the publicly owned land that comprises the remaining one-third of Montana, serves as pasture for privately owned livestock, while supporting a wide variety of ungulate species. The livestock industry, conservation groups and recreationists are often divided over forage management on public lands, and the use wildlife of private lands by wildlife. The implementation of “rest rotation grazing”, as described by Hormay (1970), where livestock is utilized to improve range or pasture land for wildlife, has provided a partial solution to some of these problems for Montana.

2. Elements of “Rest Rotation Grazing”

Rest rotation grazing is a forage management system that, by using livestock, can maintain or improve soil, and the health and composition of vegetation on a site. Improvements are accomplished by “resting” the area from livestock grazing for two growing seasons following intensive grazing during an initial growing season. The “rest” is achieved by the use of fencing that restricts the use of the range to specific sites each year.

Repetition of this rotational cycle over time

allows four processes are to occur:

1) Plants that have been grazed are permitted the opportunity to build their root system and the reserves of carbohydrates in the root system. This in turn allows the plant to become more robust, increases an individual plants likelihood for survival, and increases overall forage production.

2) Seed production and ripening takes place increasing the probability of reproduction of important grass species.

3) Seedlings are given time to become established, which reduces erosion and increases forage production on a site.

4) Organic material accumulates between plants enriching and building soil, while reducing both wind and water erosion.

An example of a grazing formula that provides these basic needs, and the one most commonly used in Montana is a three pasture rest rotation system. (Tab. 1) Under this scenario one pasture is grazed during the early spring and the growing season until the grass seeds are ripe (Early Graze). After seed ripe, the live stock is moved into the second pasture where they will remain until moved to off site winter ranges (Late Graze). The third pasture is “rested” from grazing. This systematic movement of livestock between the three pastures accomplishes the following on an annual basis.

Early Grazing: The trampling of accumulated residual growth following a season of rest increases litter between plants and returns organic material to the soil. Studies have also shown that the removal of the residual growth from the previous years rest treatment makes the plants more palatable to wintering elk

Tab. 1 - Schematic of a typical three pasture rest rotation grazing formula.

Year	Pasture I	Pasture II	Pasture III
One, Four, Seven	Early Graze	Late Graze	Rest
Two, Five, Eight	Late Graze	Rest	Early Graze
Three, Six, Nine	Rest	Early Graze	Late Graze

Cervus canadensis and improves forage quality (Anderson & Scherzinger, 1975; Jourdonnais, 1985). It also is more attractive to mule deer *Odocoileus hemionus* and white-tailed deer *Odocoileus virginianus* during the following spring. Early grazing of a pasture often results in a better distribution of forage utilization than later grazing as the upland vegetation remains succulent and attracts livestock off riparian areas. This allows for regrowth of riparian vegetation and puts less grazing pressure on woody vegetation located on or along those sites (Ehrhart & Hansen, 1998)

When livestock are removed from the pasture cooler weather and fall moisture generally result in some regrowth of most grasses and some forbs prior to the plants becoming dormant. This regrowth is then available for wintering wildlife, and serves as nesting cover for gallinaceous and passerine species the next spring.

Late Grazing: Turning livestock into the pasture after seed ripe allows the plant to complete a full season of photosynthesis prior to grazing. This results in the plant both producing seed and storing sufficient quantities of food to maintain itself in good condition throughout the winter months. Seeds are subsequently dislodged by the grazing action of the livestock and sown in the soil by trampling, thus increasing the possibilities for seedling establishment the following growing season. The trampling action also increases the litter accumulation between plants and again helps to control erosion and return organic materials to the soil.

Rest: A full year of rest following the late grazing treatment allows grasslike plants to again establish additional root growth and store carbohydrates for reproduction and over winter needs. This combination of rest periods helps assure plants will be at full vigor when grazed the following spring. During this treatment residual plant material is accumulated to act as litter for erosion control and soil building materials. This treatment also allows seeds trampled

during the late grazing to become established as seedlings and for additional root growth to take place on seedlings established during earlier treatments. Woody plants benefit through additional leader growth and food storage.

Management objectives: Rest-rotation grazing systems have been utilized to accomplish a number of highly variable management objectives within Montana. It is important to note however, that management objective must be established and agreed upon prior to any action taking place on the ground. Without objectives being established, and adhered to, such projects are destined for failure. The objectives must also meet the both the wildlife needs in the area, and as importantly, those of the livestock producer.

Some projects that have been undertaken using rest-rotation grazing systems in Montana include improving elk ranges, reducing the spring use of private lands by reducing the residual vegetation on spring ranges located on public lands, revitalization of under utilized range lands and regeneration of vegetation on over-grazed pastures and riparian areas.

Monitoring: In order to determine if the management objectives are being met it is necessary to establish a monitoring program while the management objectives are being developed. Monitoring allows quantitative and qualitative measurement to be made prior to, during and after treatments take place. They serve to determine if objectives are being met and help "sell" the program to other livestock producers and the public.

Monitoring should include an inventory of plant composition and range conditions prior to the establishment of the project. This can be followed up with photo plots and quantitative measurements of forage production, plant composition, litter accumulation and bare soil. Additional information that can be gathered from the stock producer include the weaning weights for young of the year and/or average gain by yearling animals being shipped to market.

Other important measurements include population trends for wild ungulates and/or game birds utilizing the area, and estimated days of use by wildlife prior to and after the project has been established. Another measurement used in Montana is the number of hunter days the area provides the public, and the harvest of wild game and birds taken from the area.

Stocking rates: Stocking rates, or the numbers of livestock per hectare grazed, can be determined over time. Experience has shown that the stocking rate on an area is not as critical as the timing of livestock use. Stocking rates should be reflective of the objectives of the project and the economic impacts on the stock owner.

Grazing by unconfined wildlife seldom becomes a factor due to their wider distribution, and less intensive grazing patterns. Also, because grasses are dormant during winter months when wildlife becomes more confined and can intensively graze an area, residual vegetation can be removed without harming the plants. Annual grazing of both forbs and grasses during the early spring growing season can, however, result in lowered plant health and may dramatically decrease annual production on such sites. High numbers of browsing animals such as moose and mule deer, can also negatively affect the woody component of an area and reduce both cover and biomass of forage available. For these reasons managing wildlife populations to keep them in balance with the available forage must also be a key factor in any forage management program.

3. Montana Fish Wildlife and Parks & Rest-Rotation Grazing

The Montana Fish Wildlife and Parks (FWP) began to experiment with rest-rotation grazing systems on land we had purchased as elk winter ranges. These "Wildlife Management Areas" (WMA) compose an integral part of Montana's elk management by providing essential winter range for elk where elk had become reliant on private lands for winter forage. FWP holds title to 20 WMAs, which comprise approximately 100,000 hectares, 12, comprising approximately 60,000 hectares, are currently managed using livestock and rest-rotation grazing to maintain or improve forage conditions. In addition to this 10 other systems (35,000 hectares) have been established on lands where FWP has purchased the grazing rights using conservation easements and an additional 72,000 hectares are under rest-rotation grazing

systems to improve habitat for upland bird populations in Montana.

These systems have been established to accomplish three main objectives: *i.* Improved range conditions for wildlife; *ii.* Reduction of depredation to private lands; *iii.* Accommodation of grazing opportunities for both wildlife and livestock.

4. Wall Creek WMA

One example of such a system is the Wall Creek WMA. Located in south central Montana within the Madison Mountain Range, the property was purchased in 1961, at which time approximately 250 head of elk were using the area as winter range. After the purchase the area was grazed only by elk until 1980. During that time vegetation on portions of the WMA had become overgrown and less attractive for wintering elk. This resulted in private lands adjacent to the WMA becoming heavily grazed by elk. In 1980 FWP entered into an agreement with private landowners and the U.S. Forest Service to establish a 10 pasture rest rotation system that incorporated the WMA, private lands and federal lands adjacent to the WMA.

The management objectives established for the system were:

- i.* Maintain and enhance the soil and vegetative resource.
- ii.* Provide high-quality winter forage for elk throughout the winter range, regardless of ownership.
- iii.* Alleviate game damage conflicts on private lands by enhancing the desirability of the WMA.
- iv.* Provide spring, summer and fall cattle grazing.

Wall Creek WMA Grazing Formula:

Each year 700 cattle are moved into one of three systems made up of three pastures each. Pastures are arranged along an elevational gradient ranging from 1,860 meters to 3,000 meters. The three low elevation and three mid-elevation pastures provide elk winter range. The highest pastures serve as elk summer range. Cattle begin grazing one of the low-elevation pastures on May 1st. On June 1st, when rapid plant growth begins in the area, the cattle are moved to the mid-elevation pasture where they stay until July 15th, when they are moved to the high elevation pasture until seed ripe. Following seed ripe, which occurs about mid-August, they are moved to the second of the three high elevation pastures. On September 15th they are moved to the mid-

elevation pasture in that system for one week, after which time they are moved to the low-elevation pasture for an additional week. On September 30th they are moved off the area to private lands for the winter.

Management benefits of the system are:

- 1) Approximately 85% of the vegetation produced on the 6 pastures grazed during the summer is available for wintering elk. Between 1,400 and 1,500 elk currently utilize the area.
- 2) During the summer months three of the four pastures used as summer elk range are available to elk without the presence of cattle.
- 3) The periodic removal of residual vegetation has increased the palatability of grass species on the WMA, resulting in less elk depredation to private lands.
- 4) Private landowners are receiving an additional 826 animal months of grazing.
- 5) Better relationships between the FWP, the private stock growers and the U.S. Forest Service.

5. Conclusions

This is just one example of how rest rotation grazing systems can be adapted to meet both the summer and wintering needs of wildlife and livestock. The rest rotation grazing system has been used in conjunction with private and public lands, or as a stand alone system on our own lands. It has been adopted to meet the needs of a single landowner on less than 1,400

hectares or to address the grazing needs of multiple parties over with over 6,400 hectares of pastures. In Montana this system has been adapted to meet many different situations, and, as long as one year of grazing during the growing season has been followed by two years of rest, it has addressed a wide variety of forage, and social needs for both Montana's wildlife and livestock.

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