FLEXIBLE GRAZING BASED ON WEATHER

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By grazing or browsing the forage produced on rangelands with livestock and wildlife in a planned and well managed scheme: the range resources enhanced animal production is optimized; and the soil, plant, and water resources are maintained or improved. If these resources are mismanaged to a point where plant cover is not providing sufficient soil cover, and species composition of the plant communities is changed, then productivity and soil protection on the unit is reduced. Continued abuse results in soil erosion problems. This does not imply that proper grazing is destructive. Some of our native range communities have evolved over thousands of years along with grazing use by native animals. However, the plant communities that have evolved are not always the most productive under intensive livestock grazing, e.g., production can be increased on some sites by the use of improved range plants.

CONCEPT OF GRAZING MANAGEMENT

It is useful to conceptualize the practices used in grazing management (Fig. 1). Most manipulative range improvement practices have a greater production potential than grazing management practices. Practices such as brush control, revegetation, and fertilization have the potential to increase range forage productivity 2- to 10-fold. On the other hand, manipulation of time and intensity of grazing results in relatively minor decreases or increases of productivity. Long-duration grazing, as used in Figure 1, refers to continuous use by animals or grazing periods of several months to more than a year on a given unit of rangeland. The periods of deferment from grazing may also extend from several months to more than a year. One to several herds or flocks of animals may be involved. Conversely, short-duration grazing involves one, or a few herds of animals that are moved to a new unit every 1-7 days. Deferment from grazing extends from 30-60 days. The periods of grazing and the periods of deferment are both important.

Long-duration grazing often requires a minimum outlay of capital for fence and water developments. Management inputs are also relatively minor because decisions on livestock numbers and when to move the animals to another unit are not critical as long as the permanent range resources, plants and soils, are not damaged irrevocably. Short-duration grazing, on the other hand, may require a larger outlay of capital for fence and water developments. Decisions on movement of livestock are critical because with an intensive system, young plants should only be grazed once before they receive some deferment from grazing. Therefore, the risk is greater and more management is required for the more intensive, short-duration grazing. Higher management inputs do not guarantee higher returns to the operator.

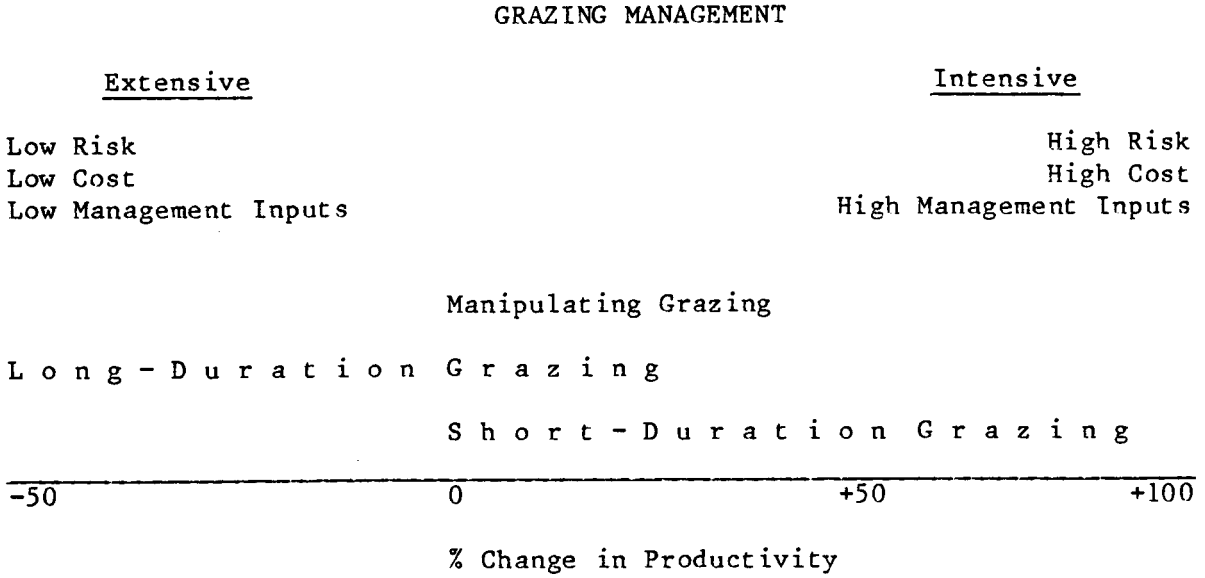

Figure 1. Concept of grazing management

The use of a grazing system may result in an improvement in the species composition of a plant community. After several years, this shift in palatable plant species may permit the operator to increase the use of the range resource. The benefits obtained from improved grazing management practices are relatively small compared to manipulative range improvements because of the relatively minor shifts (magnitude of 100% or less) in the production of rangelands.

SOME PRINCIPLES OF GRAZING MANAGEMENT

Resource managers often use a combination of extensive and intensive practices on rangelands, e.g., brush control + a grazing system. A manager has the option of selecting the degree of intensity for a unit of rangeland depending on: 1) the potential for each site within a unit of rangeland, 2) economic, social, and political factors, and 3) the availability of technology. Rangelands can be managed for various objectives. Generally, we attempt to optimize management, social, economic, and environmental concerns. Managers of range land must be innovative in planning operations on a range unit. The practices successful on one range unit may be less useful on the next unit, and may be unsuccessful on a unit in an adjoining county. No grazing system will eliminate the need for practicing all available, economic range management techniques that are environmentally sound. No practice will produce the desired results if the manager does not understand and believe in the principles involved, keep records on the performance of range units and animals, and adjust schedules and livestock numbers with changing conditions. Differences in opinion regarding management objectives sometimes lead to serious conflicts. The principles pertaining to grazing management are discussed below.

1. Proper utilization. The desirable, perennial plants produced on rangelands must be used moderately during the growing season. Thus, the old guideline, use half and leave half. Where additional soil protection is required, the guide of utilizing 40% of the herbage crop is used. Heavy use of the perennial forage plants, followed by a prolonged drought can result in a high death loss of the desirable plants. On the other hand, utilization greater than 50% is useful under some conditions. Ephemerals, often annual plants, generally are used by animals extensively when they are available. The forage crop may vary considerably from one time to another because of variations in the amounts of precipitation. It is not unusual for the annual forage crop on rangelands to vary from 50-150% of average.

2. Grazing intensity. There is no apparent justification for leaving a range unit ungrazed for an entire year. The primary purpose in range management is to eliminate excessive grazing, especially during the growing season, in order to increase the vigor and productivity of existing plants. An alternative to heavy grazing to obtain use of less desirable plants is to graze a unit during the time of year when the less desirable species are more palatable than the preferred plants. Another possibility is to use an alternate kind of livestock, or wildlife, to temporarily reduce the less desirable plants.

3. Stocking rate. The main factor influencing animal production per unit area is stocking rate, but to achieve maximum production per acre, live-weight gain per animal is reduced. Both high production per animal and per unit area can be achieved by varying the stocking rate during the grazing season.

4. Animal distribution. The objective in most instances is to obtain even distribution of livestock to obtain proper utilization of forage plants. In the large range units prevalent in most arid and semiarid areas, it is possible to go from serious overutilization near watering points to zero utilization in portions of the unit. Improved animal distribution is obtained through the following: 1) increased watering points, 2) salting and supplemental feeding 1-2 miles from watering points, 3) increased fencing, 4) building trails, 5) selective fertilization, and 6) use of different classes of livestock. Any practice that improves livestock distribution will increase animal productivity of the range.

5. Proper plants. Some of the major species growing in the Rocky Mountains, and west of the Rocky Mountains, did not evolve under grazing pressure, as did those species growing in the Great Plains. Species that are not well adapted climatically also should not be considered important components of the range ecosystem. We must have plants adapted for grazing or browsing by animals and for soil protection. The value of all plants growing on an area must be considered. Even minor amounts of a few species may contribute much to animal performance for a brief, but critical, part of the year.

6. Reproductive potential. On most range ecosystems, the desirable climax species are long-lived perennial plants. Often these plants are poor seed producers and do not reproduce readily from seed. If these desirable species are depleted by overgrazing or drought, it is often difficult, if not impossible, to obtain recovery by manipulating the grazing animal. Conversely, if seed production is important for reproduction, grazing use can be adjusted to encourage the formation of seeds. Similarly, vegetative reproduction of certain species can also be encouraged by manipulation of the grazing animal.

7. Flexibility. Most grazing studies have been established at a fixed stocking rate. Downward adjustments in livestock numbers were made only in severe droughts. However, wide fluctuations in the forage crop, both amount present and plants that are prominent, occur frequently. When ranch operators adopt a grazing scheme, they often allow for a flexibility in time of grazing and deferral from grazing, and the number of livestock in the scheme. This flexibility may be the difference between success or failure of the grazing scheme. Both plant and animal requirements must be considered. For example, some of the range units in a ranch operation may be manipulated to furnish highly nutritious forage during a period when livestock need a higher plane of nutrition. Furthermore, it must be recognized that the critical growth stage of plants varies over time because of weather conditions. Because of grazing history and weather conditions, it may be more important to defer grazing in some periods than others. Range units should be grazed when the key plants are damaged least by grazing and when the forage best meets the nutritional requirements of the animals. This often means grazing in no set or predetermined sequence. Grazing schemes should also be tailored to conform to a variety of vegetation types, soil types, physical facilities, and herd-management plans. This means that there may be considerable variation in specific details for operating a certain grazing scheme among ranch operations. In some instances, it may be desirable to use a certain grazing system to attain a certain measure of improvement and then change to a different system for maximum net returns while maintaining the resource. The basic advantage of multiunit schemes is in the inherent flexibility of the management used in such schemes, permitting the manager flexibility as dictated by variable precipitation and specific requirements of each unit.

8. Management plan. When a grazing scheme is initiated, range improvements such as brush control, revegetation, fencing, and water developments are often not properly credited for observed differences when compared to unimproved ranges. Rather, there is a tendency to credit the grazing scheme for observed improvements in range condition or animal performance. Any improvement that aids livestock distribution or increases forage yields will result in a greater productivity of the range unit. The entire management plan, including both range improvements and grazing scheme, is the important consideration. All of the beneficial, economical practices should be integrated into the overall management plan.

SEMIDESERT GRASSLAND

A number of studies on the Jornada Experimental Range, north of Las Cruces, New Mexico, have contributed to developing a grazing system, The Best Pasture Grazing System. The major forage species on the light- to medium-textured soils are black grama and mesa dropseed. Tobosa and burrograss grow on heavier soils. Under certain weather conditions, there may be an abundance of a variety of forbs and annual grasses. The average annual precipitation is 9 inches. The average precipitaion during the summer growing season is 5 inches. The average annual evaporation from a Weather Bureau pan is 90 inches, or 10 times the precipitation. Precipitation averages have little meaning. During 53 years of record, 45% of the years had seasonal precipitation of less than 85% of average, and 34% of the years had seasonal precipitation greater than 115% of average. Furthermore, summer rainfall occurs as localized, convectional thunderstorms. Cool night-time temperatures limit growth of some of the warm-season plants in spring and fall. However, since May and June are often very dry, and since spring and fall moisture is unreliable, cool temperatures have little effect on growth of the warm-season plants. High daily maximum temperatures, ranging from 100 to 105 F, occur during dry periods in the summer. This places considerable stress on many of the growing plants, and it is particularly harmful to seedlings.

Fifty years ago, there were two major vegetation types on the Jornada for management purposes; one dominated by black grama, and the other dominated by tobosa and burrograss. Because tobosa and burrograss are more palatable and can withstand moderate grazing during the summer growing season, the grazing system consisted of grazing the tobosa-burrograss type in summer and early fall, and then grazing the black grama type from late fall until the next summer. However, considerable black grama was lost because of the severe drought of 1951-56, and because of a rapid increase of mesquite on sandy soils. Now there are other vegetation types, made up of a multiplicity of forbs and a few grasses. They can provide a considerable part of the forage crop in some years. Their production is not as reliable as that of the long-lived perennial grasses, but they have a high nutritive value. Cattle graze to some extent, all species available to them, including a variety of forbs and shrub-like species. There are definite seasonal preferences for some species.

Using weather and plant information, and considering livestock needs, we developed the Best Pasture Grazing System. The system consists of establishing an objective for each range unit and stocking accordingly. The system is opportunistic, in that the use of forbs and short-lived grasses is maximized. They are of little value to the permanent range resource, but contribute much to livestock nutrition. No set stocking plan is established for a specific time period, because of considerable variation in weather conditions that affect plant growth. The system involves a rotation scheme in which the livestock are moved whenever the vegetation on another unit can be grazed to better advantage for both plants and animals than can the unit being grazed. In the large range units used in parts of the West, periodic opening and closing of watering places can be used to rotate grazing pressure to different areas within a range unit.

Stocking should be adjusted to compensate for a highly variable forage crop. Flexible herd management has been suggested by several workers as the best method for maximizing livestock production without damaging the range resource during droughty periods. During average years, the herd is made up of not more than 55 to 60% breeding animals. The remainder of the herd is composed of yearlings and replacement heifers. In years of low forage production, adjustments in the size and composition of the herd are planned to bring the herd within the capacity of the range. Readily salable animals such as weaners and yearlings are marketed. In the years of above-average precipitation, part or all of the natural increase from the breeding herd can be held over until the spring or fall, depending on conditions.

Range units have varying characteristics and objectives, and must be managed accordingly. They differ in the amount of improvements such as fencing and water developments, the proportion of various soil and vegetation types, numbers and kinds of livestock and wildlife, and recreational opportunities. Often the degree of management is determined by cultural, economic, or political considerations. With changing conditions or advances in technology, the manager may decide to modify his objectives. Conservation and development can, and should be, mutually supportive instead of antagonistic.