Grazing Systems as Methods of Managing the Range Resources[1]

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Highlight

Experience has proven that an effective grazing system is both practical and scientifically sound. An effective grazing system must be tailored to the resource. It must provide for flexibility. There are certain principles which need to be observed. The efficiency of grazing within a pasture is an important factor which can be determined. It denotes the degree of success being obtained by the grazing system and points out where corrective range management is needed. In today's range livestock industry with its notably low rate of net return on investment, efficiency is of prime concern. Ranchers are faced with rising costs of range livestock ranching and the need for increased efficiency in order to stay in the business and meet the rising demand for red meat. They must, therefore, look critically at the remaining big opportunity for increased efficiency—their rangeland. Some ranchers already have recognized and made this essential move. They realize that rangeland producing less than it could increases the cost of operation as compared to rangeland in full production. Reducing cost of operation is a major item for increasing net return on investment.

In the Glossary of Range Terms published by the American Society of Range Management, a grazing system is defined as "the manipulation of livestock grazing to accomplish a desired result."

Fences, water developments, stock trails, riding, and salting typify measures and facilities which make a grazing system workable and effective. These items help control or influence the movement of livestock.

Brush control, fertilization, waterspreading, pitting, and seeding typify treatments which speed up the process of range improvement. They facilitate a grazing system because, when applied properly, they contribute tremendously to the rate and ease with which the native forage can be improved.

The core of a grazing system, however, is management of the forage crop itself. The objective is to improve or maintain the vigor, proportion, and stand of major forage plants and to harvest them efficiently. Deferred grazing and its rotation among a number of pastures over a period of years, range readiness, season of use, and safe degree of use constitute major forage management practices.

An effective grazing system is both practical and scientifically sound. It can be designed for a huge or a small enterprise. It can be simple or very complex. With either extreme, however, there is a point beyond which the cost-benefit ratios become questionable.

Two effective grazing systems seldom are exactly alike. To be effective and practical, a grazing system needs to be tailored to an individual ranch or grazing allotment. It needs to take into account the kind and condition of available resources and the demands on these resources for grazing by both livestock and game, for watershed stability, and for soil protection. It needs to be flexible enough to be manipulated readily to comply with changes in the markets, weather, and the desires and needs of the operator.

Before a grazing system can be tailored to an individual operating unit, those who are developing the system must understand two important sets of basic principles. The grazing system itself has to be understood—what it is designed to do, how it works theoretically, and what results can be expected. Secondly, the growth requirements of the forage resource to which the system will be applied must be understood—which are the key management species, what is range readiness stage, how closely can the key species be grazed safely during the spring, or in summer, or fall and winter.

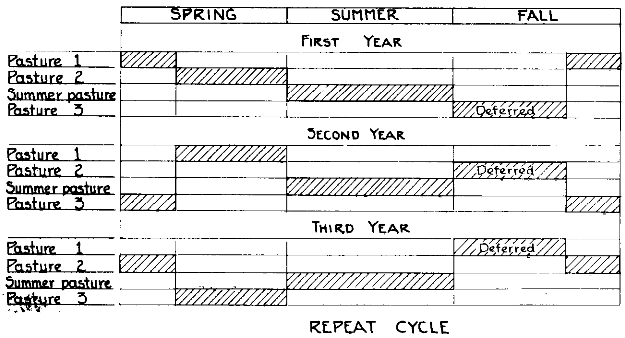

FIG. 1. Simple illustration of rotation of deferred grazing applied to three pastures. Cross-hatched areas represent how the grazing animals are moved from pasture to pasture.

Grazing System

Fig. 1 illustrates how a grazing system can be presented graphically to emphasize the principles involved in a simple manner (Frandsen, 1950). Depicted is one system—rotation of deferred grazing—for managing cattle on bunchgrass forage, which is increasing in popularity (Anderson, 1967). Cross-hatched areas represent how the grazing animals are moved from pasture to pasture. This system has several major features which affect the results obtained. They include: (a) a portion of the range is rested from grazing (deferred)

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from beginning of spring growth until after seed maturity; (b) the forage crop on the deferred area is grazed in late summer, fall, or early winter, rather than leaving it ungrazed and wasted; (c) a safe degree of use of key management species is observed as a principle of sound forage management; (d) the season of use on each portion of the range is rotated over a period of years; (e) turn-in is in the pasture that was deferred the previous year; and (f) generally no pasture is grazed more than half of any one growing season or at the same portion of the growing season in successive years.

The manner in which these factors are applied may vary from region to region, or locally with major changes in vegetation, or with differences between one livestock enterprise and another.

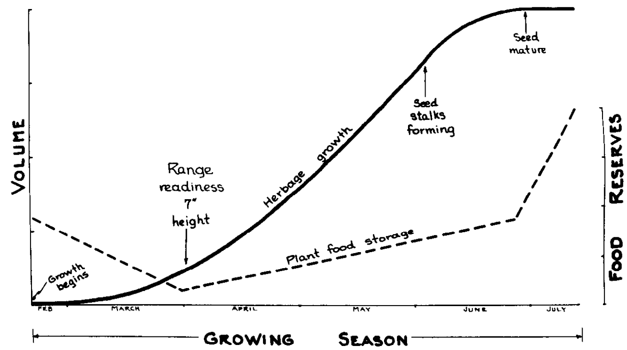

FIG. 2. Generalized herbage growth and plant food storage for a key management species, bluebunch wheatgrass.

Growth Curve

The second set of basic principles which needs to be understood has to do with the growth requirements of the major forage species. Fig. 2 is a simple illustration of top growth and plant food storage in roots of bluebunch wheatgrass (*Agropyron spicatum*). This chart briefly presents McIlvanie's (1942) work on carbohydrate storage in bluebunch wheatgrass.

The growth curve (Anderson, 1952) is characterized by a period of slow growth in early spring followed by rapidly increasing growth and then a gradual tapering off in early summer.

During the period of slow development in early spring, a bunchgrass depends almost entirely upon plant food which it stored during the end of the previous growing season in its roots, crown, and lower stems. During this stage these food reserves are depleted. When soil and air temperatures become more favorable, the plant begins to manufacture food. As the leaf growth increases, so does the size and production capacity of the plant's food factory. As the production curve rises sharply, the food reserve is partially replenished. Plant food storage is completed during a relatively short period during the latter part of the primary growing season.

Fall rains and warm weather commonly result in new fall growth of bluebunch wheatgrass. Regrowth is made at the expense of the plant's food reserves which decreases the supply available for the next year's spring growth. The situation may appear to be detrimental, but this is not entirely true. Warm fall rains and good regrowth generally results in a good grass year the following year, if fall regrowth is not kept grazed off. The production of bluebunch wheatgrass depends largely upon deep soil moisture stored during the fall and winter (Blaisdell, 1958). Obviously, spring

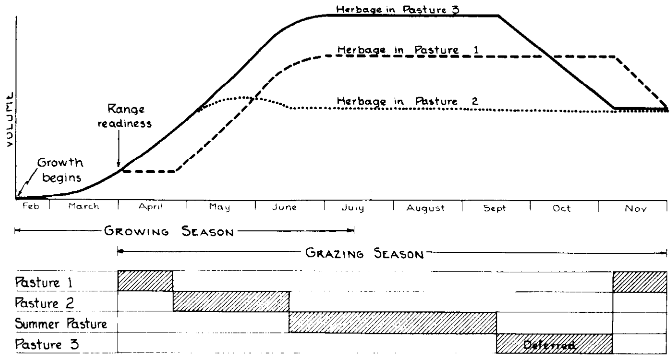

FIG. 3. Rotation of deferred grazing theoretically correlated with growth curve of key management species in each of three pastures.

rains further increase forage production, especially if they occur during the peak growing season.

Correlation

Fig. 3 illustrates how the growth curve in each of the three pastures would be affected theoretically by the grazing system during 1 year.

When stock are turned into Pasture 1 at range readiness, they remove forage about as fast as it grows. The dashed-line curve shows how this pasture would be grazed closely during the early spring season if properly stocked. When the stock are removed from Pasture 1, the forage plants can grow uninterruptedly for the remainder of the growing season. Regrowth following early spring grazing commonly results in the formation of some seedstalks, which is accompanied by food storage and other important physiological and morphological processes of the growth cycle.

The stock are turned into Pasture 2 during optimum growing conditions. For a time, the rate of production will exceed removal by grazing under proper stocking as represented by the dotted line. When the key management species have been grazed to a safe degree of use, the stock are moved to the summer pasture. Usually, bluebunch wheatgrass has little or no regrowth if grazed this late in the growing season.

Pasture 3 has been deferred and allowed to go through a complete growth cycle ungrazed. This results in increased vigor of the forage plants and the entire plant community. Yet the forage crop in this pasture is eventually harvested, rather than wasted. At this time of year, the quality of bluebunch wheatgrass forage is not all that is desired. The forage in this deferred pasture is as good, however, as any other mature bluebunch wheatgrass range. And, there is more of it per acre because it hasn't been grazed. The solid-line curve illustrates how the mature forage crop in Pasture 3 is harvested and, when a safe degree of use is reached, the stock are returned to Pasture 1 to clean up any regrowth that grew in May and June.

Ideally, having a fall pasture such as crop aftermath, which could be grazed in lieu of Pasture 3 during the early fall, is desirable. Then Pasture 3 as well as Pasture 1 could be grazed in late fall and early winter when rains usually soften the bunchgrass forage; it is more readily taken by cattle and good utilization can be obtained. Furthermore, the value of this forage to the ranch operation in late fall and early winter is high because it substitutes for hay. Even though some supplements may be needed, the cost of harvesting an early winter range usually is considerably less than feeding hay in drylot. Reducing costs is a good way to increase net profit.

Obviously, such a simple grazing system seldom, if ever, can be used on a ranch or grazing allotment. It would be complicated by areas which are best suited for grazing during a particular season; by stock being grazed on Federal range or on leased lands at various seasons; by use of supplemental irrigated pastures, hay aftermath, meadows, grain stubble, and so on. Variations such as these can be included in the grazing program, however, and the principles of good range management coordinated with the growth requirements of the native key forage species.

These three charts emphasize the necessity for understanding both the resource and the grazing system. They illustrate how a system of grazing can be made to fit the resource rather than trying to apply a standardized grazing system irrespective of the resource.

Again, it is pertinent to emphasize: (1) Know the resource; (2) Tailor the grazing system to fit the resource, not to a standardized format; (3) Allow for flexibility so that needed adjustments can be made in time to comply with unpredicted changes in weather, markets and so on.

Checking Results

No successful grazing system is static. Once a system is worked out theoretically, it can become out-of-date the next year because of unpredictable situations. And yet, thoroughly evaluating the resources and figuring out a theoretical system is almost a requirement for its success. A base to start from is a necessity.

Grazing systems commonly are put into effect step-by-step over a period of years. One or a combination of practices are inaugurated during a single season. Following the application of each phase of the grazing plan, it is highly desirable to check the results being obtained in terms of its affect on the forage resource. It is also important to check progress during the grazing season. This procedure is called a utilization check or a management check. Management checks should be an integral part of each grazing system. Timely management checks provide guidelines for determining needed adjustments and additional treatments.

Experience has pinpointed several essential features for making a successful management check. The technique for reading degree of use of key forage plants must be simple and easy to do. It should be suited to various ways of traversing the terrain such as on foot or horseback, by jeep or even by helicopter (Chohlis and Schlots, 1950). The use classes should be few—five has proven adequate and only three may be needed in some situations. A general picture of the pattern of grazing is all that is needed. For normal range management an accurate measurement would be too costly and no more useful, if as much. Zones of use which represent the pattern of use within each pasture should be mapped, particularly in rough terrain range. The mapped pattern provides a guideline for evaluating the need for additional measures and adjustments and indicates where they are needed within a pasture. It provides a record from which progress over a series of years can be determined.

The following case history illustrates the importance of knowing the pattern of use within the pasture. It is taken from data obtained in a series of annual management checks which were made on the Central Oregon Land Utilization Project by the Soil Conservation Service beginning in 1949. A grazing system — rotation of deferred grazing—was inaugurated on this project in 1950. Management checks were made annually to determine the effectiveness of the grazing system. This project now is known as the Crooked River National Grasslands administered by the U.S. Forest Service. Annual management checks have been continued and a remarkably effective grazing system has been maintained over the years. For about 15 years, this project has been one of the outstanding examples of good range management in the Nation. In 1950 when the project was about 110,000 acres in size, it produced about 13,625 animal unit months of grazing. Today, the project is about 106,000 acres. It is estimated by the Forest Service that the production in 1967 will be about 17,500 AUM. By 1970, if the present rate of development is maintained, the annual production should reach about 34,000 AUM.

Efficiency of Grazing

Fig. 4 shows the pattern of grazing, as represented by use-zones, which occurred in one 6,000-acre pasture as a result of season-long grazing by cattle in 1949. Season-long grazing had been practiced for nearly 15 years on this and other pastures of the project. In 1949, this particular pasture was grazed by 250 A.U. of cattle for 7.5 months—April 15 to November 30—for a total of 1900 AUM. Although the weighted-average utilization for the entire pasture was 113% of proper use—only 13% over a perfect average use—the wide variation in degree of grazing indicated a stupendous need for corrective range management. Fifty percent of the forage in this pasture was being wasted or destroyed. Another 36% was being grazed too closely for maintenance or improvement of the grazing resource. As inefficient as this grazing was, however, it represents a common situation that exists on bunchgrass ranges in rough topography being grazed season-long.

During 1949 a range site and condition inventory was made of the project which, together with the management check, provided the basis for planning the grazing system. A three-pasture grazing system was planned for this and two adjacent pastures of similar size. Range readiness, rotation of deferred grazing, safe use of key management species, additional stockwater, progressive salting into under-used areas, and considerably more riding to distribute the livestock represent broadly the measures planned.

After 2 years of applying the new grazing system to the three pastures, and the benefit of additional stockwater, the 1951 management check showed remarkable improvement in grazing efficiency, as illustrated by Fig. 5. Forage being wasted or destroyed was reduced to 30% of the total. Heavy use was reduced to about 10%. Safe use was obtained on a good portion of the forage supply.

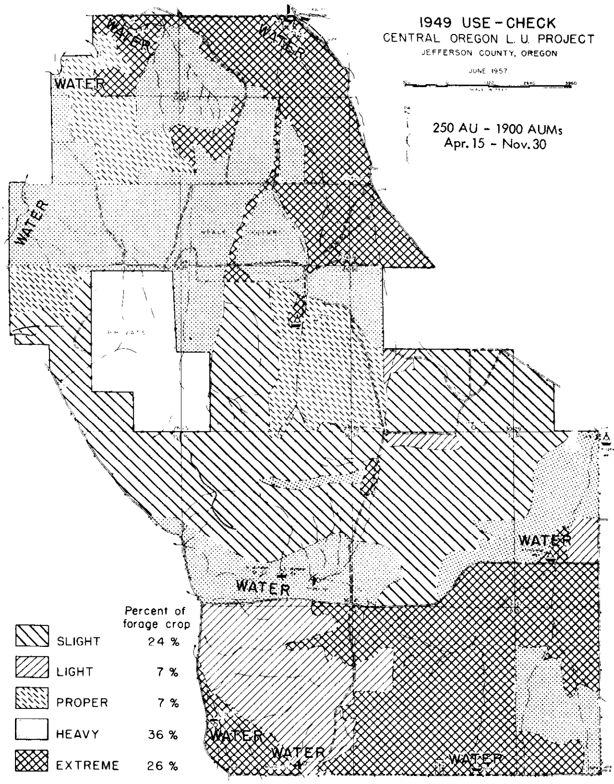

FIG. 4. Utilization pattern in a pasture grazed season-long by cattle in 1949.

The amount of grazing within this pasture had not been reduced significantly as a part of the grazing plan. The manner by which the AUM were obtained, however, was changed drastically in 1950 and 1951. In 1951, the pasture was grazed by 720 AU of cattle for 2.5 months—June 15 to August 30—for a total of 1,800 AUM. The other two pastures in the grazing system carried this herd for the remainder of the season.

In 1951 the weighted average utilization in this pasture was a perfect 100% of proper use. This, again, has no real meaning until it is evaluated along with the pattern of use. Alone, it indicates that the stocking rate and the length of the grazing season were about right for that year. The use-pattern, however, shows that, in spite of correct stocking and grazing season, there still was need for corrective range management.

In 1953 after two more years of improving the grazing system, this area was grazed as two pastures as shown by Fig. 6. The larger portion was grazed by 640 AU of cattle for 36 days—April 25 to May 31—and again by 125 AU for 60 days—October 1 to November 31—for a total of 1,015 AUM. The southern portion was grazed by 722 AU for 15 days—June 1 to 15—for 361 AUM. The total AUM from this area in 1953 was 1,083, which was less than for 1951 or 1949. Drought in 1952

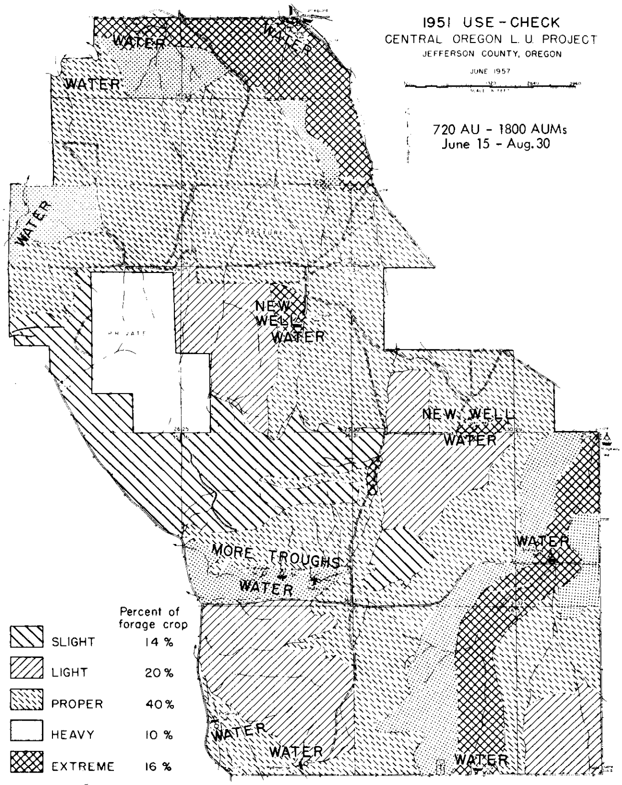

FIG. 5. Utilization pattern in 1951 after two years of corrective range management and with range developments.

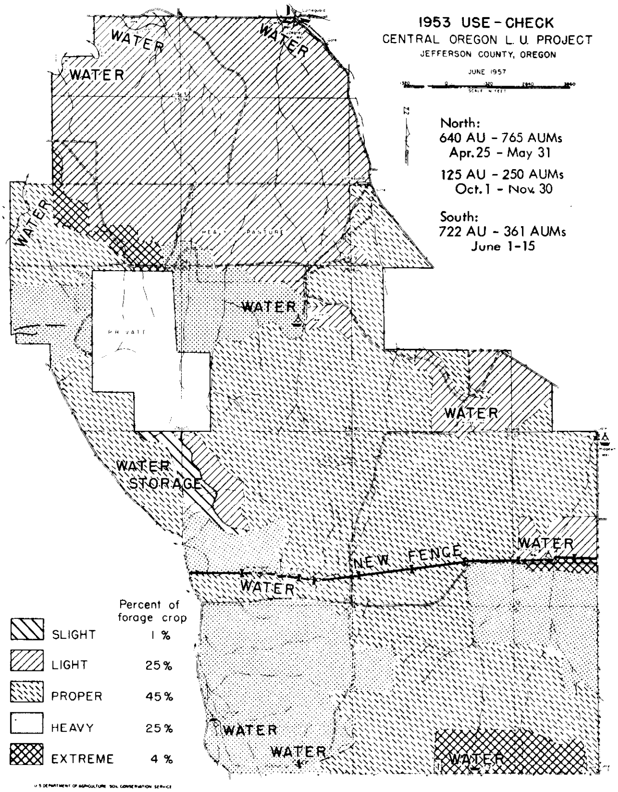

FIG. 6. Utilization pattern in 1953 after four years of intensified management and developments.

and again in 1953 was the cause. When the forage was grazed to a safe degree of use, the stock were moved to other pastures which resulted in fewer total AUM from this area. Other pastures and range seedings on the project acted as buffers to compensate for the general droughty conditions.

For both segments of the original pasture, the forage being wasted and destroyed was reduced to 5%. Heavy use, however, increased to 25% of the total forage crop. An increase in close utilization can be expected when adverse growing conditions occur. If adverse weather continues for several years, a reduction in stocking is mandatory or arrangements must be made for additional feed, otherwise the forage resource will be damaged. Grazing efficiency probably should be on the light side in relatively good years in order to have some reserve on hand to act as a buffer when adverse weather temporarily affects the operation, as in 1953. The degree of grazing efficiency in a pasture can be attributed to all the treatments and improvements, to the system of forage management, and to the weather collectively. It is not the result of the system of forage management alone.

Discussion

To improve grazing efficiency, it is necessary to employ a system of forage management that fits the resource to be managed as well as the needs of the livestock enterprise and other uses of the resource such as wildlife, recreation and watersheds. Adequate stockwater is essential. Good fences must be properly placed and pastures must be of the correct size—not too large or small—to control the livestock. Riding frequently to distribute livestock, and more important, to periodically analyze the pattern of use, usually is essential for high efficiency (Skovlin, 1965). Observing safe use of key forage species is an absolute must for optimum production of forage and, consequently, livestock products from animals consuming the forage.

In today's range livestock industry with its notably low rate of net return on investment, efficiency is of prime concern. Generally speaking, much has been done to increase the efficiency of range livestock by breeding, selection, production testing, and veterinary medicine. Efficiency in other components of livestock ranching such as marketing, transportation, machinery, and farm crops has also been improved. Many people and companies whose livelihoods depend directly on a healthy livestock industry have devoted their time and money to help that industry become efficient. And by doing so, of course, they benefited from good markets and sales of their respective products.

The story of grazing efficiency on rangeland is entirely different. Almost no one except a few Federal and State employees and a very few private consultants have sincerely pushed scientifically sound range management to achieve grazing efficiency on the range. Achieving range efficiency involves almost no special products to be bought by the rancher from some company. Consequently, there is no advertising program for good range management as there is for products for animal health or machinery, for example. There are no industries which go all out to support the theme of efficient range management. It would be helpful if the banking business would take an active interest in advertising good range management since its commodity—money and returns on investment—is involved primarily.

Ranchers are faced with rising costs of range livestock ranching and the need for increased efficiency in order to stay in the business and meet the rising demand for red meat. They must therefore look critically at the remaining big opportunity for increased efficiency—their rangeland. Some ranchers already have recognized and made this essential move (Skeete, 1966). They realize that rangeland producing less than it could increases the cost of operation as compared to rangeland in full production. Reducing cost of operation is a major item for increasing net return on investment.

As the need for grazing efficiency becomes acknowledged to a greater degree, the significance of sound grazing systems will come alive. Ranchers, scientists, and technicians will be challenged time and again to work harmoniously to efficiently produce livestock products and at the same time improve rangelands. And it should not be overlooked that restored rangeland contributes greatly to wildlife, rural beauty, and recreation and, at the same time, reduces silting of streams, lakes and reservoirs, and improves the quality and dependability of watersheds.

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