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Grazing Systems for Profitable Ranching

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For today's rancher to remain in the ranching business, he has to be more efficient in his operation to overcome the "cost price squeeze" of livestock production. Increasing costs force the rancher to risk over-capitalization on each animal unit owned. Profit depends upon the managerial ability of the operator, who must produce livestock and wildlife at the lowest cost through good herd and forage management, combined with sound economic and marketing procedures.

Range forage is the lowest-cost feed available although the quality may be low at times. Deficiencies in quality can be corrected with protein, energy and mineral supplementation. Range forage production is an integral part of profitable ranching, and the quantity and harvest of forage produced are dependent upon knowledge of sound range management.

An estimated 75 percent of the 107 million acres of Texas rangeland produces less than half its potential because of range deterioration resulting from past management, drought, etc. These deteriorated rangelands are characterized by predominance of unpalatable and low-producing forage species and topsoil loss. To improve range condition, desirable forage species must be allowed to reproduce and spread.

A good system of grazing can be defined as one that manipulates animals in order to obtain maximum sustained animal and forage production at a low cost. Grazing systems generally have been designed to improve the vegetation, with plant requirements the basic criteria used in designing them. The benefits to vegetation have been improved plant vigor and production; improved grazing distribution; and improved species composition of the vegetation with more desirable species.

Grazing systems should be designed based on forage plant, livestock and wildlife needs. Grazing is timed so that livestock receive a varied, high quality diet correlated with growth patterns of vegetation. This usually results in more effective maintenance and production per animal unit and for the herd. Therefore, the objectives are to meet the nutritional needs of animals, avoid stress on livestock and reduce supplemental feeding. Additional objectives are to minimize labor costs and improve or maintain habitat for wildlife.

Not all grazing systems achieve both goals of meeting plant and animal requirements. Some favor the plants whereas others favor the livestock and/or wildlife. An ideal grazing system is one that meets both goals depending upon rancher objectives.

Decisions

There are basically three approaches to grazing management:

1. Continuous grazing has been the traditional method. This is the constant use of forage in a given area, either throughout the year or during most of the growing period.
2. Deferred rotation systems have been tried and tested in Texas for more than 30 years. In this type of system, half or more of the total land is grazed at any given time. The time a pasture is grazed equals or exceeds the period of rest. These systems have proven effective at providing long-term range improvement and high animal performance, especially where combinations of stock can be managed.
3. Short duration grazing (SDG) systems are those in which livestock are concentrated on less than half the total land area an the lengths of deferment periods exceeds the length of grazing periods. These may be "extensive" or "intensive."

Several decisions must be made with respect to grazing management. Under any type of grazing, a rancher must decide on stocking rate, kind and class of animals, pasture size(s), water location and supplement locations.

Deferred rotation and short duration systems require that additional decisions be made before implementation. These include land area per system, number of pastures per system, number of herds per system and grazing cycle (length of rest periods, length of grazing periods).

Under continuous grazing, stocking rate is the only variable the producer can adjust; thus, little flexibility is possible in response to stress periods such as drought. Rotation systems provide more flexibility in regard to stocking rates, stocking density, grazing pressure, and time and frequency of grazing.

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Planned Considerations

No grazing system can compensate for overstocking. Animal numbers must be balanced with forage production. Therefore, light continuous grazing may improve range but cause lower returns per acre than another system. Deferred rotation systems tend to allow the animals to graze more selectively than do the heavy continuous or extensive short duration systems. This results in increased animal performance and a slower rate of range improvement. Extensive short duration systems favor greater perennial plant growth. Depending upon rancher objectives, a short duration system may be implemented to promote more rapid range improvement. Later, after the desired level of improvement is reached, a deferred rotation system or continuous grazing at moderate stocking rate may be substituted to maintain range condition and maximize livestock production.

The specific type of grazing system to choose will depend upon many factors:

1. The system must satisfy the rancher's objectives and meet the needs of livestock and/or wildlife and the grazing resources. Also, the size of range, number of grazing units, climate, range sites and range condition are important.
2. Physical facilities such as fencing, working pens and water storage should be considered in terms of forage use, livestock distribution and costs/benefits. Increased numbers of livestock per pasture will require additional water supplies.
3. Special provisions for prolonged drought or other unusual circumstances should be included.
4. Sufficient forage reserves to facilitate operations such as breeding, lambing, kidding or calving must be planned for. The numbers and kinds of livestock in grazed pastures can vary to fit the forage and livestock needs.
5. Rest periods should be long enough and at the proper season to accomplish specific management objectives for key forage species, but maintain high forage quality for good livestock nutrition. Grazing period should be short enough to provide adequate animal nutrition but not long enough for animals to graze regrowth before plants recover.
6. All domestic livestock must be removed from pastures being rested.
7. Numbers of wildlife animals should be controlled to prevent overuse of desired plants, provide higher quality diets and improve the animals' performance.
8. The grazing system should be started when there is sufficient forage in the pastures(s) to be grazed.
9. The number of grazing animals and the amount of forage must be kept in balance. Herd size should be flexible.
10. Grazing periods must be alternated during the growing season of the desired plants so that the same units are not used at the same time each year.
11. Stock water must be provided in each grazing unit as needed for the number of stock and the period of grazing expected.
12. Variations from a planned grazing system may be required to meet the needs of plants, livestock or wildlife. Necessary changes should reflect sound forage and livestock management. A system must be flexible.
13. Records of livestock and wildlife performance and pasture use and condition must be kept.

Kinds of Systems

Planned use refers to how, when and where the animals are to be grazed. Planned use is based upon the needs and characteristics of the ranching enterprises and is designed to give maximum and efficient use of the forage over the entire ranch. When designed and executed properly, a planned system can improve range and sustain maximum production. Adjustments may be necessary for a particular system to work in a particular livestock and wildlife operation. The rancher is responsible for the success or failure of a planned system. Each system must be flexible enough to adjust to current and expected conditions as well as to changes in ranch objectives.

All systems are based on the main principle of grazing management - controlling the frequency and severity of defoliation of individual plants. The immediate response of an individual plant to grazing may be:

1. increased plant vigor, as evidenced by increased size or reproduction;
2. decreased plant vigor or death; or
3. neither a positive nor a negative reaction.

The major factor controlling the frequency and severity of defoliation, regardless of the type of grazing system, is grazing pressure (defined as the animal unit, or forage demand, to forage supply ratio). Severity and frequency of defoliation will always increase as grazing pressure increases.

Under continuous grazing schemes stocked with a single class of livestock, grazing pressure can only be manipulated by stocking rate (the number of animals that a given area of range actually supports for a period of 12 months). This is also the case in the deferred rotation systems. However, in these systems a period of rest is periodically scheduled to ensure that the grazed plants have an opportunity to regain their vigor. Under any short duration grazing system there is much greater control of the frequency and severity of defoliation because the stocking rate, stocking density and length of graze/rest periods can be manipulated to benefit plants or animals.

Continuous Grazing

Since the number of desirable forage species is limited on poor or fair ranges, it is difficult for them to reproduce under year-long grazing pressure, even with very light stocking rates. This is because animals are selective grazers and will graze the palatable species first. With year-long grazing the desirable species are grazed continuously. On ranges in good condition, continuous grazing with moderate stocking rates generally does not harm animal or forage production. Animal production is often more erratic under continuous grazing, but this system generally returns more income/acre than most other grazing systems.

Deferred Grazing

Removing grazing animals for an adequate period of time gives desirable plant species an opportunity to regain vigor and reproduce. Deferred grazing can be of several types, any of which can be designed to meet the requirements of both forage plants and grazing animals.

Decision Deferment

Decision deferment is based on adapting the grazing system to specific needs or situations. The deferment usually is for the entire growing season, or for a part of it when moisture conditions are best. Success of this system depends upon the ability of the manager to make a correct decision. Decision deferment is recommended following range seedling and brush control, or in situations where systematic deferment cannot be applied economically.

Off an On

The off-and-on system is a method or rotating deferment based upon forage utilization. The animals are switched from one pasture to another when proper use of the key forage species has been obtained. The duration of grazing is not specific because the time required to obtain proper utilization can vary from year to year and from season to season. Also, the time of deferment is not specific because the animals are not returned to a pasture until the key forage species have regained their vigor and can be grazed without harm.

Systematic Deferment Grazing Programs

Four Pasture Deferred Rotation

This system was developed in 1949 by Dr. Leo B. Merrill at the Texas Agricultural Experiment Station near Sonora, and is known as the "Merrill" system. The four-pasture deferred rotation grazing program is rather simple in design (Fig.1). All four pastures should be about equal in grazing capacity. This is important because overgrazing will be detrimental to the forage and cause the system to fail. The total proper stocking rate of all four pastures is calculated and stock are divided into three herds. Three pastures are then grazed while one is deferred. The deferment seasons should be based on climatic factors, rainfall, growing season, nutritional needs of the livestock and requirements of the range plants.

Figure 1. It takes 4 years to complete the four-pasture deferred rotation grazing system. Each pasture is grazed 12 months then deferred for 4 months. There are three 16-month grazing cycles.

Pasture Deferred 1 July-October, first cycle November-February, second cycle March-June, third cycle	**Pasture Deferred 2** November-February, first cycle March-June, second cycle July-October, third cycle
Pasture Deferred 3 March-June, first cycle July-October, second cycle November-February, third cycle	**Pasture Deferred 4** March-June, first cycle July-October, second cycle November-February, third cycle

Two-Pasture Deferred Rotation

This system is sometimes called South African Switchback. The two-pasture system is generally satisfactory, but may not give results as good as the four-pasture deferred rotation system. However, the system is superior to year-long grazing.

Two pastures of nearly equal grazing capacity are necessary. The total grazing capacity of both pastures is combined into one herd, so that the herd is rotated between the two pastures. The design of a two-pasture system is given in Figure 2.

Figure 2. The two-pasture deferred rotation grazing system is completed in 2 years. There are 12-month grazing cycles with staggered grazing and deferment periods occurring in the same year.

Pasture Deferred 1 June 16-November 15, first cycle November 16-February, second cycle March-June 15, third cycle	**Pasture Deferred 2** March 15-June 15, first cycle June 16-November 15, second cycle November 16-February third cycle

The dates and periods of deferment should be selected for the specific area in which the system is to be used. The pasture being grazed should be observed often for signs of excessive overuse or deterioration.

Seasonal Grazing

Seasonal grazing is less common in the Southwest than in the West and involves grazing in a specific season only, such as spring, fall, summer or winter. Stocker operations may use a winter/spring grazing season. This type is best used in the Southwest in situations involving both rangeland and tame pastures. The tame pastures should be grazed during their most productive seasons, while the rangeland is deferred. Such a system can result in highly efficient livestock production at a low cost.

Short Duration Grazing

Short duration grazing (SDG) has relatively short history in Texas. It is possible to improve range very rapidly with long, frequent rest periods. However, there may be reduced livestock production. There is a continuum in the deferment-grazing cycles of SDG that ranges from short to long rests and short to long grazing periods (Table 1). Extensive SDG is often called "non-selective" grazing. The quality of the livestock diet often declines after they have been in a

pasture longer than seven days. Also, the long rest periods allow pastures to accumulate high amounts of cured forage of lower quality. Intensive SDG refers to more rapid rotation with short grazing periods and correspondingly shorter rest periods. The shorter graze period usually improves livestock diet quality through more selective grazing and reduces the possibility that livestock will graze regrowth before a rest period allows recovery.

High Intensity-Low Frequency Grazing (HILF)

HILF systems concentrate livestock into one herd and allow them to graze a pasture until proper use is obtained. They are then moved to another pasture and the process is repeated. Multiple pastures are necessary so that significant time may elapse before the original pasture is regrazed. In areas of high rainfall and rapid vegetation growth, the length of the rest period may need to be six months or less.

The rancher should determine in which months maximum growth and forage production can be expected, and in which months little growth can be expected. The system should be designed to promote maximum production in all possible pastures during the growing season, and allow for standing forage to remain for use during periods of dormancy.

Several advantages accrue to this type of system. Re-establishment of desirable plants is rapid. Individual animal production is lower than with other systems, but higher stocking rates compensate with a higher return per land area. Emergency feed costs usually are much higher if animal performance is maintained.

Table 1. A continuum exists for lengths of rest and grazing periods in Short Duration Grazing. These should be adjusted according to plant and animal needs, depending on the physical location.

Days of	Intensive SDG		SDG	Extensive SDG (HLIF)
Graze	1-3	4-7	7-15	15-30
Rest	30-60		45-90	90-180

Length of grazing period can be calculated by the following formula:

$$\text{Average grazing period} = \frac{\text{Average rest period}}{\text{Number of pastures resting}}$$

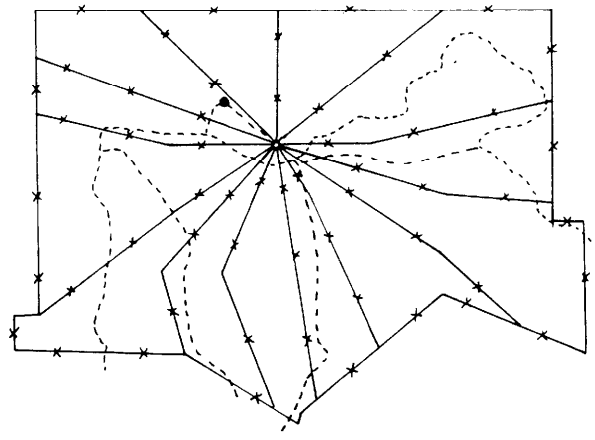
Rapid Rotation SDG

This is a relatively new method of grazing in Texas. In this method the livestock usually are grouped into one herd for each group of pastures, and moved through the system in such a manner that they select a high quality diet, begin in a pasture only a short time; are in a pasture too short a time to overuse plants; and are off the pasture long enough for the grazed plants to recover enough to withstand another grazing period.

Stock are grazed on pasture from 1 to 145 (usually no more than 5 to 7) days before being moved. An average grazing period is adjusted for each pasture relative to differences in production and size. Pastures are rested from 30 to 90 days (up to 120 days during drought). Longer deferment periods are possible during the dormant season but should not be used during the growing season. The system can utilize existing pastures but may require roundups to rotate the animals.

The "cell" system involves fencing that radiates from a central watering and working facility like spokes on a wheel (Fig. 3). This reduces livestock handling stress and the need for developing a water source in each pasture.

Figure 3. Fence design for a 13-pasture short duration grazing system with water and working pens located in the center. Livestock graze each pasture for a very short period and will return to that pasture less than two months later.
(Average grazing period = 5 days = $\frac{60 \text{ days rest}}{(12 \text{ pastures resting})}$



A planned grazing system is not a "cure-all" for ranching problems. It is a tool for controlling when, where and how much vegetation is grazed. If the system is adapted to fit ranch operations and to meet objectives, it can boost animal production and provide a sound forage base for livestock and/or wildlife. A grazing system can benefit plants, livestock and man when the proper stocking rate is used.

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