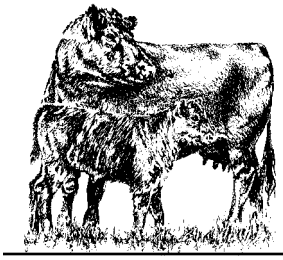

Western Beef Resource Committee *Fourth Edition*

Cattle Producer's Handbook

Range and Pasture Section 500

Developing Management Strategies for Rangeland Grazing

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Rangelands in the western states are complex ecosystems that are dynamic, diverse, and unpredictable. To thrive as a beef cattle producer on these complex landscapes, it is necessary to implement creative, adaptive strategies for grazing that help you accomplish your goals.

For a producer to attain management goals it is necessary to use management strategies that adapt to the diverse and evolving rangeland landscape. Fixed strategies are destined to fail so a producer needs to make strategic and adaptive management decisions based on available information and prior experience. Important factors to consider include animal health, animal performance and condition, ranch economics, weather, previous grazing activities, range condition, and the physiologic state of rangeland plants. The focus here is on the unique interdependence between rangeland ecosystems and beef cattle.

Western U.S. Rangelands

The western U.S. has 12 rangeland types with economic importance (Table 1). Among these rangeland types is a high degree of variation in topography, precipitation, and plant communities. The same degree of variation extends within the same rangeland ecosystem as a myriad of soil types affect both plant communities and plant production.

To promote healthy rangelands, a producer needs to continually gather information to manage rangelands for the health of the greater landscape instead of isolated pastures. Cataloging the status of livestock and natural resources, combined with prior management experience, will allow you to implement a dynamic management strategy. Here are some general concepts that will help you graze rangelands in a sustainable and healthy manner.

Basic Rangeland Grazing Concepts

Rangeland plant communities and animals depend on each other. Because of this interdependent relationship, it is important to understand plant community dynamics, as well as how those plants respond to grazing.

Overgrazing is the repetitive selection of the most palatable plants. It is a process whereby animals can eventually alter plant communities and damage the rangeland ecosystem (Reed et al. 1999). The negative effects of overgrazing can range from portions of a pasture all the way to the entire landscape.

Healthy plant communities contribute to healthy beef cattle. Therefore, identify and manage for desirable plant species. Do so by providing recovery or rest periods that allow these desirable plants to regrow.

Plant communities on the landscape are dynamic and respond to grazing. For example, grazing frequency, intensity, time of year, and the length of grazing can influence plant communities. Over time, the dietary selection and plant preferences of beef cattle can change plant communities, so manage grazing to achieve both animal and plant needs while protecting soil resources.

The nutritive value of plants exhibit a high degree of variation throughout the year. For instance, grasses are more nutritious when they are actively growing compared to when they are dormant. Determine if the forage your cattle are grazing meet their nutrient requirements by assessing cow body condition scores (see 720), calf weight gains, and by submitting fecal samples to a laboratory that can provide you a nutritional balance report based on the sample. If the requirements of your beef cattle exceed the nutritive value of the available forage, those animals must be supplemented with the appropriate nutrients to optimize gains.

Table 1. Major grazing areas of the western United States.[1]

Name	Location (major areas)	Major plant types	Recovery time to overgrazing	Comment
Southern mixed prairie	eastern NM	Grama grasses, buffalograss, bluestems	3-10 years	Grasses evolved with grazing
Northern mixed prairie	MT, WY	Cool season grasses, bluebunch wheatgrass	3-10 years	Severe winters, summer moisture, 140-day growing seasons
Shortgrass prairie	NM to WY, MT	Warm season grasses, grama grasses, winterfat	3-10 years	Cool winters, warm summers, precipitation in summer
California annual grassland	CA	Cool season bunchgrasses (stipa's), needlegrass	10-30 years	Longest domestic livestock grazing history of western ranges
Palouse prairie (bunchgrass)	eastern WA, OR, western ID	Bluebunch wheatgrass, Idaho fescue, sandberg bluegrass	10-30 years	Winter moisture, did not evolve with grazing
Hot desert	CA, AZ, NM, NV	Mesquite, creosote bush, black grama, annual forbs and grasses	>30 years	Precipitation in the summer, lack of killing frosts
Cold desert, sagebrush grassland	OR, ID, NV, UT, MT, WY	Big sagebrush, bluebunch and western wheatgrass, Indian ricegrass, rabbitbrush, Great Basin wild rye	>30 years	One of the most extensive western ranges, moisture comes as winter snow
Cold desert, salt shrubland	UT, NV	Shadscale saltbush, galleta, Indian ricegrass, rabbitbrush, Great Basin wild rye	>30 years	Occurs in mosaic with sagebrush cold desert, xeric, and high in salt
Pinyon Juniper woodland	UT, CO, AZ, NM	Pinyon and juniper trees, a mix of warm and cool season grasses	>30 years	One of most depleted range types, wood more valuable than range, may never recover without fire
Mountain browse	CO, UT, OR, ID	Chokecherry, buckbrush, oak,mountain mahogany	10-30 years	Intermediate between grassland and forest
Western coniferous forest	CO, ID, WY, MT, OR, WA, AZ, NM	Pine, fir, aspen trees	10-30 years	Multiple use is important, grazing land is in good condition because of long term monitoring
Oak woodland	NM, CA, OR, AZ	Oak species	10-30 years	Provides good wildlife habitat

[1]Holechek, et al., 1989.

Beef cattle nutritional requirements depend on a host of factors including their physiologic and production statuses. For example, lactating cows exhibit the greatest nutrient demand because milk production is the most energy intensive physiological process in an animal. The last trimester of gestation is the next period where pregnant cattle require high nutritional requirements. Failure to meet the minimum nutrient requirements during this stage in pregnancy can restrict calf growth and production.

Following these basic rangeland-grazing concepts, use animal and rangeland plant knowledge to develop a grazing program that will improve long-term rangeland health and performance. Several important factors you should consider when implementing a grazing management strategy include:

- Schedule their breeding times.
- Choose specific grazing areas.
- Determine when to graze.
- Consider calving at differing times.

Adaptive Management Planning

Endless factors influence rangeland health and ranching profitability. Despite such uncertainty, plan to manage plant communities to be more resilient and diverse.

To be successful in creating healthy rangelands, consider altering the timing, frequency, and distribution of defoliation. These changes must provide plants—especially the heavily defoliated and preferred plants—the opportunity to recover adequately as well as increase their proportion on the landscape.

Continually assess how plants respond to grazing and then adapt future management. Effective grazing managers use four approaches when considering landscape management (Barnes & Hild 2013). These include:

1. Match the stocking rate to the resource and animal needs,
2. Time the frequency and duration of grazing and recovery periods to the resource constraints,
3. Distribute animal use spatially to provide a diversity of plant offerings, and
4. Moderate selection of those plants by grazing animals.

Record the impact of management decisions on rangeland plants and the landscape. Important information to keep includes weather information and the amount of plant growth in the current year. Based on the forage availability, determine what changes to make in your plan and modify your plan, if necessary. Additionally, create objectives so you can measure the success of your adaptive grazing management strategy.

Additionally, review grazing leases, including public land permits. Determine if the provisions are satisfactory, and if they are not, make the necessary changes. Verify whether forage sources are available and dependable. If not, secure a forage source. Contact your public land administrator and determine if there are changes in dates or numbers from the previous year.

Implement a rangeland monitoring protocol to identify changes to the integrity of plant communities and animal body condition. Consider the following factors:

- Distribute grazing by strategically placing salt and water.
- Move a fence location if it will help.
- Identify poisonous plants/noxious weeds, control them, and note their location.
- Make utilization checks.
- Establish a photo monitoring program (see 520).
- Contact your county Extension Service or Natural Resource Conservation Service representative for help.

Management Activities Calendar

There are several major considerations to remember throughout the year. For instance:

Keep a record of your own activities. Modify those activities in this calendar as they fit your operation.

Keep a daily notebook. Include cattle introduction and removal dates on pastures, notes about the weather, etc. The daily notebook can help you can make a continuous overall use record.

Record notes made on utilization checks. The information you record will be useful each winter when you review management plans for the following year.

Grass Growth

The nutritive qualities of cool-season and warm-season perennial grasses are different throughout the year so it is important to know the differences between the two. Cool-season perennial species make most of their growth in the cool weather of the spring or fall when temperatures are between 40º to 75ºF. They primarily flower in early summer providing spring and fall forage at lower elevations and summer forage at high elevations. In contrast, warm-season perennial species grow rapidly during the warmer summer months when temperatures are between 70º to 95ºF. They flower mid-summer to early fall and provide forage during summer months.

Visually assess plants on the range and determine their stage of production. Perennial rangeland grasses have three stages in their annual life cycle (Fig. 1). Understanding these stages will help you decide when to implement your grazing strategy and for how long. The lengths of these stages depend on the location and can vary from year to year.

Stage 1: Dormant Season

During this stage the relative growth rate of perennial grasses is near the lowest point. While the growth rate is at its lowest point, the plant is concurrently creating new roots to support future plant growth. At this time it is not undergoing photosynthesis nor does it try to immediately reestablish itself. Compared to other stages in the perennial grass life cycle, grazing during the dormant season is the least destructive stage to the plant.

The dormant period is also the longest stage in the plant life cycle. During this time, the nutritive value of plant material is the lowest so beef cattle tend to be selective—preferring the most nutritious and palatable plants. When possible, consider implementing management intensive grazing, which implements higher stocking densities to promote more uniform rangeland utilization. Not only can this strategy reduce fuel loads but it can also reduce both the risk and severity of wildfire.

Stage 2: Initiate Growth

The initiate growth stage follows the dormant season. This stage is characterized by a rapid increase in relative growth that corresponds with increased pho-

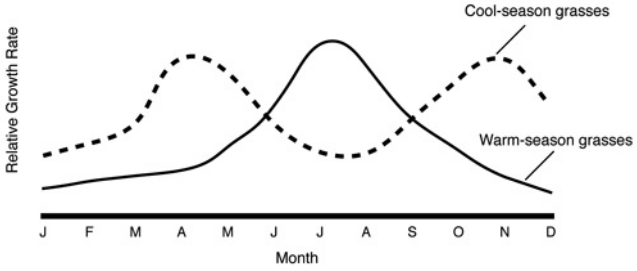

Fig. 1. The relative growth rate of cool- and warm-season perennial grasses.

tosynthetic activity. The roots are prepared to develop from this new leaf material, which is very nutritious—high crude protein, minerals, and overall energy.

Determine whether the young plant growth will be enough to meet the nutrient requirements of your beef cattle. Despite the lush, green plant growth emerging on the landscape, your cattle may still struggle to meet their intake requirements. Altering stocking rates will encourage more uniform utilization of the forage standing crop.

In general, grazing is not detrimental during this period because soils tend to be moist and fertile. However, length of grazing periods should be kept short to reduce the risk of detrimental impacts during this period. Record the date when key plant species initiate growth in pastures where your cattle graze. The plants use this opportunity to store energy for future use. From year to year environmental factors may differ so document how this period changes over time. Additionally, it is important to note that grazing during drought conditions may be detrimental to the plant. If this is the situation, decide whether you want to graze at this time or wait until the dormant season.

Protect native perennial grass pastures and riparian areas by strategically grazing non-native pastures. For example, graze pastures with either annual grasses or crested wheatgrass pastures in early spring so the more fragile native pastures and riparian areas can develop more fully.

Stage 3: Flower Initiation

The flower initiation stage follows the initiate growth stage preceding the dormant season. At this point the plant is in a sensitive state—less tolerant of grazing—and typically reaches peak biomass. Likewise, it is also when the plant has the highest energy demands as energy generated from photosynthesis at this stage is used to develop seed.

Grazing during flower initiation can be detrimental to the long-term health of the plant. In fact, the integrity of the plant is compromised when grazed at this stage because it has a limited opportunity to recover. Therefore, you can strategically suppress specific plant communities by altering grazing frequency, timing, and intensity when the plant is in the flower initiation stage.

Coordinate your grazing strategy with the individuals or agencies that manage the land you graze. If you hold a federal permit, discuss the current-year management with the rangeland management specialist. Use the beef cattle production records from previous years, as well as rangeland monitoring notes and pictures, and clearly discuss your goals and objectives, including how you plan to accomplish what you have set forth.

General Observations

The key to successful rangeland grazing is to use adaptive management strategies based on plant-animal cues. These decisions should be made sooner rather than later to protect the strength and the integrity of desired plant communities. Active monitoring is critical for success. Delaying management decisions can prolong the problem, which will require you to expend time and money getting back to your original state. Ultimately, adaptive grazing managers place their animals in pastures after considering the plant development.

In much of the western states, winter precipitation can be used as a predictor of current year's range forage production. Use it as a planning tool. Additionally, follow and use market information to establish an initial stocking rate that makes financial sense. However, clearly identify the point at which additional animals will limit production and profits.

Adopt and maintain a regular monitoring protocol on your grazing lands. Monitoring is a tool used to record the changes in plant communities in response to management decisions. It will also give you flexibility and help you make timely decisions based on plant stages.

Strategically place mineral supplants and stock water in strategic places to harvest forage in underutilized areas. Likewise, removing access to water sources can be a strategy you can use to help plant communities recover from prolonged disturbance.

Adaptive decision-making is an effective management approach that allows flexibility. There is no set or fixed solution, rather take into consideration plant dynamics and understand that sustainable beef cattle production will depend on the health and integrity of the rangeland landscape.

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