Colorado Grazing Lands Conservation Initiative

Making Pasture Use Decisions with the Grazing Response Index

Ruminant livestock production is primarily focused on the utilization of relatively marginal environments that are poorly suited for other agricultural practices. Producers must have the natural resources, in this case grasses and forbs, for grazing to produce marketable product – pounds of live animals. Ultimately, producers are in the business of grass production, not the production of animal weight. The Stockman Grass Farmer Editor, Alan Nation, stated it aptly, "It is the stocking rate rather than individual cow performance that primarily determines who drives the Cadillac."

For producers to know where they are going, they must know where they have been or where they are starting. Just as producers must be proficient at monitoring the health of their animals, they also need to be proficient at monitoring the health of their ultimate income source – the land. Grazing Response Index (GRI) was developed by Floyd Reed – United States Forest Service Range Staff Officer in Colorado, Steve Bishop – Region 5 Range Program Leader, and Dr. Roy Roath – Colorado State University Cooperative Extension Range Specialist. GRI is a short-term monitoring method that can be used to obtain timely information about the effects of grazing events during a year.

The GRI is a simple and comprehensive grazing management tool that provides quick feedback and allows for timely adjustments without major time and money investment. Parameters within the GRI model include the fundamental grazing concepts of: not grazing the same place the same time every year; graze for the shortest time frame possible; graze at a moderately heavy stocking rate; and give plants the opportunity to grow before and re-grow after the grazing cycle. Observations should not only be made on the pasture in general, but on specific location that shows deviation in animal use, or non-use, from the average. A pre-grazing GRI survey may be used to establish a grazing sequence to your pasture rotation prior to and during the grazing season. Surveying a pasture soon after the animals have been removed is used to assess the effects grazing has had on the plant community.

Frequency Determination

Frequency refers to the number of times forage plants are defoliated during the grazing period. It is dependent on the length of time (grazing period) plants are exposed to grazing animals. Values may be assigned using the following table:

Number of Times Grazed	Days	Value
1	Less than or equal to 7	+1
2	7 to 14	0
3 or more	Greater than or equal to 14	-1

Zero is a neutral figure indicating that the frequency had little to no effect on the resource. Positive values indicate too short of a grazing period and negative values indicate too long of a grazing period.

Values may also be obtained by dividing the number of days that a pasture was stocked by a value between seven and fourteen. This is the standard number of days that are required for a defoliated (grazed) plant to attain sufficient re-growth to be defoliated again, allowing for season of growth and type of environment.

Faster grow and regrowth, such as early spring plant development, allows for the lower numbers of seven or ten. Ten or fourteen could be a more accurate observation in the late season or more arid environments when plant growth is slower.

Example: We ran 200 cows on 640 acres for 13 days in mid-June (late spring moderate growth rate). Thirteen grazing days divided by 8 equals 1.6; rounding up gives a frequency of 2 defoliations per grazing periods. This translates into a frequency value of zero.

Intensity

Intensity describes the amount of plant leaf material removed during the grazing period. This accounts for the popular grazing adage – "Use half/leave half". Better plant recovery occurs with a greater amount of photosynthetic active material remaining after grazing. The intensity of grazing use is linked with the relative stocking rate in the pasture. Intensity values may be assigned using the following table:

Level of Defoliation	Percent Used	Value
Light	Less than 40%	+1
Moderate	41-55%	0
Heavy	Greater than 56%	-1

Again, zero would indicate a neutral effect on the resource from stocking rate and a positive number would indicate too light of a stocking rate or underutilization.

For a more accurate estimation, knowing what was available prior to grazing is helpful. Establishment of reference points with pre-grazing clippings or grazing cages is suggested. For assistance with these techniques, contact your local CSU Extension Office or NRCS staff.

Example: Returning to the previous example situation. Assuming a worst-case scenario, we will estimate that 60% of the available forage was used. This will give us a utilization value of negative 1 indicating too high of a stocking rate.

Opportunity

Plants must be allowed sufficient time to re-grow and store energy before the next grazing event. Therefore, it is critical that your grazing management program allows the key forage plants the opportunity for full recovery after being grazed. Plant identification is not necessary but may aid in the observation of key forage species. Since this factor is so important in sustaining healthy plants, the relative rankings are doubled in value when the final GRI rating is calculated.

The following chart may be used to assign opportunity values.

Opportunity for regrowth	Value
Full Season	+2
Most of the Season	+1
Some Chance	0
Little Chance	-1
No Chance – Continuous Season-long grazing	-2

Example: Finishing the example situation. Let's assume that we are having a drought and because of extenuating circumstances, we have to move back to this pasture in 30 days. From the Opportunity chart, we could estimate an opportunity value of zero or negative 1.

So, with a Frequency value of zero, an Intensity value of negative 1 and an Opportunity value of negative 1; the GRI equation is 0 + (-1) + (-1) = -2 for the GRI score. Which means a second grazing would greatly impact the forage health in the pasture.

Example: Demonstrating how this contributes to the decision-making process. Assume you have six pastures in a rotation. Your headquarters is between pastures one and three. You have been grazing pasture two for thirteen days and need to move to a new pasture. The current rotation pattern is one, three, five, six, four and two. However, it is later in the season and pastures one and three are good winter pastures with protection and close to facilities.

A GRI assessment is used to score the pastures. Pasture two scores a negative 1 since it is being grazed. Pastures four and six both score zero because they have recently been grazed, rains have been spotty and they have not had time to recover sufficiently. Pasture five scores a positive 2, it includes some bottom ground with a more diverse plant population. Pastures three and one both score positive three, they have been grazed heavy but have had time to recover. You would like to save both pastures for later in the season for weaning and winter pasture.

With a GRI score of positive 2, pasture five shows enough recovery that it could be grazed again allowing more recovery time for pastures four and six and still saving pastures three and one for later in the year. This allows for "stockpiling" of forage supplies in pastures one and three, plus the formation of seed-heads to help in natural reseeding of grass species.