The Grazing Response Index (GRI)

The *Grazing Response Index* developed by Dr. Roy Roath, Colorado State University Cooperative Extension Range Specialist, is a short-term monitoring method that was developed to assess the effects of grazing during the current year and aid in planning the grazing for the following year. The GRI is based on general assessment of the current grazing use. It involves three concepts related to plant health in evaluating the impacts of grazing. These are the frequency of defoliation, the intensity of defoliation, and the opportunity of the plant to regrow after being grazed.

Frequency is the number of times forage plants are grazed during the grazing period. It is dependent on how long plants are exposed to grazing animals. Seven to 10 days are required for a plant to allow growth enough to be grazed again during late spring and early summer. Grazing the same area over an extended period of time allows animals to select the most preferred plants to their detriment. Grazing plants three or more times during a growing season reduces productivity and weakens them.

A simple way to estimate how many times plants were, or will be, defoliated during a grazing period, is to divide the number of days in the planned grazing period by 7 or up to 10 if growth is slower. An index value of +1 to –1 is assigned as follows:

Number of Defoliations	Value
1 (7 days/7 = 1)	+1
2 (14 days/7 = 2)	0
≥3 (≤21 days/7 = ≥3)	-1

A value of +1 indicates plants grazed less than twice would respond positively to grazing. Zero is neutral and –1 indicates plants have been grazed three or more times and is excessive.

Intensity is the amount of leaf material removed during the grazing period. The primary concern is the amount of photosynthetically active material remaining for the plant to recover from defoliation. A plant that has relatively more leaf area remaining after grazing is going to respond better than one that has less leaf area. The intensity of grazing use is linked with the relative stocking rate in the pasture. The GRI uses the following value for describing intensity of grazing:

Level of Defoliation	% Used	Value
Light	<40%	+1
Moderate	41-55%	0
Heavy	>56%	-1

Opportunity is the amount of time plants have to regrow after the grazing has taken place. The plants must be able to fully store energy at some time during the active

growth period before the next scheduled grazing period. Therefore, it is critical that your grazing management program allows the key forage plants the opportunity for full recovery after being grazed. Since this factor is so important in sustaining healthy plants, the relative rankings are doubled in value when the final GRI rating is calculated.

Opportunity for Regrow	Value
Full Season	+2
Most of Season	+1
Some Chance	0
Little Chance	-1
No Chance – continuous season-long grazing	-2

The overall GRI rating is obtained by adding the values for the frequency, intensity and opportunity for regrowth together. A positive value indicates that the grazing management was beneficial to the health, structure and vigor of the plants. Conversely, a negative value indicates that the grazing management being monitored was harmful. A zero rating is neutral.

The GRI links mechanisms that control plant response to grazing. It uses three variables that can be managed – length of grazing period, stocking rate and season of use. If the frequency index indicates plant response is likely to be negative, shortening the length of the grazing period will improve plant response. If the intensity index is too high on most pastures of the ranch, the stocking rate is too high. Since opportunity is based on plant growth or regrowth, it is influenced by season of use.

The GRI is a simple but comprehensive method to monitor the effects of current grazing management. It provides quick feedback to your management, and allows you to make timely adjustments to grazing without major investments of money and time.

A more detailed version of this document can be found in the journal Rangelands 21(4)3-6 (August 1999).