

Introduction

Proper grazing management ensures;

- ▶ Animals have sufficient forage to remain healthy.
- ▶ Grazing does not permanently damage soil and vegetation

Repeated grazing by animals;

- ▶ Weakens forage plants, allowing less palatable species (Increasers) to replace them.
- ▶ Exposes rangelands to wind erosion due to absence of vegetation, leading to dust and poor quality air.
- ▶ Exacerbates water erosion, thus increased sediment load in watersheds and subsequent decrease in water quality.

Carrying capacity and stocking rate

- ▶ Carrying capacity is the maximum stocking rate possible without inducing damage to vegetation or related resources (Bryant et al. 1978); the maximum sustainable stocking rate which maintains soil and vegetation integrity.
- ▶ Stocking rate is the number of animals on a given area at one point.
- ▶ Carrying capacity and stocking rate (expressed in AUMs) both refer to the tenure of the animals allowed to graze in a pasture and the amount of forage that we expect these animals to harvest.
- ▶ Stocking rate does not reflect the effects of the grazing on the vegetation and soil resources.

Determining stocking rate

- ▶ AUM is the amount of forage required to support a 450kgs cow for one month, conventionally i.e. 450kgs per month ($15\text{kgs} \times 30 \text{ days}$)
- ▶ E.g. 5cows graze for 5months=25AUMs or 10 cows grazing for 2.5 months = 25 AUMs will require 22500lbs ,that is (25×900)
- ▶ NB: In calculating carrying capacity , total forage production is determined against the number of animals allowed to graze and/or grazing time .
- Forage production is measured in the area with maximum growth, where no grazing has been done.

Measuring forage production

Equipment

- ▶ Pair of grass clippers
- ▶ Old piece of garden hose
- ▶ Garden hose connector
 - ▶ Paper bags

procedure

- ▶ Connect both ends of the garden with a hose connector allowing the ends of the garden hose to be within 0.25 to 0.5 inches from each other
- ▶ Randomly place the loop at 10 locations in small pastures to reduce bias
- ▶ Clip all the palatable forage (to ground level) in the hoop and place it in a paper bag

Measuring forage production cont.....

- ▶ Repeat the process at all 10 randomly selected spots
- ▶ Poke holes into the paper bag to allow free flow of air, and dry for at least 10 days
- ▶ After drying, weigh the bag and forage in grams and record weight
- ▶ Empty the forage and weigh the bag(to get the net forage weight)
- ▶ Forage production in lbs. /acre= $\text{net forage per hoop} \times 10 \times \text{mass in grams of every hoop}$

Designing stocking rate

factors to consider

- ❖ Production potential of forage
- ❖ Utilization patterns of livestock
- ❖ Nutrient content of the forage and forage growth patterns
 - ❖ Species diversity comprising the pasture
 - ❖ Seasonal variations in temperature and moisture

SR

=Pasture size*pasture yield per acre

Daily intake*average animal weight*days of grazing

Stocking rate cont.....

Example

Determine the number of 1000lb cows a 50-acre pasture will support for 100 days given a pasture yield of yield of 3000lbs of dry matter per acre

$$\frac{50 \text{ acres} * 3000 \text{ lbs/acre}}{0.02 * 1000 \text{ lbs} * 100}$$

$$= 75 \text{ cows}$$

How many animals and for how long

No of animals=AUMS in a pasture/grazing period in months*AUE

- ▶ Where AUE is 1000lb;1 AUM
- ▶ AUE differ from species to species based on weight

Example

How many sheep are needed to properly graze pasture with a carrying capacity of 1.5 AUMs in 2 weeks (assuming a sheep weighs 200lbs)

No. of animals= $1.5/0.5*0.2$
=15 sheep.

Proper use factor

- ▶ Is a benchmark used to determine how much of the total pasture is sustainably available for grazing , usually 50% or 0.5 i.e.
- ▶ Total forage production*proper use factor=available forage

Example

- ▶ If a 2 acre -pasture produces a total of 450lbs per acre, the available forage would be :
- ▶ $450 * 0.5 * 2 = 450 \text{ lbs}$. If an AUM is 900lbs, then a 1000lb cow would graze the pasture for 15 days(0.5 months).....i.e. $450 / 900 = 0.5 \text{ months}$

Refining the carrying capacity estimates

- ▶ With proper use factor considered , carrying capacity is redefined to enhance sustainability of grazing and pasture management. This is achieved by;
- ▶ Recording the number of animals in a pasture
- ▶ Length of grazing period when the forage has been grazed to a proper level
- ▶ Thus, the tenure of animals(in AUMs) when utilization reaches 50% is the desired stocking level.
- ▶ With this information , forage production determination is re-engineered to meet the new parameters

Refined forage production determination

- ▶ At least 10 ungrazed grass bundles are clipped to ground level and a piece of sewing thread put around the grass plant near the base to avoid losing leaves.
- ▶ A waxed string is then used to balance the grass bundle as if it was a balance scale .
- ▶ This grass plant would be estimated to have 50% utilization of the current year's growth used when grazed to 2.5 inches .
- ▶ The average of the 10 plants is used to set the targeted plant height at 50% utilization following grazing