



DETERMINING YOUR STOCKING RATE

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Range Management Fact Sheet

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To determine how many animals your land will support (stocking rate), you need to know two things: 1) How much forage the particular animal or group of animals you have on your rangeland will consume, and 2) How much forage you have available.

THE ANIMAL UNIT MONTH OR AUM

The animal unit month (AUM) concept is the most widely used way to determine the carrying capacity of grazing animals on rangelands. The AUM provides us with the approximate amount of forage a 1000 lb cow with calf will eat in one month. It was standardized to the 1000 lb cow with calf when they were the most prevalent on rangeland. This AUM was established to be 800 lbs of forage on a dry weight basis (not green weight). All other animals were then converted to an "Animal Unit Equivalent" of this cow. For example, a mature sheep has an Animal Unit Equivalent of 0.20. This means a sheep eats about 20% of the forage a cow will eat in one month. This allows managers to match the number of animals with the amount of available forage. While there are numerous ways to calculate how many animals can be carried on a particular range, based on what is available and what is being eaten, the following table is a starting point. How it can be altered depends on your management goals and management intensity.

TABLE 1: Commonly used Animal Unit Equivalents

CLASS OF ANIMAL	<i>ANIMAL UNIT EQUIVALENT</i>
Cow, 1000 lb, dry	0.92
Cow, 1000 lb, with calf	1.00
Bull, mature	1.35
Cattle, 1 year old	0.60
Cattle, 2 years old	0.80
Horse, mature	1.25
Sheep, mature	0.20
Lamb, 1 year old	0.15
goat, mature	0.15
Kid, 1 year old	0.10
Deer, white tailed, mature	0.15
Deer, mule, mature	0.20
Elk, mature	0.60
Antelope, mature	0.20
Bison, mature	1.00
Sheep, bighorn, mature	0.20

(from USDA NRCS National Range and Pasture Handbook)

TABLE 2: Adjusted Animal Unit Equivalents for Heavier Cattle

CLASS OF ANIMAL	<i>ANIMAL UNIT EQUIVALENT</i>
Cow, 1000 lbs, with calf	1.0
Cow, 1200 lbs, with calf	1.2
Cow, 1400 lbs, with calf	1.4
Cow, 1600 lbs, with calf	1.6

Calculating Animal Unit Months has created a controversy for the last several years. The original theory behind the method was to make an easy standard approach for everyone to calculate stocking rates on rangelands. They took the average sized cow with calf and determined the amount of forage the animal would require. This was based on the metabolic requirements of the animal. This was also done in the 1950's and 1960's, when an average cow size was estimated to be 1000 lbs. Because of the changes in animal selection and the desire to alter the size of a cow, the average cow size has grown above 1000 lbs. If your average cow in your herd is larger than 1000 lbs, the corresponding Animal Unit Equivalent numbers in Table 2

should be used. The Average Animal Weight method (explained below) can also help to determine a more accurate Stocking Rate.

Working through and determining your own stocking rate is something every livestock producer should do. The steps to calculate stocking rate using Animal Unit Equivalents and the Average Animal Weight Method are listed below with an example problem.

CLASSIC STOCKING RATE PROBLEM

1. Determine total production of the area
2. Calculate total “available” forage by using the “take half, leave half” method, either divide total production by 2, or multiply by 0.5.
3. Determine pounds of forage eaten by cattle per month. This is generally 80% of the body weight of a 1000 lb cow, but often ranges from 600 to 900.
4. Calculate proper stocking rate for cattle:

$$\text{Stocking Rate} = \frac{\text{Available forage}}{\text{Pounds eaten/month}}$$

5. Convert for Animal type you are using with Animal Unit Equivalents:

$$\text{Animal Unit Months for your animal} = \frac{\text{Stocking Rate}}{\text{Animal Unit Equivalent}}$$

6. Determine number of animals you can keep over the time needed:

$$\text{Number of Animals} = \frac{\text{Animal Unit Months for your animal}}{\text{Number of months on pasture or allotment}}$$

EXAMPLE STOCKING RATE PROBLEM:

1. *Determine Total Production of the Area.*

Information:

- *After clipping and weighing plots, the total production of the 1000 acre allotment is determined to be 1200 lbs/ac.*

2. *Calculate Total Available Forage:*

Total Available Forage = Total Production X (how much you can use) 0.5 X Allotment Size*

$$\text{Total Available Forage} = 1200 \text{ lbs/ac} \times 0.5 \times 1000 \text{ ac}$$

**(50% is the most common use factor. This can vary based on management and species present.)*

$$\text{Total Available Forage} = 600,000 \text{ lbs/ac}$$

3. Determine pounds per month intake for a 1000 lb animal.

$$\text{Intake} = 1000 \text{ lb animal} \times 80\% \text{ of bodyweight}$$

$$\text{Intake} = 800 \text{ lbs/month}$$

4. Calculate Proper Stocking Rate:

$$\text{Stocking Rate} = \frac{\text{Available Forage}}{\text{Pounds Eaten/Month}}$$

$$\text{Stocking Rate} = \frac{600,000 \text{ lbs/ac}}{800 \text{ lbs/month}}$$

$$\text{Stocking Rate} = 750 \text{ animals/month}$$

5. Convert for animal type you are using with Animal Unit Equivalents:

Information:

- The cow herd on the allotment has an average weight of 1400 lbs.

$$\text{Animal Unit Month for class of livestock} = \frac{\text{Stocking Rate}}{\text{Animal Unit Equivalent}}$$

$$\text{Animal Unit Month for class of livestock} = \frac{750 \text{ animals/month}}{1.4}$$

$$\text{Animal Unit Month for class of livestock} = 535 \text{ animals/month}$$

6. Determine amount of animals that can be grazed over allotted time:

Information:

- The allotment can be grazed for 3 months

$$\text{Number of Animals} = \frac{\text{Animal Unit Month for class of livestock}}{\text{Number of months on allotment}}$$

$$\text{Number of Animals} = \frac{535 \text{ animals/month}}{3 \text{ months}}$$

$$\text{Number of animals} = 178 \text{ animals}$$

AVERAGE ANIMAL WEIGHT METHOD OF DETERMINING STOCKING RATE

The Average Animal Weight (AAW) method of determining stocking rate is a more accurate method than the classic stocking rate method. The Average animal weight method uses one conversion factor, 0.02667. This number was derived using the metabolic rate requirements of a cow with calf. In order to achieve its daily metabolic requirement, a cow with calf needs to consume 2.667% of its body weight each day. This number can vary depending on animal and forage conditions. To determine your herds stocking rate using the Average Animal Weight method, use the following steps:

1. Determine total production of the area
2. Calculate total “available” forage. First you need to determine the percentage of use you would like on the area. This number varies based on your management objectives. A conservative figure often used is the “take half, leave half” (or 50%) rule of thumb. Calculate your available forage by multiplying total forage by your percentage of use (0.5 in the case of 50% use).
3. The Average Animal Weight method allows you to calculate the required forage for the animal, regardless of the breed or species, and determine the daily and monthly forage requirement for their size by using the conversion factor of 2.667%.
 - a. Estimate your average size of animal (in pounds).
 - b. Multiply this number by the Average Animal Weight method conversion factor (0.02667)
 - c. Multiply this figure by 30 days/month to get your herds AUM consumption

Monthly Forage Requirement = Average Animal Size X 0.02667 X 30 days/month

4. Calculate proper stocking rate for class of livestock you are using

$$\text{Stocking Rate} = \frac{\text{Available forage}}{\text{Monthly Forage Requirement}}$$

5. Determine the number of animals you can graze over the time needed:

$$\text{Number of Animals} = \frac{\text{Stocking Rate for class of livestock}}{\text{Months on pasture or allotment}}$$

(from Zobell, personal communication)

EXAMPLE AVERAGE ANIMAL WEIGHT (AAW) PROBLEM:

1. Determine Total Production of the Area.

Information:

- After clipping and weighing plots, the total production of the 1000 acre allotment is determined to be 1200 lbs/ac. The area will be grazed using the take half, leave half rule (50%).

2. Calculate Total Available Forage:

$$\text{Total Available Forage} = \text{Total Production} \times \text{Estimated Use} \times \text{Allotment Size}$$

$$\text{Total Available Forage} = 1200 \text{ lbs/ac} \times 0.5 \times 1000 \text{ ac}$$

$$\text{Total Available Forage} = 600,000 \text{ lbs/ac}$$

3. A) Determine average animal size in pounds:

Information:

- The Cattle you raise average 1400 lbs.

B) Multiply this number by the conversion factor to determine amount of forage consumed per day:

$$\text{Forage consumed per day} = \text{Animal Weight} \times \text{AAW Conversion Factor}$$

$$\text{Forage consumed per day} = 1400 \text{ lbs} \times 0.02667$$

$$\text{Forage consumed per day} = 37.338 \text{ lbs forage eaten per day}$$

C) Multiply this figure by 30 days/month to determine the amount of forage consumed per month:

$$\text{Monthly intake} = 37.338 \text{ lbs} \times 30 \text{ days}$$

$$\text{Monthly intake} = 1120.14 \text{ lbs}$$

4. Calculate Proper Stocking Rate:

$$\text{Stocking Rate} = \frac{\text{Available Forage}}{\text{Pounds Eaten/Month}}$$

$$\text{Stocking Rate} = \frac{600,000 \text{ lbs/ac}}{1120.14 \text{ lbs/month}}$$

$$\text{Stocking Rate} = 535.65 \text{ animals/month}$$

5. Determine amount of animals that can be grazed over allotted time:

Information:

- The allotment can be grazed for 3 months

$$\text{Number of Animals} = \frac{\text{Animal Unit Month for class of livestock}}{\text{Number of months on allotment}}$$

$$\text{Number of Animals} = \frac{535.65 \text{ animals/month}}{3 \text{ months}}$$

$$\text{Number of animals} = 178.55 \text{ animals}$$

REFERENCES

USDA Natural Resources Conservation Service. National Range and Pasture Handbook. 1997.

Zobel, Dale R. Beef Extension Specialist. Personal Communication. 2000.

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