PLANNING GUIDE NO. 4

Rangeland Watershed Program

U.C. Cooperative Extension and USDA Natural Resources Conservation Service

Animal Units

The term "animal unit" is something that all ranchers, extension personnel, and rangeland managers use and presumably understand. But do we really understand what an "animal unit" is?

Over 60 years ago the term animal unit was defined as "1 cow-unit and that was the equivalent to 5 sheep and 5 goats." The "cow unit," however, wasn't fully defined. About 20 years later the animal unit was defined as "the amount of forage grazed by a mature cow in 1 year" (whatever that is) and that 5 sheep, 5 goats, or 1 horse were "considered" equal to 1 cow for range grazing.

Over the years our ability and our need to define animal unit more precisely has increased. Today their are three approaches to defining an animal unit: a cow-calf unit, 1,000 lbs. of live weight of any species, and on an energy basis.

Cow-Calf Unit

The following table has become the "bible" of animal units based on the original cow-calve unit.

Cattle	Animal Unit
Weaned calf to yearling	0.6
Steers and heifers (1-2 years)	1.0
Mature cows with or without calf	1.0
Mature bulls	1.3
Sheep	
5 weaned lambs to yearlings	0.6
5 muttons or ewes	1.0
5 mature ewes with or without lambs	1.0
5 mature rams	1.3
Goats and Deer	
6 weaned kids to yearlings	0.6
6 muttons or does	1.0
6 does with or without kids	1.0
6 mature bucks	1.3
6 deer	1.0

The "Bible Standards" were based upon research data that is over 32 years old. Certainly, we have obtained more knowledge to answer the question, "What is an animal unit?" Listed below are two major problems that the animal unit concept doesn't address.

1. Growing livestock (post-weaned growth). As an animal grows his nutrition and forage intake changes. A 600 lb. calf can certainly eat more forage and require a lower quality diet (percent level) than a 400 lb. calf. If you correctly stock a pasture with 400 lb. calves, those calves should certainly grow and develop. As they get larger their forage intake requirement increases, and if a stocking rate adjustment isn't made, then the pasture becomes "overgrazed." This change in forage demand for a growing animal must be considered in order to obtain desired animal performance.

2. Cow with or without a calf. There is no question that when a cow delivers a calf and starts to lactate, the nutrient requirement and forage intake greatly increase. Therefore, to say that a cow with or without a calf is an animal unit is misleading. Over the coarse of a year, however, the animal unit of a producing cow may in fact average out to be 1 animal unit. However, the variation within that year of production is tremendous. The forage requirement does fluctuate within any production year. If this is not accounted for at certain times of the year, the pasture will be overgrazed. To make matters worse, these overgrazed periods are the most economically important periods of the production year.

1000 lbs. Liveweight

In the 1950s, animal unit was defined as "1000 lbs. liveweight, or roughly equivalent to the weight of a cow and a calf." However, it is common during part of the year for a cow and calf to total 1400 lbs. liveweight. Further work in the 1950s led some researchers to adopt a liveweight approach to defining an animal unit. Under this approach a 1,000 lb. (454 kg) animal of any species was equivalent to 1 animal unit. This method will account for changes in growing animals if it is recalculated every month or two, such as in a monthly stock flow chart.

Metabolizable Energy

Dr. Larry D. White of the Texas A & M Extension Service has developed the concept of using the daily metabolizable energy requirement of an animal to account for changing nutrient requirements. He has developed comparisons using a 1000 lb. dry cow during the last third of pregnancy as a standard (17.3 Mcal).

All metabolizable energy requirements are then

compared to 17.3 Mcal of metabolizable energy for the 1000 lb. dry cow. The result of this comparison is referred to as a "stock unit." For example:

Type of Animal		Metabolizable Energy	Standard Animal Unit	
1,100 lb.	lactating cow	19.9	17.3	Mcal = 1.15
800 lb.	lactating cow	16.6	17.3	Mcal = .96
500 lb.	steer (gaining 1#/day)	11.8	17.3	Mcal = .68
700 lb.	steer (gaining 0.5#/day)	13.1	17.3	Mcal = .76
2,000 lb.	bull	24.9	17.3	Mcal = 1.44
132 lb.	ewes (dry)	4.8	17.3	Mcal = .28
88 lb.	Angora does (dry)	3.9	17.3	Mcal = .23

The stock unit equivalent measure is similar to the animal unit in purpose. It compares the daily metabolizable energy requirements (17.3 Mcal equal) for a mature 1000 lb. cow at the last third of pregnancy (standard SUE) to the energy requirements at different weights, physiological conditions, and between animals. The SUE allows estimation of forage quantity needs by multiplying SUE by 19.6 lbs. dry matter (50% digestibility) for the animal in question. By using a conversion based on energy, we can correct intake for digestibility and more appropriately estimate daily forage demand.

The stock unit equivalent guides (development for a 50% digestible forage) allow us to adjust daily intake based on research relative to different feed digestibilities. Also, they allow comparison among species of animals that eat different diets but can be compared on metabolizable energy requirements. This procedure and use of SUE is used in determining forage grown. Also, ratios among species are expressed on the primary nutrient selected for energy and can be adjusted with diet analysis for different forage intakes.

Forage and Feed Equivalents

An AUM is the amount of feed required by an animal unit for one month. It is approximately equivalent to the following forages and feeds:

400 lbs.	of total digestible nutrients (TDN)
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800 lbs.	(.4 ton) of hay
1,333 lbs.	(.67 ton) silage
2,400 lbs.	(1.25 tons) green feed
533 lbs.	(.27 ton) concentrate

More precise AUM conversions can be calculated for specific feeds using data in the NRC nutritional requirements for beef or sheep.

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