

MEASURE AND MANAGE

Pasture Management

By Dale Cowan

dcowan@agtest.com

Agri-Food Laboratories CCA.On

Rotational Grazing Management

The Penn State Forage Management Specialists define 4 steps to managing a rotational grazing system.

Step 1 – Determine number of Animal Units (AU)

Step 2 – Estimate Number of acres needed

Step 3 – Estimate the number of paddocks needed

Step 4 – Estimate the size of each paddock

Step 1 Determine the number of AU that will be grazing

The use of AU gives a better measure of pasture required. One AU is based on the daily forage intake of one 1000lb dry cow consuming approximately 25 pounds of dry matter per day. Table 1 gives you the AU values of different size animals and species.

Table 1

Animal	Animal Unit
Dairy	
1000 lb dairy cow maintenance	1.0
800 lb dairy cow last 2 months gestation	1.0
1000 lb dairy last 2 months gestation	1.2
1300 lb dairy cow last 2 months gestation	1.5
1500 mature dairy bull	1.4
550 lb growing heifer	1.0
Beef	
1300 lb dry cow	1.3
1400 lb dry cow	1.4
1300 lb lactating 1 st 4 months after calving	1.6
1400 lb lactating cow 1 st 4 months after calving	1.72*
2000 lb mature bull	1.7*
550 lb growing finishing steer 2 lbs / day gain	1.2
Sheep	
110 lb brood ewe	0.15
132 lb brood ewe	0.17
175 lb brood ewe	0.20
300 lb mature ram	0.40
110 to 132 lb replacement ewe. Lambs. yearlings	0.22
220 lb replacement ram, Lambs, and yearlings	0.42

* Indicates the values used in the equations below.

Determine the total number of AU. In this example herd consisting of 30, 1400lb cows and calves and one mature bull.

$$1400 \text{ lb cow w /calf} = 1.72 * \text{AU} \times 30 = 51.6 \text{ AU}$$

$$2000 \text{ lb bull} = 1.7 * \text{AU} \times 1 = 1.7$$

Total: $51.6 + 1.7 = 53 \text{ AU}$ for this herd. (rounded)

Step 2 – Estimate the number of acres needed

The total number of acres needed depend not only on the total animals grazing but on the characteristics and growth of the pasture. Pasture growth will be a function of fertility, pasture composition, soil moisture and temperature. Because of these variables we can only roughly estimate the acres required. From Step 1 we have the total AU and in step 2 (Table 2) we can choose a pasture type and the number of acres per AU required by month to support the herd. *(This chart assumes 70% grazing efficiency)*

Table 2

Number of acres required to provide forages for each AU

Pasture Species	Pasture productivity	Annual DM yield	April	May	June	July	August	Septemer	October	November	December
Bluegrass White clover	medium	2	5.4	0.6	1.3	5.5	5.5	2.2	3.5		
Orchard grass white clover	low	2	-	1.0	1.1	1.8	1.8	1.8	9.2		
	medium	3	-	0.7	0.7	1.2	1.2	1.2	6.2		
	high	3.5	-	0.6	0.6	1.1	1.1	1.0	5.3		
Orchard grass plus Nitrogen	low	2	5.4	0.8	1.3	2.8	2.3	1.8	9.2		
	medium	3	3.6	0.5	0.9	1.8	1.5	1.2	6.2		
	high	4.5	2.4	0.4	0.6	1.2	1.0	0.8	4.1		
Stockpiled tall fescue	medium	4.5	2.4	0.4	0.6	1.0	-	-	1.1	1.0	1.0

Example herd of 53 AU – Let us compare two management styles. A bluegrass pasture versus Orchard grass with Nitrogen to see the impact that management and forage species can have on total acres required.

Month	Bluegrass/ clover (medium)	Orchard grass with Nitrogen (medium)
May	$0.6 \times 53 = 32$ acres	$0.5 \times 53 = 27$ acres
June	$1.3 \times 53 = 69$ acres	$0.9 \times 53 = 48$ acres
July	$5.5 \times 53 = 291$ acres	$1.8 \times 53 = 95$ acres
August	$5.5 \times 53 = 291$ acres	$1.5 \times 53 = 80$ acres
September	$2.2 \times 53 = 116$ acres	$1.2 \times 53 = 63$ acres
October	$3.5 \times 3 = 185$ acres	$6.2 \times 53 = 330$ acres

The bluegrass system starts out providing good early growth but fades fast in the summer months we would need close to 260 acres to support this herd on average. For the more intensively managed orchard grass with fertilizer, 80 acres would provide ample grazing for most of the year. Both systems would allow for some of the acres to be taken as hay and used later in the grazing cycle as both systems are drastically short of feed in October. This comparison clearly shows that under intensively managed pasture program, only 30% of the land base is needed to support this herd compared to a less intensive bluegrass system.

Step 3 – Estimate the number of paddocks needed

We will use the Orchard grass system

The number of paddocks will depend on the number of days the animals will graze, and the maximum rest or recovery period. This length of time will depend on the season and the weather conditions.

Season	Weather conditions	Growth rate	Rest period
Spring	Cool, moist	fast	10 -14 days
Spring	Warm, dry	medium	14- 20 days
Summer	Hot, moist	slow	30-35 days
Summer	Hot ,dry	Very slow	40 -60 days

Growth rate is very much affected by both management and weather. Soil fertility needs to be optimum. This may require flexibility in moving animals to paddocks that are at optimum grazing condition and bypassing those that are not yet recovered. Spring management also requires the flexibility to make hay or silage in order to keep ahead of the growth of the paddocks and keep them at optimum nutritional value. That means cutting at appropriate stages for desired quality. Certainly dry cows have less of a requirement than young calves and can handle more mature stages of growth. Cutting at immature stages such as bud stage on alfalfa or boot stage on grass maximizes protein and energy.

$$\text{Number of paddocks} = (\text{Max rest period/ grazing period}) + 1$$

Back to our example herd: We will graze each paddock for 3 days and rest for 35 days

$$\text{Number of paddocks} = (35 \text{ days rest}/3 \text{ days of grazing}) + 1 = 13 \text{ paddocks}$$

For higher quality forages grazing may be reduced to 0.5 to 2 days, at 2 days the number of paddocks jumps to 19.

Step 4 – How big should each paddock be?

Paddock size is dependant on the herd size in our example 53 AUs. The amount of pasture available at the beginning of grazing, desired grazing period and total available acres for grazing.

Size of paddocks = Number of acres / number of paddocks

In our example we estimated 80 acres to be available (required) and 13 paddocks

Estimated size of paddocks (80 acres/ 13 paddocks) = 6 acres.