

# Four Factors in the Application of Management Intensive Grazing (MIG) or Controlled Rotational Grazing

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**STEP 1** Determine the number of animal units  
**STEP 2** Estimate the number of acres needed  
**STEP 3** Estimate the number of paddocks needed  
**STEP 4** Estimate the size of each paddock

## Introduction

A well-managed pasture program is the most economical way to provide forage to ruminant animals. Careful planning and sound management are the most important aspects required to optimize the production and utilization of pasture forage, as well as animal performance. Knowing your animals, plants and soils, and being able to respond to their needs are skills that must be developed if rotational grazing is to be successful on your farm.

Developing a pasture system that uses your given land resources and fits your total animal and forage program is important in pasture management. A major goal in pasture management is to provide quality pasture for the grazing animals year-round. Use the information in this report to establish and help attain your goal.

**Example Herd.** To demonstrate how each of the 4 Steps in MIG works, this example uses 30 beef cows in a 1-bull herd, 1,100-lb cows with average calf weight of 300 lb, and an 1,800-lb bull.

### Step 1: Determine the number of animal units (AU) that will be in the grazing system.

The first step in controlled rotational grazing is to determine the forage requirements of the herd. Dry matter forage intake varies by animal species and class of livestock. Young growing an-

imals can eat a higher percentage of their body weight than mature animals at maintenance. The concept of animal units gives a better measure of pasture required than using simple animal numbers. One animal unit is based on the daily forage intake of one 1,000-lb dry cow (about 26 lb dry forage per day). Table 1 gives some typical animal unit values for various classes of livestock.

**Example Herd.** Determine number of AU using the following equation:

$AU * \text{number of animals} = AU \text{ for grazing system}$

Example herd 1,100-lb cow with 300-lb calf equals 1.4 AU:

$1.4 AU * 30 \text{ cows} = 42 AU$

1,800-lb bull = 1.6 AU

$42 + 1.6 = 43.6 (44) AU \text{ in herd}$

### Step 2: Estimate the number of acres needed throughout the grazing season.

Estimating the number of acres required to pasture a herd depends not only on the feed requirements of the animals but also on the available forage produced. Pasture growth is dependent upon plant species, soil characteristics, topography, fertilization, temperature and soil moisture. Because of the variability in pasture growth, we can only estimate the number of acres required for grazing animals. Selected species and levels of management on moderately productive soils in south Louisiana are presented in Table 2 for the acreage required to support an animal unit for that month.

To estimate how much pasture a herd will need, first calculate the total AU of the herd (Step

1). Second, estimate how many acres each AU will need during each month of the grazing season (Table 2). For example, if the herd will be grazing medium producing bahiagrass pasture in September, then approximately 1.2 acres will be needed to support each AU. The same herd grazing high producing ryegrass and crimson clover pasture in March would only need .3 acres for each AU.

**Example Herd.** From Step 1, we know the example herd contains 44 AU. The herd will be grazing high-producing ryegrass and crimson clover pasture in the winter and spring, and a bahiagrass pasture the rest of the year.

**Acres needed for the herd:**

January	1 acres/AU	*	44 AU	=	44 acres
February	.6 acres/AU	*	44 AU	=	26 acres
March	.3 acres/AU	*	44 AU	=	13 acres
April	.3 acres/AU	*	44 AU	=	13 acres
May	.8 acres/AU	*	44 AU	=	35 acres
June	.5 acres/AU	*	44 AU	=	22 acres
July	.4 acres/AU	*	44 AU	=	18 acres
August	.7 acres/AU	*	44 AU	=	31 acres
September	1.2 acres/AU	*	44 AU	=	53 acres
October	6 acres/AU	*	44 AU	=	264 acres
November	5 acres/AU	*	44 AU	=	220 acres
December	1 acres/AU	*	44 AU	=	44 acres

For the example herd, 30 acres will be sufficient for much of the year, except October and November. However, there will be excess forage in the spring and the herd will need to receive supplemental forage in October and November. During this deficit period in the fall, stockpiled forages (standing bahiagrass or other warm-season perennial grass) from other areas of the farm or hay preserved from the spring will be required.

**Step 3: Estimate number of paddocks needed.**

The number of paddocks needed for a controlled rotational grazing system or MIG will depend on the number of days the animals graze in a paddock and the maximum rest period needed during the growing season. Rest (recovery) periods

should be based on the growth rate of the pasture and will vary depending on the season and weather conditions as shown in Table 3.

Growth rate will be affected by soil productivity and fertility levels. Therefore, even within a pasture system the recovery periods will vary. The best way to manage this situation is to not use a set rotational scheme, but move animals to those paddocks which have reached their optimum available pasture. Keep animals off a particular paddock until it reaches its desired optimum available pasture volume (approximately 2,000 lb/acre forage dry matter). The plants should have four to five leaves per stem and be in the vegetative or phase two stage of growth.

Spring management usually involves diverting some of the paddocks out of the rotation scheme and harvesting the forage for hay or silage. This effectively shortens the rest period between grazings and improves utilization of rapid spring growth. Remember the adage that when forage grows fast, move the animals fast. All the paddocks may need to be topgrazed to obtain the maximum benefit of the quality forage before diverting some of the paddocks for hay.

**Example Herd.** Estimate the number of paddocks needed using the following equation:

$$(\text{Maximum rest period} \div \text{grazing period}) + 1$$

The example herd will graze each bahiagrass paddock for two days and the maximum rest period between grazings will be 25 days.

*Paddocks of bahiagrass:*

$$(25 \text{ days rest} \div 2 \text{ days grazing}) + 1 = 13.5(14)$$

*Paddocks of ryegrass:*

$$(20 \text{ days rest} \div 1 \text{ day grazing}) + 1 = 21$$

*Paddocks of ryegrass—intensive:*

$$(15 \text{ days rest} \div .5 \text{ days grazing}) + 1 = 31$$

**Note:** Species and class of the grazing animal may determine grazing period. Lactating dairy cows and stocker animals need consistent, high-quality

forage; therefore, the grazing period may be only ½ to 1 day. Beef cows, brood ewes and most other ruminants do not require as consistent a quality forage and a grazing period of 2 or 3 days may suffice.

**Step 4: Estimate size each paddock.**

Paddock size depends on the AU in the herd, the amount of available pasture at the beginning of grazing, and the desired grazing period. Available pasture refers to that present in a paddock at the start of grazing minus the amount present when the animals are removed from the paddock (the residual that you desire). The species of forage and density of the plants determine the density of forage in the pasture. Bahiagrass may have about 275 lb of forage dry matter for each inch of height of the grass. If a herd is turned into a pad-

dock when the pasture is 10" tall and taken off when the pasture is 4" tall to leave approximately 1,000 lb of residual, approximately 1,500 to 2,000 lb of pasture was available.

**Example Herd.** In order to calculate paddock size, divide the total number of acres by the number of paddocks in the system. The example herd will graze 30 acres and there are 14 paddocks:

$$30 \div 14 = 2.14 \text{ acres in each paddock}$$

For flexibility, the use of temporary interior fences is recommended to decrease paddock size and increase stocking density for maximum forage utilization.

**Reference**

Williams, C., and M.H. Hall. Four Steps in Rotational Grazing. Department of Agronomy, Pennsylvania State University.

**Table 1.** Animal units of various species and classes of livestock

<b>Livestock</b>	<b>Animal Units</b>
Dairy cattle	
1000-lb dairy cow (maintenance)	1.0
800-lb dairy cow (last 2 months of gestation)	1.0
1000-lb dairy cow (last 2 months of gestation)	1.2
1300-lb dairy cow (last 2 months of gestation)	1.5
550-lb dairy growing dairy heifer	1.0
750-lb growing dairy heifer	1.3
Beef cattle	
1000-lb dry cow	1.0
1300-lb dry cow	1.3
1000-lb lactating cow (first 4 months after calving)	1.4
1300-lb lactating cow (first 4 months after calving)	1.6
1800-lb mature bull	1.6
550-lb growing steer (2 lb/day gain)	1.2
750-lb growing finishing steer (2 lb/day gain)	1.5

**Table 2.** Estimate of acres required for one animal unit (AU), assuming 60% pasture utilization<sup>a</sup>

Pasture Species	Past Production	DM Yield <sup>b</sup>	Acres/AU											
			JA N	FE B	MA R	AP R	MA Y	JU N	JU L	AU G	SE P	OC T	NO V	DE C
Bahia grass	LOW	4	—	—	—	3.2	1.1	.7	1.0	1.0	1.6	8.1	—	—
	MED	5	—	—	—	2.4	.8	.5	.4	.7	1.2	6.0	—	—
	HIGH	6	—	—	—	1.9	.6	.4	.3	.5	1.0	4.7	—	—
Bahia grass–ryegrass	MED	9	5.9	3.0	.7	.5	.5	.4	.3	.4	.9	2.0	5.9	2.0
Common bermudagrass	LOW	4	—	—	8.1	3.2	1.0	.6	.6	1.1	2.3	8.1	—	—
	MED	5	—	—	6.5	2.6	.8	.5	.5	.9	1.8	6.5	—	—
	HIGH	7	—	—	5.0	2.0	.6	.4	.4	.7	1.4	5.0	—	—
Bermudagrass–white clover	LOW	5	—	7.9	1.8	.4	.4	.4	.5	.8	2.9	4.4	—	—
	MED	6	—	7.8	1.6	.4	.4	.4	.5	.7	2.6	4.0	—	—
	HIGH	8	—	7.5	1.5	.4	.3	.3	.4	.7	2.5	3.7	—	—
Bermudagrass–crimson clover	LOW	4	—	4.1	1.0	.6	.3	.4	.7	.8	2.1	4.1	—	—
Bermudagrass–ryegrass	HIGH	10	3.3	3.3	.5	.4	.4	.3	.6	.6	1.7	3.3	—	1.7
Ryegrass–crimson clover	MED	5	1.3	.8	.4	.3	2.2	—	—	—	—	—	6.0	1.3
	HIGH	6	1.0	.6	.3	.3	2.0	—	—	—	—	—	5.0	1.0

<sup>a</sup>Actual acreage will depend on pasture yield, dry matter intake, and the efficiency of pasture utilization.

<sup>b</sup>Annual yield; units = ton/acre.

**Table 3.** Typical paddock rest (recovery) periods for rotational grazing systems

Season	Weather Conditions	Growth Rate	Rest Period
Winter	cold, moist	slow	30–40 days
Spring (early)	cool, moist	very fast	10–15 days
Spring (late)	warm, moist	fast	15–20 days
Summer	hot, moist	fast	20–30 days
Summer	hot, dry	medium	30–40 days
Fall	warm, dry	slow	40–50 days

**NOTES:**

