July 2013

Example Calculations for 528 Practice Guide

1. Objective: Maintain forage and animal health while meeting state requirements.

2. 2 Animal Groups

Group 1: Beef Animals OR Heifers
55 animals @ 850 lbs
55 × 850 = 46750 lbs (Total Live Weight)
Supplement = 0 lb DM/animal/day

Group 2: Dairy Cows (lactating)
20 animals @ 1250 lbs
20 × 1250 = 25000 lbs (Total Live Weight)
Supplement: 40 lb DM/animal/day

Keep in mind - these calculations are intended to be an estimate of animal intake + forage production. Daily management is required by the producer to monitor forage availability and move animals as needed.

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3 Stocking Rate

$$\frac{46750\text{ lb} + 25000\text{ lb}}{1000\text{ lb}} = 71.75\text{ AU}$$

71.75 AU / 85 Ac. = 0.8 AU/Ac. (Total Pasture Acres)

However, the animals are not utilizing all acres equally.

Group 1:
46750 lb/1000 lb = 46.75 AU
46.75 AU / 75 Ac. = 0.6 AU/Ac.

Group 2:
25000 lbs/1000 lb = 25 AU
25 AU / 10 Ac. = 2.5 AU/Ac.

Do you need to run the nutrient calculator?

4 Grazing Information:

Group 1:
Start - May 1 } 180 Days
End - Oct 31
Occupancy - 7 Days

Group 2:
Start - } Year Round Access
End - } (365 days)
Occupancy - Continuous

For the length of the grazing season, how many days will you use?

- In PA, the average grazing season lasts 180 days (See Table 3
- Can you really graze year round, 365 days?

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5 Forage Information

* Kentucky bluegrass / White Clover
  Continuously Overgrazed
  10 Acres × 750 lb DM = 7500 lb DM/yr.

* Orchardgrass / Clover
  Well managed, good soil
  55 acres × 6000 lb DM/yr = 330 000 lb DM/yr.

* Grazed Hay Field - Orchardgrass
  Fertilized, good soil
  20 Acres × (8000 lb DM/ac/yr - 4000 lb DM) = 80 000 lb DM/yr.

Total Yield/Ac/Yr.

Total Amount of Hay Removed w/ 1st cutting (2 Tons or 4000 lb DM)

Total Forage Production:
7500 lb DM + 330 000 lb DM + 80 000 lb DM/Yr

This would be for co-grazing animals.

Total Forage Production is separated into acreage grazed by each group.

Total Available to Group 1
330 000 lb DM + 80 000 lb DM = 410 000 lb DM/yr.

Total Available to Group 2 = 7500 lb DM/yr.

Graying Heights

	Turn In	Removal
* Kentucky bluegrass / White Clover	6 inches	4 inches
* Orchardgrass / Clover	8 inches	3 inches
* Orchardgrass	8 inches	3 inches

6 Forage - Animal Balance

Group 1

46750 lbs × .025 = 1169 lb DM/day (need)
1169 lb DM/day × 180 days = 210420 lb DM/season (need)
330000 lb DM × .6 = 198000 lb DM available (w/o hay field)
410000 lb DM × .6 = 246000 lb DM available (w/ hay field)

Without Hay 198000 lb DM available - 210420 lb DM needed = -12420 lb DM

With Hay 246000 lb DM available - 210420 lb DM needed = 35580 lb DM

So, for Group 1, without access to the hayfield, there is a forage deficit and additional forage or stored feed will be needed.

If Group 1 has access to the hay field (following first cutting) there is an excess of forage. For this scenario, no additional feed will be needed for an average year.

Group 2

25000 lb × .03 = 750 lb DM needed/day
750 lb DM × 180 days = 135000 lb DM needed/season
7500 lb DM × .90 = 6750 lb DM available

6750 lb DM available - 135000 lb DM need = -128250 lb DM

Group 2 is showing a severe deficit. Additional forage or stored feed is needed. Due to the high stocking rate, nutrient accumulation is also likely to be a problem.

7 Supplemental Feed

Group 1 - w/o hay field

$\frac{-12420 \text{ lb DM}}{180 \text{ days}} = 69 \text{ lb DM/group/day need}$

$\frac{69 \text{ lb DM}}{55 \text{ animals}} = 1.25 \text{ lb DM supplement/animal/day}$

Group 1 - with hay field
- Balanced, no supplement needed

Group 2 -

$\frac{-128250 \text{ lb DM}}{180 \text{ days}} = 713 \text{ lb DM/group/day needed}$

$\frac{713 \text{ lb DM}}{20 \text{ animals}} = 35.6 \text{ lb DM supplement/animal/day}$

This group is currently recieving 40 lb DM/animal/day and is being over supplemented.

713 lb DM needed - (40 lb DM/animal/day × 20 animals)
- 87 lb DM from pasture needed.

Group 2 Scenario is oversupplemented, with limited acreage for the animal group. Proceed to Section 8B and use baseline numbers.

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8A Paddock Size - Rotational Grazing
Group 1

$$\frac{7 \text{ days} \times 46750 \text{ lb} \times .025}{200 \text{ lb DM/in} \times 5 \text{ inch} \times .6} = 13.6 \text{ Ac/paddock}$$

$\frac{20 \text{ day rest}}{7 \text{ day occupation}} + 1 = 4$ paddocks $\times 13.6$ Ac/paddock $= 54.4$ Ac Needed

$\frac{35 \text{ day rest}}{7 \text{ day occupation}} + 1 = 6$ paddocks $\times 13.6$ Ac/paddock $= 81.6$ Ac needed

$\frac{50 \text{ day rest}}{7 \text{ day occupation}} + 1 = 8$ paddocks $\times 13.6$ Ac/paddock $= 108.8$ Ac Needed

Note: The 55 ac. of Orchardgrass/Clover is adequate for spring grazing + rest.
The 55 ac. of Orchardgrass/Clover plus 20 ac. of orchardgrass (hay field) meets the needs for a wet summer.
Additional acreage or feed will be needed during a hot dry summer.

8B Length of Occupancy – Vegetation Management Group 2

4 inches – 3 inches = 1 inch available
1 inch available × 10 acres = 10 Acre-Inch Available
80 lb DM/inch × 10 A-In = 800 lb DM available

$$\frac{800 \text{ lb DM available} \times .9}{2 \text{ lb DM Need/Day} \times 20 \text{ animals}} = 18 \text{ day occupancy}$$

The above calculation is based on the animals having 24 hr/day access to the area. At the end of the 18 day period. Animals must be removed from the area until the grass has regrown to 4 inches. See Table 6 for seasonal rest periods.

If the producer wants the animals to have access to the area for a longer part of the growing season, and is willing to keep animals off of the area (i.e. – in the barn) for a portion of the day determine the total number of hours the animals can access the area before exhausting the forage.

18 days × 24 hours = 432 hours

For animal access for 12 hours (i.e. – night pasture)
432/12 = 36 partial (12 hr) days

For animal access for 8 hours
432/8 = 54 partial (8 hr.) days

Limiting animal access for part of the day requires more management.

* Note – For this scenario, it is ultimately the producer's responsibility to manage the animals so that 3 inches of forage are maintained in the area at all times.