

GRAZING CELL MANAGEMENT

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INTRODUCTION

Management of a grazing cell requires careful planning and continuous monitoring. Both the planning and monitoring activities can be made easier by the use of computer spreadsheets to assist in calculations and data organization. Two useful spreadsheets are the growing season planning spreadsheet and the dormant season planning spreadsheet. The use of both of these spreadsheets are described below.

GROWING SEASON PLANNING

The growing season planning spreadsheet (see Table 1) assists in making the calculations to determine the guidelines for rotation of animals through a cell during the season the forage is growing. To use the spreadsheet simply fill in the items in the spreadsheet, which are displayed in the gray cells. Each of these items is discussed below.

NUMBER OF PADDOCKS 14

If you have a different number of paddocks than the example program you will have to modify the spreadsheet by adding or deleting rows. If you do this you must change the formulas in D26 and D27 to reflect the correct number of paddocks. If you insert rows

be sure to copy the formulas in row 24 to the new rows.

MINIMUM REST DESIRED 30
MAXIMUM REST DESIRED 45

Minimum rest desired is the least number of days you must rest a paddock when the plants are growing rapidly. Maximum rest desired is the most number of days you should rest a paddock when the plants are growing rapidly. Thirty and 45 days are reasonable values for many southwestern ranches. If plant growth is extremely rapid 20 to 50 days might be more reasonable. Since the spreadsheet assumes that you start in paddock 1 and proceed in numerical order, be sure to enter the paddock data accordingly.

RELATIVE QUALITY

The next step is to make an assessment of the forage available per acre in each paddock relative to one another. For new cells a simple procedure is to assume an equal quality of one for each paddock. If you have information about differences in production per acre among paddocks relative quality values can be assigned. This information is normally collected and refined as you operate a cell and keep records on its performance. To calculate the total forage available in a paddock the size of the paddock in acres is required by the spreadsheet. The following table might represent the data input for a typical cell.

PADDOCK	SIZE ACRES	RELATIVE QUALITY
1	500	0.5
2	300	2
3	200	1.2
4	300	2
5	500	0.3
6	600	0.7
7	500	1
8	200	0.3
9	300	3
10	400	1.5
11	500	0.6
12	200	0.8
13	300	1
14	500	2

At this point all of the required data has been entered into the spreadsheet and the results should appear as in the Table 1.

Use the minimum and maximum grazing periods for each paddock in the cell as guidelines for animal rotation. Continue this procedure throughout the growing season. Modifications may need to be made in the relative quality ratings of the paddocks based on observations of forage availability immediately after the animals are removed from a paddock. As modifications are made new guidelines will be calculated by the spreadsheet and should be used in determining animal rotations.

DORMANT SEASON PLANNING

The dormant season planning spreadsheet (see Table 2 and 3) assists in making the calculations to determine to guidelines for rotation of animals through a cell during the season the forage is not growing. To use the spreadsheet simply fill in the items in the spreadsheet, which are displayed in the gray cells. Each of these items is discussed below.

STARTING DATE 10/1/88

The starting date is simply the beginning date for the dormant season.

NUMBER OF PADDOCKS 14

Table 1

	A	B	C	D	E	F
1	ACTIVE GROWING SEASON					
2						
3						
4	NUMBER OF PADDOCKS		14			
5	MINIMUM REST DESIRED		20			
6	MAXIMUM REST DESIRED		30			
7						
8						
9	Paddock	SIZE	RELATIVE	STANDARD	MINIMUM	MAXIMUM
10		ACRES	QUALITY	ACRES OF	GRAZING	GRAZING
				FORAGE	PERIOD	PERIOD
11	1	500	0.5	250	0.9	1.3
12	2	300	2	600	2.1	3.2
13	3	200	1.2	240	0.9	1.3
14	4	300	2	600	2.1	3.2
15	5	500	0.3	150	0.5	0.8
16	6	600	0.7	420	1.5	2.2
17	7	500	1	500	1.8	2.7
18	8	200	0.3	60	0.2	0.3
19	9	300	3	900	3.2	4.8
20	10	400	1.5	600	2.1	3.2
21	11	500	0.6	300	1.1	1.6
22	12	200	0.8	160	0.6	0.9
23	13	300	1	300	1.1	1.6
24	14	500	2	1000	3.5	5.3
25						
26	TOTAL FORAGE AVAILABLE (STANDARD ACRES)			6080		
27	AVERAGE Paddock RATING (STANDARD ACRES)			434		
28	AVERAGE MINIMUM GRAZING PERIOD			1.54		
29	AVERAGE MAXIMUM GRAZING PERIOD			2.31		

Table 2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	DORMANT SEASON													
2														
3														
4	NUMBER OF PADDOCKS			14										
5	MINIMUM REST DESIRED			90										
6	MAXIMUM REST DESIRED			120										
7	ADA FOR RELATIVE QUALITY = 1			20.00										
8						MINIMUM		MAX.						
9	PADDOCK	SIZE ACRES	RELATIVE QUALITY	INITIAL ADA AVAILABLE	GRAZING PERIOD	GRAZING PERIOD	STARTING DATE	DAYS GRAZED	NUMBER OF AD	AD REMAINING	STARTING DATE	DAYS GRAZED	NUMBER OF AD	AD REMAINING
11	1	500	0.5	5000	3.99	5.31	1/1/88	5	1674	67%	5/9/88	5	2491	17%
12	2	300	2	12000	9.56	12.75	1/6/88	13	4018	67%	5/14/88	13	5979	17%
13	3	200	1.2	4800	3.83	5.10	1/19/88	5	1607	67%	5/27/88	5	2391	17%
14	4	300	2	12000	9.56	12.75	1/24/88	13	4018	67%	6/1/88	13	5979	17%
15	5	500	0.3	3000	2.39	3.19	2/5/88	3	1178	61%	6/14/88	3	1495	11%
16	6	600	0.7	8400	6.70	8.93	2/9/88	9	3299	61%	6/17/88	9	4185	11%
17	7	500	1	10000	7.97	10.63	2/18/88	11	3928	61%	6/26/88	11	4982	11%
18	8	200	0.3	1200	0.96	1.28	2/28/88	1	471	61%	7/6/88	1	632	8%
19	9	300	3	18000	14.35	19.13	2/29/88	19	7070	61%	7/8/88	19	9484	8%
20	10	400	1.5	12000	9.56	12.75	3/20/88	13	4714	61%	7/27/88	13	6323	8%
21	11	500	0.6	6000	4.78	6.38	4/1/88	6	2989	50%	8/9/88	6	1961	17%
22	12	200	0.8	3200	2.55	3.40	4/8/88	3	1594	50%	8/15/88	3	1046	17%
23	13	300	1	6000	4.78	6.38	4/11/88	6	2989	50%	8/18/88	6	1961	17%
24	14	500	2	20000	15.94	21.26	4/17/88	21	9964	50%	8/25/88	21	6538	17%
25														
26	TOTAL FORAGE AVAILABLE			121600	ADS									
27	AVERAGE PADDOCK RATING			8686	ADS									
28	AVERAGE MINIMUM GRAZING PERIOD			6.92	days									
29	AVERAGE MAXIMUM GRAZING PERIOD			9.23	days									

TABLE 3

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
30	STOCK TABLE														
31			JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	
32	YEARLINGS														
33		STEERS													
34		HEIFERS	60	60	60	60	60	60	60	60	60	60	60	60	
35															
36	COWS														
37		BRED HEIFERS	40	40	40	40	40	40	40	40	40	40	40	40	
38		COWS	200	200	200	200	200	200	200	200	200	200	200	200	
39															
40	BULLS														
41									15						
42	NUTRIENT REQUIREMENTS PER COW														
43	CALVE IN														
44		%	IN	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
45	JAN	0	1.60	1.60	1.60	1.60	1.60	0.95	0.95	0.95	0.98	0.98	0.98	1.20	1.20
46	FEB	0	1.20	1.60	1.60	1.60	1.60	1.60	0.95	0.95	0.95	0.98	0.98	0.98	1.20
47	MAR	0	1.20	1.20	1.60	1.60	1.60	1.60	1.60	0.95	0.95	0.95	0.98	0.98	0.98
48	APRIL	100	0.98	1.20	1.20	1.60	1.60	1.60	1.60	0.95	0.95	0.95	0.98	0.98	0.98
49	MAY	0	0.98	0.98	1.20	1.20	1.60	1.60	1.60	1.60	0.95	0.95	0.95	0.98	0.98
50	JUNE	0	0.98	0.98	0.98	1.20	1.20	1.60	1.60	1.60	1.60	1.60	0.95	0.95	0.95
51	JULY	0	0.95	0.98	0.98	0.98	0.98	1.20	1.20	1.60	1.60	1.60	1.60	0.95	0.95
52	AUG	0	0.95	0.95	0.98	0.98	0.98	0.98	1.20	1.20	1.60	1.60	1.60	1.60	0.95
53	SEPT	0	0.95	0.95	0.95	0.98	0.98	0.98	0.98	1.20	1.20	1.60	1.60	1.60	1.60
54	OCT	0	1.60	0.95	0.95	0.95	0.98	0.98	0.98	1.20	1.20	1.60	1.60	1.60	1.60
55	NOV	0	1.60	1.60	0.95	0.95	0.95	0.98	0.98	0.98	0.98	1.20	1.20	1.60	1.60
56	DEC	0	1.60	1.60	1.60	0.95	0.95	0.95	0.98	0.98	0.98	1.20	1.20	1.60	1.60
57															
58	AD YEARLINGS														
59		STEERS	0	0	0	0	0	0	0	0	0	0	0	0	0
60		HEIFERS	72	72	72	72	72	72	72	72	72	72	72	72	72
61	AD COWS														
62		BRED HEIFERS	47	58	58	77	77	77	77	46	46	46	47	47	
63		COWS	196	240	240	320	320	320	320	190	190	190	196	196	
64															
65	AD BULLS														
66	TOTAL		315	370	370	469	469	469	496	308	308	308	315	315	

If you have a different number of paddocks than the example program you will have to modify the spreadsheet by adding or deleting rows. If you do this, you must change the formulas in D26 and D27 to reflect the correct number of paddocks. If you insert rows be sure to copy the formulas in row 24 to the new rows.

Minimum rest desired is the minimum number of days you must rest a paddock during the dormant season when forage plants are growing slowly or growth has halted. Maximum rest desired is the maximum you would want to rest a paddock during the dormant season. Values of 90 and 120 days are reasonable for many southwestern ranches.

MINIMUM REST DESIRED 90
 MAXIMUM REST DESIRED 120

ADA FOR RELATIVE QUALITY = 120.00

ADA is animal days per acre and refers to the quantity of forage that can be harvested by an animal from one acre of a paddock. If there is enough forage in a paddock for 20 animals to eat for a day on one acre or for 1 animal to eat for 20 days on one acre then the ADA for that paddock is equal to 20. We recommend the following procedure to estimate ADA's.

Select the paddock which is average for your cell. This paddock will become a standard and be assigned a relative quality value of 1.

Estimate how many square yards it would take to feed one cow for one day in this paddock. This would require about 20 pounds of edible forage on a dry weight basis. Then convert the square yard value into acre units by dividing it into 4840 (the number of square yards in an acre). For example, you might estimate that it would take an area 25 yards by 25 yards or 625 square yards to provide enough forage for one cow to eat for one day. Dividing 4840 by 625 results in an ADA value of 7.74. An average value for southeastern Arizona ranches would be around 10 to 12.

RELATIVE QUALITY

The next step is to make an assessment of the forage available per acre in each paddock relative to one another. Since the spreadsheet assumes that you start in paddock 1 and proceed in numerical order be sure to enter the paddock data accordingly. Rate each other paddock compared to the standard. For example a paddock with twice as much forage per acre (one which would only require 312.5 square yards i.e., about 18 by 18 yards to feed one cow for a day) would be rated as having a relative quality of 2. Table 2 shows what a typical rating might look like.

To calculate the total forage available in a paddock the size of the paddock in

acres is required by the spreadsheet. Again, Table 2 might represent the data input for a typical cell. Continue to monitor the paddocks as you move your animals. If the relative quality measures do not reflect the forage availability of the cell revise them to be more realistic and rerun the spreadsheet.

STOCK TABLE

In order to calculate the correct ADA requirements for your herd, the number and type of animals grazing the cell need to be entered into the stock table. The results might look like Table 2, which follows. The stock table simply keeps track of the number of animals in the herd each month.

Since cows have different nutritional requirements depending on what stage of the pregnancy cycle they are in it is necessary to input the calving dates into the spreadsheet. The month when the cows are expected to calve needs to be known in order to keep track of the increased nutrient requirements of the cows during critical periods. For example, the final trimester of pregnancy, lactation and breeding periods require increased emphasis on cow nutrition. A typical situation might be as in Table 3, which follows.

ANALYSIS OF RESULTS FROM SPREADSHEET

The results of the spreadsheet are displayed in Table 2. The first thing to check for is whether the moves planned by the spreadsheet and the initial levels of forage will result in enough forage available to last through the expected dormant season with appropriate considerations for drought reserve. If the projected plan meets these requirements the the guidelines can be used to plan the rotation of animals through the paddocks. As you make your moves, be sure to monitor the forage

conditions and modify and rerun the spreadsheet when conditions change.

CONCLUSIONS

The use of the spreadsheets described above can reduce the drudgery of

making the calculations necessary for management of a grazing cell. In addition they can be used to evaluate quickly many what if questions. What if I add 20 cows? What if the dormant seasons is two months longer than usual?

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