

What can Grazing Records Tell Us?

A year in review of using PastureMap™

The VA Graze 300 Team

As part of a 2021 Virginia Tech College of Agriculture and Life Sciences Integrated Internal Competitive Grant, the Virginia Graze 300 VA Team received funding to purchase usage rights to the online web-based recordkeeping app PastureMap™ for a two-year trial period. Eleven operations signed on to pilot the software in Virginia. A benefit of PastureMap™ is the ability to record pasture moves in the field with a smartphone. Additionally, PastureMap™ can produce a Microsoft Excel® grazing report in which a user can summarize important grazing measures. We used these measures to evaluate grazing efficiency on these operations. This article summarizes information experiences from the first year of using the program (2022). For more information on this project, please contact John Benner at benner89@vt.edu.

This article is a summary of the grazing reports from two producers for the grazing season of 2022 through January of 2023. One farm separately manages three types of grazing management systems within their operation. We decided to summarize the operations by grazing system, giving us four separate systems to evaluate (Grazing System 2, 3 and 4 are all one large producer). Table 1 shows the data for all of the Grazing Systems evaluated. We evaluated the data using the following metrics.

Stocking Rate [Acres/cow]. Most of us know our total farm acreage. However, after accounting for the house lawn, barn dry lots, woods, ponds and other fenced out areas (stream exclusion buffers and CREP areas), we often have less grazable acres than we thought. Using an FSA or conservation map or field-collected GPS points, we drew our pastures into PastureMap to determine the total grazable acres of each farm. The total grazable acres was then divided by total number of cows in the herd to arrive at an overall stocking rate (grazable acres/total cows in herd). For the sake of simplicity, we ignored calves as the majority of steer calves are sold near weaning while replacement heifers enter the herd annually and older cows are culled in these operations. Stocking rate for these operations ranged from 0.92 acres per cow to 3.09 acres per cow or replacement heifer.

Average Stock Density [lb/acre]. PastureMap™ allows user to specify cow and calf weights. By using known weight records and number of animals in a paddock we could estimate an average stock density for the grazing system (Gross Animal Weight / acreage in a paddock), then averaged them across all paddocks. A stock density of 5,000 lb may be practical for most operations during the grazing season. A higher stock density may be needed to maximize utilization of stockpiled forage.

Average Grazing Days per Rotation. In our preliminary report in July, we showed a histogram of grazing rotation lengths by several producers and found that the most frequent rotation length was 3-5 days per pasture from April thru June. For this analysis we were evaluating the grazing season from April 2022 thru March 2023. Therefore, when calculating an average grazing days per rotation, we naturally have greater variation for the entire season, with shorter rotations in the spring and fall and longer durations in the summer and winter. Additionally, different pasture sizes and acreages greatly impact the length of a grazing rotation. A high number may be reflective of grazing rotations not made quickly enough. Regrowth of vegetative forage begins as soon as three days after grazing. To avoid having livestock selectively graze the vegetative regrowth while letting non-grazed grasses become mature and unpalatable, we typically move cattle between 3-7 days using an increased stock density during the growing season.

Total Days Grazed Per Pasture. The total days grazed per pasture is sum of all grazing rotations in each paddock. This number is an indirect metric of field productivity in the place of grass growth data or residual sward heights. A higher number is not necessarily the singular focus, as it may reflect a double counting of days between herds or forages could be overharvested or overgrazed. Additionally, larger fields again have more days of grazing.

Average Rest Days per Pasture. Average Rest Days per Pasture is the average interval between grazing events for a pasture. For most cool season grass-based pastures, 25-30 days is adequate in the spring, with additional time needed during the slow growth conditions of the summer. The more paddocks you have, the greater the ability you have to rest each individual pasture. We hoped to see three to five times the average rest days for a pasture than the average time of grazing duration.

Maximum Grazing Days in a Pasture. This number is the maximum days that a cow group stayed in any one pasture on the operation. In terms of forage management, a moderate number may be ideal. However, there may be animal management reasons, such as calving requirements, that may necessitate keeping animals on a pasture for a longer period of time. Larger pastures will provide forage for the herd for an extended period of time.

Average Minimum Rest Days. Rather than focusing on the absolute minimum rest days for a pasture, we focused on the average of the minimum number of rest days. For example, moving cattle to and from a working facility for treatment before moving back to a given pasture resulted in a minimum of 1 rest days for the pasture. To gather more meaningful data, we averaged the minimum rest day in each pasture. A low number for average minimum rest may indicate that some of our pastures are not receiving enough rest.

Total Rest Days in Pasture. This number is the sum of all rest days taken in each pasture. Similar to with the Average Rest Days per Pasture between grazing events, we would ideally see a number three to five times the number of total grazing days. For instance, a field grazed for 30 days during a year in 5-day increments with 30 rest days between grazing intervals will rest for 150 days. In this scenario, we may potentially achieve 5 to 6 grazing intervals per year outside of the typical winter dormancy period. To accomplish this schedule for each field in a management system during the grazing season, we will need at least 7 or more paddocks.

Cow Grazing Days an Acre. Cow Grazing Days an Acre can be best understood as a measure of the productivity of our grazing operation. Mathematically it is:

$$\text{Cow Grazing Days an Acre} = \frac{\text{number of Cows} \times \text{number of Days Grazing}}{\text{acres}}$$

Focusing on this number alone may ignore potential drawbacks such as poor animal performance from overgrazing. This number does not provide information about initial forage heights and residual heights, which are important predictors of stand production and viability. However, in combination with other grazing metrics it can be used as a grazing productivity score for an operation.

Grazing System 1

The producer manages a fall-calving cow-calf operation. The farm boards three horses and utilizes five bulls to service the 103-cow herd. In the calculation of stocking rate, the horses were included in the cow number, for a total of 111 animal units. With 343 grazeable acres, the stocking rate is 3.09

acres/cow. The farm has 28 pastures ranging from 1.7 acres to 26.0 acres in size. The farm splits the largest fields in half or in thirds during summer grazing and fall/winter grazing. In 2022, the farm made 60 acres of hay and then grazed those five hayfields after the first cutting. Summarized data for the operation is included in Table 1.

Grazing System 2

This grazing system is a fall-calving cow-calf operation with 90 cows on 260 grazable acres (stocking rate at 2.89 acres/cow). There are 28 pastures in the system. Bred heifers are imported into the system from another farm in April, shortly after grazing commences (9 days). Summarized data for grazing system 2 is included in Table 1. Two fields adjacent to this system are cut for hay, but only one is grazed and included in the system after hay cutting as it is used as a calving pasture. This field during calving was grazed for 53 days. The Average Grazing Days per Pasture rotation ranged from 2 days to 59 days (the latter number indicating strip-grazing in an 18-acre stockpiled field). During late fall and winter grazing, stock density was increased to 10,000 to 12,000 lb/acre by combining cow groups and using polywire to subdivide fields.

Grazing System 3

Grazing system 3 is the most intensive of the ones we studied. This operation included 32 cows on 65 acres for a stocking rate of 2.023 acres/cow. The fields are divided into 34 paddocks with an average of 1.90 acres in a paddock. This system included one paddock of winter annuals followed by summer annuals. Additionally, cattle are grouped into four groups of eight cows each, which are rotated through eight-nine paddocks per group. Cattle are rotated on an average of every 5 days. All hay in the system is imported.

Grazing System 4

Grazing system 4 consisted of seven paddocks on a total of 29.9 acres. In Grazing System 4, bred heifers grazed a total of nine days in the early spring before being sent to Grazing System 2. After the bred heifers were removed, 36 replacement heifers were turned out in Grazing System 4 in May. Six heifers were put into each of the six paddocks similarly sized paddocks. There they continuously grazed from May until grass ran out (late October). Forage was then stockpiled until January, when the heifers were grouped and the fields were strip-grazed. The average stock density from May to October was 4,921 lb/acre. The strip grazing stock density was 21,171 lb/acre while the yearlong stock density average was of 8,536 lb/ac. Most notably, with the continuous grazing conducted from May to October, the total rest was affected greatly with only 79 days of rest through the entire year. This rest period was primarily due to the long rest period between October to January. It is also worth noting that, due to the onset of winter dormancy, most of this period should not be considered “rest” as little to no forage growth was occurring.

Table 1 – Grazing System Summary Data

Grazing System Metrics	Grazing system 1	Grazing system 2	Grazing system 3	Grazing system 4
Number of Pastures	28	28	34	7

Stocking Rate Acres/cow	3.09	2.89	2.02	0.92
Average Acreage in each Pasture	12.7	8.9	1.9	4.3
Average Stock Density/acreage (lbs)	5013	7149	6502	8536
Actual Grazing Days Average	11	8	5	75
Total Days Grazed per Pasture	51	19	23	153
Rest Days Average	32	41	41	56
Max Grazing Days in pasture	56	53	22	181
Rest Days Minimum	18	23	7	9
Total Rest in Individual Pasture	133	156	151	67
Total Days Grazed	278	295	230	195
Cow Grazing Days Per Acre	89.9	102	113	N/A

Discussion and Interpretation

In comparing these systems, tradeoffs regarding stocking rate, stocking density, grazing rotation length and rest time become apparent in their impact on cow grazing days an acre. System 1, due to a slightly lower stocking rate, grazed 278 days. System 2, due to its smaller paddock size relative to the herd size, maintained a higher stocking density, which helped keep the average grazing days per rotation lower and increase the rest in each field. These practices helped them graze longer (295 days) despite a higher stocking rate. System 2 also had a greater cow grazing days/acre, due to greater grazing efficiency.

In comparing both Systems 1 and 2 to System 3, it becomes evident that a higher stocking rate is likely responsible for the lower days grazed in a season (230 for system 3 versus 278 and 264 for systems 1 and 2, respectively). Furthermore, increasing the stocking density and thereby increasing the rest days might also have a further impact in increasing the calendar days grazed (i.e. combining the four groups into two groups and rotating more frequently through more pastures). However, the Cow Grazing Days an acre for System 3 is the highest (113 days), indicating a greater efficiency of forage utilization. If we were to decrease our stocking rate to one more comparable to System 1 or 2 while managing a high stock density, we could expect to be able to graze longer than either of those systems.

With only replacement heifers grazing continuously for most of the year, we did not calculate Cow Grazing Days per acre for System 4. In a continuous grazing system, we feel this number may not accurately represent grazing efficiency.

The web-based recordkeeping app, PastureMap™ made these records simple to obtain and calculate. However, you can easily calculate Cow Grazing Days per Acre without PastureMap™. You simply need to know the days grazed, the number of animals in your herd, and the acreage of the grazing system. The additional records that PastureMap can provide can show specific areas to adjust or change.

These producers, along with several others, will continue to use the program this coming grazing season. We look forward to sharing similar producer data in future articles.

For more information contact John Benner or any member of the Graze 300 VA Team.