GRAZING MANAGEMENT PLANNING WORKBOOK

Leverage the power of planning to optimize resilience of your operation



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OPERATION DETAILS

Operation Name: _____

Grazing Management Plan Owner: _____

Date Created: _____

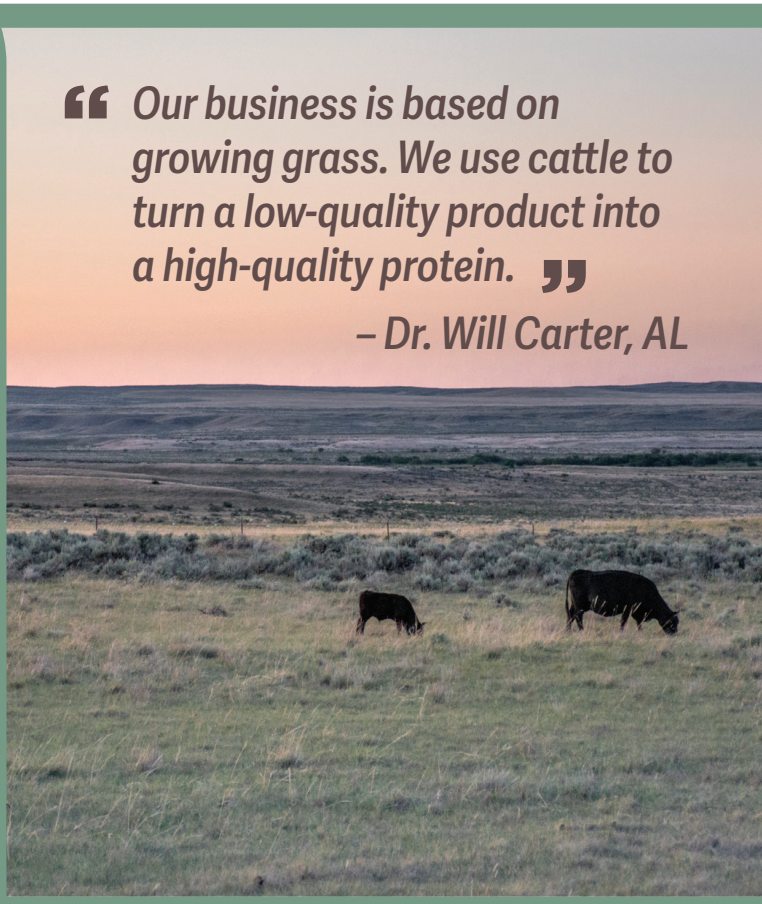
Review Cycle: _____

User Tips
Review the entire workbook before filling out sections to ensure that information is properly placed.
The U.S. Roundtable for Sustainable Beef Grazing Management Plan Development Module supports topics covered in this workbook.
The section, "Utilizing a Grazing Stick", located at the end of this workbook identifies key metrics that are referred to throughout the workbook. These metrics are identified with the following symbol:



IMPORTANCE OF A GRAZING MANAGEMENT PLAN

Implementing a grazing management plan (GMP) helps to inventory resources and provides a roadmap to improved pasture management. Having a GMP is essential to the success, longevity and profitability of your operation. A GMP is a resource that helps to optimize productivity of the land through implementation of cost-effective practices that support forage growth & quality, cattle productivity and improved environmental factors. It can help to further the farm or ranch's resilience and increase the efficiency of the operation.



GRAZING MANAGEMENT PLANS SERVE TO:

- Enrich grazing lands conditions
- Maximize water resources
- Improve soil condition and forage quality
- Optimize cattle grazing and pasture utilization
- Enhance wildlife habitat
- Identify risk factors and implement response actions

Grazing management decisions made today can have a **lasting impact** on the **success of your operation.** Through the development and regular use of a written GMP, you will be able to **track and evaluate methods** for **protecting and improving** your operation.

This template serves to provide a **starting point** in developing a **personalized grazing management plan** that benefits the goals of your operation. A grazing management plan is designed to be reviewed often for the changing needs of your grazing strategies. An **annual in-depth review** in addition to frequent references will ensure that the plan stays up-to-date and represents the practices that are most beneficial to your operation.

FARM & RANCH RESOURCE INVENTORY & CONDITIONS

This ranch & farm resource inventory is an opportunity to take an assessment of available resources, particularly those related to grazing management. Later in this workbook is a section to inventory wildlife resources, particularly wildlife species, habitat and income generated from outdoor-recreation.

Land Resource Inventory

Total Acres	Grazeable Acres	Non-Grazeable Acres	Total # of Grazing Units (Pasture/Paddocks)

Forage Resources and Inventory

Desirable forage species found in grazing units
Undesirable/invasive plant species found in grazing units
Estimated total forage production (lbs. of forage per acre)

Grazing-related Infrastructure

Describe the grazing-related infrastructure on your operation (e.g., fencing, facilities, watering units, human capital, etc.)

Additional Farm & Ranch Inventory Considerations

Climate and weather	
Native plants, animals, and habitats/ecological systems	
Rare or unique plant or animal populations	
Soil health and soil types	
Water quality and water cycle evaluation	
Streamside/riparian areas and wetlands	

Farm & Ranch Resource Inventory & Conditions Reflection & Notes

How does this inventory show strength in your operation?

How can these resources be improved?

What resources could be added to improve the operation?

What advisors could be utilized to help inventory-specific resources?

Notes:

GOALS & OBJECTIVES

After reviewing key resource inventory and condition items, identify goals and objectives you would like to accomplish on your operation in relation to grazing management. Each goal will have one or more objectives that provide the measurable steps or actions needed to achieve the goal.

As you are creating your goals, remember to make them SMART: Specific, Measurable, Achievable, Relevant & Time bound.

Goal	Objective(s)	Return on Investment	Timeframe

Goals & Objectives Reflection & Notes

What outcomes are you looking for at the operational level or in individual pasture units?

What is driving your goals?

What opportunities exist for improvement in your operation?

Are there technical advisors that can help to identify actionable goals and steps to achieve your objectives?

Notes:

STOCKING RATE & PASTURE UTILIZATION

The stocking rate is one of the most important decisions grazing managers will make because it directly affects animal performance and ecological resources. Each operation calculates and determines stocking rate differently and utilizing grazing resources and technical advice can help to determine the best method for your goals. Use this space to define how stocking rates are determined for your operation and what factors are considered when adjusting rates.

Total Operation Grazing Acreage	Animal Unit (AU) Capacity *(1,000 lb cow with calf = 1 AU)*	Current AU	Method for determining stocking rate	Stocking Rate *(# of animal units per acre for a specified amount of time)*

Operation-wide methods for calculating and factors for adjusting stocking rates.

Operation-wide methods for determining grazing utilization. *(When to start a grazing unit, move animals, rest a grazing unit, etc.)*

Evaluation of Pasture Utilization

On a scale of 1 to 10, how well are you currently utilizing your pastures? *(1 being under-utilized, 10 being over-utilized)*	

What are you currently doing to improve your utilization performance?

Define pasture utilization success for your operation in:
1 Year
5 Years
10 Years

Your operation-specific grazing management plan may also include plans for individual grazing units. Utilize this table, or if additional space is needed, create a separate table to evaluate and plan next steps for specific units.

Grazing Unit			
Acres			
Stocking Rate			
Monitoring plans			
Pasture Utilization factors to observe			
Forage Production			
Pasture Rest Days			

Stocking Rate & Pasture Utilization Reflection & Notes

What grazing method(s) have you used on your operation in the past?

How have the grazing method(s) impacted animal performance? Pasture condition and quality? Overall operation goals?

What operation goals are driving your stocking rate and pasture utilization decisions?

What additional information, assessment or expertise might you need to gain to make stocking rate and pasture utilization decisions?

Could technical experts input help to optimize pasture utilization?

Notes:

PASTURE MANAGEMENT

Pasture management plans include management actions related to pasture establishment, application of inputs, grazing infrastructure, water and prescribed burning (if applicable). Use the following sections as relevant to your operation to consider pasture management actions.

Pasture Establishment and Renovation: *(includes soil health, plant species, weed control, etc.)*

Management tasks during utilization	Off-season management tasks

Application of Inputs: *(includes fertilizer, pesticides, etc.)*

Management tasks during utilization	Off-season management tasks

Grazing Infrastructure: *(includes fencing, cattle guards, access roads, shelters, etc.)*

Management tasks during utilization	Off-season management tasks

Water Resources: *(includes water quality, water quantity, water distribution, etc.)*

Management tasks during utilization	Off-season management tasks

Prescribed Burning

Prescribed burning is a tool some producers use to improve plant production and forage quantity or quality by controlling invasive or undesirable plant species. Utilizing prescribed burning depends on geography and management goals and technical assistance should be consulted before implementing this management practice.

Timing	
Equipment Needs	
Personnel and Partners	
Regulatory Considerations	
Health and Safety Priorities	
Special Considerations	

Pasture Management Notes & Reflection

What pasture management method(s) have you used on your operation in the past?

How have these method(s) impacted overall operation goals?

What operation goals are driving your pasture management plans?

What operational goals will be most influential in making pasture management decisions?

What technical assistance or expertise can be utilized to establish pasture management practices or improve preexisting practices?

Notes:

WILDLIFE RESOURCE INVENTORY & MANAGEMENT

Wildlife resource inventory and management plans include an assessment of potential for wildlife resources. This element of the workbook also identifies important factors to manage that can help to achieve desired/optimal wildlife resource conditions.

	Current State	Desired Future State	Management Strategies
Native plant community composition and structure			
Native fish and wildlife populations *(game, non-game and rare or unique species)*			
Habitat conditions			
Income from wildlife-based enterprises (e.g., hunting, fishing), mitigation credit sales and other marketable ecosystem services			

Wildlife Resource Inventory Management Reflection & Notes

Why is wildlife resource management important to your operation?

How can improving wildlife resources benefit your operation or provide new opportunities?

What wildlife resources need to be assessed on your operation?

What additional expertise from advisors might you need to bring in to create a wildlife resource management plan?

Notes:

CONTINGENCY PLANNING

A contingency plan is designed to inform management actions and decisions in unforeseen circumstances. It's a tool to assist you in adjusting your grazing plan to ensure resource management and economic feasibility without resource degradation.

Risk Area	Special Criteria	Actions	Resources Needed
The general name of the area of risk.	*Additional detail about the situation which may trigger various actions.*	*A list of the primary actions in response to the crisis or problem.*	*Resources needed to implement the actions.*

Contingency Planning Reflection & Notes

What are the areas of highest risk for your operation?

What implications could these risks have for your operation?

What actions could you take to mitigate risk?

Who can help assess risk and consult on mitigation strategies?

Notes:



UTILIZING A GRAZING STICK

This document was developed with the help of the resources on grazing sticks from South Dakota State University Extension and the Oklahoma Cooperative Extension Service.[1,2]

Grazing sticks can be an effective and low-cost tool for producers to use in the grazing management planning process. Utilizing a grazing stick can enable producers to determine the production of their pastures for various types of forages, which is important for determining stocking rates for pasture units, tracking forage production over time and developing a successful grazing management plan.

Plant leaf height measurements are taken by the grazing stick to estimate the amount of production using the average height of the grasses. For each inch of leaf growth, the grazing stick estimates the amount of dry plant material in pounds. These measurements can be used in calculations to determine stocking rates for your operation. Outlined below is a step-by-step guide to utilizing a grazing stick in your grazing management planning process.

1. Measure Forage Height

Gathering measurements for an adequate representation of the forage heights in your pastures is important. It is recommended to take at least 15-20 measurements per pasture. Ensuring that these measurements are taken throughout the pasture to represent the entire pasture unit is important to getting an adequate representation. These measurements should be random and represent the forage growth of the entire pasture not just low or high producing areas.

To determine forage height, follow the below steps:

a) Place the grazing stick upright at the base of the plant and measure the height of the leaves.

b) Gently push your hand down into the canopy and record the height where you start to feel resistance indicating that most of the plant leaves are touching your hand.

c) If there are various forage types at different heights, measure the representation of the various species.

d) If possible, measure plants that are upright, however, if only trampled forage or lodged forage is available, hold the forage upright on the grazing stick to obtain a measurement but do not stretch the plant beyond its natural stand.

e) Add together your measurements in inches and divide by the number of total measurements to obtain the average height of forage in the pasture.



2. Determine Forage Coverage and Forage Type

Forage cover refers to the relative closeness of desirable plants across the pasture unit. Determining forage cover is done by understanding the ground cover and thickness of desirable plants. Forage cover should only consider forages that will be utilized in the grazing system and should discount for undesirable forage cover. Excellent forage cover would have greater than 85% coverage and the forages should be vigorous. Average/good forage cover would represent a coverage of 50 – 85% of the forages in the pasture unit.

To determine forage cover, follow the below steps:

a) In the same location as where you have measured forage height, slide your grazing stick horizontally at the base of the forage below the forage cover with the ruler side facing up.

b) Count the uncovered, visible, inch marks out of 33 marks to obtain a covered number of marks out of 33.

c) Multiply the covered inch marks by 3 to estimate the percent forage cover. (e.g., 25 covered inch marks multiplied by 3 would equal to 75% forage cover)

Forage type factors into forage production and should be considered when calculating stocking rate. Identifying forage species in your operation not only factors into forage production but can also help to determine growth periods and calculate air-dry weight of forage in your pasture. Forage types have varying growth heights that should be considered when making management discussions and to determine when to not graze certain forages. Your grazing stick will list a variety of forage types to assist you with your calculations. The grazing stick will have start and stop heights for different forages which will come in handy in quantifying forage production in step 3.

3. Quantify Forage Production

Now that you have forage cover and forage type you can determine estimated dry matter in pounds per acre inch (lbs/acre inch). This metric can then be used to determine forage production in pounds of forage per acre. Most grazing sticks will have tables, such as Table 1 below, which show the estimated dry matter in lbs/acre inch using forage type and forage cover. The value on the table indicates the estimated standing dry matter in lbs/acre inch for the forage type you select.

To determine estimated dry matter in pounds per acre inch, follow the steps below:

a) Identify the most common forage type in your pasture from Table 1.

b) Use your previously calculated forage cover (step 2) to assist in determining your estimated dry matter in pounds per acre inch. If your forage cover is 50-85% then your dry matter in lbs/acre inch can be estimated as "Average / Good" in Table 1 below.

c) The value selected for estimated dry matter in lbs/per acre inch will be used to calculate estimated forage production below.

Forage production (pounds of forage per acre) can be determined using the measured height and the estimated dry matter in lbs/acre inch. When calculating forage production, you must also account for the residue height of forage to be left after the grazing period. The rule of "take half, leave half" of the forage leaf can be applied when making these calculations.

To calculate forage production, follow the steps below:

d) Use your grazing stick to determine the stop grazing height for each plant species (Figure 1). This indicates the height each specific forage type should not be grazed below.

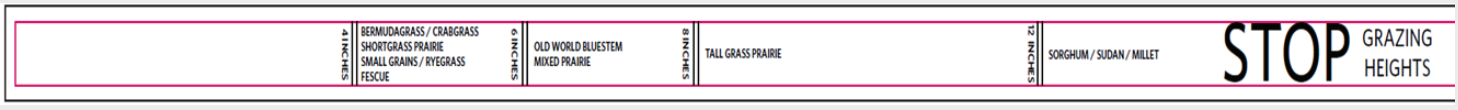
e) Subtract your desired residual height (your stop height) from the average measure forage height (calculated in step 1) to determine an available forage height.

f) Multiply the available forage height by the estimated dry matter lbs/acre inch (calculated in 3a-c above) will provide the estimated average pounds of forage per acre.

For example, the average measured height of the forage was 8 inches and if you wish to leave 4 inches of residue height there would be 4 inches of available forage height. If the estimated lbs/acre inch was 150 pounds you would multiply that by 4 for an average of 600 pounds of forage per acre.

TABLE 1. ESTIMATED AVAILABLE STANDING DRY MATTER IN LBS/ACRE INCH		
FORAGE	**AVERAGE / GOOD**	**LOW – HIGH RANGE**
BERMUDAGRASS	250	80 – 750
SMALL GRAINS / RYEGRASS / FESCUE	150	20 – 450
CRABGRASS	130	60 – 300
OLD WORLD BLUESTEM	175	90 – 485
NATIVE PRAIRIE	115	30 – 195

Figure 1. Stop Grazing Heights for Forage



4. Allocating Forage to Livestock

There are two primary equations that can help to determine the days of grazing in a pasture unit for a particular number of livestock or the number of livestock the pasture can adequately support for a given number of days. These equations determine a value by using estimated forage amounts and may need to be adjusted to ensure that pastures are properly grazed. Days of grazing can also be used to determine the number of pastures needed to meet desired days of rest for forages in a rotational grazing system. Use Equations 1, 2 and 3 below to estimate days of grazing for a pasture unit, number of animals per pasture unit and number of pastures needed for desired rest, respectively.

Equation 1: Days of Grazing for a Pasture Unit

Use this calculation to obtain an estimated number of days that a pasture unit could be grazed by a set number of animals.

$$\text{Days of Grazing} = \frac{\text{Lbs. of Forage Per Acre} \times \text{Acres} \times \text{Harvest Efficiency *}}{\text{Animal WT} \times \text{Forage Intake \% of Body WT} \times \text{Animal \#}}$$

"Harvest Efficiency" is defined as the amount of forage allocated by the manager for the animal's consumption. Common values utilized are 25% for rangeland and/or native pasture and 50% for introduced pasture. Harvest Efficiency is generally used when establishing the stocking rate for a ranch, as a whole. *Harvest Efficiency* can be substituted with *"Percentage Utilization"* for individual pasture recommendations to determine how much forage is available for a particular grazing event. An estimate of 50% is recommended when using *Percentage Utilization*, but this will vary depending on the pasture in question. Look to local advisors or range conservation specialists if you need assistance in establishing an appropriate value for *Harvest Efficiency* or *Percentage Utilization*.

Equation 2: Number of Animals per Pasture Unit

Use this calculation to obtain an estimated number of animals that a pasture unit could carry.

$$\text{Animal \#} = \frac{\text{Lbs. of Forage Per Acre} \times \text{Acres} \times \text{Harvest Efficiency*}}{\text{Animal WT} \times \text{Forage Intake \% of Body WT} \times \text{Days}}$$

Similar to calculating Days of Grazing (Equation 1), *"Harvest Efficiency"* can be substituted with *"Percentage Utilization"*. It is recommended to use *Harvest Efficiency* when setting the stocking rate at the whole ranch level within a given timeframe (usually 365 days, though can vary by location). It is recommended to use *Percentage Utilization* when estimating how many animals can graze a given pasture for a given number of days. Look to local advisors or range conservation specialists if you need assistance in establishing an appropriate value for *Harvest Efficiency* or *Percentage Utilization*.

Equation 3: Number of Pastures Needed for Desired Rest Period

Use this calculation to obtain the estimated pastures needed to give forage the desired rest period after grazing.

$$\text{\# of Pastures Needed} = \frac{\text{Planned Day of Rest}}{\text{Planned Grazing Days on Pasture}} + 1$$

References

1. *Bauman, P. (2021). Using the 'Grazing Stick' To Assess Pasture Forage. South Dakota State University Extension. Retrieved from https://extension.sdstate.edu/using-grazing-stick-assess-pasture-forage*
2. *Rocateli, A. (2016). Plan grazing management using the Oklahoma grazing stick. Oklahoma Cooperative Extension Service. Retrieved from https://extension.okstate.edu/fact-sheets/print-publications/pss/plan-grazing-management-using-the-oklahoma-grazing-stick-pss-2594.pdf*



Notes:

FURTHER RESOURCES

Grazing Management Plan Development Interactive Module

If you are looking to dive deeper into each topic covered in this workbook, go to USRSB.org/Resources or scan the below QR code to access a free interactive module, developed by the U.S. Roundtable for Sustainable Beef.

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