

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**PRESCRIBED GRAZING**

(ACRES)  
Code 528

**DEFINITION**

Managing the controlled harvest of vegetation with grazing animals

The intensity, frequency, duration, and season of grazing will be manipulated to promote ecologically sound and economically stable plant communities which will sustain all resources of the ecosystem while meeting the landowner objectives.

**PURPOSES**

This practice is applied as part of a conservation management system to accomplish one or more of the following purposes:

Grazing use, for sustainable management purposes, on browse (woody) species will not remove more than 50 percent of the current year's growth of the designated browse species.

1. Improve the health and vigor of plant communities
2. Improve or maintain the quantity and quality of food, cover and shelter available for wildlife.
3. Improve or maintain quantity and quality of forage for livestock health and productivity.
4. Maintain or improve water quality and quantity.
5. Reduce accelerated soil erosion and maintain or improve soil condition.
6. Promote economic stability through grazing land sustainability.

Severely degraded grazing lands can benefit from a grazing deferment during the growing season. Deferment should be for a minimum of three consecutive months during the growing season. The minimum deferment period for cool season plant communities should be from April 1 to June 30 and for warm season plant communities from June 1 to August 31.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to all lands where grazing animals are managed.

To be effective, all domestic grazing animals must be removed from any grassland unit being deferred.

**CRITERIA**

**General criteria applicable for all the purposes stated above.**

All facilitating practice such as; Fencing, Livestock Watering Facilities, Prescribed Burning, Wildlife Habitat Management or others that are needed to effect adequate grazing distribution as planned by this practice standard will be functional and maintained in good working order.

Grazing will be in accordance with production limitations, rate of plant growth, the physiological needs of the forage plants and management goals using the Missouri Field Office Technical Guide, USDA/NRCS National Range and Pasture Handbook and other references as guidance.

Frequency and season of grazing will be based on the growth rate of the forage specie(s) being grazed at that time and its/their physiological condition.

MOFOTG - Section II-Pasture and Hayland Interpretations. Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

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**ADDITIONAL CRITERIA:** The following additional criteria apply depending on which of the 6 purposes are being addressed.

### 1. Additional criteria to improve or maintain the health and vigor of plant communities.

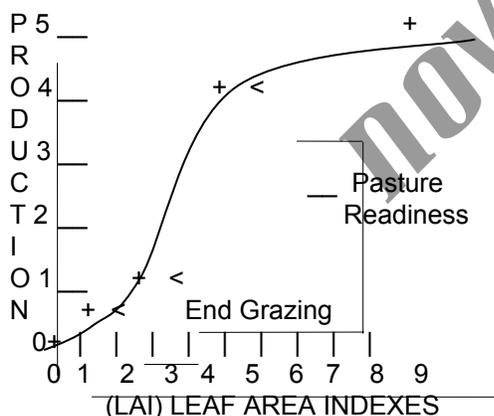
Grazing and rest periods should be scheduled to meet the desired objectives for the plant communities and the associated resources in each pasture including the grazing animals.

Use Table 1 as a guide to determine grazing efficiency (degree utilization) as well as the frequency and duration of grazing that a pasture (paddock) can safely withstand while maintaining or improving the forage resource.

Livestock should be moved based on rate of plant growth and utilization rate, not calendar dates.

Plant growth (production) is influenced by a number of factors including; rainfall, soil fertility, temperature, plant efficiency, carbon dioxide, light intensity, and leaf surface area. Of these, leaf surface area or **Leaf Area Index (LAI)** is the one factor that the grazing manager can control without requiring substantial outside inputs.

(LAI) Leaf Area Index, is the direct relationship of leaf area that occurs over a given ground surface area.



When stored carbohydrates needed for initial growth have been replaced and the **Leaf Area Index** exceeds that needed for suitable production, pastures are ready for grazing. This occurs with LAIs of 2-4. Guidance is provided in inches of growth, in Table 1, column 1.

End grazing when photosynthetic material beyond that needed to support satisfactory regrowth has been utilized. This point is reached when the "active" **Leaf Area Index** approaches 1. Guidance is given in inches of residual remaining, see Table 1, column 2.

When available, crop aftermath can be included in the grazing system to allow time for forage growth before a frost or as a forage supply to extend the grazing period.

If needed, the grazing prescription will be adjusted putting more emphasis on the maintenance or improvement of the riparian and associated upland vegetation to support planning goals and objectives for the broader ecosystem.

Grazing strategies will be adapted to meet new planning goals if significant changes in plant vigor/composition, animal kind/class or management objectives occur.

When two or more pastures are planned to be grazed only one time during the growing season, plan the rest period so that introduced grasses and/or legumes, receive a minimum of 30 consecutive days of rest during the growing season. Native grass pastures, need a minimum of 45 consecutive days of rest during the growing season. If the system is a simple rotation (3 pastures or less) grazing of native warm-season grasses should end by August 15th.

Where three or more pastures are planned to be grazed and rested multiple times during a growing season, plan the rest periods so introduced grasses receive a minimum of 20 consecutive days of rest. Legumes, with or without grass, need a minimum of 25 continuous days of rest and native grasses a minimum of 30 days of continual rest during a grazing rest sequence. Forage plants should have at least 75 total days of rest during a growing season.

To prevent grazing the same pasture at the same time each year, the grazing sequence should start in a different pasture each year.

The grazing manager should initiate a monitoring program to document actual

grazing dates, livestock performance, climatic conditions, vegetation utilization, and changes in plant communities over time. The results of these analyses will be useful in developing the following year's grazing schedule. (JS-AGRON 24 and/or JS-AGRON 29 can be used as monitoring tools)

The *severity, frequency* and *duration* of grazing determine the stability of the forage resource. The producer's wants and the pasture suitability group determine pasture kind. Using guidance given in Table 1, with the producer, develop a grazing prescription showing; Begin/End Grazing Guide (inches), Min-Max Rest/Grazing Periods (days) and Minimum Pastures Needed (number) needed to improve, or maintain, the condition and trend of the grazing resource and provide a stable and desired plant community.

## **2. Additional criteria for improving or maintaining the quantity and quality of food, cover, and shelter available for wildlife.**

Prescribed grazing, when properly applied, results in diverse plant communities capable of meeting the needs of all domestic animals and wildlife species. Manage plant height, structure and density for the desired plant diversity or wildlife species. Consider resting a portion of the grazing system during the critical nesting period (May 1 – July 15) to provide essential nesting habitat. Blocks of undisturbed nesting habitat are preferred over linear strips. Where applicable, consider using a patch-burn grazing system to increase plant diversity and enhance upland wildlife habitat.

Consider wildlife species present and develop grazing prescriptions that will provide adequate food, water, and cover. Wildlife Habitat Appraisal Guides (WHAG forms) have been developed for the major habitat communities found in Missouri. When managing for wildlife, WHAG evaluations must result in a habitat suitability index of at least 0.5 for the field, community or farm. Refer to Upland Wildlife Habitat (645) or Restoration of Declining Habitats (643) for guidance when writing grazing prescriptions on land where wildlife management is an additional concern.

## **3. Additional criteria for improving or maintaining the quantity and quality of forage for livestock health and productivity.**

Grazing should be scheduled in accordance with forage quality and quantity criteria that best meets the production goals for the kind/class of animal(s) of primary concern. (See Table 2 for growth curve quantity/quality information)

Movement of animals will be scheduled to promote animal health and performance and to reduce or prevent the spread of disease, parasites, and contact with harmful insects and toxic plants. For example, avoid planning and locating lanes, feeding and watering facilities at sites where chronic wetness may contribute to foot rot problems.

## **4. Additional criteria for maintaining or improving water quality and quantity.**

The duration, intensity, frequency, and season of grazing near surface waters will be prescribed in a manner that provides a positive impact to vegetation, ground cover, and water quality.

Appropriate levels of residue and forage residual enhance the water cycle by slowing overland flow, reducing sedimentation from sheet, rill, gully and streambank erosion. Slowing overland flow permits more water to percolate through the soil profile watering deep rooted plants and recharging aquifers.

Water yield to surface drainages or impoundments and subsurface aquifers can be manipulated by varying the grazing prescription.

Duration, intensity, frequency, and season of grazing should be planned to enhance nutrient cycling by causing more uniform manure distribution and an increased rate of decomposition.

Minimize concentrated livestock areas to enhance nutrient distribution and improve or maintain ground cover.

Locate livestock watering and supplemental feeding areas as from waterbodies as possible to reduce the potential for adversely

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impacting waterbodies with sediment and nutrients.

### 5. Additional criteria to reduce accelerated soil erosion and improve soil condition.

Maintain the amount of vegetative cover needed to prevent accelerated soil erosion due to wind or water on all areas of the grazing unit. Pay particular attention to those areas that may receive concentrated foot traffic from the grazing animals such as around watering sites, feeding areas and travel lanes. Duration, intensity, frequency, and season of grazing shall be managed to minimize soil compaction, sustain suitable levels of residue, and reduce detrimental effects on soil condition. Residue at the soil surface enhances the soil/water relationship and encourages biological activity near the soil surface improving infiltration and soil condition.

Providing the grazing animal with a high quality forage diet promotes rapid breakdown of manure and promotes a rapid rate of nutrient cycling. Use a harrow or other similar equipment as needed to break up concentrated areas of dung to maintain a more rapid of nutrient cycling.

### 6. Additional criteria to promote economic sustainability stability through grazing land sustainability.

Evaluate the economics of the forage system and associated infrastructure.

Develop a grazing system that provides forage for as much of the year as possible to minimize supplemental feed cost.

Develop a contingency plan to insure resource management and economic feasibility without resource degradation.

Reduce the loss of livestock and livestock health problems from toxic and poisonous plants.

### Additional criterion for PURPOSES 2,3,4,5 &6.

The grazing prescription chosen for PURPOSES 2,3,4,5 & 6 may be as simple as continuous grazing where stubble heights are used as the monitoring tool, or as complex as a very management intensive

grazing system where grazing and rest periods are based on growth rate and are closely monitored. The difference depends on the complexity of the resource problems, the goals of the producer and their ability to implement goals.

Use Table 1 as a guide for proper beginning and ending grazing heights.

### CONSIDERATIONS

In some cases the planned grazing sequence may be changed for short periods to take advantage of seasonal forages such as annual bromes, Kentucky bluegrass, crop aftermath and to condition pastures for grazing later in the season.

When using a management intensive grazing system, grazing should begin in the spring prior to the forage reaching the beginning grazing height shown in (Table 1). This prevents last grazed paddocks from becoming over mature and delayed loss in forage quality. The forage manager can in this way keep pastures in a vegetative state for a longer portion of the grazing period.

Supplemental feed may be necessary to meet the desired nutritional levels for animals of concern. The proper placement of supplemental feeds can be used as a method to distribute livestock grazing evenly throughout a pasture. Improper placement can have negative impacts on the soil, water, air, plant, and animal resources.

To improve animal comfort, the use of natural or artificial shelter should be considered when conditions indicate that their use would enhance the well being of the grazing animal. If artificial shade is used, it should be located as far away from waterbodies as possible. Artificial shade must be moved often to prevent destroying ground cover, increasing soil erosion and increasing nutrient concentrations.

Systems shall be developed that subject animals to a minimum amount of stress.

Inadequate supplies of livestock water will cause stress in livestock faster and more dramatically than any other factor.

Livestock water quantity and quality must be adequate to meet the demand for the specified grazing period when livestock will be in a pasture. Thirty gallons per 1000 pound of body weight should be provided daily for cattle. It is desirable to have drinking water within 800 feet of the grazing animal and constructed to provide safe access to wildlife species, especially birds.

Where livestock drink directly from a stream or other natural water bodies, care should be taken to protect water quality and the riparian zone. Salinity and nitrates are the two most common quality problems associated with livestock water. Tolerable levels for these can be found in Table 2.1 and 2.2 of the Missouri Livestock Watering Systems Handbook.

Soil testing is helpful in determining if low soil fertility is contributing to lower than expected forage production. A proper application of fertilizer can be of economic benefit in achieving a desired production goal.

Grazing programs must be tailored to meet the cooperator's goals and resources. Animal husbandry requirements, such as handling, feeding and breeding programs, may affect the design of the grazing prescription and must be resolved during the planning process.

Prescribed Grazing should consider the needs of other activities that may utilize the same land base, such as wildlife, water sheds and recreational uses.

When needed, rest areas for a period of time to ensure the success of prescribed fire, brush control, seedings or other conservation practices.

When weeds are a significant problem prescribed grazing should be implemented in conjunction with pest management to protect desired plant communities.

Consider improving carbon sequestration in biomass and soils through grazing management to produce the desired results.

## PLANS AND SPECIFICATIONS

A grazing prescription will be prepared for the operating unit or portion of an operating unit where grazing will occur. The prescribed grazing plan shall conform to all applicable federal, state

and local laws. Seek measures to avoid adverse affects to endangered, threatened, and candidate species and their habitats.

The prescription will be recorded in a manner that is readily understood and usable by the decision maker. The manner of documentation will depend upon the size and complexity of the operating unit and the detail required for a successful conclusion of the grazing plan.

### Prescribed Grazing plans will include the following information:

- Goals and Objectives clearly stated.
- Resource inventories (pasture condition, existing structures, facilities, soils, suitability groups) Document any special problems inventoried such as location of toxic plants, over or under grazed areas, heavy traffic areas and waterbodies.
- Documentation of the anticipated forage quantity and quality for each management unit, and availability.
- For each kind and class of domestic livestock and grazing/browsing wildlife species of concern, show animal numbers and their estimated forage demand. Show nutritional surpluses and deficiencies from the forage resources and supplemental feed needed to meet the desired nutritional level. Also, indicate any special needs of animals such as nesting or brooding cover.
- Develop a planned grazing schedule for livestock which identifies periods when pastures are grazed, rested, and other treatment activities, or needs, for each management unit. The grazing schedule is to be used as a guide and can not take the place of daily observations. Changing weather patterns results in significant swings in supply and demand of any forage/livestock management system.
- Provide a contingency plan, that accounts for problems with forage availability and livestock demand, and provides guidelines for adjusting the grazing prescription to

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- insure resource goals are achieved in an economically feasible manner without resource degradation. To protect against shortages in the forage supply, 10% of the management unit should be in a state of Pasture Readiness at all times.
- A monitoring plan will be developed with appropriate records to assess whether the grazing strategy is meeting the objectives.
- Appropriate stocking rates will be calculated and used as a guide to optimize utilization while sustaining or improving the forage resource. Adjust livestock numbers and/or grazing time to match forage demand to forage yield.

Use the following formulas to estimate animal numbers or grazing days:

$$A.N. = \frac{T.F.P./Ac. \times Ac. \times \% G.E.}{A.W. \times I.R. \times Days}$$

$$Days = \frac{T.F.P./Ac. \times Ac. \times \% G.E.}{A.W. \times I.R. \times A.N.}$$

A.N. = Animal Number

T.F.P. = Total Forage Production (Total above ground biomass in lbs./acre dry weight)

Ac. = Acres

G.E. = Grazing Efficiency (same as % utilization or harvest efficiency)

*Guide:*

- 1- 3 pastures = 30% or less
- 4- 8 pastures = 30 - 40%
- 8-12 pastures = 40 - 50%
- 12-16 pastures = 50 - 60%
- 16-24 pastures = 60 - 65%
- 24 + pastures = 65 - 70%

A.W. = Animal weight (pounds)

I.R. = Intake Rate in % body weight

*Guide:*

- 2.0 % for maintenance
- 3.0 % average production
- 4.0 % high production

Days = Days of grazing planned

### Grazing Efficiency

Grazing efficiency should not exceed those values listed above at any time during the grazing season

Grazing use should not exceed 50 percent for any grazing period during the growing season and will often be considerably less than 50 percent early in the growing season. Close grazing during the growing season reduces total forage production.

### Grazing and Rest Period

The length of the grazing period is determined by the length of the rest period needed for recovery of the forage resource following grazing and provides for optimum photosynthetic activity. Shorter grazing periods reduces second bite opportunities during any one grazing event.

During rapid growth, short (Minimum) rest periods are necessary; as growth slows, rest periods should be lengthened to (Maximum) at dormancy. (See TABLE 1)

$$GP = \frac{\text{Rest Period needed in days}}{\text{No. of pastures} - \text{No. of herds}}$$

(GP = Grazing Period)

Remove all livestock from a resting pasture.

The grazing sequence should begin in a different pasture each year.

### OPERATION AND MAINTENANCE

**Operation:** The manager will apply Prescribed Grazing on a continuing basis making adjustments as needed to insure that during application the plan's concepts and objectives are met.

**Maintenance:** An evaluation of the current grazing prescription and its facilitating practices should be monitored periodically to insure that all resources, practices, goals and objectives are operating as planned. If planned goals or objectives are not being met, or there is degradation of any of the practices or resources, the prescription needs to be adjusted.

## REFERENCES

USDA/NRCS - National Range and Pasture Handbook.

Missouri Grazing Manual

Missouri Grassland Planning Manual

MOFOTG - Section II Pasture and Hayland Interpretations.

MOFOTG - Section IV Practice Standards and Specifications.

Missouri Livestock Watering System Handbook

**TABLE 1  
GRAZING MANAGEMENT GUIDELINES**

Select the kind of pasture that most closely reflects the one being planned.	1/ Begin Grazing Guide (inches)	2/ End Grazing Guide (inches)	3/ Min-Max Rest Period (days)	4/ Min-Max Grazing Periods (days)	5/ Minimum Pastures Needed (number)
Single Species (single species planting)			—		
Introduced:					
grass	6 - 8 $\frac{6}{8}$	3 - 4 $\frac{6}{8}$	20-45	10-22	3
legume	8 - 10 $\frac{6}{8}$	3 - 4 $\frac{6}{8}$	25-35 (45)*	5-7 (9)*	6
Native:					
grass	9 - 12	8 - 10	30-50	10-17	4
Simple Mixtures (2-4 like species, or w/legume)					
Introduced:					
grasses/legume	6 - 8 $\frac{6}{8}$	3 - 4 $\frac{6}{8}$	25-45*	8-15*	4
Native:					
grasses	9 - 12	8 - 10	30-50	8-12	5
Complex Mixtures (5+ unlike species, or w/legume)					
Introduced:					
grasses/legume	6 - 8	3 - 4	25-45*	5-9*	6
Native:					
grasses	9 - 12	8 - 10	30-50	4-7	8

1/ Begin grazing when carbohydrates used for initial and regrowth have been replaced and the Leaf Area Index exceeds that needed for suitable production. With 7 or more paddocks grazed in a single system, begin grazing before the lowest suggested height range is reached in the first grazed paddocks to prevent later grazed paddocks from becoming over mature.

2/ End grazing when forage, beyond that needed to maintain adequate carbohydrate reserves, has been utilized. When a grazing period ends there should be photosynthetic residual remaining adequate to support vigorous regrowth. With 7 or more paddocks grazed in a single system, grazing can end at the lower range. Lower grazing heights may require longer rest periods. No more than 20% of the field should be spot grazed below the minimum grazing height.

3/ Min-Max Rest Periods provide a time period for plants to recover from grazing. The plant's potential growth rate and current growing conditions regulates the length of the rest period needed. Fast growth, means fast rotation and short (Min.) rests. Slow growth, requires slow rotation, and long (Max.) rests. The (Min.) rest period may be reduced by 1/3 if grazing efficiency in the previous occupancy is < 20%.

4/ Min-Max Grazing Periods are determined by the Min-Max Rest Periods necessary for adequate recovery of the pasture following grazing. Properly planned grazing management limits second bite opportunities.

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5/ Minimum Pastures Needed is a relationship between necessary rest period and appropriate grazing period. Increase pasture numbers to; reduce length of grazing period, increase pasture rest, enhance grazing efficiency, improve manure distribution, promote water quality and provide higher forage quality.

6/ For low growing forage species such as Bermudagrass, Old World bluestem, ladino clover and Kentucky bluegrass, use a Begin Grazing Guide of 4-5 inches and an End Grazing Guide of 2-3 inches.

\* Once flowering begins 40-45 days of rest are needed for the production of viable legume seed.

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**TABLE 2  
GROWTH CURVE**

<b>Species</b>	<b>Months</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>
		-----percent of total growth by month-----									
<b><u>Cool Season Grasses</u></b>											
KY Bluegrass		2	16	27	23	4	3	5	14	6	0
Smooth Bromegrass		3	16	20	20	10	4	8	13	6	0
Tall Fescue	6	15	18	18	7	4	7	13	9	3	
Orchardgrass		4	15	21	18	7	5	9	14	7	0
Reed Canarygrass		4	17	20	20	12	6	12	9	0	0
Red Top	2	16	27	23	4	3	5	14	6	0	
Timothy	3	12	30	30	5	5	10	5	0	0	
<b><u>Warm Season Grasses</u></b>											
Bermudagrass		0	0	15	25	25	15	15	5	0	0
Big Bluestem	0	0	10	40	35	12	3	0	0	0	
Caucasian Bluestem		0	0	10	20	30	15	20	5	0	0
Indiangrass	0	0	10	22	28	25	10	5	0	0	
Little Bluestem	0	0	13	25	25	20	12	5	0	0	
Switchgrass	0	0	15	42	30	10	3	0	0	0	
E. Gamagrass		0	0	15	20	25	25	10	5	0	0
<b><u>Legumes</u></b>											
Alfalfa		3	10	18	19	16	9	13	9	3	0
Alsike Clover	5	12	23	22	9	6	8	12	3	0	
Birdsfoot Trefoil	2	11	21	21	16	9	11	9	0	0	
Crownvetch	2	11	21	21	16	9	11	9	0	0	
Ladino Clover	5	12	23	22	9	6	8	12	3	0	
Lespedeza	0	2	17	27	21	14	11	8	0	0	
Red Clover	5	12	23	22	9	6	8	11	4	0	

The best forage quality is in the early part of the growth curve and when present the regrowth curve. Quality declines later in the growth cycle when reproductive parts become major components of growth.