



GRAZING # 3

Subject: Designing a Prescribed Grazing System

Date: February 2009

Purpose

The purpose of a prescribed grazing plan and the specifications tied to it are to help the land manager achieve an objective relating to the plant, animal, soil and water resources on the land. Grazing management plans that promote economic stability through grazing land sustainability is also the intent of this practice.

Goals and Objectives

Clearly defined and recorded goals and objectives will assist the land manager in achieving the desired results on grazing lands. Goals are broad-based, and landscape encompassing, while objectives should be specific, measurable, achievable and indicate the timeframe in which the planned for results can be expected. A resource inventory may be necessary before grazing land objectives can be adequately defined. Resource and forage inventories, analyses, consideration of alternatives, and the development of practices, treatments and monitoring plans should all be completed within the scope of the objective. The goals and objectives on the grazing operation will be recorded as part of the conservation plan. Planners are encouraged to use the Prescribed Grazing Template.

Resource Inventory

The resource inventory will document existing resource conditions and concerns, forage suitability group (when available), and the location and condition of structural improvements such as existing fence, watering facilities, and points where resource concerns are occurring. Include seasonal availability and quality of watering sites. The resource inventory may be documented on a conservation plan map or as part of the Prescribed Grazing Template.

The forage suitability group (when available) will be identified for each management unit and a Pasture Condition Score assigned. Additional information is contained in the Guide to Pasture Condition Scoring (www.glti.nrcs.usda.gov/technical/Publications) and on the Pasture Condition Scoresheet.

Forage Inventory

The forage inventory provides information for the land manager to know the proper amount of forage to harvest with grazing and/or browsing animals to maintain enough cover to protect the soil and maintain or improve the quality and quantity of desired vegetation. The inventory will record quantity of forage in pounds per acre, quality of forage indicating percent desirable species and uniformity of grazing (refer to the Pasture Condition Scoresheet), and forage species in each management unit. Special problems that restrict forage availability, use, or nutritional quality, such as toxic plants or mixed land uses, will also be documented.

Additional feed available should be considered in the inventory of forage and within the forage balance calculations. Additional feed may include, but not limited to: stored or purchased hay, crop residues, summer annual crops, turnips and other brassicas, mixed rations, silage and haylage. Supplemental feed and mineral requirements should be balanced with the forage consumption to meet the desired nutritional level for the kind and class of grazing and/or browsing livestock.

Information of field procedures for inventorying forage resources can be found in the National Range and Pasture Handbook, Chapter 4 and Chapter 5. The Grazing Calculator provides average yields and seasonal distribution of forage growth for many species and mixes used in Michigan. The data is based on the most current MSU forage research.

Forage-Animal Balance

A forage-animal balance, also known as a forage budget, helps the land manager ensure that forage produced or supplied meets the livestock and/or wildlife demand. An inventory of grazing and/or browsing animals occupying or planned to occupy a management unit is necessary so that the forage demand can be planned in relation to forage production.

Preliminary estimates of forage availability and stocking rates should be discussed with the land manager. Calculations to determine the estimated number of acres needed for grazing and/or browsing can be made with the following equations. These estimates are only a starting point for planning a grazing system and not representative of the expected forage-animal balance.

Step 1. Determine the Animal Demand.

$\frac{\text{Average weight/animal (lb)}}{\text{lb DM/head/day}} \times .04 \text{ (or supplemented figure)} = \frac{\text{lb DM/head/day}}{\text{lbs DM/day}}$
$\frac{\text{lb DM/head/day}}{\text{lb DM/head/day}} \times \frac{\text{# of animals}}{\text{# of animals}} = \text{Total Forage Need} \frac{\text{lbs DM/day}}{\text{lbs DM/day}}$

Step 2. Estimate the forage supply.

Hay Yield									
Tons/acre/year	6.0	5.5	5.0	4.5	4.0	3.5	3.0	2.5	2.0
Forage Availability	2400	2200	2000	1800	1600	1400	1200	1000	800
Lb./acre/rotation									
Forage Supply _____									
(lb./ac/rotation)									

Step 3. Determine acres needed for grazing and/or browsing

(_____ / _____)	*	_____ days	=	_____ acres
	Animal demand			Forage supply		
				number of grazing days planned (usually 3-5 days)		Paddock size
	_____ / _____		+	1	=	_____ number of paddocks
	Rest period (use 30-45 days)			grazing days		
	_____ *			_____ =		_____ number of acres needed
	Paddock size			Paddock number		

The Grazing Calculator or GSAT should be used to calculate species specific monthly forage surpluses and deficits. Reports generated by these programs will document the calculated estimates. The estimates of forage production will be used in determining stocking rates and grazing schedules.

If the current or planned forage demand exceeds the existing forage supply by 20% or more, then a re-evaluation of the pasture resource objectives with the land manager should be scheduled. An assessment should then be made as to whether the resource objective can be achieved through grazing management alone under the current or proposed stocking rate.

Grazing Plan

A properly developed grazing plan will identify periods of grazing and/or browsing, deferment, rest, and other treatment activities for each management unit. The grazing plan should be site specific and based on information obtained from the resource, forage, and animal inventories. The system should be selected by the land manager, and consider the economic factors and time constraints of the manager in performing scheduled livestock movements. The grazing system should be designed to be flexible in terms of adjusting to climatic conditions and other factors

affecting forage availability and nutritive value. Diagrams, maps, schedules or charts showing the grazing and/or browsing, rest and deferment periods by management unit will be planned through one cycle of the grazing prescription treatment.

Adequate plant recovery/rest periods during the growing season will help meet the needs of both the plant resources and the grazing and/or browsing animal. Alternatives to the number of pastures included or developed for the prescribed grazing sequence should be discussed with the land manager in terms of maintaining forage balance. Livestock movements should be based on plant growth and target utilization levels (Table 1.) and not on calendar dates. Calendar dates are only used as a guide in initial grazing schedule development and in the equations for estimating needed acres.

Table 1. Target Heights of Pasture Forage in inches

Species	Begin Grazing	End Grazing	Overwinter
Kentucky Bluegrass	4-6	2-3	3
Orchardgrass	8-10	4-5	8
Perennial Ryegrass, Tall Fescue, other non-jointed grasses	6-8	3-4	4
Tall Fescue, endophyte free or friendly endophyte	8-10	3-4	6
Smooth Bromegrass	10-20	4-6	8
Timothy, Reed Canarygrass, other jointed grasses	6-8	3-4	5-6
Big Bluestem, Indiangrass, Switchgrass	12-18	8	8-12
Eastern Gamagrass	12-18	6-8	12
Alfalfa	8-12	3	8
Alfalfa grass mix	8	3	8
Birdsfoot trefoil	10-12	5-6	6
Birdsfoot trefoil grass mix	7	4	6
White clovers	6-10	3	6
White clover grass mix	7	3	8
Red clovers, Alsike clover	8-12	3-4	8
White Dutch clover	4	2	4

Grazing heights should be followed during the grazing season. Starting the grazing season, it is not always practical to wait for the maximum grazing heights. In this situation, livestock should be removed from the paddock or unit when utilization of ½ the plant height has occurred.

Alternate the beginning paddock or unit each year. Similarly, end of season grazing heights will not be achieved for the paddock or unit that is in use. Alternate the unit or paddock where grazing ends each year. When possible, the ending unit or paddock should be one of the units scheduled for later use the following spring.

Grazing periods that are kept as short as practical with adequate recovery periods, will minimize the opportunity for livestock to re-graze plants. The greater the number of paddocks in a system, the more efficiently the animals will utilize the forage resource. When livestock stay in the same paddock or pasture for more than 15 days, the system becomes just as damaging to plant resources as continuous grazing. The recovery guidelines (Table 2.) should be used to develop the initial prescribed grazing schedule. To protect the plant resource, some species respond best when livestock are removed from pasture to allow recovery.

The periods of vegetative rapid and slow growth fluctuate widely from year to year. Grazing and recovery periods should be adjusted to reflect field observations of current growing conditions and the specific needs of key species. Table 3 lists dates at which management for recovery prior to frost is recommended.

Periods of season long deferment or rest may be prescribed to meet specific resource needs or to prepare for accelerating practices such as prescribed burns, or to follow treatments such as brush management. Refer to the Grassland Activity Dates in section IV, Ecological Sciences Specifications of the Field Office Technical Guide for timing deferments for wildlife.

Table 2. Recovery Guidelines, Michigan Grasslands (In days)

Key Species of Concern	Forage Regrowth and Vigor			
	Rapid recovery, good vigor	Delayed recovery, fair vigor	Slow recovery, fair vigor	Slow recovery, poor vigor
Kentucky Bluegrass	14	20	30	30
Orchardgrass,	14	25	30	40
Perennial Ryegrass,	10	20	20	Off
Reed Canarygrass	14	20	30	30
Smooth Bromegrass	14	25	30	40
Timothy	14	25	30	Off
Tall Fescue	14	25	30	35
Big Bluestem, Indiangrass,				
Switchgrass, Eastern Gamagrass	30	30-45	45-60	45-60
Alfalfa, White clovers	20	25	30	30
Birdsfoot trefoil, Red clovers,				
Alsike clover	20	25	30	45

Pasture recovery from drought, excessive moisture and flooding, disease, insect damage and other stress events may require extended periods for forage recovery and rest. Grazing prescriptions may also need to be adjusted when significant changes occur in plant vigor or compositions, animal kind or class, and management objectives. Grazing prescriptions for riparian area objectives will include management of intensity, frequency, duration and timing of grazing and/or browsing so that water quality is not degraded. Only short duration grazing and/or browsing of the shoreline or stream bank for a maximum of 3 days per period and when the soil is not saturated is allowed as “flash grazing.” A 30 day recovery period will be observed before another sequence of flash grazing.

Contingency plans will be developed to guide the land manager in adjusting the grazing prescription to ensure resource management and economic feasibility without resource degradation. Planning for expected and unpredictable potential problems, such as drought and flooding, up front will help to minimize damage to the forage resource. A contingency plan should consider alternatives in adjusting the grazing prescription based on the condition of existing forage reserves, the supplemental forages on hand, and past and future stocking rates

During periods of drought when forage production is low or none at all, the options include but not limited to: increase paddock size and schedule grazing periods at a “slower” than normal pace; put the livestock in a “sacrifice” paddock to concentrate the livestock while other paddocks rest and avoid damage; feed a supplemental forage supply such as hay; or reduce the herd size. There may be situations when a long drought will require all of the above to be implemented.

During periods of excessive rainfall when mud or flooding is a problem the options include, but not limited to: scheduled grazing periods at a “faster” than normal pace; placing them in a “sacrifice” paddock; changing the sequence of grazing and/or browsing to avoid muddy paddocks or pastures. There may be situations where all the above will be implemented during a long wet period. When soil moisture conditions permit, excess forage should be harvested as hay and the grazing schedule adjust to accommodate this activity.

A sacrifice paddock should be a level area with good resistance to hoof traffic. Soil erosion and manure runoff will be controlled with management and installed conservation practices. Replanting the base forages or planting a cover crop to protect the soil after the sacrifice paddock is no longer needed is encouraged.

Monitoring Plan

Monitoring will help the land manager evaluate the grazing plan; whether its meeting resource objectives and management criteria. Key areas and key plants that the land manager should evaluate will be listed in the grazing plan. Short-term monitoring of forage utilization will ensure that the forage resource is being managed at the appropriate plant heights and with adequate recovery time. Records of utilization will record, at a minimum, the paddock or pasture

in use, beginning and ending forage heights, and the length of the grazing and/or browsing period. Long-term monitoring for trends in vegetation changes over time, climatic conditions, and stocking rates will help the land manager to evaluate the impact on meeting objectives. Review of this data along with the grazing plan at least annually allows the land manager to schedule treatments for the pasture or paddocks and make adjustments to the grazing prescription.

Observations of utilization based on planned forage target heights for key species will be documented. The land manager will use the target heights to adjust the grazing prescription for livestock movement. Target forage heights are listed in Table 1.

Table 3. Approximate Date to Begin Rest for Winter Protection Michigan

Species	Upper Peninsula	Northern	Southern
Kentucky Bluegrass	NA	NA	NA
Orchardgrass Perennial Ryegrass, Tall Fescue, other non-jointed grasses; and Tall Fescue, endophyte free or friendly endophyte, Smooth Bromegrass, Timothy, Reed Canarygrass, other jointed grasses	September 1-15	September 15 - October 1	October 1
Big Bluestem, Indiangrass, Switchgrass*	August 1	August 1-15	August 15- September 1
Eastern Gamagrass**	August 1	August 1-15	August 15- September 1
Alfalfa Alfalfa grass mix Birdsfoot trefoil Birdsfoot trefoil grass mix White clovers White clover grass mix Red clovers, Alsike clover White Dutch clover	September 1-15	September 15- October 1	October 1

* Switchgrass may be grazed to the height of 6-8 inches after a killing frost.

**Eastern Gamagrass should not be grazed or hayed after a killing frost.

Operation and Maintenance

Prescribed Grazing will be applied on a continuing basis throughout the occupation period of all grazing units.

Adjustments will be made as needed to ensure that the goals and objectives of the prescribed grazing strategy are met.

Manage grazing and/or browsing animals to maintain adequate cover on sensitive areas.

The analysis of short and long term monitoring information including records of actual use will be used to determine proper adjustments in stock rates, season of use, and grazing and/or browsing schedules.

Contingency plans will be followed when climatic or vegetative conditions necessitate their implementation.

All facilitating and accelerating practices that are needed to effect adequate grazing and/or browsing distribution as planned by this practice standard will be maintained in good working order and operated as intended.

Miscellaneous

Grazing plans may include maps delineating land available for grazing, field boundaries, land use identification, location of installed conservation practices, and other details such as paddock dimensions, lanes, and watering systems.

When wildlife habitat is of equal concern to grazing, the grazing plan should be written as “wildlife-friendly.” Refer to the Grassland Activity Dates document found in section IV of the Field Office Technical Guide for specifications.

Natural resource concern areas (sensitive areas) and surface water protection may be described in a grazing plan. Management to address soil limitations may be discussed as part of the grazing schedule.

Documenting Implementation

Implementation as observed on a site visit will be recorded on the Prescribed Grazing 528, Implementation Document, found in the conservation sheet.

Land managers may be required to submit grazing records.

Grazing Terms

Controlled Grazing, Managed Grazing, Prescribed Grazing, or Management-intensive Grazing (MiG) - A type of grazing strategy that provides control of the grazing animal, emphasizing management of plant resources by both grazing and rest periods, rather than continuous intensive grazing. Typically, this system will have a minimum of 6-8 paddocks but usually more, noting that the more paddocks within the system the more efficient the system will be.

Deferred Grazing - Postponing grazing or resting an area for a prescribed period, usually to meet a specific management objective.

Flash Grazing - Livestock grazing a specified area for a very short interval where the primary objective is not for maximum grazing efficiency. This grazing event is less than 72 hours long. Minimum recovery and rest periods of the grazed area is 30 days.

Grazing management - The manipulation of grazing and browsing animals to accomplish a desired result.

Grazing management plan or grazing plan - A program of action designed to secure the best practicable use of the forage resources by manipulation of the grazing and browsing animal.

Grazing system - A specialization of grazing management that defines systematically recurring periods of grazing and deferment for two or more pastures or management units.

Key Forage Species - A single plant species (some situations two or three similar species) chosen to serve as a guide to the grazing use of the entire plant community. If the key species on the key grazing area is properly grazed, the entire plant community will not be excessively grazed.

Key Grazing Area - A relatively small portion of a pasture or management unit selected because of its location, use, or grazing value as a monitoring point for grazing use.

Planned grazing system - A system in which two or more grazing units are rested and grazed in a planned sequence over a period. Planned grazing systems are designed and applied to meet the needs of the vegetation, the animals, and the overall objectives of the operator.

Rotational Grazing - A type of grazing system that involves moving grazing animals from one pasture to another to achieve a desired management objective.

Sacrifice area - a fenced-off, small portion of a grazing management unit intentionally overgrazed and/or heavily trafficked to prevent lasting damage to the entire unit. This is only done for short periods during extreme weather conditions. Site is then deferred from grazing until it recovers, including reseeded if necessary.

Stockpiling - Resting an area at a specific time to be grazed at a later time. Resting a few acres of pasture in late summer for grazing in the late fall would be an example.