

NATURAL RESOURCES CONSERVATION SERVICE
MONTANA CONSERVATION PRACTICE SPECIFICATION

PRESCRIBED GRAZING (ACRE)

CODE 528

DEFINITION AND PURPOSE: This specification provides guidance for the planning and implementation of prescribed grazing on rangeland, pastureland, riparian areas, forestland, dormant season grazing, and winter feed areas.

I. RANGELANDS

PRESCRIBED GRAZING SYSTEM

A prescribed grazing system shall be designed that is comprised of multiple pastures that are alternately rested from grazing in a planned sequence. A grazing schedule is developed in order to regulate the time of the year grazing is to occur, the length of the grazing period, and the frequency and extent of plant defoliations.

Scheduled rest periods for plant recovery after grazing are essential, and must occur within the current or following growing seasons of the plant species to be managed. The length and frequency of planned rest periods will determine the amount of grazing utilization possible without damage to plants.

There is no single grazing system that can be applied to all situations, as every management unit is unique. Grazing systems must be designed according to management objectives and resource concerns. Resource limitations such as poisonous plants, lease requirements, and seasonal availability of water must be considered. The system must have built in flexibility to accommodate for unplanned events such as severe drought, insects, or wildfire. A contingency plan will be developed that will serve as a guide for adjusting the grazing prescription to ensure resource management and economic feasibility while avoiding resource degradation. The contingency plan will detail potential problems and identify specific “triggers” the manager will recognize and use to implement a change in management.

The forage requirements of the animals to be managed must be balanced with the total forage supply of the pasture. Consider the accessibility of forage during the period when livestock are scheduled to graze. Forage production data may be field measured (clipped and weighed) or estimated using weight units of plant species on a site-specific basis. Refer to the National Range and Pasture Handbook for guidance regarding development of initial stocking rates and accepted inventory methods. Livestock breed, age, size, physiological stage and weight must be considered to assign the appropriate animal unit equivalent factor.

Facilities such as fences and water developments may need to be developed before initiating a grazing system. For optimum livestock performance, all livestock should have access to water within a 2-hour period. Check storage capacities of wells and springs, and seasonal availability of ponds, streams, or other live water sources.

The number, size, and arrangement of pastures will greatly influence and possibly dictate the type of grazing system to be applied. The system must be designed considering water availability, fencing, and natural barriers. It must be compatible with labor resources, and ease of moving livestock must be considered. Systems that minimize animal stress will provide for higher animal performance.

In general, when designing the grazing schedule, no pasture should be grazed for more than half the growing season of key species, to avoid selective re-grazing of preferred plants. Generally, cool season species actively grow during April, May and June, while warm season species complete most of their growth during May, June, and July. This will vary locally, but serves as a guide to determining the growing season for a particular species or a plant community. For specific circumstances if grazing occurs longer than half of the growing season in a particular pasture, then that particular pasture should be completely rested for two

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consecutive years or only grazed during the dormant season the next three years. Keep in mind that areas with less than 10 inches of effective precipitation and subalpine plant communities will have a shorter growing season of only 30-45 days.

Periods of use throughout the grazing season (early, mid, late) will be alternated from year to year. To ensure reproductive recovery of key species, grazing may need to be deferred from initiation of growth until the dormant period at least once every three to four years. Where maintenance or enhancement of shrubs and/or trees is an objective, the season of use should be alternated from year to year, or the grazing prescription should provide for annual light use of browse species, to allow for woody species regeneration. Continued early spring use can reduce the potential forage production by eliminating new leaves needed to capture sunlight energy and may cause resource damage in areas where soils and streambanks are wet and more susceptible to compaction and animal trampling damage.

Calendar dates showing the time each pasture can be grazed (after establishing the initial stocking rates from the range inventory), provide an initial guide to the landowner/manager to match animal kind and numbers with plant growth and phenology, length of grazing period, target utilization levels, and frequency of grazing. As the landowner/manager becomes more familiar with plant growth and phenology, frequency and intensity of grazing of key species and the effects of weather changes from year to year, they can rely less on the calendar dates.

The season of use (spring, summer, fall, winter) within a pasture should be planned according to management objectives, plant physiological requirements, and animal nutritional needs. It must also coordinate with livestock management operations, such as breeding and calving periods.

HERBACEOUS UTILIZATION ON RANGELANDS

Target utilization levels are used to help ensure that resource objectives are met. Attaining a specified use level of key species is not an objective, but serves as a reference point to evaluate the grazing system and its effect on the desired plant communities.

Monitoring methods which may include photographs, cover and/or other vegetative data are more meaningful indicators of the effectiveness of a grazing management strategy over time than is the degree of utilization.

Target utilization levels should be planned by considering current and planned resource conditions, scheduled rest periods, and grazing tolerance of key species. Utilization tolerance of native species varies by the physiology and morphology of the plant, season of use, soil, climate, vigor and health of plants, and competition with other species.

In general, during the growing season, plant health is affected by grazing when use levels exceed 50 percent of total current year's aboveground production by reducing or stopping root growth. In the dormant season, plant health is affected by grazing when use levels exceed 65% by reducing thermal cover of remaining stems, removing carbohydrate storage sites, damaging crown buds, etc. Target utilization levels must ensure the plant has adequate leaf area and growth for photosynthesis and recovery following grazing.

In areas where rangelands are in need of vegetation improvement using grazing as a tool, (or areas receiving less than 10 inches of annual precipitation), utilization levels will not exceed 35% during the growing season on key species. In all other areas, utilization levels will not exceed 50% during the growing season on key species. (Holechek et. al. 1999 Rangelands, Vol. 21(2)).

The rate of recovery from grazing is a function of two criteria:

- (1) Factors associated with the physiology of the grazed plant, and
- (2) Environmental factors that affect growing conditions.

The primary factors associated with plant physiology are:

- a. the amount of photosynthetic material remaining after defoliation,
- b. the susceptibility of growing points to damage or removal,
- c. the ability of the plant to produce new tillers, and
- d. the ability of the plant to allocate resources to maintain a favorable shoot to root balance.

Those factors associated with environmental conditions include soil moisture, soil and ambient temperatures, fertility, and competition. Plant recovery can only occur when these conditions are favorable for plant growth.

Wildlife, insects, hail, or wildfire may also place demands on the forage resource that are beyond the control of the manager. The manager must provide an adequate recovery period following these types of harvests to sustain a healthy plant community.

Grazing strategies, which incorporate heavier utilization levels, should have a greater rest to grazing period ratio for sufficient plant recovery following grazing. Utilization levels of 60-70% during the growing season may eliminate taller-statured, cool season bunchgrasses (such as bluebunch wheatgrass and basin wildrye) within two years (especially when compounded by drought conditions). Heavy utilization levels (>60%) can be beneficial to stands with a heavy litter build-up, but should not be grazed at a high utilization level more than once in a 10-year period. When grazing frequency is low, and plants are assured adequate re-growth and recovery before being re-grazed, plants are able to withstand a higher percentage of annual use—greater than 50 percent—to be removed during the short grazing period. In these systems, grazing is scheduled at high intensity for short duration, and then rested for long periods. These systems are beneficial to reduce selective grazing and can improve competitive interactions. Any temporary heavy utilization must not contribute to site deterioration.

Grazability (factor(s) that may affect a specific animal's ability to access and/or graze rangeland forage—examples: distance from water, topography, palatability and forage preference, other site factors) and utilization levels must be evaluated using key species and key areas in order to prevent resource degradation.

WOODY (BROWSE) UTILIZATION

When designing a grazing strategy with the objective to maintain or restore woody species, the timing of grazing and recovery must consider the phenology and needs of the woody plants themselves.

Utilization of woody species will not exceed 50 percent of annual leaf and twig growth within reach of animals, unless a grazing strategy is implemented which has a high rest to grazing period ratio which allows for adequate recovery following heavier use. Wildlife use of woody browse must be considered, as it may pose special management concerns.

Other factors to consider in evaluating grazing effects on woody species are: age and size classes of key browse species; season of the year that browsing occurs; evidence of severe hedging; grazing use of plant growth older than one year; evidence of browse lines; presence of dead or dying plants; use of low preference species; and amount of reproduction of key species.

Where woody browse utilization becomes excessive, it may be an indicator that overall forage quality or quantity are not adequate to meet animal nutritional needs. Season of use, length of grazing periods, and stocking levels should be evaluated and adjusted if browse utilization exceeds planned levels.

For acceptable methods for measuring utilization, reference *NRCS National Range and Pasture Handbook, 2003, Chapter 4, Pages 4-9-4-10.*

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ESTABLISHING KEY AREAS AND KEY SPECIES ON RANGELANDS

Key grazing areas will be selected within a pasture that are representative of that unit, and can be used to prescribe and monitor grazing use. A minimum of one key area will be selected per 1,000 acres of grazing land within a pasture (i.e., on a 2,000 acre pasture, two key areas will be selected). If the entire ranch is less than 1,000 acres in size, a minimum of one key area will be selected. A key grazing area must provide a significant amount of the available forage in the pasture, and contain the key plant species to be managed. When riparian areas make up part of the pasture, key areas and key species must be selected in these areas (see *Additional Planning Considerations for Riparian Areas—Selecting Key Areas and Species*).

Key grazing areas and key species should be identified according to management objectives, resource concerns, and characteristics, which influence the pattern of grazing distribution in each pasture. It is assumed that if the key area is properly grazed, the pasture as a whole will not be excessively used. Due to the variability of grazing preference values of different range sites, there may need to be more than one key area per pasture.

Key plant species (one or more) will be selected that are important to management objectives, and will comprise more than 15 percent of the available forage by species or groups of species. Other species may be selected based on specific management considerations, such as for stabilizing streambanks, competing with noxious weeds, or wildlife habitat.

Key areas should consist of a single ecological site or grouped into ecological sites with the same grazing preferences and distribution patterns. Upland and bottomland ecological sites generally should not be grouped together as one key area as they tend to have drastically different grazing preference values. Areas of animal concentration, such as stream crossings, watering points, fence lines, or gate areas, should not be selected as key areas, as they are not representative of the whole unit. These might be considered critical areas, which may be chosen to monitor for a specific management reason.

Key areas will serve as monitoring sites used to evaluate management. Management checks should be made prior to grazing, throughout the grazing period, and during rest periods to determine the degree of use and other resource conditions, to make needed adjustments in grazing management.

Key areas may need to be reselected when significant changes in grazing management occurs, such as changing the season of use, adding structural improvements that influence livestock distribution, or changing the kind and/or class of grazing animal.

For a more detailed discussion of selecting key areas and key species, reference *NRCS National Range and Pasture Handbook, 2003, Chapter 5, Pages 5.1-5 to 5.1-8*.

LIVESTOCK DISTRIBUTION ON RANGELANDS

When evaluating livestock grazing and distribution patterns, strong emphasis should be to manage the pasture as a whole, considering both upland and riparian distribution patterns. Identification should be made of areas which are utilized heavily, and those that receive less than full use. Grazability and utilization levels must be evaluated using key species and key areas in order to prevent resource degradation. Grazability and the determination of available forage allocated to grazing include kind and class of animal, consideration of distance to water, slope, topography, species preferences and palatability, and additional site specific factors.

If a pasture contains two or more ecological sites or pasture suitability groups which have significantly different forage preference values, use patterns may not be uniform, and forage resources may not be used equally. Determine reasons for uneven use patterns, such as differences in quality of forage or long distances to high quality drinking water. Facilitating practices such as salting, water developments, fencing, trails, and herding can often be used effectively to change livestock behavior and use patterns.

Small areas of livestock concentration (fence lines, gates, supplement locations) may be expected, but should not be allowed to cause significant resource damage.

Areas within native plant communities which are seeded to improved non-native species (e.g., crested wheatgrass seeded within native rangeland areas), may pose special management concerns due to differences in seasonal forage palatability.

When provided, salt and minerals will not be placed adjacent to watering locations or in riparian or meadow ecological sites, unless specifically placed to concentrate animals for a management objective such as targeting noxious weeds or other undesirable plants. At a minimum, supplements will be placed in an adjacent upland ecological site to lure livestock away from watering areas or other sensitive areas and to contribute to more desirable grazing distribution. On large rangeland areas, place supplements a minimum of one-quarter mile away from water to encourage use of uplands.

Salt and minerals will not be located in areas where loose soil will be susceptible to wind or water erosion. Rotate salt and mineral locations periodically. Use salt troughs whenever possible.

II. PASTURELAND

Following routine winter feeding, grazing of pasture forage plants will not be allowed until forage plants grow to at least the four-leaf growth stage. Pastures may be grazed earlier in the spring before the four-leaf growth stage has been achieved only if an adequate rest period is allowed for plant re-growth during the peak-growing season (prior to June 15).

Residual grazing heights for pasture species under continuous stocking and rotational grazing are listed in Forage Harvest Management (Code 511) specification, TABLE 1. These heights are suggested to allow for plant growth and recovery following grazing. Refer to *Montana Interagency Plant Materials Handbook* for management information on individual forage species.

The planned grazing system for the pasture units must identify key species and balance forage supply with animal demand. Pasture condition and yield information will be used to determine appropriate stocking rates. Refer to *MT-NRCS Pasture Inventory Worksheet (MT-ECS-116)*. See additional specifications for planned grazing systems under Rangelands.

Occasionally pasture plants may become over-mature and livestock will reject them. In this instance mowing is desirable to maintain high quality pasture. Mowing pastures should be done only if there is a need to remove undesirable or stagnant vegetation.

Pastures must maintain an appropriate amount and balance of nutrients to be productive. Fertilizer programs will consider the maintenance requirements of the plant species, desired production levels, and soil textures. Soil tests are required prior to the application of fertilizer. Nitrogen fertilizers are used to increase grass production and split applications of nitrogen may be more effective than a single application. Phosphate applications will favor an increase of legumes in the stand. Legumes that are properly inoculated with the appropriate rhizobium will not respond to nitrogen fertilizer and may have soil test results that indicate no nitrogen fertilizer is necessary. Legumes that have not been properly inoculated will respond to nitrogen fertilization. Sulphur and other trace nutrients may be needed.

With rotational stocking methods the need to spread manure should be minimal. There may be areas of manure accumulation where continuous stocking occurs that will need to be dragged to redistribute nutrients back to the pasture.

The maintenance of vigorous stands of forage plants and an adequate fertilizer program will help control weedy plants. If new populations of weeds appear in a pasture, it may be a sign of improper grazing management. Grazing periods can be adjusted to target harvesting of undesirable plants. A combination of control methods should be initiated if weeds become a problem.

Reseeding should be the last step in making a pasture become more productive. In many cases, controlling the management of grazing animals by implementing a grazing plan, followed by correcting deficiencies in soil fertility, will be adequate to bring a pasture back to an acceptable level of productivity. Pasture reseeding should only be considered after these factors have been evaluated.

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On irrigated pastures, the type and scheduling of irrigation must be considered when designing the grazing plan. Ideally, pastures should reach field capacity following irrigation before livestock are allowed to graze.

III. RIPARIAN AREAS

This section contains additional planning considerations for managing riparian areas associated with rangeland, pasture or grazed forests. This section will be used in conjunction with the appropriate planning considerations for the specified land type or use. Riparian areas are not considered separate land units to be managed by themselves, but must be considered in the overall management of the ranch and pasture(s) for their specific resource concerns and planned resource conditions.

Considerations for establishing management objectives on riparian areas should include:

- (1) The ecological site potential and current resource conditions, including the geology, topography, soils, vegetation, hydrology, and stream characteristics.
- (2) The desired plant community which will have the ability to provide adequate streambank stabilization and cover.
- (3) The benchmark and planned condition of resources including the physical structure of stream channels and characteristics of the plant community, soils, landform, and recovery potential.
- (4) Maintaining a balance between the grazing use of upland and riparian plant communities.
- (5) Upstream and downstream influences on the stream channel and its stability.

STREAMBANK STABILITY

Streambank stability is critical for maintaining or improving riparian condition and function. Riparian functions of a stream include sediment filtering and transport, bank building, water storage, aquifer recharge, and energy dissipation. These and other stream functions are necessary to provide for beneficial uses of water and are dependent on stable streambanks. Reference NRCS *Riparian Assessment*, and *A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic or Lentic Areas*.

Streambank disturbance from grazing must be managed according to the stream type, planned resource conditions, and management objectives for the stream. Areas which should be considered of high concern are those with actively eroding banks, or high erosion potential; those that contain sensitive fish or plant species and nesting bird habitat. Riparian areas in poor functioning condition will also be considered of high concern.

SELECTING KEY AREAS AND SPECIES FOR RIPARIAN AREAS

Key grazing areas should be selected to serve as indicators of grazing management for the entire pasture. Key areas in riparian pastures must contain key plant species chosen to evaluate grazing management objectives. Key species should be selected based on their ability to provide streambank stabilization and filtering capabilities, such as native sedges and other deep-rooted grasses and shrubs. On sites where potential exists for both woody and herbaceous vegetation, key species of each type should be selected.

Several key areas may be selected in a riparian pasture. Where uplands and riparian areas are managed in the same pasture, select areas along the riparian zone, as well as upland sites.

Areas of animal concentration, such as stream crossings, watering points, fence lines, or gate areas, will not be selected as key areas, as they do not represent the pasture as a whole. They may be selected as critical areas for monitoring if chosen for specific management objectives. However, if concentration areas make up a significant portion of the riparian area, efforts should be made to relocate concentration areas away from the riparian zone.

LIVESTOCK GRAZING PATTERNS AND DISTRIBUTION IN RIPARIAN AREAS

When managing riparian areas within pastures comprised primarily of uplands, management should be directed toward proper distribution of livestock throughout the entire pasture. Riparian areas are often preferred by livestock over upland range areas, particularly during portions of the grazing period when air temperatures are hot. Several factors can influence grazing distribution in riparian areas, including kind and class of livestock, season of use, quality of adjoining upland forage, presence of off-site water and/or supplements, stream accessibility to livestock, alternative shade, and landform.

Facilitating practices are often needed to control grazing use of riparian areas due to their high grazing preference. Some of these practices include: riding or herding, salt placement in upland areas, fencing, off-stream development of high quality water, renovating and seeding uplands, prescribed burning of uplands, and placement of rock or vegetative obstacles (tree branches, brush piles, etc.,) on streambanks. Reference *Successful Strategies for Grazing Cattle in Riparian Zones* for additional practices.

PLANNED GRAZING SYSTEMS FOR RIPARIAN AREAS

A grazing system designed to maintain, enhance or restore riparian conditions will:

- (1) Specify grazing periods and outline specific recovery periods following grazing that are needed to maintain desired streambank integrity and proper functioning condition of the riparian area(s),
- (2) Specify season of use,
- (3) Outline target utilization levels which will maintain both herbaceous and woody vegetation (according to site potential) and the desired plant community.
- (4) Leave sufficient plant residue necessary to protect streambanks and filter sediments,
- (5) Be consistent with other resource values and overall management objectives, and
- (6) Manage streambank shearing and trampling to meet objectives within the grazing strategy.

Continuous or season long stocking in the growing season is not a viable option for improving deteriorated riparian-wetland areas, or for sustaining those areas in high functioning condition.

Planning the preferred season of use on riparian areas and meadows is essential to avoid over use of these areas when upland vegetation has cured and woody species become more desirable. Where maintenance or enhancement of woody species is an objective, season of use should be alternated from year to year to prevent damage to woody regeneration.

Periodically rest or defer riparian pastures from grazing during the critical growth period of key plant species, which are critical to provide streambank stability and cover.

Management should allow for flexibility regarding the timing that livestock are turned into or removed from a pasture, based on yearly variations in climate. For example, during years of below normal precipitation, livestock may tend to graze riparian areas earlier in the season and more intensively than during periods of normal or above normal precipitation. The management strategy should allow for livestock to enter the pasture earlier in the season to better utilize all available forage, and then be taken out of the pasture sooner. If this is not practical due to breeding or calving cycles, livestock should be put into an alternative "dry year" pasture when utilization target levels are met earlier than usual.

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HERBACEOUS FORAGE UTILIZATION IN RIPARIAN AREAS

Target utilization levels of plant communities within or adjacent to riparian wetland areas need to be planned in accordance with management objectives, the type of grazing system, and planned rest periods. The amount of greenline vegetation needed to keep streambanks protected, and to trap and filter sediments to maintain water quality conditions also needs to be considered. The greenline is defined as the first perennial vegetation above the base summer flow of a stream or water body.

Attaining target utilization levels on riparian vegetation is often difficult in riparian areas that are small in size and are associated with larger upland grazing areas. Livestock will be attracted to these riparian areas, so it may be difficult to keep riparian use levels within planned ranges and also achieve sufficient planned use of the upland areas. To remedy this, specific management factors should be employed that will assure temporary heavier use of the riparian area will be compensated for by providing sufficient rest periods and/or alternating the grazing season of use annually.

Adequate vegetative stubble height on the greenline at the end of the growing season is important to provide streambank stability, protect streambanks from runoff events and trap and filter potential sediment deposits. Desired vegetation that can meet these criteria are deep-rooted water-tolerant (hydrophytic) species.

Grazing management should allow for a minimum of 3 to 5 inches of stubble height to remain on riparian herbaceous species at the time of year protection is needed for peak runoff events, such as springtime flows or summer storms. Some sites may require more stubble height to protect beneficial uses. Riparian pastures that are included in a planned grazing system may not be able to meet these minimum stubble heights every year, but these stubble heights should be maintained over the course of the grazing rotation. Reference *Herbaceous Stubble Height as a Warning of Impending Cattle Damage to Riparian Areas* and *Prescribed Grazing Practices for Water Quality Protection on Montana's Grazing Lands*.

In certain stream types, when riparian areas are of high concern, herbaceous utilization levels approaching 50% may also be associated with other resource impacts such as over-browsing of desirable woody species, and causing streambank shearing or trampling. The type of soil material, amount of rock on streambanks, type and amount of vegetation, length of grazing and rest periods, and season of use all dictate how these resources are effected and to what degree. Evaluate herbaceous utilization levels, browsing of woody vegetation and streambank disturbance at one point in time to determine if management objectives are being met (in other words don't concentrate on any one objective, but always have all three objectives in mind, no matter what time of year grazing/browsing occurs).

MANAGING WOODY RIPARIAN SPECIES

Trees and/or shrubs are essential for stabilizing certain stream types and riparian plant communities. Where present, woody species act as a barrier to livestock and wildlife and they help prevent streambanks from being trampled and/or eroded by animals trailing along the banks.

Maintaining woody species for streambank protection is often the most efficient way to protect streams from degradation. Trees and shrubs can be managed to reduce animal access to streambanks. Relatively dense stands of willow, alder or other species along the stream channel will protect the streambanks from animal trampling and also provide winter and summer shelter and cover for both livestock and wildlife.

Wildlife use of woody browse species can be a significant factor when trying to maintain or restore woody vegetation.

Wildlife use should be documented in the pasture so that it is not attributed to livestock. The grazing manager should work with local and state wildlife biologists to assess wildlife use and coordinate wildlife management in the pasture.

IV. GRAZED FORESTLAND

These specifications apply to grazed forestland (also called grazed woodlands), stocked or non-stocked with trees, and where the land will remain as forestland or woodland (i.e., clear-cuts and temporary meadows).

Forage production in woodlands is transitory, as it is strongly influenced by the density of the tree canopy. Herbaceous forage is primarily produced in areas which have been opened up by timber harvest, fire, insects or disease, or in natural or cleared openings in the forest. Peak forage production occurs for several years following timber harvest, and then decreases significantly as the tree canopy increases over time. Herbaceous forage production decreases significantly when the tree canopy exceeds 30 percent cover, and becomes practically nonexistent in canopies greater than 50 percent cover. To manage for both timber and forage production, the optimum canopy cover is 30 percent.

In forestland pastures the location of key forage areas and the quantity and quality of forage in these areas are transitory in nature, i.e., changing over time. Grazing strategies must take into account the potential changes in total forage production, quality and accessibility over time, wildlife (big game herbivores such as elk and deer) forage requirements and seasons of use, and balance these with animal requirements.

Key areas shall be identified which will serve as indicators of grazing management for the entire unit. Key herbaceous or woody species will be selected which reflect management objectives and comprise at least 15 percent of the readily available forage. Key species must have high grazing preference for the season of use planned as compared with other associated species within the key area.

Target utilization levels shall be set for the key species selected, based on planned grazing periods and rest periods. Management checks should be made at least two-thirds through the grazing period to provide time for any needed adjustments.

If riparian areas are present within a forestland pasture, key areas and species must be selected in these areas. See *Section III. Riparian Areas*.

GUIDES TO INITIAL STOCKING RATES FOR GRAZED FORESTLAND

NRCS Forestland Grazing Guides, ecological site descriptions, actual data from inventory clipping or other acceptable methods will be used to determine the forage production of the pasture, and to guide initial recommended stocking rates. The forestland grazing guides and ecological site descriptions are located Section II, NRCS Field Office Technical Guide (FOTG).

Several factors interact to influence livestock distribution in a forestland pasture, and may physically limit the number of acres livestock have access to graze. These "*grazability factors*" are utilized to determine and adjust stocking rates, and include:

- (1) Slope of the land,
- (2) Distance to drinking water,
- (3) Amount of slash or mechanical barriers present, such as downed trees, and
- (4) Amount of roads and trails in the unit.

Once the total useable forage in a pasture is determined, initial stocking rates must be further adjusted to account for these accessibility and distribution limitations. This is recorded as the Adjusted Stocking Rate.

Knowledge of historical stocking rates and an assessment of current resource conditions are essential when making stocking rate decisions.

Grazability Factors and Adjusted Stocking Rate Guidelines for cattle are part of the NRCS Forestland Grazing Guides. Assessments for other kinds of livestock and wildlife must be made on an individual basis.

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FORAGE VALUE RATINGS FOR GRAZED FORESTLAND

The Forage Value Rating is an essential part of the Forestland Grazing Guide used to assess total forage quality and quantity. Forage quality, quantity and palatability are primary factors which influence livestock grazing patterns in woodlands, in conjunction with the "grazability factors."

Palatability decreases in grass species as they mature and certain species become unpalatable. For example, when pinegrass (*Calamagrostis rubescens*) comprises a major portion of the forage resource, caution must be used not to over estimate useable forage production. Pinegrass becomes undesirable to cattle after the fourth leaf stage and livestock will begin to select for more palatable species. Pinegrass is rated as "desirable" in the Forestland Grazing Guides, but in some situations after August, its actual forage rating may be "undesirable" or "non-consumed" if other forage is available. Knowledge of local conditions is important to guide these assessments.

Abandoned logging roads are often vegetated with bluegrass, clover, or other preferred species and may contribute a significant forage resource to a pasture. These areas should be evaluated for their grazing potential and management possibilities, if they comprise a sizeable area.

IMPROVING LIVESTOCK DISTRIBUTION IN GRAZED FORESTLAND

Forestland pastures often contain multiple plant communities that will have very different forage value ratings. Because of these differences in forage quantity and quality, livestock will tend to concentrate in more preferred areas and avoid others. Livestock will also concentrate in areas which have fewer limitations to grazing accessibility, such as more level terrain or close proximity to a water source.

Cattle grazing preferences in forestland situations have been documented to be in the following order:

- (1) Open Meadows,
- (2) Riparian Areas,
- (3) Open Grasslands,
- (4) Roads and/or Clearings,
- (5) Clear-cuts and/or Seeded Areas,
- (6) Open Canopy Forest (10-30%), and
- (7) Closed Canopy Forest.

Cattle will feed up to 80 percent of the time in meadows, riparian areas, and open grasslands if given free choice. Facilitating practices which effectively move livestock out of these preferred areas are essential to preventing continual re-grazing of these preferred areas. These practices include; upland water developments, fences, salting away from water sources, herding, removing debris and clearing trails for easier access.

Sheep generally do not prefer riparian areas as much as cattle. They are very efficient grazers in forestlands when herded and managed properly. Sheep grazing may be an effective tool to control noxious weeds and undesirable brush in woodlands.

Opportunities for structural improvements to enhance livestock distribution in forestlands are often limited due to the large size of pastures, multiple land ownerships, variability of topography and vegetation, cost of structural maintenance, and potential impact from timber operations.

Developing additional water sources or constructing cross fences with water gaps may often be the most efficient and effective method to achieve more uniform grazing distribution. Livestock will generally not graze

far from water and will avoid areas with no water. For example, it has been documented that in steep forestland areas, cattle would travel only one-quarter mile away from water and in gentle sloping forestlands they would travel one-half mile away. This demonstrates the tendency for areas around water sources to become over grazed and how effective additional water sources can be to change livestock distribution patterns. The quality of drinking water, slope of the land, ease of travel, and accessibility will also dictate livestock movements.

Maintenance costs must be carefully considered when designing structural improvements in forestland settings.

Timber management activities will have a significant impact on livestock movements. Harvested areas that have accumulated debris and slash cannot be easily accessed by livestock. Slash disposal will encourage use of harvested areas.

Timber management can also affect the quality and quantity of forage by manipulating the density of the tree canopy. Forage quality can be improved by stand thinning, seeding grasses, and/or prescribed burning.

Timber harvest and stand thinning can be utilized to help distribute livestock away from riparian areas if the sites are seeded to palatable grasses. Forest Habitat Types which are best adapted to livestock grazing improvements are the Ponderosa Pine and Douglas Fir Habitat Types.

PLANNED GRAZING SYSTEMS FOR FORESTLAND

Dividing a forestland pasture into several pastures to attain a planned grazing system can be accomplished by fencing, utilizing natural barriers, fencing out or rotating available water sources, herding, and influencing livestock movements through the use of salt and supplements. Controlling the timing and duration that each pasture is grazed is essential. Grazing strategies that have proven successful in transitory forestland situations are:

- (1) Alternating livestock turnout locations from year to year;
- (2) Alternating the season of use (spring, summer, fall, winter) in each pasture every year, or every other year;
- (3) Limiting grazing periods to a maximum of 30 days in each pasture where riparian areas and woody species are of concern;
- (4) Allowing complete growing season rest in each pasture once every 3 to 4 years; and,
- (5) Alternating grazing and resting treatments between two pastures or leases every other year.

Planning the grazing season of use is essential to maintain desired resource conditions and to meet livestock nutritional needs. Forestland units, which are grazed every year from spring to fall often, contain preferred grazing areas (e.g., areas close to water, riparian zones, natural openings, roads or other cleared areas) which are severely grazed, and contribute to resource degradation.

Factors which must be considered in order to plan the optimum season of use are:

- (1) Seasonal availability of forage based on snow cover, elevation and aspect;
- (2) Seasonal wetness of soils which may become damaged due to livestock compaction and trampling;
- (3) Seasonal grazing preferences between plant species to be managed;
- (4) Seasonal availability of water sources; and,
- (5) Forage quality of plants as they mature into the summer and fall.

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During spring and early summer most plant species contribute green feed to the forage base, and preference between individual plants is low, so livestock tend to distribute themselves better throughout a pasture. Livestock will also distribute themselves more evenly in the spring when there is more drinking water available for them and they need less water due to the moisture content of the forage.

Grazing each year during the "hot season" of summer and fall can contribute to the degradation of preferred plants. Grasses and forbs become less palatable and nutritious as they mature, whereas woody species maintain higher protein content into the fall. Livestock will tend to select for woody species during this time. Riparian areas that have extended green feed periods are very susceptible to excessive use during these periods.

Livestock nutritional needs must be considered during the late summer and fall. As nutritive quality of the forage decreases, weight losses in livestock are common. Moving livestock to tame pastures in the late fall is one alternative to avoid this, especially during very dry years.

Grazing systems in forestland settings must incorporate any scheduled timber harvests or tree regeneration activities. When wood production is the primary land use, grazing strategies must prevent detrimental impacts to that use. Grazing strategies can be developed to support silvicultural objectives. Wildlife use and habitat needs must be considered.

Multiple land ownerships within a watershed often results in separate land management objectives and may pose limitations to proper resource management. Opportunities to plan grazing on a watershed management basis should be explored, when practical, and be in the best interest of all landowners in order to meet resource and grazing management objectives.

V. DORMANT SEASON GRAZING AND WINTER FEED AREAS

Grazing utilization levels of herbaceous species during the dormant season (generally October-March, but will vary by location) can generally be higher than in the growing season without creating significant plant stress. The following factors must be considered when planning dormant utilization levels: amount of plant cover needed to protect soil resources, physical damage to plants if they are grazed too close, and the amount of plant height and cover needed to trap snow and retain moisture. Periods of warm weather may break true dormancy and grazing must be managed accordingly.

Planned herbaceous utilization levels during the dormant season will not exceed 65 percent use unless special considerations are given for higher use levels. In the dormant season, plant health is affected by grazing when use levels exceed 65% by reducing thermal cover of remaining stems, removing carbohydrate storage sites, damaging crown buds, etc. Planned use levels must ensure the plant has adequate leaf area and growth for photosynthesis and recovery following grazing or at the end of dormancy. Dormant season utilization levels may need to be lower than 65% to meet target objectives for herbaceous cover for spring nesting birds such as sage grouse.

Livestock will often select for woody browse during the dormant period of herbaceous vegetation, and may begin to use woody species excessively. This can be minimized by avoiding grazing access to deciduous trees and shrubs when they may have green leaves at the beginning or end of the dormant period. Utilization of woody species will not exceed 50 percent of annual leaf and twig growth. Use of woody browse species by wildlife must be considered.

Feed and mineral sites will be placed as far as possible from riparian areas or watercourses. Historically, winter feeding areas have been located along streams for a dependable source of water during this time of year. Development of year-round off-stream stock water will reduce trampling damage and build up of manure within the riparian area.

Avoid supplement feed placement near natural shelter except during periods of extreme weather conditions, i.e., wind chill, heavy snow, etc. This will protect these areas for use when they are specifically needed for calving or wind protection. Planted windbreaks may be necessary if natural shelter is limited or if woody vegetation is being overly affected by grazing. Portable shelters can also be used.

Select feeding areas to manage for a minimum of manure buildup and potential runoff into streams. Select rocky areas with good drainage or sod-bound areas. It is possible to increase plant growth on thin soils or sod-bound areas by encouraging feeding and manure spreading in these areas.

Winter feeding areas must be managed to prevent physical damage to plant and soil resources by over-concentrating animals over a period of time in the same location. The impacts from heavy concentrations of livestock for long periods of time can be minimized by rotating winter feed areas periodically, rotating feed placement within a feeding area, and reducing the amount of time livestock spend in each feed area. Encourage even distribution of animal impacts within a feeding area by changing feed placement locations, and providing artificial shelter, i.e., hay stacks, wooden shelters, equipment, etc. To avoid livestock manure buildup in feeding areas, feed in the same patterns as you would spread manure for fertilizer. Accumulated spots of manure and rotten feed may result in weed infestations.

VI. DEVELOPMENT OF CONTINGENCY PLANS FOR GRAZING LANDS

All grazing plans will include a contingency plan that details potential unforeseen environmental events such as drought, flood, etc., and a guide for adjusting the grazing prescription to ensure proper resource management and economic feasibility.

The contingency plan will include how the client will recognize the potential problem(s) in the early phases and a plan of action that will be taken to offset and minimize the deterioration of the resources, livestock, wildlife and the economics of the operation.

VII. MONITORING REQUIREMENTS FOR GRAZING LANDS

Monitoring is an orderly collection, analysis and interpretation of resource data that has been initiated to evaluate the effectiveness of management decisions to meet specific goals over an extended period of time. Monitoring techniques are different from those techniques used during the inventory process because monitoring uses the same location (permanent) on a repetitive basis over time so that comparisons can be made to analyze specific changes that may be taking place in a pasture or pastures. The monitoring information that is collected and analyzed will be useful to the producer to make management decisions for the next grazing season in a particular pasture and/or the entire ranch.

All prescribed grazing plans will include a monitoring plan that details the objectives of the landowner, location of key areas to be monitored, identification of key species, and a plan detailing the monitoring method used at each key area (if different across the ranch).

Monitoring methods gather specific quantitative and/or qualitative data that are responsive to the specific objectives identified by the landowner. For example, if the landowner is interested in reducing soil surface erosion, appropriate characteristics to measure are plant cover and bare ground. A monitoring transect that is responsive to tracking plant cover and bare ground changes over time (such as line-point and/or line-intercept to measure cover) would be an appropriate method on the identified key areas. Qualitative and to some degree quantitative data can be obtained with the use of photographs.

Most of the monitoring on a ranch will be a representative type monitoring scheme—changes over time that are found using photos or cover measurements on a transect or a point, for example, will be the same changes that take place on the surrounding landscape away from the monitoring transect—this can be a sizable area dominated by one ecological site or similar ecological sites in the same landscape position. These transects will be set up as permanent points or transects.

Critical area monitoring would include smaller areas that may have serious resource repercussions if these sites are not addressed in a timely manner—these could include a new head cut in a drainageway, a noxious weed invasion that has recently been discovered, etc. They can be evaluated with the same techniques as the representative monitoring, but are usually much smaller in size than the areas that are monitored for representative monitoring. This kind of monitoring is not necessarily permanent, but would be monitored for some period of time until the concern was eliminated or controlled.

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Site-specific monitoring can also be developed to measure responsiveness and effectiveness of a certain management technique or conservation treatment (e.g., grazing land mechanical treatment). This type of monitoring will be established on an as-needed basis with the producer. It does not replace the need for monitoring to measure the effectiveness of the grazing prescription (see the Rangeland Monitoring Fact Sheet, Montana Technical Note No. 29, April 2002 for more information and a good overall discussion of monitoring on grazing lands).

The required *minimum* monitoring requirements include:

- Goals and objectives for the ranch and the monitoring plan.
- Grazing use records outlining grazing periods (turn-in, turn-out dates) with numbers and kinds of animals in each grazing unit.
- Target and actual utilization levels of key plants in key areas.
- Assessment(s) used to evaluate monitoring goals—such as cover measurements (could be basal, ground, surface and/or canopy cover), and/or photographs of vegetation, ground cover, streambank condition, and/or other acceptable monitoring techniques. One kind of assessment may be sufficient to meet the goal(s) of a monitoring plan in one instance, while there may need to be multiple monitoring methods needed to meet a different monitoring goal(s).

Permanent monitoring plots or transects will be installed within the first two years of the development of the prescribed grazing plan. When a conservation plan is under contract (EQIP, WHIP, CSP, etc.), the assessments (e.g., cover) would be established and examined at the beginning of the contract, at some point during the middle of the contract and during the final year of the contract. Photo plots should be photographed at least every other year, but preferably, every year.

Producers are responsible for keeping documentation of their monitoring plan, including photographs, grazing use records, utilization studies and assessment method(s) data such as cover measurements.