

S Best management
333.74 practices for
N7bmpz grazing Montana
1999

BEST MANAGEMENT PRACTICES

for Grazing

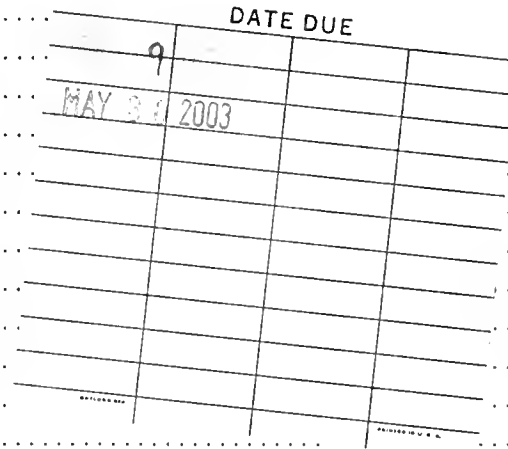


MONTANA

CONTENTS



Introduction	1
Prescribed Grazing Standard	1
Statement of Intent	1
Why Use Grazing BMPs?	3
What Are Best Management Practices?	3
Designing a Grazing Management Plan	4
Five Steps to a Successful Grazing Management Plan	4
What determines a plant's ability to recover from grazing?	9
How do I decide when to graze?	10
How much of a plant should be grazed?	11
Grazing BMPs for All Range Types	13
Grazing Management in Riparian Areas	14
Selecting key areas and key species in riparian areas	16
Livestock grazing patterns and distribution in riparian areas	17
Benefits of a Healthy Riparian Area	18
Managing for Herbaceous Plants in Riparian Areas	18
Managing for Woody Plants in Riparian Areas	18
Grazing Management on Forestlands	19
Canopy coverage	19
Selecting key areas and key species in forestland grazing units	19
Forage value ratings—what are they and how are they used?	20
Livestock distribution in forested grazing lands	20
Season of use	22
Timber management and grazing in forestlands	22
Successful grazing strategies for forestland situations:	23
An example of some points that may be included in a grazing prescription would be:	23
Grazing Management for the Dormant Season and Winter Feed Areas	24
Glossary	26



PRESCRIBED GRAZING STANDARD

The grazing Best Management Practices (BMPs) in this book were developed through the hard-work and cooperation of a diverse group of people and organizations. Representatives from MSU College of Agriculture, Society of American Fisheries, Montana Stockgrowers Association, Montana Woolgrowers Association, USDI Bureau of Land Management, USDA Forest Service, USDA Natural Resources Conservation Service, Montana Farm Bureau, and Montana Department of Natural Resources and Conservation formed the grazing practices work group to develop the Prescribed Grazing Standard from which the BMPs for grazing in Montana were derived.



INTRODUCTION

Montana's rangelands provide scenic beauty, wildlife habitat, open space, minerals, recreational opportunities, clean water, grazing forage, thousands of jobs, and a way of life for many Montanans. This book is dedicated to the stewardship of these qualities—particularly clean water. It describes Best Management Practices (BMPs) for livestock grazing designed to protect and enhance water quality, soils, plant communities, and other rangeland resources.

STATEMENT OF INTENT

The Prescribed Grazing Standard (see sidebar at left) represents a process to be used when planning a grazing system. The work group's intention is that this practice be voluntary and be used as a tool by land managers to achieve their management objectives and meet the provisions of the Montana Water Quality Act and other state and federal laws as they relate to livestock grazing.

Due to a wide range of resource conditions, management goals, and economic circumstances in Montana, there is no single approach that will work for all situations. The BMPs are not intended to be viewed as the only way to develop a grazing management system. References to the numeric levels or elements identified in the planning considerations should not be interpreted as dictating absolute standards for grazing.

It is important to understand the context in which BMPs and the term BMPs have been and will be used. This is a brief description of how BMPs fit into Montana's water quality laws. Montana law uses the term, "reasonable land, soil, and water conservation practices" when discussing the use of BMPs to address water quality concerns. "Reasonable land, soil, and water conservation practices" are defined as "...methods, measures, or practices that protect present and reasonable anticipated beneficial uses. These practices include but are not limited to structural and non-



Montana's rangelands provide scenic beauty, wildlife habitat, open space, minerals, recreational opportunities, clean water, grazing forage, thousands of jobs, and a way of life for many Montanans.

...ational controls and operation and maintenance procedures. Appropriate practices may be applied before, during, or after pollution producing activities." Montana's water quality improvement law requires the Department of Environmental Quality (DEQ) to develop and promote a system of these practices to help landowners address nonpoint source pollution. Montana's NonPoint Source Management Plan refers to the NRCS Field Office Technical Guide for agricultural non-point source BMPs. The Prescribed Grazing Standard is part of that Field Office Technical Guide.

If you work on the range, own or lease rangeland, or are concerned about rangeland resources, this book is for you. It explains how and why to use the BMPs to manage upland rangeland, forested rangeland, and riparian areas. It also describes how grazing BMPs fit into a grazing management plan, which can help get the most out of rangeland while protecting its resources. Applying these BMPs will require practice, patience, and personal judgment, but the rewards are well worth it.



As part of a grazing management plan, these BMPs can help correct resource problems or prevent them before they occur.

Why Use GRAZING BMPs?

The grazing BMPs in this book can help protect and enhance the health and productivity of rangeland. As part of a grazing management plan, these BMPs can help correct resource problems or prevent them before they occur. Use the BMPs to:

- Promote health and vigor of selected plants and maintain a stable and desired plant community.
- Improve and maintain the health and productivity of livestock and wildlife by providing sufficient food, water, shelter, and cover.
- Maintain or improve the quality and quantity of streams, lakes, and groundwater for beneficial uses and to support a viable water cycle, in accordance with state water quality standards.
- Maintain or improve soil condition in both upland and riparian/wetland plant communities.
- Promote economic stability based on the sustainable use of grazing resources.



WHAT ARE BEST MANAGEMENT PRACTICES?

Best Management Practices (BMPs) are strategies for managing the use of a resource (such as grazing land) in a manner that protects the resource and promotes ecological and economic sustainability. They are tools to help achieve grazing management objectives. They include practical ideas like placing salt blocks in strategic sites to distribute livestock away from sensitive areas, and encouraging the growth of willow, alder, and other shrubs along stream channels to protect banks from animal trampling. Using the BMPs in this book can help promote livestock health and productivity while protecting the water, soils, plants, and other vital range resources. One of the more important management objectives is to protect water quality and to remedy water quality problems sometimes caused by livestock. These BMPs can be used on upland rangelands, riparian pasture, and forested rangelands—anywhere grazing or browsing animals use these resources.

The BMPs in this book are based on the concept of *prescribed grazing*, which is the controlled harvest of plants by grazing or browsing animals managed to achieve specific objectives. Prescribed grazing was developed on the premise that grazing and browsing are integral parts of ecosystem processes on grazing lands. Montana's range plants have evolved with use from wildlife and domestic livestock. These plants are generally healthier when used, if they are used properly and not overgrazed. Prescribed grazing should be applied with this in mind.



Best Management Practices (BMPs) are strategies for managing the use of a resource (such as grazing land) in a manner that protects the resource and promotes ecological and economic sustainability.

DESIGNING A GRAZING MANAGEMENT PLAN

To realize the full benefits of Grazing BMPs, it is important to implement them as part of a grazing management plan. The plan will help manage the *intensity*, *frequency*, *duration*, and *season of grazing*. To develop a successful grazing management plan, be sure to consult with the people who will be affected when the plan is put into action, including the landowner, manager, rider, and lessee. In many cases, it may be advantageous to discuss plans with neighboring landowners. It may also be beneficial to seek advice from technical experts regarding water, soils, plant, wildlife, and livestock issues as they present themselves.



Start planning by gathering baseline information about upland range and riparian areas.

FIVE STEPS TO A SUCCESSFUL GRAZING MANAGEMENT PLAN

Step 1 – Inventory existing resources and range conditions.

Start planning by gathering baseline information about upland range and riparian areas. Make a list of grazing acreage by condition. Some agencies are now using a comparison between the existing plant community relative to the desired plant community. However, it may be easier for producer records to continue using the “range condition” concept of poor, fair, good, and excellent condition. A color-coded map of range condition is also helpful. Other items to include in your inventory:

- Acreage—of pastures/fields, noting existing plant communities—noxious species, key species in each pasture, and current and past productivity.
- Water sources—streamflow records, well records, and documented water quantity and quality concerns.
- Facilities—roads, fencelines, corrals, and buildings.
- Natural terrain features—soil types, major elevation changes, and barriers to livestock movement.



- Forage—amount of forage available and amount of forage needed to sustain the animals using the land, on a yearly basis.
- Number of livestock by kind and class; records and photos of historical grazing use along with records of past supplemental feed requirements.
- Wildlife—seasonal grazing and browsing patterns, degree of use, and migratory routes.
- Livestock grazing patterns – areas of heavy use and non-use



Step 2 – Determine management goals and objectives.

Make a list of the management goals. They probably fit within four general areas:

- Maintain and/or improve the economic value, diversity, and stability of the ranch.
- Maintain and/or improve the health and productivity of livestock.
- Maintain and/or improve the health and productivity of desirable plants.
- Maintain and/or improve the quality and quantity of water, soils, and other resources.

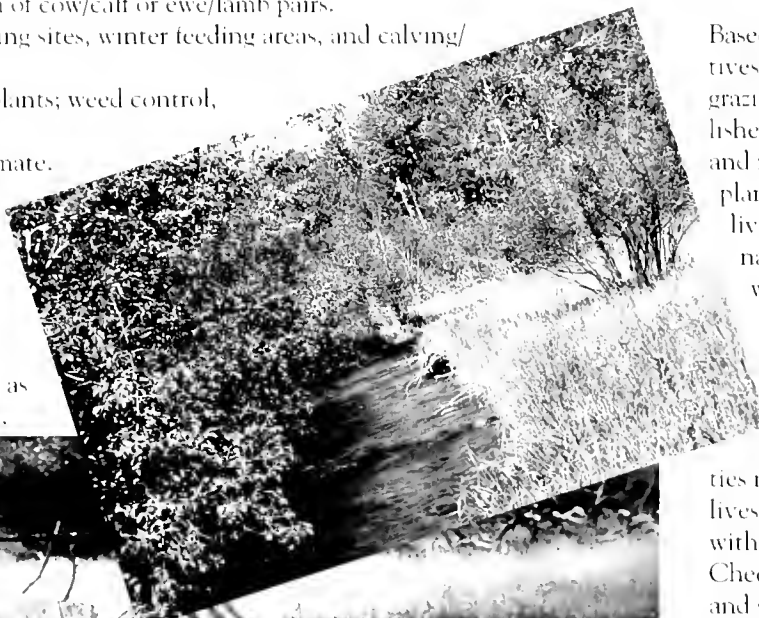
Be more specific when making your own list. Remember that your goals must take into account many different factors such as:

- Economic needs and stability, based in part on maintaining the health and vigor of the grazing lands ecosystem.
- Available acreage.



To realize the full benefits of Grazing BMPs, it is important to implement them as part of a grazing management plan.

- Number, kind, and class of livestock.
- Animal husbandry requirements, such as moving livestock to prevent or reduce disease and parasites and to limit the disruption of cow/calf or ewe/lamb pairs.
- Location of pens and corrals, watering sites, winter feeding areas, and calving/lambing areas.
- Presence of desirable and noxious plants; weed control, brush management, and chiseling.
- Growing seasons—weather and climate.
- Surface and groundwater quality, quantity, and availability.
- Terrain and soil types.
- Possible outbreaks of disease and insects.
- Grazing and browsing by wildlife.
- Other management priorities (such as wildlife management or recreation).



Step 3 - Map out two or more grazing management units.

Based on the management goals and objectives, divide the grazing land into two or more grazing units, which may already be established. These units will be alternately grazed and rested in a planned sequence to allow plants to recover. You must be able to contain livestock within each unit, using fencing and natural barriers or herding, and you will want to consider the ease of moving animals from one unit to another. When mapping unit boundaries, bear in mind the location of roads, fences, corrals, natural barriers, water sources, and shelter. Fencing, gates, or other facilities may need to be added. For optimum livestock performance, animals should be within 2 hours travelling distance of water. Check storage capacities of wells and springs, and seasonal availability of ponds, streams, or other live water sources.

Be sure to balance the total forage supply of each grazing unit with the forage needs of the animals. Consider the accessibility of forage during the period when livestock are scheduled to graze. Forage production data may be field measured or estimated on a site-specific basis. Guidebooks are available from agencies to help determine production data. Consider livestock breed, age, size, and weight when assigning the appropriate animal unit equivalent factor.

Once the grazing units have been mapped out, key grazing areas and key plant species can be

Be sure to balance the total forage supply of each grazing unit with the forage needs of the animals.



A grazing schedule provides an outline of the time of the year grazing occurs, the length of the grazing period, and the frequency and extent of plant use.

Identify key grazing areas and key species according to management objectives, resource concerns, and other influences on the pattern of grazing distribution in each grazing unit. If the key area is properly grazed, the grazing unit as a whole will not be over grazed. Remember that livestock preference varies for different types of range, so you may need more than one key area in each grazing unit.

Step 4 – Develop a grazing schedule to implement.

A grazing schedule provides an outline of the time of the year grazing occurs, the length of the grazing period, and the frequency and extent of plant use. Scheduled rest periods for plant recovery after grazing are essential, and must occur within the current or following growing season of the key plant species. The length and frequency of planned rest periods will determine the amount of grazing use possible without damage to plants. If a long rest period is planned, plants can usually sustain a greater degree of use.

In general, to avoid selective re-grazing of preferred plants, no grazing unit should be grazed for more than half the growing season of key species. Periods of use throughout the growing season (early, mid, late) may be alternated from year to year. At least once every three to four years, rest each field—do not allow grazing on it from the beginning of plant growth until seed set. This will ensure reproductive recovery.

identified in each unit. A key grazing area is a relatively small portion of a grazing unit selected because of its location, use, or grazing value. A properly selected key area may serve as a monitoring point and will reflect grazing use and effects throughout the grazing unit.

Within each grazing unit, select key grazing areas that are representative of that unit. Monitor the key areas to evaluate grazing and management on the entire unit. A key grazing area must provide a significant amount of the available forage in the grazing unit and must contain the key plant species being managed for. When riparian areas make up part of the grazing unit, be sure to select key areas and key species within those riparian areas. This may include browsing of woody species; indicating that it is time to move to the next pasture.

Key plant species are forage plants that serve as indicators—the extent of grazing on key species reflects the extent of grazing on associated species. Plants can also be designated as key species simply because they play such an important role that they must be considered in the management plan.

GRAZING SCHEDULE

		YEAR			
		1	2	3	4
PASTURE	1				
	2				
	3				
	4				
		UNGRAZED	GRAZED		

Deciding when to move livestock is often a challenge. Don't rely on calendar dates. Instead, consider plant growth and lifecycle, precipitation, length of grazing period, target grazing use level, streambank impacts caused by livestock, and frequency of grazing to determine when livestock are ready to be moved to another grazing unit.

Step 5 – Develop a monitoring and evaluation strategy.

To determine whether the grazing management plan is meeting objectives, monitor grazing use and continually evaluate the condition of livestock, range plants, streams, and soils. Keep records of precipitation levels, grazing use for each grazing unit, the dates grazing occurs, and the number, the kind of animals in each unit, and the average weight of those animals if available. Written assessments and photographs at permanent monitoring plots of resource conditions, especially streambanks and other sensitive areas, are also useful. Keep notes on the apparent trends of plant communities, and target and actual grazing levels. Record such monitoring data, at the same time each year, review it at regular intervals, and adjust grazing management as needed.



WHAT DETERMINES A PLANT'S ABILITY TO RECOVER FROM GRAZING?

A plant's rate of recovery from grazing depends on the plant's condition and its immediate environment.

Consider the Plant's Condition:

- the amount of leaf area available for photosynthesis after grazing has occurred
- the susceptibility of growing points to damage or removal
- the ability of the plant to produce new tillers
- the ability of the plant to maintain a favorable shoot-to-root balance

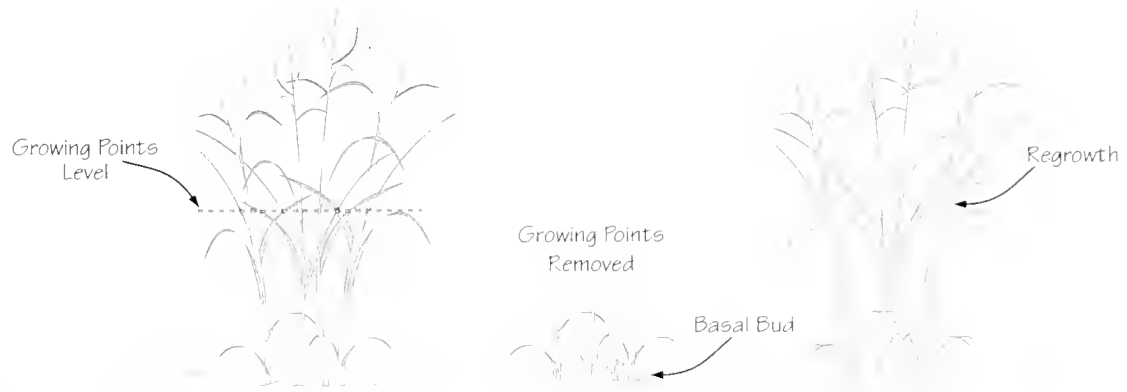
Consider Environmental Conditions:

- soil moisture
- soil and air temperatures
- fertility
- competition

Recovery can occur only when these conditions are favorable for plant growth. Wildlife, insects, hail, or wildfire may also place demands on forage plants. Provide an adequate recovery period following these types of harvests to sustain a healthy plant community.



Unelongated Tillers



Elongated Tillers

Credit - Roy Garrett "Understanding Grass Growth"

How do I decide WHEN TO GRAZE?

There is no single grazing schedule that can be applied to all situations because every grazing unit is unique. Design a grazing schedule according to your management objectives and resource concerns. Remember to consider resource limitations such as poisonous plants, seasonal availability of water, wildlife use, and lease requirements. Build flexibility into the schedule to accommodate unplanned events, such as severe drought, insect outbreaks, or wildfire.

The number, size, and arrangement of grazing units will greatly influence and possibly dictate the type of grazing schedule that can be applied. Be realistic when estimating labor resources and the ease of moving livestock. Schedules that minimize animal stress will result in higher animal performance.

Plan the season of use (spring, summer, fall, winter) within a grazing unit according to management objectives, the lifecycles and needs of plants,



There is no single grazing schedule that can be applied to all situations because every grazing unit is unique.

and animal nutritional needs. Coordinate the season of use with livestock management operations, such as breeding and calving/lambing periods.

Bear in mind that early spring use may cause resource damage when soils and streambanks are wet and more susceptible to compaction and animal trampling. Early spring use also removes new leaf growth at a critical time in their growth cycle. These leaves are needed for photosynthesis, and their removal may result in reduced forage production throughout the growing season. Pastures seeded to introduced plant species such as crested wheatgrass or Russian wildrye that have been developed primarily for early spring use can provide early spring forage for livestock while native pastures begin their yearly growth cycle.

Encourage the growth of desirable trees, shrubs, and other woody plants in grazing units, especially in riparian areas.



Plan the season of use (spring, summer, fall, winter) within a grazing unit according to management objectives, the lifecycles and needs of plants, and animal nutritional needs.

How much of a plant should be grazed?

One of the most important factors in determining when and where to schedule and distribute grazing use is knowing how much grazing certain plant communities can withstand. The grazing tolerance for most plants depends on the basic makeup of the plant, season of use, soil, climate, vigor and health of plants, and competition with other plant species. Plant health can be adversely affected by grazing when greater than 60 percent of the current year's growth is removed unless additional rest is provided from grazing.

To ensure that management objectives are being met, set *target grazing use levels* for each unit in your grazing schedule. A target grazing use level is a percentage of the plant's weight that can be removed on a yearly basis without having a negative impact on the plant's health. This level must be established on a site-specific basis that recognizes resource needs as well as management unit objectives. After assessing the condition of the rangeland in a grazing unit, set a target level for grazing use that balances animals' nutritional needs with the need to maintain a healthy plant community. Consider current and planned resource conditions, scheduled rest periods, and the grazing tolerance of key species. Setting a target level for key plant species, though not an objective in itself, will give you a reference point for evaluating grazing use throughout the unit.

Generally, if the plant community is relatively stable and healthy, plan target grazing use levels for no more than 50 to 60 percent use of the key species. The plant must have adequate leaf area for photosynthesis and recovery of growth after grazing. If the plant community is not stable, or if less desirable plants are competing for space, set lower target use levels. This percentage can be correlated for each plant species to a specific stubble height remaining after grazing. For example, on an average year, 50 percent use on bluebunch wheatgrass correlates to about a 4-inch stubble height. Remember that this level must be determined at each site.



To ensure that management objectives are being met, set target grazing use levels for each unit in your grazing schedule.

Unmunched	Slight Munch (A)	Slight Munch (B)	Light Munch	Moderate Munch	Heavy Munch
	Seedheads clipped off 10% use	20% nubbed off close 10% use	40% nubbed off close 30% use	70% nubbed off close 50% use	Whole plant nubbed off close 70% use

At heavier grazing use levels (above 50 percent), range will need a greater rest-to-grazing ratio so plants can recover. Grazing can be scheduled at high intensity for a short period, but the grazing unit must then be rested for a longer time. Such a schedule helps to reduce selective grazing and can help native plants compete against less desirable species.

In any grazing plan, grazing use levels during the growing season of greater than 65 to 70 percent may require a rest period of one-and-a-half to two growing seasons to maintain healthy plant communities. Any short-term heavy grazing use must not contribute to site deterioration.

To assess the effectiveness of your management plan, look beyond the degree of grazing use. Carefully monitor range condition and make trend estimates or measurements for at least three years or at least two rotations through the grazing schedule. Trend is the direction a resource is going. Estimate trend on the plant community that is desired. Better decisions can be made on grazing management and how grazing is affecting this plant community by monitoring trend. There may not be a drastic change in trend on rangelands within a 3-year period; however, even small changes can assist with management decisions. It takes 3 years or more of data to show true trend.



Better decisions can be made on grazing management and how grazing is affecting this plant community by monitoring trend.

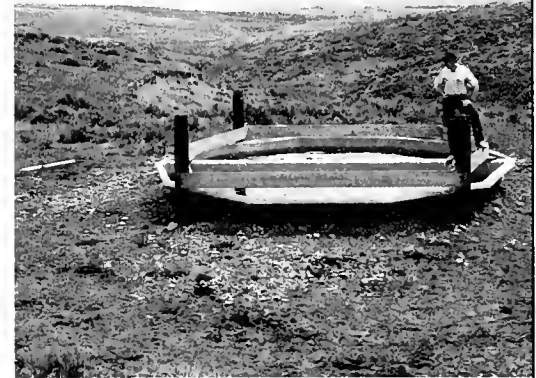
A word of caution: the effects of grazing on the plant community cannot be judged by averaging the degree of use on different plant species. The fact that one species was lightly grazed does not compensate for another species being grazed heavily. This is part of the reason it is so important to determine the key species. The key species is usually the species that will show the effects of use first or will be used the heaviest if the animals aren't moved from the pasture. Determining moving dates based on the degree of use on this key species will decrease the chance that the pasture will be overgrazed. If the plant preferred by livestock isn't overgrazed it is pretty safe to assume that the others won't be. The same applies to range conditions within each management unit. If part of the grazing unit is untouched, but another section is continually and heavily grazed, averaging the two extremes will not give you an accurate picture of overall conditions. Keep track of the grazing use in different areas of your pastures, especially those that are large in size. Animal distribution may be improved through riding/herding, salting in unused areas, or developing water sources in areas that are not used because of their distance from the water source.



To assess the effectiveness of your management plan, look beyond the degree of grazing use.

GRAZING BMPs for All Range Types

- Set target grazing use levels in accordance with production limitations, plant sensitivities, and management goals. This will help ensure the health of the desirable plants in a grazing unit.
- Manage the frequency, duration, season of use, and intensity of grazing to promote desirable plant communities and the optimal productivity of key forage species.
- Manage grazing to maintain or restore riparian and upland plant communities. Maintain enough vegetative cover to prevent accelerated soil erosion by wind and water.
- Manage livestock to protect streambanks from trampling and erosion. Distribute livestock to promote the dispersion and decomposition of manure and to prevent the delivery of manure to water sources.
- Promote an effective water cycle by properly managing upland range and riparian resources.
- When evaluating livestock grazing and distribution patterns, it is important to manage the grazing unit as a whole, considering both upland and riparian distribution patterns. Identify areas that are heavily grazed as well as those that receive less than full use.
- Examine livestock behavior to determine reasons for uneven use patterns, such as differences in quality of forage or distance to high-quality drinking water. Consider livestock distribution when seeding pastures with improved forage species, which may create differences in seasonal forage palatability within a grazing unit. Use salting, water developments, fencing, trails, and herding to change livestock behavior and use patterns.
- Distribute livestock away from places where animals tend to congregate—water sources, fence lines, gates, supplemental feed and mineral sites. Periodically rotate feed and mineral sites.
- Place salt and minerals away from water sources, preferably in uplands, to better distribute grazing. On large grazing units, place supplements a minimum of one-quarter mile from water to encourage use of uplands. Do not place them in riparian areas or in meadows, unless you want to temporarily concentrate animals for a specific management objective, such as targeting noxious weeds or other undesirable plants.
- Locate salt and minerals in areas where loose soil will not be susceptible to wind or water erosion. Salt troughs help keep the salt in the animals, not on the ground.



Proper water placement can aid with livestock distribution within a pasture.

GRAZING MANAGEMENT IN RIPARIAN AREAS

A *riparian area* is the green zone immediately adjacent to streams, rivers, lakes, and ponds. Water and land interact here, and the plant community is shaped by the presence of water. Riparian areas often feature sedges and rushes, willows, alders, cottonwoods, and other deciduous shrubs and trees.

Although riparian areas are special, don't think of them as separate lands to be managed by themselves. They should be integrated into the overall grazing management plan—as part of larger grazing units—with consideration given to specific riparian resource concerns and management objectives. To develop management plans for riparian areas consider the following guidance.

- **Tailor the grazing approach to the specific riparian area under consideration.** While streams and riparian areas can be categorized or classified into types, each remains unique; and what constitutes “appropriate management” will be specific to your site and your objectives.
- **Incorporate management of riparian areas into the overall management plan for the whole operation.** Riparian areas comprise only a small portion of any ranch or grazing allotment, and proposed actions on them must be managerially feasible as well as ecologically sound. Consider the impact on the overall operation of actions intended to improve or maintain riparian areas. Remember: what is done in the riparian areas may affect uplands and vice versa.



A riparian area is the green zone immediately adjacent to streams, rivers, lakes, and ponds.



Although riparian areas are special, don't think of them as separate lands to be managed by themselves.

- **Select a season or seasons of use so grazing occurs, as often as possible, during periods compatible with animal behavior and conditions in the riparian area.** No season is “best” for grazing livestock in riparian areas. Livestock will affect riparian vegetation and physical conditions differently depending on many factors, including the time of year, the site's physical characteristics and condition, the stage of plant communities in both the riparian area and the uplands, and the current weather.
- **Control the distribution of livestock within the targeted pasture.** Ultimately, it is not the length of time cattle are in the pasture, but the amount of time they are actually in the riparian area of that pasture that determines the amount of grazing impact. It is important to encourage livestock to move away from the stream.

- **Ensure adequate residual vegetative cover.** How much and what type of vegetation exists on a site determines how well the riparian area performs its functions. In many situations, projections of residual vegetation must include probable wildlife use after livestock are removed.
- **Provide adequate regrowth time and rest for plants.** For plants to remain vigorous and productive, they must have time for growth, seed development, and storage of carbohydrates.
- **Be prepared to play an active role in managing riparian areas.** Success in maintaining or enhancing riparian health is dependent more on the degree of operator involvement than on what grazing system is employed. For a system to be effective, the land manager must be willing to monitor the effects of the system and to respond accordingly by making management adjustments where needed.



Streambank stability is an important concern in riparian areas.

Streambank stability is an important concern in riparian areas.

When banks erode, productive land is lost, sediment can be contributed to the stream, damage from high flows is more severe, and less water is retained along the banks and in the ground. Areas of high concern are banks that are actively eroding or that have high erosion potential, riparian habitat for sensitive fish or plant species, and riparian areas in poor functioning condition.



SELECTING KEY AREAS AND KEY SPECIES IN RIPARIAN AREAS.

Key grazing areas should be selected to serve as indicators of grazing management for the entire grazing unit. A key area in a riparian area should be indicative of the rest of the riparian areas in the pasture. If the riparian area is part of a riparian pasture, it should be representative of the pasture. Key areas in riparian grazing units must contain key plant species 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 both woody and herbaceous plants will grow, select key species of each type.

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

Areas of animal concentration, such as stream crossings, watering points, fence lines, or gates, should not be selected as key areas because they do not represent the grazing unit as a whole. These types of areas would be considered critical areas. Critical areas are established to monitor a specific resource concern or goal. Do monitor these areas and redistribute livestock to prevent resource damage, particularly when animals concentrate in the riparian zone. However, critical areas should not be used to evaluate the condition or health of the rest of the pasture. The critical area only tells you what is happening in that critical area!

Management options to maintain or restore the health of riparian areas:

- Alternate livestock turn in locations from year to year.
- Set grazing periods and specific rest periods to protect streambank stability.
- Alternate the season of use from year to year.
- Set target grazing use levels to maintain both herbaceous and woody plants (according to the site's potential) and the desired plant community, and monitor use each year to be sure you are meeting your objectives.
- Leave enough plant growth to protect streambanks and filter sediments.



A key area in a riparian area should be indicative of the rest of the riparian areas in the pasture.

- When upland forage cures after the growing season, livestock seek out woody browse in riparian areas and meadows, which can result in over use. To maintain or improve the growth of woody shrubs and trees, plan the season of use accordingly and alternate the season of use from year to year.
- Periodically rest or defer riparian pastures during the critical growth period of plant species that are essential to provide streambank stability and cover.
- Be flexible in deciding when to move livestock into or out of a grazing unit to accommodate yearly variations in weather. For example, during years of below normal precipitation, livestock may tend to graze riparian areas earlier in the season and more intensely than during times of normal precipitation. Plan to put livestock into that grazing unit earlier in the season to make better use of all available forage, and then take them out of the unit sooner. If this is not practical due to breeding or calving/lambing cycles, livestock should be put into an alternative “dry year” pasture when target grazing use levels are met earlier than usual.
- Provide off-site water in locations where adequate forage is available on upland sites.

- Develop riparian pastures to be managed as a separate unit where feasible.

- Monitor livestock forage use. Move to the next grazing unit when livestock reach the desired herbaceous plant use level or start choosing to graze woody species such as shrubs and trees rather than more herbaceous forage such as grass and forbs



Key grazing areas should be selected to serve as indicators of grazing management for the entire grazing unit.

LIVESTOCK GRAZING PATTERNS AND DISTRIBUTION IN RIPARIAN AREAS.

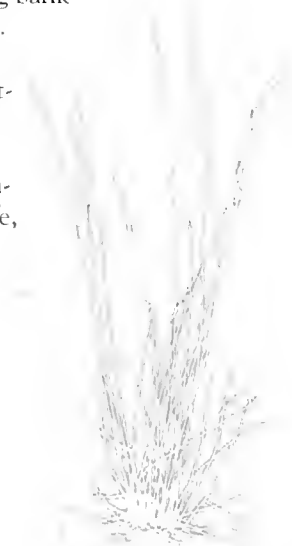
On upland grazing units that contain riparian areas, take care to distribute livestock throughout the grazing unit. Riparian areas are often preferred by livestock over upland range, particularly during hot weather. A number of methods can be used to control grazing of riparian areas and to redistribute livestock.

- Herd livestock to upland areas.
- Place salt and supplemental feed in upland areas.
- Fence off riparian zones, or create riparian pastures.
- Provide off-stream, high-quality water sources.
- Renovate and seed uplands with preferred forage species.
- Conduct prescribed burning of uplands to regenerate desirable species.
- Place rocks, tree branches, or brush piles on streambanks to limit animal access and the number of crossings.
- Create hardened stream crossings.

BENEFITS OF A HEALTHY RIPARIAN AREA

A healthy riparian area:

- Produces much more forage per unit area than uplands, often resulting in higher livestock weaning weights.
- Provides shelter for livestock during weather extremes.
- Stabilizes streambanks with dense plants, reducing damage from animal trampling, ice scouring, and erosion due to floods.
- Increases late-summer stream flows for irrigation, stockwater, and fisheries by recharging groundwater stores and providing bank water storage.
- Filters sediment, protecting water quality, prolonging irrigation pump life, and reducing siltation of ponds and irrigation ditches.



MANAGING FOR HERBACEOUS PLANTS IN RIPARIAN AREAS

- In addition to the usual management considerations, the grazing schedule and target grazing use levels in riparian areas must also reflect the amount of *greenline* vegetation needed to protect streambanks and filter sediments to maintain water quality conditions. The greenline is the first perennial vegetation above the base summer flow of a stream. Allow for a sufficient stubble height remaining on greenline herbaceous plants at the end of the growing season to provide streambank stability, protect streambanks from high runoff, and trap and filter sediment. Some sites may require more stubble height for other beneficial uses. Grazing units scheduled for heavy use may not be able to meet this standard every year, so schedule rest periods into the grazing rotation.
- Livestock are drawn to small riparian areas on larger upland units, so it may be difficult to keep riparian use within target levels and still make sufficient use of upland areas. To remedy this, supply upland water sources, place supplemental feed and minerals in upland areas, and make sure that riparian areas are rested after heavier grazing. Also, alternating the season of use each year allows plants to recover.



In addition to the usual management considerations, the grazing schedule and target grazing use levels in riparian areas must also reflect the amount of greenline vegetation needed to protect streambanks and filter sediments to maintain water quality conditions.

MANAGING FOR WOODY PLANTS IN RIPARIAN AREAS

- Encourage the growth of woody plants to protect streambanks from damage and erosion. Dense stands of willow, alder, and other trees and shrubs along the stream channel will limit animal access, protect banks from trampling, and provide shelter and cover from weather extremes. Woody species also have large root systems that help hold the banks together during periods of high runoff.
- Avoid hot summer use and maintain higher stubble heights on grass/grasslike plants to prevent a grazing use change from herbaceous plants to browse species.
- Work with local and state wildlife biologists to document wildlife use and coordinate wildlife management on the grazing unit.

GRAZING MANAGEMENT ON FORESTLANDS

Forested lands can be managed for grazing based on the same principles that apply to other types of range. A few forest characteristics, however, bear special consideration.

CANOPY COVERAGE

In woodlands, forage production is always changing because it is strongly influenced by the density of the tree canopy. Herbaceous forage is primarily produced in areas that 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 fills in again. 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.

SELECTING KEY AREAS AND KEY SPECIES IN FORESTLAND GRAZING UNITS

In forestland grazing units, the location of key forage areas and the quantity and quality of forage in these areas changes over time. Grazing strategies must take into account the potential changes in total forage production, quality, and accessibility over time, and balance these with animal needs.

Identify key management areas to serve as indicators of grazing management for the entire unit. Select key species that reflect management objectives and that make up at least 15 percent of the readily available forage. Key species must have high grazing preference for the planned season of use compared to other species within the key area.

Set target grazing use levels for the key species selected, based on planned grazing periods and rest periods. Conduct management checks at least two-thirds through the grazing period to allow time for any needed adjustments.

If riparian areas are present within a forestland grazing unit, select key areas and species in these areas as discussed in the riparian section.



Grazing strategies must take into account the potential changes in total forage production, quality, and accessibility over time, and balance these with animal needs.

FORAGE VALUE RATINGS—WHAT ARE THEY AND HOW ARE THEY USED?

Forage value ratings are established for each plant species. These ratings help to determine the “value” of that plant for grazing during the planned season of use. These forage value ratings are essential to assess total forage quality and quantity. Forage value ratings consider forage quality, quantity, and palatability, which are primary factors that influence livestock grazing patterns in woodlands. Forage value ratings should be considered in conjunction with the “grazability factors” described in the distribution section.

As grasses mature, their palatability to livestock decreases. Some species become so unpalatable that livestock will not eat them if other forage is available. For example, pinegrass is rated as “desirable” in the NRCS Forestland Grazing Guides, but after its fourth leaf stage (in late summer) its actual forage rating may be “undesirable” or “non-consumed” as livestock select other forage. When pinegrass comprises a major portion of the forage resource, be cautious not to overestimate useable forage production. Knowing local conditions is important when making

such estimates. The forage value rating for pinegrass would be lower in the fall. Its value for grazing and its palatability decreases as the growing season nears completion.



Forage value ratings consider forage quality, quantity, and palatability, which are primary factors that influence livestock grazing patterns in woodlands.



Several factors interact to influence livestock distribution in a forestland grazing unit.

Abandoned logging roads often hold bluegrass, clover, or other preferred species and may contribute a significant forage resource to a grazing unit. If they comprise a sizeable area, evaluate these areas for their grazing potential and management possibilities.

LIVESTOCK DISTRIBUTION IN FORESTED GRAZING LANDS

Several factors interact to influence livestock distribution in a forestland grazing unit. They may physically limit the number of acres livestock have access to graze. Remember, when determining stocking rates, count only the acres that livestock will actually use. It is important to recognize these limitations so that you don't accidentally overstock forested acreages. The following are “grazability factors” to consider when setting stocking rates and evaluating livestock distribution in a forested pasture.

- Slope of the land.
- Distance to drinking water.
- Amount of slash or other barriers present, such as downed trees.
- Miles of roads and trails in the unit.

Forestland grazing units often contain various plant communities with very different forage value ratings. Because of these differences in forage quantity and quality, livestock tend to concentrate in more preferred areas and avoid others. Livestock will also concentrate in areas that have fewer limitations to grazing accessibility, such as on flat slopes or near water.

In forestland, cattle prefer to graze in different areas, due to a variety of reasons. Their general preferences in descending order are:

1. Open meadows
2. Riparian areas
3. Open grasslands
4. Roads and clearings
5. Clear-cuts and seeded areas
6. Open canopy forest
7. Closed canopy forest



In forestland, cattle prefer to graze in different areas, due to a variety of reasons.

If left to follow their own desires, cattle will feed up to 80 percent of the time in meadows, riparian areas, and open grasslands. To prevent continual overgrazing, move livestock out of these preferred areas. This can be accomplished by developing water sources in other areas, fencing, salting away from water, herding, removing debris, and clearing trails for easier access.



Sheep do not prefer riparian areas as much as cattle and are very efficient grazers in forestlands when herded and managed properly.

Opportunities for structural improvements to distribute livestock in forestlands are often limited due to the large size of grazing units, multiple landowners, variability in terrain and vegetation, and potential impact from timber operations. Carefully consider maintenance costs when designing structural improvements in forestland settings.

Developing additional water sources is often the most efficient way to redistribute grazing. Livestock will generally not graze far from water, and will avoid areas with no water. Studies show that in steep forestlands, cattle will travel only one-quarter mile away from water. In gently sloping forestlands, they will travel one-half mile away. This explains why areas near water sources tend to become overgrazed, but it also demonstrates how adding water sources in other areas can effectively redistribute livestock. The quality of drinking water, slope of the land, ease of travel, and accessibility will also dictate livestock movements.

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



SEASON OF USE

Season of use is an important element of grazing management that must be considered in grazing plans for forestlands similar to consideration given to season of use in other land types. Concerns related to early spring/early summer use, livestock distribution, water availability, "hot season" use in the summer and fall, and woody species use are relative in forestland grazing systems as well. Remember that the higher elevations of most forestland grazing units delay the start of plant growth. Turn on dates may need to be deferred until late spring or summer, to keep from using these plants too early in their growing season.

TIMBER MANAGEMENT AND GRAZING IN FORESTLANDS

Timber management activities will also have a significant impact on livestock movements. Livestock cannot easily access harvested areas that have accumulated debris and slash. Disposing of slash encourages the use of harvested areas. When deciding how much slash to remove, consider wildlife values and the benefits that slash piles provide to their habitat.

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, grass seeding, and prescribed burning.

Timber harvest and stand thinning can help distribute livestock away from riparian areas if the harvested sites are seeded to palatable grasses. Forest habitat types that are best adapted to livestock grazing improvements are the Ponderosa Pine and Douglas-fir Habitat Types.

SUCCESSFUL GRAZING STRATEGIES FOR FORESTLAND SITUATIONS:

- Alternate livestock turn-in locations from year to year.
- If you are trying to avoid weight losses in the late fall, move livestock to seeded pastures as the nutritional quality of native forage declines, especially during very dry years.
- Incorporate any scheduled timber harvests or tree regeneration activities on the grazing unit. 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. Also consider wildlife use and needs.
- When a watershed is divided among several landowners, individual management objectives may limit resource management options. If practical, and if in the best interests of all land owners, explore your opportunities to plan grazing on a watershed management basis.
- Consider additional and off-site water sources to distribute livestock more easily.



AN EXAMPLE OF SOME POINTS THAT MAY BE INCLUDED IN A GRAZING PRESCRIPTION WOULD BE:

- Alternate the season of use (spring, summer, fall) in each pasture or area every year, or every other year. Plan the grazing season of use to maintain desired resource conditions and to meet livestock nutritional needs. Forestland units that are grazed every year from spring to fall often contain preferred grazing areas (areas close to water, riparian zones, natural openings, and roads or other cleared areas) that are severely grazed. These contribute to resource degradation.
- Limit grazing periods to a maximum of 30 days in each pasture or area where riparian areas and woody species are of concern.
- Rest each pasture or area for a complete growing season once every 3 to 4 years.
- Alternate grazing between at least two grazing units every other year.

GRAZING MANAGEMENT FOR THE DORMANT SEASON AND WINTER FEED AREAS

In general, grazing use levels of herbaceous plants during the dormant season (October through April) can be higher than during the growing season without significantly stressing the plants. Consider the following factors when planning dormant grazing use:

- **Amount of plant cover needed to protect soil resources.** It is important to maintain ground cover to decrease the amount of soil exposed to wind and water erosion.
- **Physical damage to plants if they are grazed too close.** The crown of the plant must remain intact, as that is where the growing points are. If this is removed, the opportunity for the plant to begin growth in the spring is gone. It is also important to maintain enough cover to prevent the crown from being frozen, especially if there is not a snow cover to serve as insulation for the plants.
- **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.**
- **Targeted grazing use levels during the dormant season should not exceed 65 percent use of current year's growth unless special considerations are given for higher use levels.** One caution against higher use is that livestock will often select woody browse when herbaceous plants are dormant, which may lead to over use. Protect deciduous trees and shrubs by limiting grazing access when woody plants have green leaves at the beginning or end of the dormant period.
- **Place feed and mineral sites as far as possible from riparian areas or watercourses.** Traditionally, winter feeding areas have been located along streams for a dependable source of water. Development of year-round off-stream stockwater will reduce trampling damage and buildup of manure within the riparian area.



- Don't put supplemental feed near natural shelter except during periods of extreme wind-chill or severe weather. This will protect these areas for use when they are specifically needed for calving/lambing or wind protection. Planted windbreaks may be necessary if natural shelter is limited, or if woody growth is overly affected by grazing. Portable shelters or windbreaks can also be used.
- Plan feeding areas to minimize manure buildup and runoff into streams. Select rocky areas with good drainage, or sodbound areas. It is possible to increase plant growth on thin soils or sodbound areas by encouraging feeding and manure spreading in these areas.
- Manage winter feeding areas to prevent physical damage to plant and soil resources, no matter how much supplemental feed is provided.
- 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 feed area, and reducing the amount of time livestock spend in each feed area.
- Distribute animal impacts within a feeding area by changing feed placement locations and providing artificial shelter, such as 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. Caution: accumulated manure and rotten feed may result in weed infestations. Also, over accumulation of unused feed may suffocate existing native plants and result in only annual or invader plants growing in these areas.
- Remember that supplemental feeding is not permitted on some public lands. Contact the local public land management agency office to get information specific to any allotment or management area.



To avoid livestock manure buildup in feeding areas, feed in the same patterns as you would spread manure for fertilizer.



Best Management Practices: Guidelines for managing the use of a resource (such as grazing land) in a manner that protects the resource and promotes ecological and economic sustainability.

* *Browse:* (n) The part of shrubs, woody vines, and trees available for animal consumption. (v) To search for or consume browse.

* *Chiseling:* Breaking or loosening the soil, without inversion, with a chisel cultivator or chisel plow. A practice used for grassland or pasture renovation.

* *Critical area:* A site selected for the purpose of monitoring or managing a specific resource concern or need in a specific area. These areas are not to be used to determine health of the grazing unit as a whole.

* *Ecological site:* A kind of land with specific physical characteristics, which differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its response to management.

* *Grazing preference:* Selection of certain plants, or plant parts, over others by grazing animals.

Grazing tolerance: The degree to which a plant can withstand grazing use and still remain healthy.

* *Grazing unit:* A subdivision of a management area.

Greenline: First perennial vegetation above the base summer flow of a stream or water body.

* *Hedging:* The persistent browsing of terminal buds of browse species, which causes excessive lateral branching and a reduction in main stem growth.

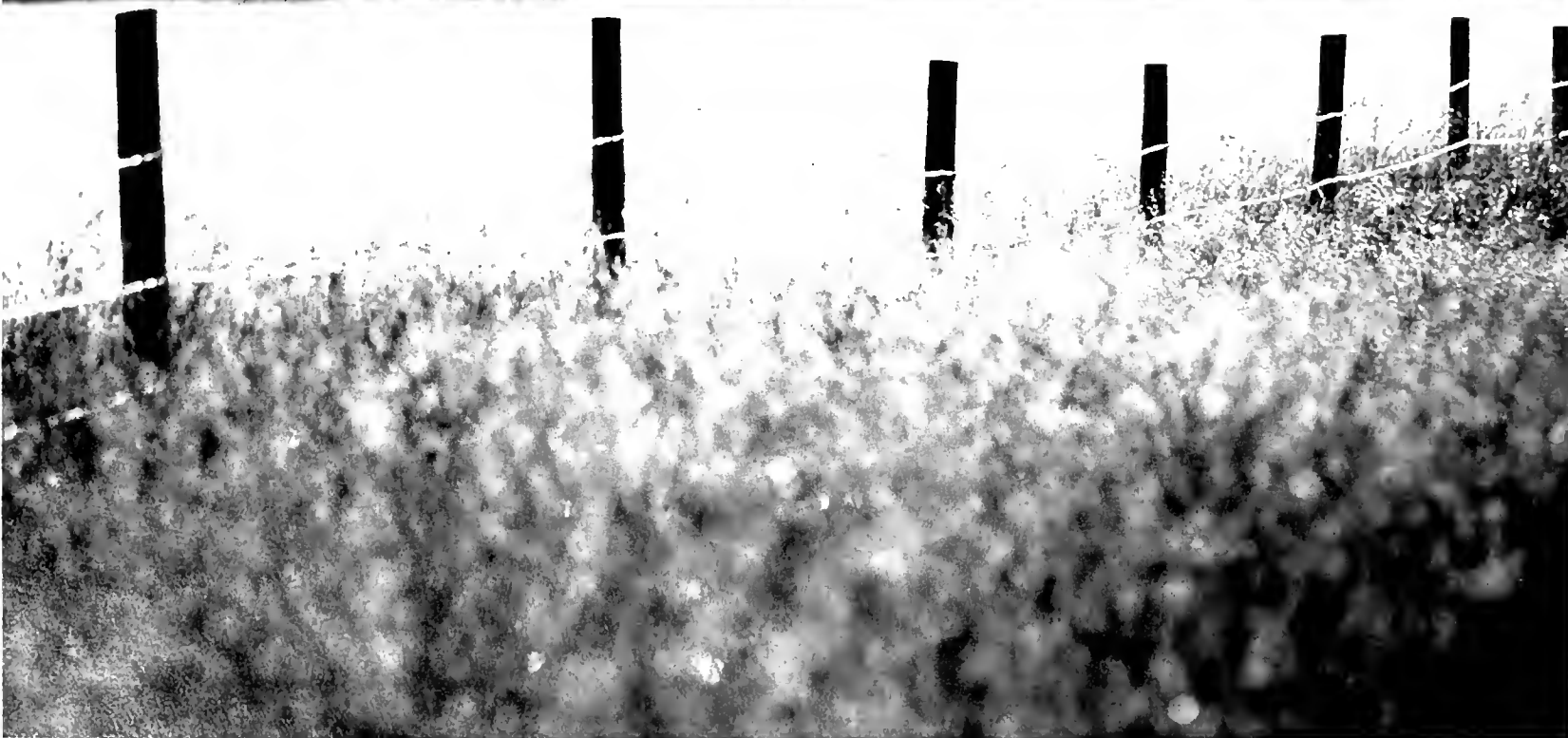
* *Key grazing area:* A relatively small portion of a range selected because of its location, use or grazing value as a monitoring point for grazing use. It is assumed that key areas, if properly selected, will reflect the overall acceptability of current grazing management over the range.

GLOSSARY

- * **Key plant species:** (1) Forage species whose use serves as an indicator to the degree of use of associated species. (2) Those species that must, because of their importance, be considered in the management program.
- * **Management area:** An area for which a single management plan is developed and applied.
- Physiology:** The organic processes of an organism, such as a plant; the functions that allow it to live, grow, and reproduce.
- Prescribed grazing:** The controlled harvest of plants by grazing or browsing animals managed to achieve specific objectives.
- * **Range condition:** Historically, has usually been defined in one of two ways: (a) a generic term relating to present status of a unit of range in terms of specific values or potentials. Specific values or potentials must be stated. (b) the present state of vegetation of a range site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the climax plant community for the site.
- * **Range trend:** The direction of change in a characteristic of the range as observed over time.
- * **Riparian:** Referring to or relating to areas adjacent to water or influenced by free water associated with streams or rivers.
- * **Riparian ecosystems:** (1) Those assemblages of plants, animals, and aquatic communities whose presence can be either directly or indirectly attributed to factors that are water-influenced or related. (2) Interacting system between aquatic and terrestrial situations identified by soil characteristics, and distinctive vegetation that requires or tolerates free or unbound water.
- * **Use:** (1) the proportion of current year's forage production that is consumed or destroyed by grazing animals (wildlife, livestock, insects, etc.). May refer either to a single species or to the vegetation as a whole. Syn. *degree of use*. (2) Applying the range to a purpose such as grazing, bedding, shelter, trailing, watering, watershed, recreation, forestry, etc.

* per the DRAFT Society for Range Management "Glossary of Terms used in Range Management.

Montana's rangelands provide scenic beauty, wildlife habitat, open space, minerals, recreational opportunities, clean water, grazing forage, thousands of jobs, and a way of life for many Montanans.



About this publication

PROJECT COORDINATOR:

Krista Lee-Campbell, Public Education
Specialist, Department of Natural Resources
and Conservation

IN COOPERATION WITH THE MONTANA WATERSHED COORDINATION COUNCIL'S GRAZING PRACTICES WORK GROUP:

John Bloomquist, Montana Stockgrowers
Association

Tim Bozörth, USDI, Bureau of Land
Management

Cassie Cady, Montana Woolgrowers
Association

Bob Hanson, Montana Farm Bureau

Warren Kellogg, USDA Natural
Resources Conservation Service

Clayton Marlow, Department of Animal and
Range Sciences, Montana State University

Sue Noggles, USDA Natural Resources
Conservation Service

Jim Olivarez, USDA Forest Service

Brad Shepard, American Fisheries Society,
Montana Chapter

With SPECIAL ASSISTANCE FROM:

Jeff Mosley, Extension Range Management
Specialist, Montana State University

Gene Surber, Extension Natural Resource
Specialist, Montana State University

Jason Campbell, Montana Stockgrowers
Association

John Youngberg, Montana Farm Bureau

Russ Offerdahl, Department of Natural
Resources and Conservation

Society for Range Management

COOPERATIVE FUNDING PROVIDED BY:

Environmental Protection Agency,
Region VIII

Department of Natural Resources and
Conservation

Edited by:

Will Harmon, Writers in the Sky,
Helena, Montana

DESIGNED AND ILLUSTRATED BY:

Ross Campbell, Department of Natural
Resources and Conservation

PRINTED by:

ColorWorld Printers
Bozeman, MT

PHOTO CREDITS:

Bob Ehrhart, Riparian Wetland
Research Program

Bob Lee, Rancher

Kathy Lee, Rancher

Gene Surber, MSU Extension Service

Laurie Zeller, Department of Natural
Resources and Conservation

Krista Lee-Campbell, Department of
Natural Resources and Conservation

Scott Kaiser, Department of Natural
Resources and Conservation

TO REQUEST COPIES:

Conservation Districts Bureau

Department of Natural Resources and
Conservation

PO Box 201601

Helena, MT 59620-1601

(406) 444-6667

*You may reproduce or copy any portion of this
booklet by notifying the Montana Department of
Natural Resources and Conservation.*

Please acknowledge this publication as the source.

Best Management Practices (BMPs) for Grazing



1999