

# Management Practices for Grazing Operations

**National Cattlemen's Beef Association**



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## **Introduction**

### **Foreword**

The National Cattlemen's Beef Association (NCBA) believes conservation is integral to the success of cattle operations everywhere. It only makes sense that those who depend on the land for their livelihood have the most invested in its continued viability. To that end, this Grazing Management Handbook is being developed by NCBA, with technical expertise from the USDA, Natural Resources Conservation Service, to help promote sustainable livestock operations through environmental stewardship. Grazing livestock operations are an essential part of our agricultural economy throughout the United States.

NCBA is a consumer-focused, producer-directed organization representing the largest segment of the nation's food and fiber industry. NCBA works to achieve the vision: "A dynamic and profitable beef industry, which concentrates resources around a unified plan, consistently meets global consumer needs and increases demand." The Natural Resources Conservation Service provides conservation assistance through technical support and cost-share programs that enhance the resources of our nation's private grazing lands. Together, along with Dow AgroSciences, the organizations coordinate, support, and promote the annual Environmental Stewardship Award Program, which regionally and nationally recognizes livestock producers who are exemplary in their efforts to both sustain environmental resources and increase the profitability and productivity of their operations. While the program highlights industry stewardship, it also provides cattlemen with examples and ideas which may be useful on their own farms and ranching operations.

This document provides producers nationwide with direct access to information on how to best conserve the resources in their care. It outlines the on-the-ground practices that any livestock operator could implement to improve resource conditions and wildlife habitat on their private lands. The information contained within is neither prescriptive nor definitive—it is all general in nature, and any of the practices would have to be developed and implemented on an individual basis according to local conditions. The Grazing Management Handbook has been reviewed by universities, state affiliates, members, and NRCS officials.

## **I. The Importance of Grazing Lands**

Grazing lands occupy more than half the total agricultural land in the United States. They furnish most of the nutrition for our forage-consuming domestic livestock, providing 84 percent of the feed units consumed by beef cattle. According to the Agricultural Statistics Service there are approximately 27.2 billion pounds of beef produced annually here in the United States. Most of that beef comes from cattle that utilize approximately one billion acres of rangeland, pasture, grazed forest and/or grazed cropland. The limited water supply and easily eroded and infertile soil types can make these areas unsuitable for intensive agricultural production. This sometimes leaves grazing as the best and only option for the utilization of these natural resources.

The vast areas of grazing and pasture land can provide valuable watershed assets, wildlife habitats and livestock forage through proper management and stewardship. For example, sediment is the primary contaminant of surface water in much of the United States. Management practices for livestock that utilize forages to stabilize the soil have significant value in terms of environmental importance. This guide offers farmers and ranchers a perspective on how various conservation practices when planned on grazing lands can aid in maximizing grazing land use while protecting and maintaining our natural resources and ensuring the sustainability of our livestock productions.

## **II. Management Practices on Grazing Lands**

Management practices on grazing lands are any actions implemented to protect and promote the ecological and economic stability of grazing land resources. They may be used to improve the soil, water quality, air quality and plant community while maintaining the health and productivity of livestock and wildlife.

Management practices represent a kit of tools from which to select various combinations to meet the desired needs of the land and the livestock. Choosing and applying the right combination of practices that complement each other can increase results at a lower cost, rather than using single-shot, high-priced practices that may or may not be successful.

## **III. Resource Concerns Created by Livestock Use and the Management Practices to Address Them**

When assessing resource conditions on farm and ranch lands a holistic or integrated approach should be taken. Practices that affect water quality may also have impacts on soil or wildlife habitat. There is almost always an interaction between one resource and another, because they are all connected on the land. A change in grazing management may decrease noxious weeds while increasing riparian cover and improving water quality. There is no one set of practices that will fit on every operation. Every region, every state, every ranch or farm is specific with their own set of concerns and objectives. Each set of resource concerns, goals and management practices needs to be determined

on a case by case basis. Throughout the country, each grazing land situation is unique. Therefore, every set of management practices must be site specific. What works best for one producer or region is not necessarily best for all. Flexibility is important in any livestock operation. Consult with your local farm advisor or NRCS grazing/rangelands specialist for specific, research-based recommendations that will work best for you.

The following set of resource concerns and management practices is merely a guideline and is not all inclusive. The focus is on how livestock can be used as a tool to help improve each of these resources through grazing management or structural practices. Grazing land plans that will include management practices can be developed from this set of guidelines through technical guidance from the NRCS, local agricultural extension agents or private consultants. Most importantly the landowner is the decision maker in the development of his or her grazing land plan.

**A. Soil** – Soil resource concerns can be broken down to erosion (wind or water), fertility and concentrations of inorganic compounds. Erosion from soils can be caused by water or wind when adequate vegetative cover is not present to prevent these events from occurring. Soil fertility concerns stem from inappropriate applications of fertilizer or soil amendments. Inorganic compounds can then runoff the surface, leech and cause nutrient loading in streams or ground water. Concentrations of inorganic compounds such as pesticides or herbicides can cause problems if application rates are inappropriate or timing of the applications is incorrect.

### **Management Practices to address Soil Issues:**

1. Test soil and manure to determine the proper level of fertilizer or soil amendments to add. Time applications to effectively meet plant and livestock needs. This will reduce contamination to surface or ground water.
2. Implement a nutrient management plan to help apply nutrients at the proper time and rate to meet plant production goals.
3. Maintain grassed waterways or riparian buffers in and around drainage ways, streams, ponds or wetlands.
4. Install grade stabilization structures when active erosion is occurring. Consult an engineer for proper placement and size of these structures.
5. Implement critical area plantings where exposed bare soil is near drainage ways, streams, ponds or wetlands.
6. Maintain appropriate residue or cover on grazed crop fields where there is potential for soils to move into water ways or where wind erosion is a threat.
7. Implement prescribed grazing so adequate vegetative cover remains for the protection of the soil resource from erosion or contamination. Specific grazing rotations, season of use, animal numbers and

residue requirements will need to be designed on a site-specific basis to meet your ranch goals.

8. Where appropriate, use no-till practices for pasture or range seeding.

**B. Water Quality (Surface & Ground Water)** – Water quality can become impaired when water runs over land or through the ground, picks up pollutants and deposits them into surface water or introduces them into groundwater. There are basically three types of contaminants:

1. Physical – sedimentation, temperature, turbidity
2. Chemical – nitrates, phosphates, pH, total dissolved solids, herbicides, pesticides or other chemical compounds
3. Biological – bacteria, viruses, protozoa, parasites or other biologically derived substances

### **Management Practices to Address Water Quality Issues:**

1. Prescribed grazing – implement a grazing plan that maintains adequate vegetative cover to help filter sediment, reduce water velocity and maintain plant vigor. This is especially important in stream corridors, around ponds, springs and wetlands.
2. Develop water sources other than streams such as springs, ponds, livestock wells, troughs and tanks. This will improve livestock distribution throughout the pasture and reduce concentrated use on streams, rivers or other naturally occurring water bodies.
3. Range planting or pasture & hayland planting – this will establish perennial vegetation to reduce surface and wind-caused erosion. If planting is done along a stream corridor, the vegetation will help trap any surface runoff.
4. Plant riparian buffer or filter strips – where needed, plant trees, shrubs or herbaceous vegetation along streams, ponds or below corrals.
5. Install tailwater return systems where irrigation water has a chance to get into a stream or other water body.
6. Decommission wells – seal all old or abandoned wells to prevent ground water contamination.
7. Design water, feeding or livestock handling sites away from storm drainage ways, streams, ponds or wetlands.
8. Implement Integrated Pest Management (IPM) practices when possible.
9. Always follow label directions for application rates of pesticides or herbicides; varying from label directions is a violation of state and federal laws.
10. Implement an irrigation water management plan to decrease any contaminated irrigation tail water from getting into the drainage system.

11. Implement a prescribed burning plan to increase vegetative ground cover by improving livestock distribution and/or controlling brush or other undesirable plants that provide inadequate soil erosion protection.

**C. Air Quality** – Air quality can be impaired due to dust, odor and particulate matter. In livestock operations, air quality concerns are usually identified with smoke from burning, odor, dust and chemical drift.

**Management Practices to address Air Quality Issues:**

1. Access road – controls road placement for possible sedimentation into streams and addresses road surfacing for dust control.
2. Prescribed burning – prevent cartographic wildfires and manage fuel loading and smoke dispersal through implementation of burn plans.
3. Conservation tillage – use no-till or reduce tillage to protect soil from wind erosion. Till soils when soil moisture levels are adequate to reduce dust.
4. Manure management – apply properly composted manure on fields and consider injection vs. surface application.
5. Residue management – maintain adequate residue on fields to reduce any blowing dust or other particulate matter.
6. Apply herbicide or pesticides according to label directions to prevent or reduce chemical drift.
7. Implement a prescribed grazing plan to properly distribute livestock and reduce concentration areas where dust and odor can become a concern.

**D. Livestock & Wildlife Use** – Livestock and wildlife use in the same area can either complement or conflict with one another. Proper grazing practices, either through livestock timing, duration or frequency in a grazing area, can be used to benefit wildlife habitats while providing adequate livestock forage. Improper grazing practices, as well as animal concentrations in one area, can cause wildlife resource concerns. There are several practices that can be implemented to alleviate conflicts between livestock and wildlife.

**Management Practices to address Livestock and Wildlife:**

1. Implement a prescribed grazing plan that addresses timing, duration and frequency of grazing for site-specific wildlife habitat needs.
2. Maintain adequate vegetative cover throughout your fields to improve biodiversity and maintain the health of the plant community.

3. Place salt, mineral or feed supplements away from drainage ways, streams, ponds and wetlands. These can be used to distribute livestock throughout the grazing unit and maintain even grazing use.
4. Develop off-site water sources to distribute livestock and wildlife away from streams, ponds and wetlands.
5. Fence riparian areas or other sensitive areas if needed to manage livestock impacts to these areas.

#### IV. **Contacts for Assistance with Management Practices on Grazing Lands**

##### **Federal, State & Local Contacts:**

- A. Natural Resources Conservation Service** provides technical assistance on practice implementation, definitions and technical resources such as soils information and ecological site data. They also provide information on Farm Bill programs and possible cost-share assistance. <http://www.nrcs.usda.gov/>
- B. U.S. Fish & Wildlife Service** provides information on threatened and endangered species and can issue incidental take permits if needed for practice implementation. The Partners for Wildlife program is a federal cost-share program used for practices that will benefit wildlife habitat. <http://www.fws.gov/>
- C. U.S. Army Corps of Engineers** is useful if you are planning on working in a river, stream or wetland. A permit from them may be needed in accordance to Section 404 of the Clean Water Act. This Act requires Corps authorization on work involving intentional or unintentional placement of fill or discharge on any dredged material into “waters of the United States.” <http://www.usace.army.mil/>
- D. Your state department of game and fish** may be needed if any practice could affect the habitat of wildlife species they manage. Some state game and fish agencies require streambed alteration permits if any work is going to be done on a creek or riparian zone. In some states, cost-share assistance may be available if practice implementation will improve existing habitat. The state game and fish agency in many states can provide helpful wildlife census, habitat and management information.
- E. Your state water resources control board or regional water quality control boards** control water quality, water pollution and water rights. They usually implement the National Pollution Discharge Elimination System Permits (NPDES) and the Federal Clean Water Act (CWA), but on a local basis. The NPDES permit is needed when proposing to discharge waste into any surface water. Any of these agencies may have funds available, as may the

state agency responsible for the Section 319 Non-point Source Program for your state.

**F. Your state department of forestry and fire protection** can assist with the development of prescribed burn plans where air quality may be a resource concern. Technical assistance and burning assistance may be available.

**G. Soil & Water Conservation Districts** are local agencies that work closely with the Natural Resource Conservation Service. They are the citizen based groups that help determine resource priorities for a district. In any given area they can be effective in obtaining grant monies to help local watershed groups implement management practices or other practices that improve watershed conditions.

<http://www.nacdnet.org/resources/cdsonweb.html>

**H. The Department of Environmental Quality** deals with National Pollution Discharge Elimination System, (NPDES). The NPDES is part of the Clean Water Act dealing with waste discharge from feedlots over 1000 Animal Units. They can be contacted at

<http://www.epa.gov/npdes/>.

## V. Where Can the Landowner Go From Here?

How do you know if you have a problem on your farm or ranch? The following is a list you can go through to assess whether or not your current grazing system or ranch/farm's resource conditions could be improved. By completing this checklist you can assess what the basis of your resource problems may be and what solutions or practice alternatives can be implemented to mitigate those problems.

### A. Preparing a Grazing Lands Management Plan:

1. Determine what objectives you have for your grazing lands:
  - a. Understand the basic ecological principles associated with managing the land, soil, water, air, plants and animals.
  - b. Realize these are all part of a complex ecosystem and that the management decisions made will influence ecological changes.
  - c. Realize the responsibilities and importance for protecting the environment and maintaining future options for the use of the resource.
  - d. Develop a plan that meets the needs of the soil, water, air, plant, and animal resources and your management objectives.

### B. Implementing the Grazing Lands Management Planning Process:

1. Developing a Preplan

2. Identifying the problem or opportunity – usually symptoms are recognized and solutions are sought.
3. Determining the objectives – generally a combination of ecological, economical, and socially sound objectives.
4. Inventory the resources – based on multiple factors such as wildlife habitat, livestock numbers, grazing lands production, livestock performance etc.
5. Analyzing the resource data – this becomes a tool to evaluate and quantify resource areas that can be improved.
6. Formulating alternative solutions – plans developed should take into account inventories, and predicted responses to future grazing land needs.
7. Evaluating alternative solutions – having alternatives provides a suite of choices that best fits the desired needs and objectives and or solves the resource problems.
8. Making decisions - compare alternatives and ask the question “does this meet my desired objective?”
9. Implementing the plan – this step often requires technical assistance to provide observations and adjustments in management strategies.
10. Evaluating the results – review the on-the-ground results of the plan, and determine if resource objectives were reached. If revisions or additional planning is necessary, repeat the above process to design a new or revised grazing land management plan.

## VII. Practices

The following is a list and description of practices typically used on grazing lands. This list is not complete, and there may be others or a combination of other practices that can be used to effectively treat resource concerns on grazing lands.

**A. Animal trails and walkways** are stabilized lanes, trails, or travel ways that facilitate animal movement. They provide or improve access to forage, water, working/handling facilities and/or shelter; improve grazing efficiency and distribution and/or protect ecologically sensitive, erosive and/or potentially erosive sites.

Animal trails or walkways should be constructed wide enough to accommodate movement of animals and access by operators for management and



maintenance, and they should be constructed in such a manner that accelerated erosion will not occur. Fenced or unfenced animal trails or walkways can be used to distribute

grazing so that it overcomes terrain features that cause uneven grazing distribution and pressure.

Animal trails and walkways require management. Periodic removal and regulation of excessive accumulated manure is important. They need periodic grading or re-shaping to maintain the designed grade and dimensions, periodic addition of surfacing materials where used, re-seeding of areas in which the vegetation has been damaged or destroyed and/or mending of fences and replacement of gates.

**B. Brush management** is the management, removal, reduction or manipulation of non-herbaceous plants on grazing land and pasture land by mechanical, chemical or biological means or by prescribed burning. Treatment is applied to reduce excess brush, restoring natural plant community balance, and to manipulate brush stands through selective and patterned treatments to meet specific needs of the land and objectives of the land manager. Brush management is used to create the desired plant community, restore desired vegetative cover to protect soils, control erosion, reduce sediment, improve water quality and enhance stream flow. It also helps to maintain or enhance wildlife habitat including that associated with threatened and endangered species, improve forage accessibility, address quality and quantity available to livestock, and protect wildlife and property from wildfire hazards.

Brush control enhances the watershed with quality and quantities of water by reducing evapo-transpiration, allowing grasses to increase so that they slow and filter overland flow and increase their

root density to hold soil.

**C. Conservation cropping rotation** is the rotation of crops in a cropping system to assist with the management of erosion control, pest management, and water quality. Often, annual crops are grazed to balance forage needs outside of the traditional grazing season.

**D. Critical area planting** is used on areas where the soil is denuded of vegetation and the erosion is severe. Species should be selected based on their intended use, realistic expected yield, maturity stage, compatibility with other species and level of management that land users are willing to provide. Plants should provide adequate ground cover, canopy cover and root mass to protect soil against wind and water erosion. Plantings are done to stabilize soil and reduce sediment.

**E. Fencing** refers to a constructed barrier that is applied to facilitate the application of other practices by providing a means to control movement of animals. Fencing may be installed to allow for rotation, deferment and resting of grazed lands. Fences should be positioned to facilitate management requirements. They should allow livestock access to water and working pens. Height, size, spacing, and type of materials used should be planned to provide the desired control and management of animals. The design and location should consider ease of access for construction, repair and maintenance. The design and location should also consider: topography, soil properties, safety and management of livestock, wildlife movement, water sources, grazing systems, access, erosion problems, moisture conditions, flooding

potential, stream crossings, and durability of materials.

Fences across gullies, canyons, or streams may require special bracing, designs or approaches. Regular inspection of fences should be part of an ongoing maintenance program. Inspection of fences after storm events is necessary to insure the continued proper function of the fence.

**F. Forage harvest management** is the cutting or grazing of plants at a height that will leave sufficient leaf stubble to re-grow and restore plant nutrients to maintain plant vigor.

**G. Grazing cover crops** at a given time and to the extent that will not damage or impair the intended conservation benefits is important.

**H. Heavy use area protection** stabilizes agricultural areas that are frequently used by livestock. Land that benefits from heavy use area protection includes but is not limited to land around water troughs, hay rings, mineral feeders, shade areas, and livestock lanes. Heavy use areas are typically protected by grading and leveling the area to provide for surface drainage and prevent pooling of water; by removing loose, wet, organic or other undesirable materials to design specifications and by placing material to stabilize this area either with stone, concrete or asphalt.

Risk of surface water contamination is reduced when sufficient perennial vegetation surrounds heavy use areas. Perennial vegetation minimizes the amount of runoff from the area. Water should be prevented from running onto

heavy use areas by shaping, grading, and/or with diversions.

**I. Heavy use areas** occur where livestock congregate around supplemental feeding areas, mineral feeders, shade areas, riparian areas and water. These areas pose both environmental and production challenges. Livestock waste accumulation, loss of vegetation, reduced drainage and increased soil erosion are reasons to properly manage these areas. Shade, mineral feeders, hay rings, water supply, lick tanks and other supplements should be spaced out individually in the pasture to avoid creating single multi-use areas frequented by livestock. Rotating the location of these areas and attention to placement is an effective and inexpensive way to minimize negative environmental impacts, decrease pasture degradation, and prevent large frequently used loafing areas.

**J. Nutrient management** is used to manage plant nutrients for optimum yields while minimizing the movement of nutrients to surface and ground water. Nutrient management considers the amount, source, placement, form and timing of the application of plant nutrients and soil amendments. This is done to properly utilize manure or organic by-products as a plant nutrient source, to protect air quality by reducing nitrogen and/or particulate emissions to the atmosphere and to maintain or improve the physical, chemical and biological condition of soil.

A nutrient budget for nitrogen, phosphorus, and potassium should be developed. It should consider all potential sources of nutrients including,

but not limited to, animal manure and organic by-products, waste water, commercial fertilizer, crop residues, and irrigation water.

Realistic yield goals should be established based on soil productivity information, historical yield data, climatic conditions, the level of management and/or local research on similar soil, forage systems and by soil and manure organic by-products tests.

Soil testing should include analysis for any nutrients for which specific information is needed to develop the nutrient plan. Current soil tests are those that are no older than five years.

Erosion, runoff and water management controls should be installed, as needed, on fields that receive nutrients.

Timing and method of nutrient application (particularly nitrogen) should correspond as closely as possible with plant nutrient uptake characteristics, while considering weather and climatic conditions and field accessibility. Applications of nitrogen should be split to provide nutrients at the time of maximum crop utilization.



Applications of animal manures or other organic by-products should be delayed if precipitation capable of producing runoff and erosion is forecast within 24 hours of the time of the planned application.

Consider application methods and timing that reduce the risk of nutrients being transported to ground and surface waters or into the atmosphere. Suggestions include: minimum application setback distances from environmentally sensitive areas, such as sinkholes, wells, gullies, ditches, surface inlets or rapidly permeable soil areas, and the potential problems from odors associated with the land application of animal manures, especially when applied near or upwind of residences and nitrogen volatilization losses associated with the land application of animal manures. Volatilization losses may become significant if manure is not immediately incorporated into the soil after application.

Keep documentation of the actual time and rate at which nutrients were applied. When the actual rates used differ from the recommended and planned rates, records should indicate the reasons for the differences. Maintain records of soil test results, recommendations, quantities and analyses and sources of nutrients applied. The dates and methods of nutrient applications, as well as weather conditions at the time of application and the length of time until a rainfall event occurred after application, should also be recorded. If your operation contains a feedlot that qualifies as a Confined Animal Feeding Operation, there may be special nutrient management concerns. Check with your local NRCS office for details.

**K. Pasture/hayland planting** is used to establish adapted and improved species, varieties or cultivars for forage production; improve or maintain livestock nutrition and/or health; balance

forage supply and demand during forage production; reduce soil erosion;



improve water quality and increase carbon sequestration. Try to match the species/cultivar selection with the livestock and forage production objectives for the ranch/farm. Forage species and their cultivars should be selected based upon climatic conditions, such as annual rainfall, seasonal rainfall patterns, growing season length, humidity levels, temperature extremes and the USDA Plant Hardiness Zones. Soil condition and position attributes such as pH, available water holding capacity, aspect, slope, drainage class, fertility level, salinity, depth, flooding, ponding and levels of toxic elements should also be considered. Pasture planting allows land owners and managers to establish forages that provide resistance to disease and insects common to the site or location. All seed and planting materials shall meet state quality standards. If needed, legume seed shall be inoculated with the proper species of viable rhizobia before planting.

**L. Pest management** involves utilizing herbicides, pesticides or biological controls to treat noxious or invasive species, insects, pests, fungus or bacteria. This practice manages the types and amounts of pesticides applied in or on the soil or on plant foliage to manage weeds, insects, diseases and

other organisms. Always follow pesticide label instructions for limiting pesticide residues in soil that may negatively impact non-target species, soil or water resources.

All methods of pest management must comply with federal, state, and local regulations, including management plans for invasive pest species, noxious weeds and disease vectors. A pesticide applicator permit or license is required when restricted use pesticides are applied. Check with your local NRCS or County Extension office for details. Integrated Pest Management (IPM) that strives to balance economics, efficiency and environmental risk shall be incorporated into planning alternatives when available. IPM is a sustainable approach to pest control that combines the use of prevention, avoidance, monitoring and suppression strategies to maintain pest populations below economically damaging levels. It is used to minimize pest resistance and possible harmful effects of pest control on human health and environmental resources. IPM suppression systems include biological controls, cultural controls and the judicious use of chemicals. All methods of pest management must be integrated. Use the minimum level of pest control necessary to meet objectives for commodity quantity and quality. Maintain records of pest management activities.

**M. Prescribed burning** is applying controlled fire to a predetermined area to control undesirable vegetation and maintain the natural balance of plants. This practice is applicable on grazing land, forestland, native pasture, pastureland, wildlife land, hay land, and

other lands as appropriate. Prescribed burning enhances the palatability and nutritional value of edible plants for livestock and wildlife species by reducing overpopulated brush and woody components in the plant community. Controlled use of fire is a valuable management tool that can be planned to prepare sites for: harvesting, planting, seeding, controlling plant disease, reducing wildfire hazards, improving wildlife habitat, improving plant production quantity and/or quality, removing slash and debris, enhancing seed and seedling production, facilitating distribution of grazing and browsing animals and restoring and/or maintaining ecological plant communities. When developing a plan, determine the objectives of the burn and secure maps of the area. Map out the fire lanes, highways and populated areas. Consider safety and the direction of smoke dispersion when deciding what



conditions must be met for a successful burn.

Comply with all applicable federal, state, and local laws and regulations during the implementation of this practice.

Consider cultural resources and threatened and endangered plants and animals when planning this practice. Consult with your local and state fire departments and the NRCS for assistance with preparation of a burn

plan. ([Click here for the state agency responsible for prescribed burn permits, where applicable.](#))

**N. Prescribed grazing** is the controlled harvest of vegetation by grazing or browsing animals with the intent to achieve a specific objective. Grazing management practices are based on the use of prescribed grazing. Prescribed grazing was developed on the premise that grazing and browsing are integral parts of ecosystem processes on grazing lands. Most forage plants, particularly pasture and range plants, have evolved with use from domestic livestock and/or wildlife. These plants are generally healthier and function well in ecosystems when they are managed properly and not overgrazed. Much of the land currently devoted to forage production would be much more productive if it were managed according to prescribed grazing.

Prescribed grazing will help address the intensity, frequency, duration and season of use. Implementation of a successful grazing management plan requires an understanding of the landowner's objectives. It may be advantageous to discuss plans with neighboring landowners, since implementation of a plan could affect others. It may also be beneficial to seek advice from technical experts regarding water, soil, plant, wildlife and livestock issues.

There are basically seven purposes for a prescribed grazing system. They are:

1. Improve or maintain the health and vigor of plant communities.
2. Improve or maintain quantity and quality of

- forage for livestock health and productivity.
3. Reduce supplemental feeding needs and costs.
  4. Improve or maintain water quality and quantity.
  5. Improve or maintain soil condition and reduce erosion.
  6. Improve or maintain the quantity and quality of food and/or cover available for wildlife.
  7. Promote economic stability through grazing land sustainability.
3. Winter forage needs should be identified, as well as the source of that forage.
  4. Periodic rest from grazing may be needed to maintain or restore the desired plant community.
  5. Plan grazing to match forage quantity and quality with goals of the land manager.
  6. Develop a contingency plan to ensure resource management and economic feasibility without resource degradation.
  7. When needed, implement rest areas for a period of time to ensure the success of prescribed fire, brush control, seeding or other conservation practices.
  8. Prevent cattle from congregating near water sources. Use fencing, off-site water developments, salt, mineral or supplement placement to distribute animals throughout the grazing unit.
  9. Maintain adequate stubble height at the end of the grazing season to maintain plant vigor, protect the soil and filter sediment and nutrients.
  10. Where practical, incorporate legumes into the pastures to improve animal performance and reduce the need for nitrogen fertilization.
  11. Provide shade for livestock if needed and when practical to

**Tips to Use When Developing Prescribed Grazing Plans:**

1. Livestock movements should not be scheduled based on calendar dates. What is more important is the rate of plant growth, available forage and utilization.
2. A record keeping system should be developed and maintained to track plant and animal productivity, practices implemented and changes occurred.

help distribute animals throughout the pasture/range.

12. More pastures will increase the management flexibility of your livestock by increasing the opportunity to control the timing, frequency, duration and season of use in each pasture, as well as to implement more precise breeding programs.
13. Adjust stocking rates to meet the desired objectives for the plant community and associated resources.

**O. Ponds** can be constructed by excavation or embankment to provide water for livestock. Side slopes of excavated ponds should be no steeper than 1:1 and should include a fenced watering ramp with a slope of 3:1. Ponds may be fenced to limit livestock access if needed. Ponds constructed with “Waters of the United States” will require a Clean Water Act Section 401 permit for approval before being designed.

**P. Range planting** is the establishment of adapted perennial vegetation such as grasses, forbs, legumes, shrubs and trees on rangeland, native or naturalized pasture, grazed forest or other suitable locations where the principal method of vegetation management will be with herbivores. Range seeding restores a plant community similar to its historic presence or to the desired existence. It provides or improves forages for livestock and provides or improves forages, browse or cover for wildlife. It also reduces erosion by wind and/or water, improves water quality and quantity and increases carbon

sequestration. This practice shall be applied where desirable vegetation is below the acceptable level for natural reseeding to occur or where the potential for enhancement of the vegetation by grazing management is unsatisfactory.

A mixture of shrubs and trees indigenous to the site can be planted when riparian area, stream bank stability and water temperature are important.

Species, cultivars or varieties selected must be compatible with management objectives and adaptive to climate conditions, soils, landscape position (e.g. aspect) and range site(s). They must also provide adequate cover to control erosion by wind and/or water within an acceptable period of time. Select species or combinations of species must meet the desired nutritional and palatability requirements for the kind and class of livestock and wildlife and meet the desired season of use or grazing period.

**Q. Residue management** is used for soil protection when areas are reseeded or forage species are changed. This is the use of no-till or minimum tillage systems and the return of sufficient pounds of dry matter to the soil to maintain adequate levels of soil organic matter.

**R. Seasonal residue management** is used when crop residues are grazed but some residual amount is planned to be left for erosion control or water quality needs and organic matter replacement.

**S. Riparian area management** is the management of riparian zones immediately adjacent to streams, rivers lakes or ponds where water and land interact. Riparian areas are ecosystems that occur along water courses or at the

fringe of water bodies. One of the most controversial issues facing cattle producers is fencing to exclude livestock from streams. Preliminary research results indicate that proper placement of alternative water supplies and shade upslope in the pasture can reduce stream use by cattle without fencing.

Additionally, rotational use of stream reaches has been demonstrated to protect vegetation and prevent erosion of stream banks without fencing.

To assess the condition of stream banks visually, first determine the percentage of perennial ground cover existing near the stream bank. Next, visually inspect the stream bank for excessive manure deposits and noticeable livestock trails. Continual access to streams and stream banks can lead to resource degradation and poor water quality in the immediate area.

Although riparian areas are unique, don't think of them as lands to be managed separately. They should be integrated into the overall grazing plan incorporating riparian resource concerns and management objectives.

To develop management plans for riparian areas consider the following guidelines:

Incorporate management of riparian areas into the overall management plan. Riparian areas comprise only a small portion of any ranch or farm and proposed action on them must be 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 area may affect uplands and visa versa.

Select a season or seasons of use so grazing impacts in riparian areas are minimal. Consider wildlife needs and riparian plant community objectives. Livestock will affect riparian vegetation and physical conditions differently depending on many factors, including the time of year, physical characteristics and condition of the riparian area, and current weather conditions.

Control the distribution of livestock within the targeted pasture. Ultimately, it is not the length of time cattle are on the pasture, but the amount of time they are actually in the riparian areas of the pasture that determines the amount of grazing impact. It is important to encourage livestock to move away from the streams.

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 cases projections of residual vegetation should include probable wildlife use after livestock have been removed.

Provide adequate re-growth time and rest for plants. For plants to remain vigorous and productive they must have time for growth, seed development and storage of carbohydrates.

Actively manage riparian areas. For a grazing system to be effective, the land manager must be willing to monitor the effects of the system and respond accordingly by making management adjustments when needed.

**T. Stream bank stabilization** is installing gravel or paved stream crossings that limit cattle access to managed portions of the stream and stream bank. They have been shown to reduce stream bank degradation. Install riprap or bioengineering where needed to control a specific erosion point.



**U. Tree and shrub establishment/riparian buffers** provide habitat (food, shelter and water) for aquatic and terrestrial organisms, as well as serving the following functions:

They intercept direct solar radiation, create shade and increase the depth to width ratio to help maintain or restore suitable water temperatures for fish and other aquatic organisms while providing a milder microclimate for wildlife.

They improve and protect water quality by reducing the amount of sediment and other pollutants, such as pesticides, organic, and nutrients in surface runoff as well as nutrients and chemicals in shallow ground water flow.

They provide food, in the form of plant

detritus, for aquatic insects which are an important food source for fish.

They help to stabilize the channel bed and stream bank.

They serve as corridors to provide landscape linkages between existing habitats.

They provide room for watercourses to establish geomorphic stability.

They manage existing riparian herbaceous habitat to improve or maintain desired plant communities.

Land managers should select native species that are adapted to site conditions and provide diversity, cover and food for wildlife. Species selected should also provide a deep, binding root mass to strengthen stream banks and improve soil health.

Necessary site preparation and planting should consider time and manner to insure survival and growth of selected species. Only viable, high quality and adapted planting stock should be used. Site preparation should be sufficient for establishment and growth of selected species and be done in a manner that does not compromise the intended purpose.

Target riparian buffer restoration on a watershed basis to address habitat fragmentation, connectivity and provide corridors for wildlife by maintaining continuous streamside vegetation. Establish alternative water sources or control stream access crossings to manage livestock access to the riparian area.

Select plant species that are native and have multiple values such as those suited for biomass, nesting, aesthetics and tolerance to locally used herbicides. Avoid plant species which may be alternate hosts to undesirable pests. Species diversity should be considered to avoid loss of function due to species-specific pests.

The location, layout and density of the buffer should complement natural features.

Corridor configuration, species planted and management should enhance habitats for threatened, endangered and other species of concern where applicable.

Use plant species that provide full ground coverage to reduce particulate matter generation during establishment and maintenance operations.

**V. Vegetative filter strips** can be utilized to treat runoff from heavy use areas. These filter strips are sized and located in an area to catch and treat any runoff that contains nutrients from the heavy use area. Width and species composition of the filter strip should be determined on a local basis.

**W. Watering facilities** such as spring developments or livestock wells with pipelines, troughs and tanks provide alternatives to streams, ponds or wetlands and help protect them from contamination. Tanks are usually made of concrete, galvanized steel, plastic or fiberglass. Plastic and fiberglass structures shall be made of ultraviolet resistant materials or should have a durable coating to protect the structure

from deterioration due to sunlight. These sources provide water to livestock and/or wildlife at select locations in order to protect and enhance vegetative cover through proper distribution of grazing. They also provide erosion control and protect streams, ponds and other water sources from contamination. A trough or tank should have adequate capacity or water flow recharge to meet the water requirements of the livestock and/or wildlife. This will include the storage volume necessary to provide adequate



water between periods of replenishment or pipe sizing and flow rates adequate to supply livestock with water on demand. Where water supplies are dependable and livestock are checked daily, troughs with little water storage capacity may be used. Troughs or tanks must provide the daily water requirement of the livestock and provide access to the entire herd within a short period of time. Some spring developments may require a Section 401 permit. Check with your local NRCS office for details.