



# Cattle Producer's Handbook

Range and Pasture Section

522

## Managing Riparian Pastures

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Riparian areas are generally defined as ecosystems that occur around water courses and water bodies. They occupy the transitional area between wet and dry ecosystems. Common examples would be land adjacent to streams, rivers, and lakes as well as marshes and wet meadows. Riparian areas are characterized by plant communities that require more water than adjacent upland plant communities.

Riparian plant communities are more productive and generally have higher quality forage than upland plant communities. Because of water availability, riparian plant communities are usually more resistant to damage from environmental or management impacts than upland plant communities. Likewise, these plant communities are relatively resilient and have a great capacity to respond positively to changes in environmental conditions or grazing management.

In the West, riparian areas represent a small portion of the landscape but provide some of the most important sources of habitat for wildlife and forage for livestock. Cattle, elk, horses, and bighorn sheep have all been shown to preferentially select riparian areas for foraging. Because riparian areas often support woody plant communities these habitats are also selected by browsing species such as deer, sheep, and goats. Shrubs and trees growing in riparian areas also provide important security cover for big game, small mammals, birds, and fish.

Riparian areas also provide important ecological functions such as flood control, groundwater storage, enhancements to water quality, and erosion control. Riparian areas provide critical habitats for fish, invertebrates, aquatic insects, and unusual plant species.

### Livestock Use of Riparian Areas

Cattle are attracted to riparian areas for one, or a combination of the following reasons:

1. Foraging conditions (quality and/or quantity) are better than adjacent uplands,

2. Environmental conditions (temperature, ease of travel, resting sites, insects, and presence of threats) are more favorable than in the uplands,
3. Available water source, or
4. Previous positive experiences and the associated learned behavior.

When and how cattle are managed in pastures with riparian plant communities can influence each of these factors and determine if riparian areas become an asset or a detriment to the condition of rangelands. A cattle producer's objective should be to use the available forage within riparian areas without causing long-term detriment to the ecosystem associated with these plant communities. Negative impacts to riparian areas from livestock grazing are usually attributable to the repeated grazing of individual sites within a single grazing season. Factors that contribute to the over use of riparian areas by cattle include:

1. The riparian area provides the only source of water.
2. Upland topography is steep and/or rocky with little forage.
3. Supplements are placed in or near the riparian area.
4. During times of hot weather the only shade available is in the riparian area.
5. Upland forage is less palatable compared to riparian forage.
6. The class of livestock tends to be less mobile or prone to dispersion (i.e., cows/calves vs. yearlings).
7. Individual animals develop behaviors favoring riparian use.
8. Continuous or extended grazing seasons.

The season of use changes the potential for livestock grazing to have negative impacts to riparian areas. In the spring, uplands typically have succulent grasses and forbs that attract grazing animals away from riparian areas. During this time, riparian areas are also cooler in temperature than may be undesirable early in the spring. The hoof action of cattle accessing water or grazing may cause mechanical damage to stream banks

(shearing or sloughing of banks) and wet meadows (deep tracks) because of saturated soil conditions.

Generally as the season progresses from spring to summer, livestock use of riparian areas increases as well. The peak period of riparian use often occurs during prolonged drought or intense heat.

During summer and early fall, upland grasses and forbs lose moisture, turn brown, and dry out much sooner than riparian grasses and forbs. The associated decline in forage quality and palatability of upland species make the green forage in riparian areas especially attractive to grazers. During this period, riparian browse species such as willows, cottonwoods, and aspen also increase in palatability relative to grasses and forbs and may be selected by cattle.

During the fall, rains moisten dry forage and cause green up in the uplands, cold weather causes frost pockets in riparian areas, and cooler temperatures reduce livestock water requirements, all of which encourage cattle to reduce riparian use and disperse in the uplands.

Winter grazing minimizes soil compaction and bank trampling. The amount of forage utilization is also much less of concern because grasses and forbs are not actively growing during this time of year. Generally, managing grazing on riparian plant communities during the winter should focus on ensuring appropriate use levels on woody species.

## Management Strategies

A reasonable goal for managing livestock grazing in riparian areas is to provide adequate forage and water to livestock while maintaining or improving the functional condition of the riparian area. Proper functioning condition is when adequate vegetation, landform, or large woody debris is present to do the following: dissipate stream energy, filter sediments and develop flood plains, stabilize stream banks, improve wildlife habitat, and support greater biodiversity (Prichard et al. 1998).

Numerous factors contribute to proper functioning condition of riparian areas, many of which are not influenced by livestock grazing. These include topography, climate, soils, geology, and hydrologic conditions. Grazing management can have a profound influence on the kind and amount of riparian vegetation and the associated condition of the stream channel. These attributes should be the focus of grazing management in riparian areas.

No “silver bullet” or a single grazing management technique is appropriate for every riparian area. In fact, application of a management strategy may be successful in one situation and fail miserably in the next. After addressing site-specific aspects of each riparian area, range managers should consider options for grazing.

The following basic principles should guide efforts to improve grazing management in riparian areas:

- Avoid grazing the same place at the same time year after year and the same place multiple times in one growing season.
- Optimize regrowth opportunities with short grazing periods and adequate rest periods.
- Limit selective grazing by increasing stock density.
- Provide for adequate plant development before the initiation of grazing.
- Provide for adequate residual after the grazing period.
- Maintain flexibility and identify options for unforeseen conditions.
- Manage for maintenance or improvement of riparian area physical functionality.
- Assess riparian area condition at a frequency adequate to enable prompt corrective management action, if necessary, to protect the health of the riparian area.
- Manage grazing based on plant community productivity and resilience (uplands and riparian plant communities are not the same).

## Tools for Proper Management

How livestock are managed is as important as when riparian areas are grazed, how many cattle are grazed, and what grazing “system” is employed. Generally, it is a good objective for range managers to strive for as short a grazing season as possible in riparian areas. This objective does not necessarily suggest minimizing the amount of forage utilization from riparian plant communities. In fact, a shorter grazing season may be most effectively accomplished with higher relative utilization levels and increases in the number of grazing animals. Management techniques can be classified into three categories.

1. Techniques that attract livestock away from riparian areas.
2. Herd management and animal husbandry practices.
3. Techniques that exclude livestock use or promote avoidance of riparian areas.

## Techniques That Attract Livestock Away from Riparian Areas

### Off Site Water Developments

Forage provided by riparian areas is important, but the water they provide is absolutely critical to grazing. In western grazing pastures, water is usually the center of livestock movements. Simply developing offsite water can significantly change distribution and foraging habits of cattle. Water development in upland areas that lack a water source is often a key factor in reducing livestock concentration in riparian areas. Moving portable stock tanks or closing access to specific watering points within

pastures is effective at altering the distribution patterns of beef cattle on arid rangelands. Distributing water tanks throughout a large pasture and having the ability to turn the water on and off at each tank may work well to distribute livestock grazing.

Range managers can develop off-site water by installing solar, hydraulic ram, nose, sling, or conventional pumps; developing springs, seeps, wells, or guzzlers; and piping water to several troughs. Mobile systems can provide watering sites in different pastures with the use of one pump and existing water sources. Each has limitations, optimum capacities, and price differences that should be compared carefully before purchasing.

Even within riparian areas or riparian pastures, water developments, ponds, or troughs can reduce stream bank trampling damage (Miner et al. 1992). Cattle often prefer to drink from a trough, which can effectively reduce stream access points and manure deposition in the water. However, water developments tend to concentrate disturbance rather than distribute it. Water developments should be carefully planned as to not create new problems, such as excess soil erosion or vegetation and habitat impacts. Creating shade and locating rubbing posts and oilers nearby may diminish the effectiveness of water development in helping to reduce the time livestock spend in riparian areas.

#### **Upland Seeding and Improvements**

Planting palatable forage species on depleted upland areas or cropland can attract livestock away from riparian areas. Livestock are drawn to the upland forage, decreasing time and use on the riparian area. When developing a seeding plan, the season of use (e.g., use cool-season grasses if trying to decrease early-season use within the riparian area) and the use of native or nonnative plant species should be considered (Wyman et al. 2006). Additionally, creating shade in upland areas may also be a means to provide cooler temperatures for livestock and serve to draw them away from the riparian areas.

#### **Prescribed Burning, Brush Beating, and Tree Clearing**

Prescribed burning, herbicide/fertilizer applications, and mechanical vegetation treatments to improve the quantity and quality of herbaceous forage species will attract grazing animals to these sites. This increase in grazing use on upland sites may reduce the selectivity for riparian plant communities and subsequent grazing use. In fact, the attraction of livestock to treated areas often facilitates temporary rest or deferment of grazing in riparian areas. Wildlife habitat needs should be considered when developing upland vegetation treatments.

In much of the West, plants and plant communities are adapted to periodic fire. Without a natural disturbance regime to shift the competitive balance, woody species

increase and eventually dominate. Highly competitive shrub and tree species, such as sagebrush, juniper and pinyon pine, may displace and reduce the productivity of herbaceous vegetation.

In some cases, woody encroachment leads to an acceleration of soil erosion, loss of habitat for some wildlife, hotter fires when the accumulated fuels eventually burn, and increased risk of invasion by noxious weeds and invasive grasses such as cheatgrass or red brome. Well-designed treatments and management strategies to reduce woody plant encroachment is essential to watershed function and to avoid permanent conversion to a woody and annual plant dominated system. An equilibrium between the woody and herbaceous species supports wildlife with a diversity of habitat needs through periodic disturbance. Prescribed burning and other vegetation treatments can be used to mimic or replace natural fire regimes.

#### **Salt, Mineral, or Supplementation Placement**

Placing salt, minerals, hay, grain, molasses, and other supplements only in upland areas away from riparian areas improves livestock distribution. In general, supplements should be placed no closer than 1/4 mile, and preferably 1/2 mile or more (depending on the topography), from riparian areas and intermittent drainages, except where salt and supplements are used intentionally to localize animal impacts. If supplements are placed near riparian areas, livestock use of shrubs and other riparian forage may increase, which should be closely monitored to prevent overuse.

### **Herd Management and Animal Husbandry Practices**

#### **Kinds or Class of Livestock**

Changing or incorporating different kinds of livestock can affect both habitat selection and forage preference. Cows with young calves may have reduced mobility and increased reliance on water, both of which favor selection of riparian bottomlands. Yearling cattle, particularly steers, generally tend to be wider ranging and use more of the adjacent uplands. Horse grazing during the winter may result in bark being stripped from deciduous trees in some areas. However, horses are primarily considered as grass eaters, and may congregate less than cattle.

Herded sheep offer several options for achieving proper management in certain riparian areas. Sheep use may be more desirable than cattle use in some areas due to the herders' control over location, timing, degree, duration, and frequency of use. Sheep prefer hillsides to the confining nature of riparian bottoms. The herder can easily move sheep to upland or ridge top areas rather than bedding them in a riparian area meadow. Generally, herders want to keep flocks or bands moving to facilitate forage selectivity. The quality of herding controls impacts to riparian areas

and rates of gain to the lambs. When properly herded, sheep cause less trampling damage than cattle.

Sheep and goats may do less physical damage to herbaceous plants due to their nibbling characteristics, whereas cattle and horses can dislodge plants from the soil because they graze with a pulling motion. This is usually only a problem on young, newly established stands. Sheep and goats may also be used to control invasive plant species such as leafy spurge and knapweed.

Because different animal species have varying plant preferences, the integration of multi-species grazing may improve plant species composition. This integration could alleviate overuse of desired forage species, decrease the potential for invasive increaser species to dominate an ecological site, and enable selective control of undesirable plant species without resorting to the use of herbicides, which is highly restricted close to water.

### **Breed of Livestock**

Most livestock operators would not consider a change in breed of livestock simply to improve distribution. However, grazing patterns might become a consideration in breed selection if an operator is considering a change for other reasons. Higher heat tolerance (and related foraging characteristics) of Brahman, Brahman crosses, and other Zebu types is often a consideration in southern and southwestern states. These breeds may demonstrate a lower reliance on water, a higher preference for browse, and an increased use of upland plant communities.

### **Culling Practices**

Culling practices are traditionally employed to improve some aspect of animal performance such as conception rates, weaning weights, or conformation. However, some operators also cull on habitat selection and foraging behavior. Several studies have found that within herds, or even within breeds, certain individuals tend to spend more time in the bottoms while others tend to select foraging sites that are steeper and more distant from water.

Habitual bottom dwelling cows are likely to produce bottom dwelling calves since forage and habitat selection is a learned behavior. For this reason, habitat selection patterns could be one of the factors considered when culling.

## **Techniques That Exclude Livestock Use or Promote Avoidance of Riparian Areas**

### **Fencing**

Fencing, when properly located, well constructed, and maintained, can be an effective tool for controlling distribution of livestock. Fencing facilitates management of riparian areas by either including or excluding livestock use, depending upon management

objectives. Sometimes exclusion fencing may be the most cost effective and practical approach for small, isolated riparian areas. The loss of forage from exclusion fencing may be inconsequential on streams in poor condition that lack vegetation. Fencing water sources at springs and seeps and piping water to adjacent areas for use is often the only effective measure for protecting small riparian areas.

Fencing has also been suggested as a tool to initiate recovery of a riparian plant community. This may be especially effective if woody species recruitment is the objective. In this case a few years of exclusion may provide woody species to reach “escape height” where they are no longer as vulnerable to browsing. When this condition is obtained, grazing can be resumed to maintain the vigor of herbaceous forage species. Fencing may also restrict wildlife and livestock movements in an undesirable manner.

In addition, fence construction and maintenance can be costly and time consuming. Temporary electric fencing can be an effective tool for improving distribution so that parts of a pasture can be grazed while others are rested. Temporary fencing is also useful for evaluating multiple placement locations before constructing more expensive permanent fencing. Using temporary fencing from year to year to break up grazing patterns and facilitate implementation of rangeland management practices provides flexibility in obtaining long-term objectives.

### **Barriers**

Barriers formed by placing trees and brush on stream banks may discourage livestock use and help stabilize eroding banks. Placing boulders (10 to 20 inches or larger) along stream banks where livestock trail and cause trampling damage can effectively displace livestock use and promote recovery. A similar effect may also occur as woody, riparian plant species increase in abundance in a riparian area. Willows often provide an effective barrier to the stream channel and a refuge for herbaceous species.

### **Hardened Crossing and Water Access Points**

Hardened crossings and water access points are coarse gravel pads that are constructed to provide favorable access locations in a stream for livestock (or people) to cross or drink. The construction of these facilities stabilize the vegetation, stream channel, and bottom where livestock are likely to access. The benefit of developing these improved access sites is that cattle may abandon other access locations and not use random stream access locations in preference for these “optimal access” sites.

Stream access points are often cited as the most significant impact to riparian habitats from livestock grazing. Livestock prefer gravel pads compared to

steep, overhanging stream banks or soggy low areas to access the water in the stream channel. During a roundup, cows will run for the gravel pad before trying to negotiate the stream banks. Locate crossings or access points in areas where the streambed is inherently stable and avoid sites where:

- The channel grade or alignment changes abruptly,
- The channel bed is unstable,
- Head cuts exist,
- Large tributaries enter the stream,
- There is a recently located or constructed channel,
- A culvert or bridge is immediately upstream or downstream, and
- Water velocity and depth are excessive.

Locating water access in rocky areas (natural or manmade) minimizes trampling damage to stream banks and streambeds. If appropriate conditions exist, it is also advisable to establish hardened crossings at sites that were previously established access points by cattle. Narrow water access, or a water gap, discourages livestock from loafing at the water source. Ice and high water flows need to be considered when locating water access points and hardened crossings in some areas. Consider fish spawning and rearing areas when determining the location of the water gap or crossing.

### **Bedding Grounds**

Bed grounds and other livestock concentration areas such as branding traps, loading areas, fence corners, gates, and sorting grounds should not be located in riparian areas. The use of low-stress stockmanship and salt, mineral, or other supplements may be useful for establishing or relocating bedding grounds away from riparian areas.

### **Livestock Turnout Locations**

Locating and mothering livestock far away from riparian areas when they are moved to a new pasture (turnout) may help regulate the timing, duration, and amount of riparian use in large pastures that contain adequate stock water. Similarly, riparian use may be varied from year to year simply by changing the location of where cattle are turned-in to a pasture.

### **Drift Fencing**

A drift fence is an open-ended fence used to retard, alter, or delay the natural movement (drift) of livestock; it is generally used in connection with natural barriers. Drift fencing in conjunction with gullies, cliffs, and other natural barriers can regulate natural trailing or loafing by livestock in some riparian areas.

## **Herding and Stockmanship**

Herding has been shown to effectively control livestock distribution in many situations. The manner in which cattle are herded has a profound impact on the effectiveness of this management action. The objective should be to move cattle in a manner that instills a positive association with other habitats. Consequently, cattle should be herded using low stress techniques and should be placed away from riparian areas to an area that provides positive attributes such as good forage, water, supplements, shade, and/or refuge from insects. Simply “kicking the cows off the creek” has limited effectiveness when this is done at reasonable frequencies.

## **Monitoring**

Monitoring and record keeping are critical components of any riparian grazing management plan. Records should be kept on growing conditions, grazing periods, and natural events (floods, fires, etc.). Photo points and/or vegetation monitoring transects should be established to document changes in riparian conditions over time. Monitoring can demonstrate which grazing management strategies are affecting the condition of the riparian area. Monitoring is the only means to objectively evaluate riparian management strategies and to demonstrate the sustainability of livestock grazing in these habitats.

Many excellent resources are available to guide rangeland and riparian area monitoring efforts. See fact sheet 518 on monitoring grazing lands and 520 on photo monitoring your range.

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