



# Beef Cattle Library

## Grazing Management Options for Riparian Areas<sup>1</sup>

Professionally  
Reviewed

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### Introduction

Riparian areas are among the most productive lands units of many ranches. They often are the major source of stock water and provide important shelter and forage for cattle and wildlife. Because each ranching operation is different, you won't find offers of hard and fast recommendations for managing your riparian areas within the pages of this fact sheet. Instead, our hope is to make you better acquainted with the important functions of riparian areas on your ranch, give you some ideas on how to manage them effectively, and provide a framework for developing grazing management that incorporates these areas into your overall cattle operation.

### Definition of Riparian Areas

Riparian areas are the "green zones" which represent the link between aquatic (water) environments and terrestrial (upland) ecosystems. Riparian areas associated with flowing water such as streams will be the focus of this fact sheet. It is the presence of water during all or a substantial part of the growing season that distinguishes riparian areas from surrounding uplands. Because streams and riparian areas are so connected we will refer to riparian areas not only as the land adjacent to the stream but the stream channel as well.

### Functions of Riparian Areas

Well-functioning riparian areas serve several important roles that not only contribute to the ecological health of rangelands but also provide economic and social benefits. The soil in streambanks, floodplains, and the substrate beneath the channel functions very much like a large sponge that absorbs and stores water. The ability of a riparian area to absorb and store water in this way can reduce peak flows during spring snow melt or after high intensity storms. Reduction in peak flow helps to reduce the destructive energy of moving water, and can greatly lessen the risk of downstream flooding and scouring that may occur with larger volumes of fast moving water. As stored water is slowly released from the "sponge," it either percolates downward to recharge groundwater aquifers or moves laterally back into the stream channel, thereby extending the availability of surface water later into the year.

Riparian vegetation, woody debris, and large cobbles in the stream channel and on streambanks and floodplains reduce the velocity of flowing water. As water is slowed down, it loses some of its energy resulting in less erosion and downstream sedimentation. Slower moving water is also more readily absorbed into the "sponge" for storage and safe release over time. Well-functioning riparian vegetation can enhance water quality by acting as filter strip to trap and hold sediments carried by surface runoff from the uplands and by the stream itself. Over time, this process results in a build-up

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of soil and organic debris on the stream banks, particularly in degraded lower gradient riparian systems, that increases the depth of the stream channel, allowing the riparian system to handle increased volumes of water and dissipate more energy. Sediments may themselves act as pollutants if present in enough quantity to degrade habitat quality for aquatic species and/or disrupt the flow of water. Sediments can also carry attached pollutants in the form of excess nutrients, pesticides, and bacteria. Well-functioning riparian vegetation can remove as much as 50-90 percent of nitrogen, phosphorus, and organic solids from runoff (Dosskey 2001).

Riparian areas offer numerous wildlife species water, food, cover, and travel corridors. About 80% of the terrestrial wildlife species known to occur in southeastern Oregon, for example, are dependent on riparian ecosystems for some portion of their life cycle (Thomas et al. 1979). Lastly, the presence of a greater quantity of water and nutrients makes riparian plant communities the most productive of community types on western rangeland. Riparian areas routinely supply a large proportion of cattle and wildlife forage despite comprising only a small percentage of rangeland (Svejcar 1997).

## Management of Riparian Areas

One of the greatest cattle distribution challenges on arid rangelands is avoiding concentrated use of riparian zones; particularly during the hot- and dry-seasons. That said, however, the impacts of cattle grazing on riparian areas depends upon how grazing is managed and can range from positive to severely negative. As important as riparian areas are, they are not separate, isolated parts of any ranching operation and should not be managed apart from, or to the detriment of the rest of the ranch or grazing allotment. It is also important to consider that each situation is unique and requires its own tailored grazing management strategy. The only way to know with any certainty whether a management strategy is workable for a particular situation is to first make an educated guess about appropriate practices based on the best available science, implement the strategy, and then monitor its effectiveness and adjust the practice as necessary.

## General Principles for Riparian Grazing Management

Although each ranching operation and corresponding situation is unique, there are general guidelines which should be considered when selecting a suitable riparian grazing strategy. How these guidelines are applied to specific situations will depend on the nature of the riparian area and surrounding uplands, the available resources, and the objectives of the ranch. Nonetheless, the range manager who wishes to maintain or enhance riparian health and productivity would benefit greatly by considering these guidelines before implementing any particular practice.

1. **Customize** the grazing strategy to the specific riparian area and operation under consideration. Tailoring your approach requires identifying specific objectives for each riparian area on the ranch. These objectives can take on many forms but will most often specify management that maintains or enhances the productivity and ability of riparian areas to perform the functions discussed above. Achieving your objectives requires an inventory of available resources of the ranch, decisions on how to best use them, development and execution of a systematic monitoring program, and willingness to adjust your practices over time depending on what your monitoring program is telling you.
2. **Integrate** management of riparian areas into the overall management plan for your operation. Management strategies aimed at improving or maintaining riparian health not only must be ecologically sound but also compatible within the overall ranching operation. Riparian areas comprise only a small proportion of most ranches, therefore, it would be a mistake to implement a strategy to maintain or enhance riparian function if those practices are applied to the detriment of the overall ranch. It is extremely important to consider the impacts of practices specific to riparian areas to ensure those actions are complimentary to remainder of your operation.
3. Select a **season of grazing** that avoids critical periods for streambanks and riparian vegetation during most years. The timing of grazing can greatly influence the sustainable grazing capacity of a riparian area. Elmore (1989) described one example in central Oregon where season-long grazing was replaced with spring

grazing. This change permitted substantial recovery in stream channel and riparian vegetation while allowing a four-fold increase in grazing capacity. Each riparian area tends to have its own critical period (s), or time(s) of a year, when it is particularly vulnerable to trampling or grazing damage. Some sites may have more than one critical period. Common examples of critical periods include late spring-early summer periods due to high soil moisture and fragility of streambanks or late fall due to heavy shrub utilization. The appropriate situations and relative advantages and disadvantages of selecting different seasons of grazing follow:

- a. Spring grazing may be appropriate for situations where cattle are discouraged from riparian use by cool temperatures and wet conditions in the bottoms, cattle are lured to the uplands by succulent, highly palatable forage, and coarse-textured rather than fine-textured soils are present, thereby reducing the risk of severe compaction of wet soils. The possible advantages of early season grazing of riparian areas include less streambank trampling and soil compaction *if* most cattle use occurs in the uplands, more time for regrowth and recovery of riparian vegetation after grazing, and less browsing of woody species in the riparian area (cattle generally prefer growing, green herbaceous vegetation over woody browse species this time of year). Potential caveats of early season grazing include a higher risk of streambank degradation and soil compaction if cattle spend much time in riparian areas, repeated grazing during the early season can negatively impact plant vigor and lead to changes in vegetation composition, and early season grazing may reduce nesting cover and disrupt brooding birds in some situations. Typically conditions are drier and there tends to be a lower likelihood of streambank degradation with summer grazing. However, advantages of grazing riparian areas during the hot season (summer) are limited and the practice should be used very judiciously and closely monitored. This is primarily because there is a greater tendency of cattle to loiter in the riparian area, particularly if shade is available.
- b. Summer grazing may be appropriate for situations where the grazing manager is committed to close monitoring of riparian conditions, the period of grazing is limited in duration and intensity, effective practices are used to discourage disproportionate use of riparian areas, and soil moisture and temperatures provide opportunity for regrowth of riparian vegetation after livestock are moved. Other than streambanks tending to be drier and thus more stable and less susceptible to trampling impacts during the “dry season,” few advantages are associated with grazing riparian areas during the summer. In fact, because of the strong tendency of cattle to remain in and disproportionately use riparian areas during summer, especially when they provide the only available shade, water source, and green forage. Great care should be exercised when grazing during this period to avoid degrading the riparian area.
- c. Fall grazing may be appropriate for situations where riparian vegetation consists primarily of herbaceous rather than woody species (shrubs and trees), when cool season grasses experience fall regrowth and provide palatable forage in the uplands, and where off-stream water sources are available to help lure cattle out of riparian areas. The potential benefits of fall grazing riparian areas include a lower risk of compaction and trampling of streambanks because of drier conditions, reduced impacts to herbaceous vegetation because plants have completed their growth cycle, and typically fewer impacts to wildlife compared to spring grazing. Caveats of fall grazing riparian areas include a lower likelihood of regrowth following grazing due to reduced soil moisture and declining temperatures and a risk of excessive use of woody species if they are present. Also, meeting end-of-season stubble heights for riparian herbaceous vegetation, if applicable, can

- be difficult with fall grazing because of a low likelihood of regrowth.
- d. Winter grazing may be successfully used in pastures that are large enough to accommodate feed for cattle or supplemental feeding areas well away from the stream, in areas where cold air drainage discourages disproportionate use of riparian areas, and where soils remain frozen throughout most of the winter reducing susceptibility of streambanks to compaction and sloughing. Advantages of winter grazing may include a lower risk of compaction and streambank damage because soils are frozen, herbaceous plants are typically dormant and therefore less impacted during winter, and cattle distribution can be easily manipulated through strategic placement of water sources and supplemental feeding areas. Perhaps the largest potential drawback of winter grazing riparian areas is a greatly elevated risk of negatively impacting woody vegetation if present.
4. Limit the **frequency of grazing** of riparian areas to allow vegetation adequate opportunity for recovery. Frequency of grazing refers to how often a plant is grazed within a growing season. To graze a plant more than once per growing season, moisture and temperature conditions should be favorable for regrowth. Minimum 30 to 60-day recovery periods between defoliations are generally appropriate depending on the type of vegetation and provided that moisture and temperature conditions are conducive to plant regrowth (Myers 1989, Allen and Marlow 1994). In addition, grazing, even with more animals, for shorter periods (~3 weeks or less) is typically preferable over fewer, longer grazing periods. Shorter grazing bouts, sometimes referred to as “flash” grazing, reduce the opportunity for cattle to repeatedly graze favored plants and promote better recovery of riparian vegetation when integrated with planned rest periods. Repeated grazing during a plant’s growth cycle eventually causes root die back, loss in vigor, reproductive decline, and eventual mortality. Thus, this may result in a change in riparian vegetation from more productive, palatable plants to a less productive, less palatable group of species.
  5. Manage the **intensity of grazing** or degree of plant utilization to ensure adequate residual cover of riparian vegetation. Intensity is a term used to describe the amount of forage taken during a grazing bout. Intensity affects the ability of vegetation to regrow, and the amount of regrowth determines overall pasture productivity. However, the ability of vegetation to respond to a certain grazing intensity is strongly linked to the timing and frequency of grazing. Plants that are not repeatedly grazed and that have sufficient opportunity for regrowth after grazing will respond more favorably to higher levels of grazing intensity compared to vegetation that are not afforded ample recovery periods. The key to managing grazing intensity is to leave sufficient above-ground growth after grazing. Based on a review of the effects of grazing intensity on riparian functions, Mosley et al. (1999) recommended that utilization levels of less than 65% of herbaceous plants are typically appropriate to sustain vegetation and protect riparian function (as long as vegetation is allowed adequate recovery periods). Utilization of riparian shrubs should not exceed 50 to 60% during the growing season.
  6. Encourage better **uniformity in grazing distribution**. The ultimate impact of cattle on the riparian system will depend on the amount of cow hours in the riparian area and may or may not relate to the duration that cattle are in a pasture, or the stocking rate of that pasture. A handful of cattle that spend large amounts of time in the riparian zone can have as much or more negative impact than a larger number of cattle more evenly dispersed across a pasture. Therefore, it is important to consider strategies to encourage cattle to move away from the stream. Such strategies fall into two major categories that include techniques that attract cattle away from riparian areas and techniques that exclude or promote avoidance of riparian areas.
    - a. Techniques that attract cattle away from riparian areas include water developments in off-stream locations, improving availability and quality of forage in uplands, and strategic placement of supplements away from riparian areas. Water development in upland areas that lack water is often used to reduce cattle concentrations in

riparian areas. Where practical, off-stream water development can be achieved by pumping water from the channel to an off-stream location using solar, hydraulic ram, or conventional pumps, developing springs, seeps, or wells, or constructing guzzlers. Careful consideration should be given to the potential impacts of new water developments. New water developments should avoid creating new problems, such as excessive soil erosion or negative vegetation/habitat impacts. Planting palatable forage species on depleted uplands can also be used to attract cattle away from riparian areas. Prescribed burning often improves forage production and palatability, and can be strategically used to attract cattle to uplands and away from riparian areas. Placing salt, protein tubs, molasses, and other supplements in upland areas away from riparian areas often improves distribution. A similar technique uses periodic forced intense cattle use of upland areas of pastures, often by dry cows, which can reduce “wolfy” plants, improve distribution, and increase forage quantity and quality.

- b. Installing physical barriers (e.g., fences) and frequent riding/herding are methods that can be used to discourage cattle use of riparian areas. Properly located and well-built and -maintained fences can be an effective tool for controlling cattle distribution. In some cases, exclusion fencing can be the most practical approach for initiating rapid riparian recovery or improving highly sensitive or degraded areas. Use of narrow water gaps in combination with exclusion fencing can help to minimize cattle loafing at the water source. Location of water gaps is critical; for best results they must be placed in rocky areas to avoid damage from concentrated hoof action. However, fencing may constrain wildlife movements and construction and maintenance costs can be considerable. Proper placement of physical barriers such as cut trees, brush, and large cobbles on streambanks may also serve to discourage cattle use

while helping stabilize eroding bank, often without the costs associated with fence construction and maintenance. Frequent riding and herding can effectively control cattle distribution in some situations. However, poorly conducted riding and herding can cause more harm to the riparian area and livestock performance than having cattle remain along the stream. The importance of knowledgeable riders who understand cattle behavior and the need for the practice cannot be overstated. The effectiveness of this technique can also be greatly improved by the presence of off-stream water and strategic placement of supplements to encourage cattle to remain in the uplands after being herded out of the riparian areas.

No discussion of grazing management would be complete without considering **monitoring**. Because of the high degree of variability between riparian areas, management strategies and practices must be adapted to the unique set of ecological conditions present in a given riparian system. Making these adjustments is contingent upon having a monitoring program in place to track the response of the riparian system to management inputs. Monitoring should include collection of annual data (weather data, grazing utilization, numbers of livestock, season of use, etc.) as well as long-term trend in riparian resource conditions. Annual monitoring includes yearly documentation of management activities, events, and observations of effects that influence progress toward objectives. Trend monitoring documents and measures, usually over a period of years, progression towards or achievement of objectives. Without trend monitoring there is no linkage between annual measures of impact and ecosystem health. For example, end-of-season stubble height standards can be used as an annual indicator of grazing intensity, but unless those measurements are paired with long-term trend data such as abundance of indicator plant species, the linkage between the annual indicator and the health of the riparian system will remain unknown.

## Conclusion

This fact sheet was written to help make you better acquainted with the important functions of streams and riparian areas on your ranch, give you

some ideas on how to manage them effectively, and provide a framework for developing grazing management that incorporates these areas into your overall cattle operation. The selection of management practices for your riparian areas will depend on the current condition of your sites, your management objectives, and the relationship of riparian areas with the rest of your operation. The importance of making sure that your objectives and the resource outlays needed to manage riparian areas are not in conflict with your overall ranch objectives cannot be overstated. In addition, the plan you develop for grazing your riparian areas must be flexible enough to accommodate a change in conditions that are beyond the control of your management. Lastly, only through a systematic monitoring program will you know if you are moving toward achieving your objectives or what “mid-course” adjustments may be needed to make progress to reaching your goals and objectives.

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