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Management of Livestock in Riparian Areas

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Abstract

In the past, livestock-grazing management practices have not addressed the needs of riparian areas. The knowledge of how these areas function has increased and has brought about an awareness of the importance of these areas to the entire ecosystem. Management strategies have now been developed that allow livestock to utilize these areas without degrading them. The strategy for a particular area depends on the characteristics of the specific riparian zone, on the management level and goals, and on the type of animal being grazed.

INTRODUCTION

Management of riparian ecosystems must address the three basic components of these systems, i.e., the soil, the water, and the vegetation. Anything that negatively influences one of these basic factors in turn affects the other two factors. If the influence is severe enough, it can set up a cycle of degradation that can spiral downward. For example, any influence that negatively affects the vegetation has potential to change species cover and composition. If the plant species that hold the banks together or the cover that traps sediment are lost, additional sediment is introduced into the system. Dencutting of the stream channel can occur, often leading to a lowering of the water table. As the water table is reduced, the site becomes drier, resulting in further changes in the plant community. Species adapted to the drier conditions become dominant. These species often have inadequate root systems to buffer the forces of water. Consequently, the stream channel is lowered even further with resulting negative influences on sedimentation, species composition, and water storage. These negative influences then have detrimental effects on wildlife and fisheries habitat, forage for native and wild herbivores, and the general health and aesthetics of the area. In severe situations, sites can be altered to the point that they can no longer be classified as riparian.

On the other hand, when appropriate riparian

vegetation is present and maintained there is a balance between the negative and the building forces of water. Sediments are caught and stored in secure stream banks bound by litter and root masses. The filtered water runs more clearly; and sediments, instead of being destructive, are used to maintain and build bank structure. Water tables are maintained at more natural levels, resulting in greater stored water for slow release in the drier season and reduced destructive flows in the wetter season. Sites remain moister, are nutrient enriched, and grow a greater abundance of appropriate soil-binding plant species. Habitat for fish and wildlife is improved, forage for ungulates is increased several fold, and aesthetics and general riparian health are improved. As we have increased our knowledge of interactions among these three basic riparian components, we have been able to improve our abilities to design and implement management strategies that will allow riparian ecosystems to provide useful grazing values yet continue to function properly.

LIVESTOCK/RIPARIAN INTERACTIONS

Livestock grazing in the Intermountain West has been a significant factor in the health of riparian ecosystems. This factor has consisted of grazing by sheep, by cattle, and occasionally by horses. These

livestock can have both direct and indirect effects on riparian areas. Direct effects involve trampling and soil compaction as well as the effect on the grazed plant species within the riparian area proper. Indirect influences come from effects on upland areas that result in movement of sediments or runoff into riparian settings.

Sheep, by their grazing nature, tend to prefer upland areas. They seldom are found grazing or resting in riparian settings unless they are purposely herded into these areas. If this type of herding occurs, it can best be corrected by training the herder to keep sheep out of the bottomland areas.

Generally, negative impacts from sheep on riparian areas are indirect. Overuse on historic bedgrounds and repeated trailing on upland sites can result in barren areas. Erosional processes are initiated on these barren areas, and the effects carry down to the riparian settings. Excessive sediment from upland sites can overwhelm the sediment trapping capabilities of the riparian vegetation (Hunter 1991). The riparian vegetation may be healthy; but the filtration component cannot keep up with the sediment load, affecting stream banks as well as water quality and fisheries habitat. Management can best correct these problems by teaching herders not to allow sheep to bed down in the same area each night. Sheep drive-ways that extend for miles and often have ten or more bands of sheep using them each spring and late summer may need to be eliminated and animals trucked to the grazing area. Although this may require additional costs to the owners, elimination of these traditional "sacrifice areas" associated with repeated, concentrated sheep use may be necessary in order to protect the riparian portion of the grazing allotment.

Cattle, unlike sheep, tend to concentrate in riparian areas for the most part. They prefer level terrain where they can feed, rest in the shade, and have drinking water without travelling very far. As a result, cattle grazing has brought about significant degradation of many Western riparian ecosystems.

Cattle especially show a preference for riparian settings when upland forage begins to dry or to become scarce. Past cattle-grazing prescriptions were primarily centered around improving upland vegetation. As a result, some of the riparian areas received inadequate management. Now, with an increased emphasis on better management of all wildland ecosystems, especially riparian areas, management strategies that will do a better job of livestock management overall must be designed.

Within riparian areas, cattle also show a preference for particular plant species. As the cattle select these plant species, composition changes toward plants that are utilized less intensively. Also, some plant species are more tolerant to livestock grazing

than other species. A good example throughout the intermountain area is the effect of cattle on Nebraska sedge (*Carex nebrascensis*). Nebraska sedge is a species native to riparian areas. It has evolved to fit requirements for plant species occurring in these settings. It has a strong, rhizomatous root system that extends four to six feet into the soil profile. These strong roots buffer the effects of moving water and help hold stream banks in place.

If the species receives grazing pressure or trampling that is too heavy, it is replaced by Kentucky bluegrass (*Poa pratensis*). Kentucky bluegrass has a relatively weak, shallow root system. As such, it has a very reduced capability to buffer the effects of moving water. If it becomes a dominant streamside species, the entire riparian ecosystem begins to deteriorate.

Willows are another example of good riparian species that cattle can detrimentally affect if not managed correctly. Cattle prefer willows during the latter part of the grazing season as associated herbaceous species dry or become scarce. This detrimental effect is also true for many of the shrubs and trees (alder, birch, aspen, and cottonwoods) that are important in stabilizing riparian systems. If these species are browsed so severely that regeneration and long-term maintenance of the stands is not possible, the entire riparian ecosystem will begin to deteriorate.

Trampling effects from cattle are important particularly when the soil is wet. Trampling uproots plants and causes hummocky situations when the soil is saturated. When it is semiwet, trampling compacts the soil and breaks down stream banks. Management schemes must consider these potentially damaging effects if degradation of riparian areas is to be alleviated.

CATTLE MANAGEMENT

In the Western United States, with its uneven topography and relatively dry summer seasons, cattle tend to concentrate in riparian areas. Management strategies should be geared to make riparian areas less attractive and upland areas more attractive to livestock. Several potential management techniques designed to accomplish this include the following:

PLACEMENT OF WATER

More emphasis should be used in making water available for livestock outside of the riparian area. Improving the availability of water can be achieved with a variety of techniques including piping water, digging watering ponds, and developing troughs away

from spring sources (Vallentine 1989). The objective is to provide animals an alternative watering source away from riparian settings.

PLACEMENT OF SALT

Even though it has been the tradition in all range-management schools to teach the importance of using salt as a tool to move animals out of concentration areas, it is not uncommon to find most of the salting areas located near a watering source. This placement of the salt only serves to concentrate animals in riparian areas. Much more emphasis must be put on locating salt away from these areas that, by their nature, favor animal concentration.

USE OF HERDING

Although cattle are not generally herded in rangeland settings in the same way that sheep are herded, use of riders to daily move animals out of concentration areas can benefit riparian areas. Herding requires a consistent effort by the herders. Practical experience has shown herding to be most beneficial if used in conjunction with other techniques, such as water developments. Herding is also most effective when done during midday when cattle are most likely to seek shade. Time is also required to train cattle and the herders for this technique to be most effective (Roger Banner, pers. comm. 1991), and it requires the riparian area to be completely cleaned of animals on each drive. Even if just 2 to 5 percent of the animals are left in the riparian area, those animals can undo the work of the herder since riparian areas are normally very small and a few animals left to graze season long can easily abuse these small areas.

USE OF BEAVER

Beaver have been a part of many naturally functioning riparian areas in the intermountain area. In fact, it is difficult to understand their natural role since most were trapped or removed from Western lands before the first settlers arrived with their animals.¹ Dam-building activities of the beaver have the capacity to raise water tables, making riparian areas less attractive to livestock. This forces animals to spend more time foraging on adjacent upland areas. Beaver, however, can only be used in areas that have adequate habitat (woody vegetation).

IMPROVE ADJACENT UPLANDS

In the absence of natural historic fires throughout the Western United States, many of the dominant shrub and tree species have increased their densities

above historic levels (Gruell 1983). This increase has led to a decline in the herbaceous vegetation in many areas. A better balance between understory/overstory species would make good ecological sense. In the 1950s and 1960s, there was an effort to increase the herbaceous component for livestock forage. Management has currently turned away from many of these practices for a variety of economic, ecologic, and aesthetic reasons.

Most of the negative attitudes associated with these earlier efforts centered around how the techniques were applied and how the exotic herbaceous species were used to revegetate these areas. Research has improved potential application of some of these techniques as well as species available for seeding. Current options available to improve the herbaceous/woody species balance in our wildland settings need to be reevaluated. This improved balance would have the potential to provide a greater foraging resource outside riparian settings and could improve the hydrologic regime by reducing evapotranspiration from upland settings and allowing more ground water to feed into riparian areas.

FENCING

Fences in wildland settings generally are expensive to install and difficult to maintain. Consequently, managers shy away from using them to help improve management of the relatively small riparian portions of their allotments. However, specialized fencing equipment, strategically located, can often be used to improve management of some riparian areas. For small-problem stream sections, short electric fences can be efficiently used in some settings, though conflicts with other riparian values such as recreation must be addressed. Pole-barrier fences can be used to keep animals off sections of banks, and these are often more aesthetic than barbed wire or electric fences. Fencing can also be designed to develop riparian pastures, i.e., sections within an overall allotment in which length of grazing and season of use can be strictly controlled. All fencing should be designed with other riparian values in mind.

GRAZING SYSTEMS

Specialized grazing systems are often the most difficult to implement but potentially can provide the greatest influence for meeting land-management objectives. Season-long grazing generally has not been effective in providing adequate management on riparian areas in the Western United States, even when reduced animal numbers are used. This technique is ineffective because the reduced number of animals spends more time grazing the relatively small riparian portion of the allotment rather than utilizing upland forage.

¹See Kay, this volume.

When various rotation grazing systems are used, care must be taken to remove all animals from the used pastures. If all of the animals are not removed, the few remaining often spend most of their time on the riparian areas, essentially resulting in season-long use on the riparian areas in that pasture. If this season-long use is not eliminated, most other riparian management techniques will not work. The grazing systems developed for riparian areas should be designed to eliminate the season-long grazing.

Riparian areas generally are least affected in the spring season by cattle because forage on the upland portion is lush and the riparian area is often soggy. These factors result in cattle spending more time grazing upland settings. If all grazing land could be used for a short time early in the season and animals then removed in time to allow regrowth, there likely would be few riparian grazing problems. However, cattle need feed throughout the growing season. Care must be used in developing a grazing system to alternate the period of use and not to remove more than the plant species are capable of tolerating or what is needed to provide adequate cover to protect the watershed values, i.e., trap sediments.

When grazing occurs late in the season, animals must be removed in time to leave 7-15 cm of stubble on the main plant species. This stubble serves as a filter for reducing sediment loss during thunderstorms or during the following spring snow melt.

If grazing is done earlier in the growing season, animals must be removed early enough to allow 7-15 cm of regrowth on the major riparian species. This growth must remain on these species to serve as a sediment trap during high flow. Allowance of 7-15 cm of growth/regrowth also should provide adequate protection for plants to maintain their vigor.

SUMMARY

There are several management opportunities that can be used to reduce the effects of livestock in riparian areas. Nature provides a buffer for use because of increased availability of water for plant regrowth. This increase in water availability can provide opportunities for use of management techniques that will meet the needs both of riparian areas and of the livestock enterprise.

In the past, season-long grazing and misunderstandings of how riparian areas function have resulted in degradation of many Western riparian areas. Although application of many of the newer grazing strategies has proven valuable, these strategies often may result in increased costs. However, if livestock grazing is to remain a viable use of riparian resources, particularly on public land, these strategies will have to be implemented.

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