

EDITOR'S CHOICE FROM RANGELAND ECOLOGY & MANAGEMENT

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How cattle and wild ungulate use of riparian areas affect measures of streambank disturbance

Brett B. Roper and W. Carl Saunder

Mahatma Gandhi acutely observed that “the greatness of a nation and its moral progress can be judged by the way its animals are treated”. To seek to improve the quality of life for those with whom we share the Earth is truly a mark of a civilized society. My corollary to Gandhi’s observation is the “greatness of people and their sustainability can be judged by the condition of their water”. On rangelands, riparian areas along rivers and streams are the lifeblood of every ecosystem through which it flows. Loss of riparian ecosystems means loss of life. Without water, cells dry, biological processes cease, and no one survives.

In the western United States, riparian areas comprise <1% percent of the land area but are the most important part of the entire system. Riparian areas provide necessary habitat for wildlife and are critical to the ecological functioning of the entire region. Riparian areas occur in low spots across the landscape, which allows ground water to be present near the surface and available to plants. The fine-textured sediments in flood plains are also able to hold large amounts of water. These two conditions promote productive and diverse plant communities. Base flows are the portion of water flowing in a stream because of ground water seepage into the channel. It is maintained by riparian vegetation that shades the water, keeping it cool and slowing evaporation. Riparian areas determine nutrient availability, downstream flooding, energy flow, water quality, and presence of aquatic and terrestrial life.

Numerous natural disturbances, such as flooding or drought affect riparian areas by altering vegetation, and channelizing streams. In addition, there are many induced disturbances that influence the functioning of riparian areas. Over the past several decades, land managers have focused on understanding the influence of livestock and wildlife on riparian areas and have developed methods to reduce their impacts. Fencing has been used to minimize the time livestock spend in riparian areas, but it has been difficult to replicate these tests because riparian settings are so variable that meaningful comparisons are challenging. Alternatively, ‘triggers’ can be used to manage livestock impacts in riparian areas. Once a ‘trigger’ is attained the livestock are removed from the riparian area. “Triggers” for livestock removal from riparian areas are metrics, such as stubble height and some quantification of streambank disturbance. It remains challenging to judge the success of these strategies across thousands of stream reaches because there continues to be disagreements on how to evaluate livestock disturbance in riparian areas.

The Editor’s Choice for *Rangeland Ecology & Management* Volume 74 is an amazing project that used time-lapse cameras to estimate ungulate use within specific stream reaches and measured near stream ungulate disturbance in these same reaches. It would be helpful to have guidance “triggers” on the number of cattle that should be permitted within an allotment to insure the protection of riparian areas and stream conditions. However, guidance on stocking rates does not account for the tendency of cattle to concentrate near water. In addition, most upland forage remains uneaten at the end of the grazing season and livestock share grazing pastures or allotments with wild ungulates.

In this Editor’s Choice article, Brett B. Roper and W. Carl Saunder found daytime, near-stream cattle and wild ungulate presence was related to reduced stubble height and streambank alteration at the end of the growing season. Some researchers have argued these short-term indicators of livestock disturbance should not be used to judge administrative performance. Roper and Saunder believe these arguments overlook studies that have related these short-term measures of livestock disturbance to longer-term stream habitat conditions important to fish. An appropriate level of near stream ungulate disturbance, as proxied by these two metrics, can be used to maintain, or improve riparian conditions while retaining rancher flexibility in cattle management. Their results, in combination with other research, suggests many riparian stream reaches can be grazed by small groups of cattle for several days without substantially decreasing stubble height or increasing streambank alteration. Active and passive

management strategies that alter the time cattle spend in riparian areas, such as increasing the availability of off stream channel water sources, placement of salt and other nutrients in upslope areas, culling of animals consistently found in riparian areas, and using range riders to alter cattle distributions in an allotment can reduce the value of near-stream metrics as a result of ungulate disturbance.

Streambank alteration follows the daytime presence of ungulates while stubble heights are also influenced by landscape covariates. Given this, there is likely greater flexibility in cattle management to meet stubble heights objectives, as different areas are more or less susceptible to grazing as evaluated by this metric. In contrast, their models suggest the best way to reduce streambank alteration is to reduce ungulate use. Their findings are supportive, yet cautionary, for the continued grazing of livestock in riparian areas on western public lands. The presence and densities of cattle these researchers observed suggest many streambanks are at limited risk to disturbance caused by ungulates as the values they recorded were low. In most settings, the additive effects of wild ungulates were insufficient to accentuate reductions in stubble heights or increases in streambank disturbance caused by cattle.

Several stream reaches subject to high densities of cattle had substantial streambank alteration and, depending upon the environmental setting, decreased stubble heights. While stubble height and streambank alteration are not the ultimate goals of livestock management in riparian areas, they help identify progress towards long-term objectives (e.g., fish habitat conditions). High levels of livestock disturbance near streams will be used by some researchers as evidence of poor management. In contrast, low levels of near stream livestock disturbance in areas subject to large numbers of cattle may suggest greater flexibility in management strategies. While their study provides additional insights into how cattle presence and density affect streambank measures, they believe there is a lot to be learned about applying these measures in different situations. Because public land management agencies need to demonstrate improved riparian management, these near stream disturbance measures will remain important to the administration of cattle on public lands into the future.

Please take a look at this excellent paper in *Rangeland Ecology & Management* Volume 74. This is a fresh method for understanding the management of cattle in riparian areas.

Thank you

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