

Cattle damage to riverbanks can be undone

Simply removing cattle may be all that is required to restore many degraded riverside areas in the American West, although this can vary and is dependent on local conditions. These are the findings of Jonathan Batchelor and William Ripple of Oregon State University in the US, lead authors of a study published in Springer's journal *Environmental Management*. Their team analyzed photographs to gauge how the removal of grazing cattle more than two decades ago from Hart Mountain National Antelope Refuge in eastern Oregon has helped to rehabilitate the natural environment.

Livestock ranching is ubiquitous across much of the western US. Depending on the density of livestock and grazing duration, it can have numerous impacts on the environment - from changes in the soil characteristics to the plants and animals to be found in an area. Riparian, or riverside, vegetation is particularly susceptible to the effects of grazing. This is because cattle tend to congregate around rivers for easy access to water, lush forage and favorable terrain. Their presence can cause woody plants to decrease, riverbanks to erode, streams to become shallower and wider, and a change to take place in the quality and temperature of the water.

It is not only important to note the effects of grazing on the environment, but also to know what happens when cattle are no longer present in a particular ecosystem. To this end, Batchelor, Ripple and their colleagues turned to Hart Mountain National Antelope Refuge, from which all cattle were removed in 1991 after decades of grazing. This was done as part of management plans to restore the environment.

Their team compared 64 pairs of repeat photographs taken in 2013 and 2014 with those taken before cattle were removed in 1991 on Hart Mountain. They found promising results showing that passive restoration works as a way to rehabilitate a landscape after decades of cattle grazing. There was an increase in woody riparian vegetation, and most notably a fourfold increase in willow and rushes. Patches of bare soil decreased to a tenth of what they were while livestock were still kept in the area. Exposed stream channels decreased dramatically in 63 percent of the cases, as did channel widths (64 percent) and the number of eroding banks (73 percent).

The resurgence of riparian vegetation was not ascribed to climate changes, given that the years prior to 1991 were generally less drought-stressed than the years following the removal of the cattle.

"The study at Hart Mountain National Antelope Refuge shows just how much a system can change within only two decades of cattle removal," said Ripple.

Batchelor added, "The removal of cattle can result in dramatic changes in riparian vegetation, even in semi-arid landscapes and without active restoration treatments."

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Reference: Batchelor, J.L., Ripple, W.J., et al (2015). Restoration of Riparian Areas Following the Removal of Cattle in the Northwestern Great Basin, *Environmental Management*. DOI 10.1007/s00267-014-0436-2

For more photos showing the restoration of Hart Mountain's riparian systems, see:
<http://www.cof.orst.edu/hart/index.html>