Pasture Management and Riparian Buffers Reduce Erosion

Sediment is the number one pollutant in U.S. waterways. Overgrazing can increase soil erosion from pastures as well as sediment loading into aquatic systems. Grazing management and buffer strips may reduce erosion; however, few studies evaluating these practices have been reported.

A 12-year study using 15 small watersheds near Booneville, AR examined the effects of five treatments: hayed, continuously grazed, rotationally grazed, rotationally grazed with an unfertilized buffer strip, and rotationally grazed with a fenced riparian buffer. Results were published in the March–April 2017 issue of Journal of Environmental Quality.

The team found that soil bulk density increased with increasing grazing pressure and was highest in continuously grazed watersheds. Runoff volumes, sediment concentrations, and sediment loads were also highest for the continuously grazed treatment and lowest for paddocks that were hayed or those that were rotationally grazed with a fenced riparian buffer. The Revised Universal Soil Loss Equation (RUSLE2) predicted soil loss fairly well for the rotationally grazed treatments but over-predicted soil loss from the continuously grazed and hayed treatments.

Using rotational grazing in combination with fenced riparian buffers or converting pastures to hayfields appear to be good options for reducing soil erosion and runoff to waterways.


Ammonia, Methane, and Nitrous Oxide Emission Reduced by Acidification of Liquid Manure

Stored livestock manure is a source of ammonia (NH₃) and the greenhouse gases methane (CH₄) and nitrous oxide (N₂O). One way to reduce these emissions may be to acidify the manure slurry. In an article recently published in the Journal of Environmental Quality, researchers evaluate emissions from acidified (pH 5.2–5.5) and unacidified (pH 7.2) liquid dairy manure.

The authors report that reducing pH to below 6 by adding sulfuric acid can reduce the emission of NH₃ by 62% during 47 days of storage and CH₄ by 68% during 57 days of storage. These effects of acidification declined with time as pH gradually increased.

A large fraction of total carbon loss was as CO₂, which must be accounted for when modeling transformation of organic matter and greenhouse gas emissions from manure stored in animal houses and outside. The loss of dissolved organic carbon (DOC) was closely related to the accumulated emission of C in CH₄ and CO₂; thus, it is proposed that DOC can be used as a predictor of C emission.

Additionally, the researchers found the concentration of volatile fatty acids (VFA) and total ammoniacal nitrogen (TAN) was higher in surface layers than in the center of stored liquid manure, possibly due to organic matter floating to the surface, a process that will make modeling NH₃ emissions complicated.