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Pasture Management Effects on Nonpoint Source Pollution of Midwestern Watersheds

James Russell*, D.A. Bear, K. Schwarte, M.M. Haan, M. Tufekcioglu, N. Hongthanat, J.L. Kovar, T.M. Isenhardt, and D.G. Morrillal
Iowa State University
*jrussell@iastate.edu

Abstract:

Practices that alter the distribution of cattle in riparian pastures may reduce nonpoint source water pollution caused by direct manure deposition and stream bank erosion. A project is being conducted to: 1) Quantify the effects of pasture management on sediment and phosphorus loading of streams; 2) Evaluate the effects of pasture characteristics, grazing management, and microclimatic factors on the temporal/spatial distribution of grazing cattle in riparian pastures; and 3) Demonstrate cost-effective grazing management practices to reduce nonpoint source pollution in two Iowa watersheds. Cow distribution, forage sward height, forage mass, bare and manure-covered ground, and stream bank erosion were measured for two years in 5 to 13 pastures on farms in the Rathbun Lake watershed in southern Iowa and for four years in 6 pastures grazed by continuous stocking with unrestricted stream access, continuous stocking with stream access restricted to stabilized crossings, or rotational stocking in the Willow Creek watershed in central Iowa. Mean proportions of observations of cattle within 32.2 m of the pasture streams in the Rathbun Lake watershed ranged from 2.2 to 25.9%, depending on pasture size and season. Compared to continuous stocking with unrestricted stream access, the mean proportions of observations of cattle within 35.5 m of pasture streams were reduced by 76.5 and 53.3% by restricting stream access to stabilized crossings or rotational stocking, respectively. Increasing stocking rate increased the proportion of fecal-covered ground, but did not affect the proportion of bare ground within 16.1 m of streams in the Rathbun Lake watershed. Restricting stream access to stabilized crossings or rotational stocking increased forage sward height and mass and reduced bare ground on and within 35.5 m of stream banks of pastures in the Willow Creek watershed. However, bank erosion did not differ in streams of pastures with different stocking rates or systems.

Impact Statement:

Restricting access of cattle to pasture streams by using stabilized crossings or rotational grazing reduces the risk of nonpoint source pollution of pasture streams by altering the temporal/spatial distribution of the cows, but effective implementation of such practices will depend on pasture size and shape. While grazing management will affect the risk of nonpoint source pollution from direct fecal deposition or in precipitation runoff, stream bank erosion is more dependent on stream hydrology and precipitation events than grazing management. Project results were the basis of an Extension publication series ("A Guide to Managing Pasture Water") and a Riparian Grazing Workshop for USDA-NRCS, Soil and Water Conservation District, and Cooperative Extension personnel as well as for field days and conferences for producers.

Category: Agricultural BMPs

Type of Presentation: Poster Presentation