

# Quantifying the role of riparian management to control non-point source pollution of pasture and cropland streams

**Abstract:** Grazing management practices have the potential to mitigate some problems with sediment and phosphorus loading in pasture streams. The project demonstrated possible strategies to lessen grazing impacts on streams.

## Investigators:

**James Russell**  
**Daniel Morrical**  
**Daryl Strohbahn**  
**Matthew Haan**  
Animal Science

**John D. Lawrence**  
Economics

**Shelly Nellesen**  
Agronomy

**Tom Isenhardt**  
**Richard Schultz**  
Natural Resources  
Ecology and  
Management  
Iowa State University

**John Kovar**  
USDA-ARS National  
Soil Tilth Laboratory

## More details:

[www.leopold.iastate.edu/research/grants/2009-1/E2004-24.pdf](http://www.leopold.iastate.edu/research/grants/2009-1/E2004-24.pdf)

*Strategies such as rotational grazing with controlled grazing of the riparian paddock, building of stabilized stream access points, and/or providing off-stream water will reduce the risks of sediment and nutrient loading of pasture streams associated with congregation of cattle in or near pasture streams..*



ECOLOGY

## What was done and why?

*Because of its association with eutrophication of rivers and lakes, phosphorus loading of surface water sources is a major non-point source pollution problem in Iowa. Since much of the phosphorus in soil is adsorbed to soil particles, soil erosion promotes phosphorus pollution of surface water sources. Overgrazing along pasture streams also may result in soil erosion,*

Objectives were to:

- Quantify losses of sediment and phosphorus (P) from stream banks in pastures grazed under different stocking systems in one location to control animal management and minimize differences in factors such as stream flow and structure, soil chemical and physical structure and riparian and upland pasture vegetation.
- Measure the spatial and temporal distribution patterns of location, defecation and urination of beef cattle managed in different stocking systems in pastures with upland and riparian zones.
- Demonstrate site-specific models of grazing management practices that optimize the quality of stream water and the profitability of beef cow-calf production in pastures in Iowa.

## What did we learn?

By altering cattle distribution, restricting access of grazing cattle to stabilized crossings or rotational grazing will reduce the potential for sediment and phosphorus loading of pasture streams. This was shown by greater forage masses and sward heights and lower proportions of bare and manure-covered ground on and/or near pasture stream banks compared to continuous stocking of grazing cattle with unrestricted access to pasture streams.

Because net erosion and soil erosion-deposition activity did not differ between grazing treatments and there were no month-by-month treatment interactions for erosion susceptibility scores or stream channel morphology, the effects of natural variation in stream bank erosion were greater than any effects of grazing over three years.