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## **Grazing Management Effects on Pathogen Loading of Midwestern Pasture Streams**

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### Abstract Text:

Loading of coliform bacteria in streams results from management practices that promote congregation of grazing cattle near pasture streams. The objective of this project is to quantify the effects of management practices that alter the distribution of beef cattle grazing in Midwestern pastures on loading of not only fecal coliforms, but also specific intestinal pathogens in streams. Water samples are being collected biweekly and after storm events from entry and exit sites of streams in 13 pastures on beef cow-calf farms in the Rathbun Lake watershed in southern Iowa and analyzed for fecal coliforms, E. coli O157:H7, bovine coronavirus, rotavirus, and enterovirus. Coliform and pathogen concentrations will be related to pasture characteristics, grazing management, and microclimatic data. To develop a model assessing risks of loading streams with pathogens from grazing cattle, the contributions of precipitation runoff and manure deposition to pathogen loading will be determined. Pathogen quantities in surface runoff from bimonthly rainfall simulations on bare and vegetated sites on stream banks will be measured in six pastures in the Willow Creek watershed in central Iowa grazed by rotational stocking or continuous stocking with full or restricted stream access. Temporal and spatial distribution of grazing cattle are being recorded with GPS collars in late spring, mid-summer, and early fall on five beef cow-calf farms in the Rathbun Lake watershed and monthly in the six pastures grazed in the Willow Creek watershed and related to their defecation patterns as affected by pasture characteristics, grazing management, and microclimatic data. The presence and concentrations of pathogens in feces are being measured from 90 cows and the amounts of feces excreted are being quantified with indigestible markers in 12 cows in the six pastures in the Willow Creek watershed.

### Impact Statement:

Previous studies have suggested that manure deposition by grazing cattle in or near pasture streams results in loading of fecal coliform bacteria in surface water sources, indicating possible contamination with pathogenic intestinal bacteria and viruses. These problems are likely associated with poor grazing management and/or pasture conditions that promote frequent congregation of cattle in or near pasture streams. This project will quantify the effects of grazing management and/or pasture improvement practices that alter timing, frequency, duration and/or intensity of beef cattle grazing near pasture streams on the risk of pathogen loading of surface water sources in the Midwest.