

# The Use of Cattle-Grazing and Fire as Management Tools to Maintain Biodiversity on Grassland Reserves in Southern Iowa

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**Goals and Objectives:**

- Collect pre-treatment data on all sites for soil carbon, plants, invertebrates, and birds.
  - Conduct controlled experiments to test the effects of the fire-grazing model on species distribution patterns of both plant and animal taxa in southern Iowa.
  - Quantify the response of native and invasive plants to fire and grazing, and how these responses are mediated by prior land use.
  - Quantify the response of invertebrates and prairie-obligate butterflies to changes in vegetation structure and composition.
  - Quantify response of grassland birds to changes in vegetation structure and composition, and to changes in invertebrate prey base.
  - Quantify the relationship between nesting success of grassland bird species and habitat conditions.
  - Identify other potential sites under public and private ownership in the Grand River Grasslands and surrounding region for possible inclusion in a follow-up regional study.
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**Introduction:**

The major threat to mesic grasslands was historically conversion to row-crop agriculture. Although conversion of grassland to row crops continues, the most significant threats to grassland systems are changing land management and factors related to global change. To mitigate these threats, public agencies, non-governmental organizations, and private landowners have employed fire and grazing – logical choices given the long co-evolutionary history of grasslands with these processes. Uniform application of fire, grazing, or other disturbances, however, tends to reduce the temporal and spatial variability that was characteristic of these landscapes historically and that is critical for some wildlife species. Recently, a fire-grazing model has been proposed that is intended to maintain or restore such variability. This model assumes that free-ranging herbivores will selectively graze patches that have been recently burned. Applying spatially discrete fires to the landscape over time causes grazing animals to shift their activities to new locations, resulting in a patchwork or shifting mosaic of habitat structure and composition that more closely approximates historical conditions. To date, the application of this model to remnant tallgrass and reconstructed prairies have confirmed these predictions.

More than 25% of Iowa remains in some form of perennial grass cover, mostly in the southern third of the state. Southern Iowa is also home to some of the state’s few remaining untilled grasslands and largest cattle herds. Our long-term goal is to evaluate the efficacy of the fire-grazing model on Iowa’s grasslands in terms of conditions for biodiversity, species of conservation concern, and benefits accruing to livestock producers.

**Progress:**

Study sites in southern Iowa have been identified, grazed treatment units were stocked with cattle in 2006, and pre-treatment data have been collected on replicate pastures.

**Future Plans:**

Treatments (i.e. patch-burns) will be applied in winter 2006-07.