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FOR SUSTAINABLE AGRICULTURE

## Devising a framework for implementing cattle-grazing and fire as management tools on grassland reserves in southern Iowa

Abstract: Grassland preservation practices such as grazing and use of fire are studied in southern Iowa and northern Missouri.

### Question & Answer

**Q:** What is the potential for using fire and grazing as tools to conserve plants and animals native to Iowa's grasslands, and at the same time serve the interests of livestock producers?

**A:** There appears to be strong support among various stakeholders, including private landowners and governmental or non-governmental agencies, for further exploration of this management framework. In particular, the notion of achieving conservation goals while at the same time providing opportunities for livestock producers has generated considerable interest.

uniformity. Such practices can transform grasslands that were historically quite variable, or heterogeneous, into landscapes that resemble a homogeneous pasture. An alternative land management paradigm calls for approaches that mimic the historical interaction between fire and grazing to produce a more dynamic landscape.

The long-term goal for the investigators is to evaluate the efficacy of the fire-grazing model on Iowa's grasslands with regard to conditions for native species and benefits to livestock producers. The overall goal of this project was to develop a framework for implementing the fire-grazing model at several sites in southern Iowa, where most of Iowa's remaining perennial grass cover is found.

### Background

Native grasslands in the central United States have been greatly reduced in area and degraded by human activities since European settlement. As a result, many species that depend on grassland habitats have experienced dramatic declines. On the region's remaining grasslands, grazing is the predominant form of land use on private holdings and fire is the predominant management tool on reserved lands. In native grasslands, fire and grazing have traditionally been viewed as separate forms of disturbance or agents of change.

Grazing management has focused on achieving a uniform distribution of grazing pressures (e.g., rotational grazing), while fire management also has typically resulted in

These project objectives were pursued:

1. Establish dialogue with stakeholders in order to identify desired outcomes,
2. Quantify current conditions at the study sites as well as past land uses,
3. Develop the fire-grazing framework to be implemented at these sites,
4. Develop protocols for measuring livestock performance and assessing producer acceptance of the model, and
5. Identify potential funding mechanisms for full-scale implementation of the fire-grazing model and associated research at these sites.

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**Budget:**  
\$22,147 for year one

## Approach and methods

In spring and summer 2006, project researchers delineated 12 pastures in an area sometimes referred to as the Grand River Grasslands. These pastures are located at the Iowa Department of Natural Resources (IDNR) Ringgold and Kellerton Wildlife Management Areas, on properties under the jurisdiction of The Nature Conservancy (TNC), and on private properties in Ringgold County and at the Missouri Department of Conservation's (MDC) Pawnee Prairie Preserve just across the state line in Harrison County, Missouri.

The pastures were allocated to one of three treatments:

1. Burning of distinct patches and free access by moderately-stocked cattle (patch-burn treatment),
2. A control with no burning and with free access by moderately-stocked cattle (traditional treatment), and
3. A control with burning but no grazing (typical management for many reserved lands in the region).

The project investigators spoke with numerous stakeholders including federal and state agency personnel (such as the U.S. Fish and Wildlife Service, Natural Resources Conservation Service, IDNR, and MDC), non-governmental organizations (including TNC and the Southern Iowa Forage and Livestock Committee) and cattle producers. These exchanges have led to establishment of protocols for implementing fire and grazing on the research pastures, and for measuring livestock performance.

## Results and discussion

Since May 2006, project researchers have been quantifying current conditions at these 12 selected pastures and in the surrounding landscape. They surveyed birds, plants, and invertebrates throughout the summer of 2006. They collected soil samples and mapped cattle trails, and measured fuel loads (i.e., combustible vegetation). They mapped land uses in the areas surrounding the pastures, as these may affect ecological processes in the pasture.

Most of these data are still being compiled and analyzed. Two encouraging observations have already emerged. First, eight species of grassland obligate birds (those entirely dependent on grassland habitats) and 10 facultative grassland species (those that use grasslands as part of a larger array of habitats) were found in these pas-



Field technician Josh Rusk conducts avian surveys to gather pre-treatment data on a southern Iowa pasture.



A 'control' pasture (that is, burning but no grazing) in northern Missouri, under the jurisdiction of Missouri Department of Conservation.

tures, and some of them were present in relatively high numbers. Second, many native prairie plant species also were noted in these pastures, including in pastures that initially appeared to be virtually devoid of native plants.

For example, it appeared that native prairie plants were largely absent in pastures on the heavily grazed Pyland property. After conducting surveys, the investigators noted that a surprisingly high number of native grassland species were indeed present in these pastures. Researchers hope that this reflects a larger trend in the region,



A just-burned grassland in southern Iowa that will serve as a treatment pasture

where pastures that seem to be monocultures of Eurasian grasses actually harbor native plants that will respond positively to patch-burn-grazing management. This suggests that many native species may react well to the interaction of fire and grazing when these treatments are applied in the future.

### **Conclusions**

The funds from the Leopold Center were used to support the establishment of dialogues with stakeholders, the development of research protocols, and the establishment of baseline data. The funding for this project allowed researchers to leverage larger grants to facilitate full implementation of the research over the next several years.

With a high level of cooperation from federal agencies, NGOs, private landowners, and especially the Iowa DNR, the investigators were able to delineate 12 study pastures and put the necessary infrastructure in place to enable grazing by cattle. Research protocols were developed that were acceptable to these stakeholders, including private landowners whose cattle provide the treatment in the grazed pastures used by the project.

Data collection in and around these pastures will provide the baseline against which the researchers measure changes that follow the application of fire and grazing. These data include information on habitat use by birds and invertebrates, vegetation, soils, fuel loads, cattle trails, and land use in the surrounding landscape.

An encouraging trend noted by the investigators was the number of private landowners who were open to considering alternative management practices. The number is admittedly small and based on a limited number of interactions, but it is a start.

### **Impact of results**

The investigators are not able to calculate the full impact while data are still being collected and analyzed.

### **Education and outreach**

Educational programs delivered in 2006 that were focused on patch burning to restore native grasslands and habitat heterogeneity with a focus on potential applications in Iowa: Quad State Tallgrass Prairie Project, Creston; Southern Iowa Forage and Livestock Committee, Winterset; Iowa

Department of Natural Resources (DNR), Research Biologists and U.S. Fish and Wildlife Service Private Lands Biologists; Lakeside Laboratory, ISU; Iowa Prairies Association Conference, Ames; Neal Smith National Wildlife Refuge, Prairie City; and Iowa DNR Statewide Wildlife Biologists meeting, Amana.

Other outreach programs where patch burning was a key component of the program: ISU-NREM seminar, Ames; Committee on Landowner Incentive Program, Des Moines; Southern Iowa Prescribed Burn Workshop, Lamoni; 2006 Loess Hills Grassbank Pasture Walk, Pisgah; and Annual Meeting of the Iowa Soil and Water Conservation Districts, Ames.

### **Leveraged funds**

The project investigators secured two additional grants that will support the next four years of study on the Grand River Grasslands sites: an Iowa Department of Natural Resources Wildlife grant for \$424,369 and a USDA National Research Initiative grant for \$499,874 (in collaboration with colleagues at Oklahoma State University).

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