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The Landowners' Decision: Grazing and fire as management tools on Iowa grasslands and oak savannas

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Abstract
Surveys were used to examine landowner attitudes, perceptions and knowledge of fire as a management tool for controlling invasive species and enhancing conditions for native plants and animals on recreational and productive agricultural lands.

Keywords
Sociology, Agroforestry, Watershed and ecoregion, Weed control alternatives

Disciplines
Forest Management | Natural Resources Management and Policy | Rural Sociology | Terrestrial and Aquatic Ecology | Weed Science

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The landowners’ decision: Grazing and fire as management tools on Iowa grasslands and oak savannas

What are grassland landowners’ knowledge and perceptions about the use of prescribed fire and grazing as management tools for prairie restoration on working agricultural lands?

The survey and conceptual mapping processes revealed lack of experience and knowledge of prescribed burning as an effective tool for managing encroachment of eastern red cedar, protecting and restoring native prairie, and providing quality forage for cattle production.

Background
Research has shown that fire and fire-grazing combinations are effective management strategies that can be used to maintain and restore agricultural grassland ecosystems. However, private landowners have been slow to learn about and adopt these practices in Iowa. In this project the investigators began to explore what the individual and community barriers are to adoption of fire management on private lands.

Project objectives were to:
1. Identify landowner goals and knowledge, information exchanges, and practices on grazing native grasslands and potential impacts to water quality, wildlife habitat and soil loss.
2. Discover the barriers to private landowner adoption and implementation of different grazing management practices and prescribed burning strategies.
3. Explore attitudes, knowledge and beliefs about fire as a management tool for private landowners of oak savannas along the Middle Raccoon River corridor.
4. Design a process for creating local landowner groups that can increase communication and learning about the ecology of native ecosystems so that management practices aimed at restoring and maintaining these systems can be implemented without risking profitability goals.

Approach and methods
Two surveys were conducted for the project. The first one occurred in the Grand River Grasslands (GRG) in southwest Iowa, a watershed with existing prairie remnants and much potential for ecological restoration, yet it was under threat by invasive species such as the eastern redcedar (Juniperus virginiana). The second survey targeted the Middle Raccoon River corridor and oak savanna restoration in the area near Perry, Iowa, where Whiterock Conservancy is located. These research sites were selected to gather farmer/landowner data as well as perceptions of community leaders (including fire departments, elected officials and natural resource professionals) regarding land practices and the application of prescribed fire. As a follow-up to survey findings, concept mapping was used with Grand River Grassland...
landowners, natural resource specialists and grassland scientists to further identify differences in mental maps and knowledge along the knowledge transfer chain that could be barriers to adoption of prescribed fire and grazing as grassland management practices.

Results and discussion

Analyses of these data provided the foundation for the development of a new model, Reserves as Catalysts. This model uses scientific experiments on public reserve lands to transfer new knowledge to key landowners. They in turn become grassland champions to their peers by demonstrating changes in the management of their working grasslands in support of native ecosystems that protect water quality, enhance conditions for biodiversity, and foster sustainable livestock production from perennial forages.

This study revealed disconnections in the way landowners think about issues related to prairie and grassland restoration and management. Landowners identified control of invasive species as a major issue, but they gave low importance ratings to restoring prairie and grassland that are subject to species invasions, which in turn are a source of loss of prairie and grassland. Most respondents viewed the increase in eastern redcedar and other trees as a problem primarily because tree encroachment causes loss of agriculturally productive grassland. Most landowners also believed that protecting wildlife habitat was very important and valued grassland-dependent species on their properties, yet did not seem to recognize the appropriate management tools needed to achieve this goal.

Conclusions

The landowner surveys revealed both barriers and opportunities regarding widespread implementation of practices necessary to improve conditions for species of concern on private grasslands. Reducing soil erosion and controlling invasive species were highly rated factors influencing management decisions by landowners, perhaps reflecting traditional approaches to maintaining agricultural productivity. The survey results revealed an emerging opportunity to improve habitat for species of concern among those landowners who do not place sole priority on agriculture production.

Successful prairie restoration may hinge on convincing private landowners interested in both agricultural and recreational uses to implement appropriate rangeland-management practices such as prescribed burning and cattle grazing to control invasive species and encroachment of woody plants. However, landowners have been slow to adopt appropriate practices in the U.S. Midwest. In the GRG, this survey work suggests that landowners do not yet have a larger vision or sense of belonging to a grassland region. They are primarily focused on managing their own parcels.

More than three-quarters of GRG respondents believed the increase in eastern redcedar and other trees in grasslands is a problem, but less than half of them consider it a major problem. Although 84 percent of landowners said they have taken action to control eastern redcedar, only 25 percent have participated in a prescribed burn. Concept mapping data suggest landowners do not yet view mechanical or herbicide
management of eastern redcedar as a time-consuming problem. Income from agriculture and recreational goals is negatively and significantly correlated. The development of a common vision and appreciation of the grasslands for agricultural production and recreation could increase the potential of the goals of both groups being achieved.

The exploratory study revealed apparent disjunctions in the way GRG landowners think about certain issues related to prairie and grassland restoration and management. Landowners identified control of invasive species as a major issue, but they ascribed less importance to restoring prairie and grassland that are subject to species invasions, which can cause loss of prairie and grassland. Most landowners also believed that protecting wildlife habitat is very important and value grassland-dependent species on their properties, yet did not seem to recognize the appropriate management tools to achieve this goal. This suggests they are thinking about their own parcel’s productivity potential but have little vision of the grasslands as a unified ecosystem. Because landowners in the Grand River Grasslands recognize the importance of many ecosystem services, they need to connect how these services can be provided through restoration of local prairie.

**Impact of results**

Surveying the Grand River Grassland landowners shows us where to start in creating a public agenda that links science to the social context of landowners within the historical tallgrass prairie region. This agenda requires public definition of the grassland at risk and a collective willingness to undertake management actions on private lands to protect it. This agenda cannot be set until landowners are able to articulate to each other the value of their grassland, the risk of eastern redcedar encroachment and some level of compatibility of agricultural production with prairie restoration goals.

Although our findings reflect only the perceptions of private landowners in the Grand River Grasslands, a small portion of the former tallgrass prairie ecoregion, they offer insights into the influence of agricultural and recreational goals on management practices in regions where most grassland is privately owned. Distinct differences in landowner goals and perceptions of prairie strongly suggest that education messages be tailored differently for different audiences to motivate effectively. It also demonstrates that a change in attitude among agricultural landowners about grazing management, particularly the need to moderate stocking rates, will be required before prescribed burning can be used to effectively control encroachment of eastern redcedar.

**Education and outreach**

Information collected from the landowner and community surveys of the Grand River Grasslands was published as a technical report and presented to local landowners in a community meeting for them to discuss. It also was referenced and used in meetings with local natural resource agency professionals working in grasslands. Subsequent field days provided additional opportunities to share with landowners selected portions of the project findings.
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Posters and presentations on the project were developed and presented by the members of the project team. Among the venues where project data were shared: University of Iowa, Denver Rangeland Ecology Conference, Rural Sociological Society, Fourth International Congress on Fire Ecology and Management, and the U.S. Regional Association of the International Association for Landscape Ecology. The project investigators provided results to government agencies at Grand River Grasslands field days in fall 2009 and 2010.

A scholarly publication on the project appeared in Rangeland Ecology and Management, and two other peer reviewed papers are in progress. Three ISU Extension publications resulted from the projects findings.

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