Restoring Perennial Cover and Ecological Function to Corn Belt Landscapes: The Iowa Farmer's Perspective

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Abstract
The tallgrass prairie ecosystem of the North American Corn Belt region has experienced major alteration of hydrologic systems, nearly complete loss of natural perennial vegetation, and concomitant decline in species due to agricultural intensification. In this working landscape, restoration to pre-European settlement conditions is doubtful. However, current research posits that restoring strategically placed patches of perennial cover across agricultural watersheds, such as stream buffers, wetlands and prairies, as well as instituting more diverse cropping rotations, could bolster current ecological function and enhance the conservation of species. These studies also suggest that such restoration might increase socio-economic resilience in the region's declining rural communities. Yet, farmers and policymakers show little awareness of, or appreciation for, such initiatives. In an effort to understand why, we are studying how ecological restoration meshes with the culture and values of Corn Belt farmers. We also seek to identify connections and leverage points that may bridge gaps between science, people, and policy in restoration initiatives.

Keywords
tallgrass prairie, hydrologic, agricultural watersheds, restoration initiative

Disciplines
Agronomy and Crop Sciences | Natural Resources Management and Policy | Terrestrial and Aquatic Ecology

Comments
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The authors developed three decision matrices to rank rare plant populations for seed collection priority with the goal of providing consistent criteria functional for a wide range of users: Matrix 1, feasibility of collection, storage, and propagation; Matrix 2, rarity based on global and regional rankings, number of populations, and seedbank status; and Matrix 3, which determines priority based on population trends, site ownership, reproductive success, taxon range, habitat type, and Matrix 1 and 2 scores. They tested their protocol using natural heritage inventory data on 456 species in New England recorded as 4,333 Element Occurrences (EO) representing individual populations or metapopulations. This resulted in more than 86 percent of the EOs ranked as collectable. The authors concluded that most of the scores matched expectations, but more information is needed on threats, reproductive activity, and population sizes.


Layne and Abrahamson examine scrub hickory (Carya floridana), describing its appearance, distribution, phenology, evolutionary history, ecology, nutritional content, and wildlife value. Scrub hickory grows on coastal Atlantic sand dunes and in three xeric fire-adapted upland communities. Sand pine scrub historically experienced rarer, high-intensity lightning fires while sandhill and scrubby flatwoods both experienced more frequent low-intensity fires. Scrub hickory resprouts after fires but prescribed burning after years of fire suppression causes increasing stem density and reduced nut production for five years.

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The tallgrass prairie ecosystem of the North American Corn Belt region has experienced major alteration of hydrologic systems, nearly complete loss of natural perennial vegetation, and concomitant decline in species due to agricultural intensification. In this working landscape, restoration to pre-European settlement conditions is doubtful. However, current research posits that restoring strategically placed patches of perennial cover across agricultural watersheds, such as stream buffers, wetlands and prairies, as well as instituting more diverse cropping rotations, could bolster current ecological function and enhance the conservation of species (Jackson and Jackson 2002, Santelmann and others 2004). These studies also suggest that such restoration might increase socio-economic resilience in the region’s declining rural communities. Yet, farmers and policymakers show little awareness of, or appreciation for, such initiatives. In an effort to understand why, we are studying how ecological restoration meshes with the culture and values of Corn Belt farmers. We also seek to identify connections and leverage points that may bridge gaps between science, people, and policy in restoration initiatives.

In the first phase of our research, the results of which are summarized here, we conducted 28 in-depth interviews in a rural Iowa watershed community. In the ongoing second phase, we bring farmers together with scientists, conservation personnel, and policy makers to design and evaluate tradeoffs in potential restoration scenarios. We used ethnographic techniques (Neuman 2003) to gain access to the rural farming community and purposive sampling to select interviewees who were representative of farmers within our study area. We employed qualitative analyses to identify and evaluate themes, supporting evidence, consistencies, and inconsistencies in empirical interview data (Miles and Huberman 1994).

Most farmers responded favorably to images depicting restoration of perennial cover on marginal agricultural land, and commonly approved of restoring perennial vegetation as a means of improving water quality. Farmers expressed concern that agricultural land use was increasingly implicated in local and regional water quality deficits and they desired to be perceived as good stewards of natural resources. Many farmers also valued restoration of wildlife habitat, especially for birds and game species. While some interviewees expressed appreciation for the beauty of perennial vegetation, the fertility of rolling fields of row crops was generally a more powerful aesthetic.

Despite the favorable response to pictures of perennial vegetation, interviewees rarely considered engaging in restoration efforts to be a priority, and many openly doubted that these practices could be implemented in their own watershed. Barriers to implementing perennial cover included 1) more pressing farm concerns, 2) agricultural intensification, 3) declining rural civic cohesion, 4) farm size, 5) age of farmer, 6) owner-operator issues, and 7) frustrations with government agencies and programs. On a hypothetical level, most of the farmers we spoke with were not fond of government subsidies that rewarded the production of commodity crops, such as corn and soybeans. They expressed a preference for selling crops on a free market and favored a transition to “green payments,” where farmers receive government support to implement restoration projects on marginal agricultural land. On a pragmatic level, however, crop production subsidies are accepted as a mainstay of rural culture because they are well understood and constitute a substantial portion of farmers’ incomes. Many farmers admitted a hesitancy to express active support for, and participate in, green payments due to the complex, contradictory, and ephemeral nature of government pro-
grams and a dearth of helpful, face-to-face interactions with local conservation personnel.

When asked what was most important about rural communities and landscapes, farmers more readily valued social, rather than biophysical, aspects of the “countryside.” Socio-cultural aspects, such as family, neighbors, children, meals, schools, and neat upkeep of rural infrastructure were viewed as extremely important. Widespread decline of this rural socio-cultural fabric is mourned and was the topic interviewees were most consistently eager to discuss. Farmers generally value the freedom to “be your own boss,” and many see the external control imposed by both regulations and participation in voluntary incentive programs as threats to their independence. We suggest that this dual valuing of socio-cultural cohesion and independence has important implications for ecological restoration in this region.

When asked how increases in perennial vegetation could become a reality in future landscapes, many farmers suggested that grassroots community connections and agricultural technology must play substantial roles. While they viewed initiatives associated with external groups (the federal government, urbanites, and “environmentalists”) with suspicion, they cited face-to-face interactions with trusted conservation personnel as motivating conservation action. Although many interviewees expressed resentment of large-scale corporate farms, almost all cited trusted, local agribusiness agents as their primary source of farm and conservation advice. Precision agriculture, Geographic Information System mapping, and the increasing size of equipment were seen as positive technological advances that could aid in identifying and farming around marginal cropland. To realize restoration goals at a landscape scale, the interviewees stated that ecologists must learn to value and access these types of grassroots networks and the technologies that are fast becoming an accepted part of rural life. Most importantly, ecological restoration must be based on face-to-face communication, and be linked to the restoration of community social and cultural fabric.

REFERENCES

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Ecological Restoration: Cultivating a “Civilized Landscape” in the Liberal Arts (Florida)
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At the 1934 dedication of the University of Wisconsin's Arboretum in Madison, Aldo Leopold presented the concept of an arboretum that would be “a sample of original Wisconsin . . . a starting point in the long and laborious job of building a permanent and mutually beneficial relationship between civilized men and a civilized landscape” (Leopold 1934). Joining Leopold was city planner, John Nolen. In 1911, Nolen authored a plan for Madison that recommended an arboretum “on the border of open country, farmland and forest” (Nolen 1911). Nolen had returned both to see his vision renewed and to receive an honorary degree.

In his acceptance speech, he seconded Leopold: The nation needed a laboratory for conducting experiments “to repair the physical, biological, and aesthetic wastes [fomented] since . . . our stern Puritan forbears landed at Plymouth and began to subdue nature to their needs for liberty” (Nolen 1934).

Leopold and Nolen spent their careers redefining traditional American ideals to procure a “civilized landscape.” Educators as well as professionals, they worked to embellish the landscape with places that promoted, as Leopold wrote in 1942, “lifelong opportunities for study and even experimentation” (Flader and Callicot 1991).

Educators at Rollins College in Winter Park have drawn from the works of Nolen and Leopold to integrate ecological restoration into the liberal arts. In 2002, faculty from the Department of Environmental Studies (ES) joined with the Elizabeth Genius Morse Foundation to restore the Genius Reserve, a 50-acre (20-ha) tract situated between three lakes in Winter Park. It contained 10 acres (4 ha) of mostly pristane mesic oak (Quercus spp.) habitat; 20 acres (8-ha) of live oak (Q. virginiana)-pastoral landscape; 8 acres (3.2 ha) of habitat dominated by exotic species (now reduced to 3 acres or 1.2 ha); a 5-acre (2-ha) orange grove; and the residence of Rollins’ late president, Hugh McKeen. Hawks, owls, ospreys, bald eagles, owls, gopher tortoises, and red foxes are among the species that use the site.

The Reserve’s urban location and diverse landscape made the University of Wisconsin-Madison Arboretum a logical model for restoration efforts. A faculty development grant enabled me to study the UW-Madison Arboretum and its archives, and then draft a conceptual restoration plan. An interdisciplinary team (environmental planner, field botanist, and landscape architect) then inventoried and “envisioned” the reserve, integrating this exercise into five ES courses. The outcome was a management plan with the goal of “restoring and preserving a glimpse of an earlier generation’s aesthetic ideal, while providing a working laboratory in ecological restoration.”