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Rising Great Plains Fire Campaign: citizen cooperatives

A summary of Dirac Twidwell, W.E. Rogers, S.D. Fuhlendorf, C.L. Wonkka, D.M. Engle, J.R. Weir, U.P. Kreuter, and C. A. Taylor, Jr., 2013.

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GRASSLAND VALUES

Grasslands have supported a broad array of life over the millennia. Not only have they supported rich biodiversity, but also they shaped the region's stream flow and groundwater hydrology, contributed to carbon sequestration, and offered many environmental benefits. Additionally, grasslands have provided the basis for agricultural and livestock production.

Grassland degradation has resulted from a history of suppression of natural fire, elimination of human-caused fire, and overgrazing by livestock. Two species of native juniper (*Juniperous ashei* and *J. virginiana*) readily encroach on grasslands when fire has been excluded, creating a juniper woodland system. Fire is often ineffective as a restoration tool in grasslands that have transitioned to juniper woodlands. This is because juniper cover and overgrazing have removed the herbaceous layer needed to support the fire intensity required to kill junipers.

High-intensity fires carry well in high-quality grassland with adequate fuel-loads.

When juniper woodland predominates, herbaceous fuels become sparse, limiting the spread and intensity of prescribed fire. On the other hand, wildland fire in juniper woodlands can result in hard to control blazes that result in property losses.

Photos courtesy of Dirac Twidwell.

A VARIABLE HISTORY OF FIRE REGIMES

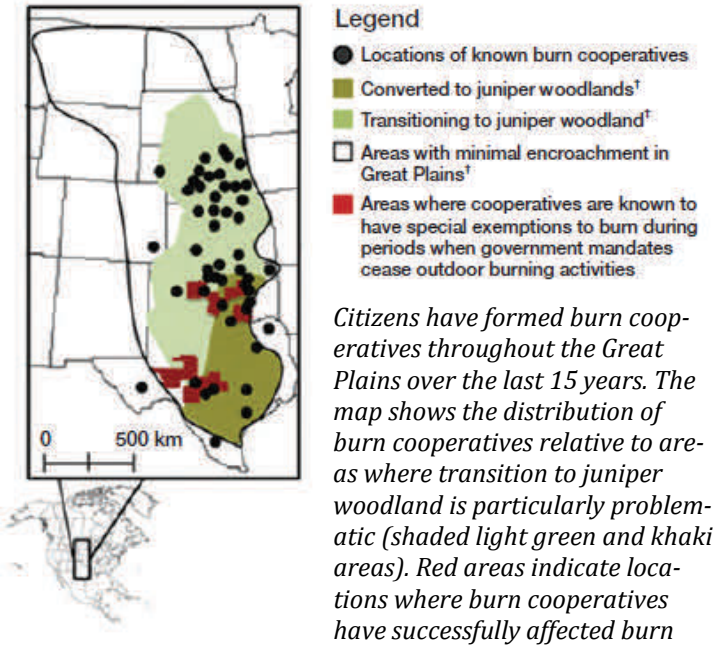
Grasslands replaced woodlands in the Great Plains following the last glaciation and subsequent warming of the climate. Evidence from carbon isotope data and fossil assemblages indicates that grasslands became the dominant vegetation between 5,000 and 8,000 years ago. Native peoples recognized the importance of the grassland ecosystem to their way of life, and helped to maintain the system by setting fires to support diverse nutritional and cultural needs. Modern settlement (1800s and beyond) resulted in fragmentation of grasslands for agriculture, resource extraction, and residential development.

Concurrent with development of native grasslands for economic uses, wildland fire became a threat to personal property and safety. The construction of highly flammable juniper windbreaks around residences reinforced the need to protect people and property from wildland fire. This set the stage for juniper encroachment in the remaining grasslands.

Transformation of grassland into juniper woodland sharply cuts biodiversity within the plant and bird communities. Of particular economic importance, grassland conversion to juniper woodland significantly decreases available forage for livestock production.

THE WORK OF BURN COOPERATIVES

Private citizens have undertaken efforts to reverse the degradation of grasslands through the use of fire. The movement started with individual landowners learning what they could about the application of fire as a management technique, acquiring the equipment necessary, and attaining training and assistance to apply fire to small areas of their own land. Although helpful on a local level, this effort did not address landscape level issues and was not easily sustained.



Citizens have formed burn cooperatives throughout the Great Plains over the last 15 years. The map shows the distribution of burn cooperatives relative to areas where transition to juniper woodland is particularly problematic (shaded light green and khaki areas). Red areas indicate locations where burn cooperatives have successfully affected burn restrictions.

Map and legend are used according to copyright restrictions, Front. Ecol. Environ. 2013; 11 (Online Issue 1): e64–e71.

MONITORING AND EVALUATION OF FIRE COOPERATIVES

1. For grasslands in early stages of juniper encroachment: evaluate juniper mortality, track changes in livestock production, compare biodiversity of native species to historical accounts, and estimate the capability of herbaceous fuels to spread fire.
2. For grasslands converting to juniper woodlands: assess if current burning has contained juniper encroachment and is capable of meeting restoration goals, monitor long-term recovery and short-term achievements, determine if fire is facilitating other invasive species, and base livestock stocking rates on forage availability and the need to maintain adequate fuel-loads.
3. For evaluation of social and ecological issues: monitor changes in juniper abundance and other benefits of fire use attributable to burn cooperatives, track changes in legal and social attitudes towards fire use, use grassland bird survey data as an indicator of restoration success, and compare regional landscapes restored or conserved by burn cooperatives to historical records.

In response to the need for broad application of fire and for assistance conducting prescribed fires, private ranchers and landowners formed burn cooperatives, associations that provide a social network to support use of prescribed fire to conserve and restore fire-dependent ecosystems across broad landscapes. These burn cooperatives represent a citizen–driven effort to prevent further juniper encroachment into Great Plains grasslands and to restore grasslands already degraded. For these associations to succeed, they must evaluate accomplishments and monitor overall ecological impacts of their actions.

Burn cooperatives not only overcome the physical challenges of conducting prescribed fire, but must also address social and political issues. Public concern about threats to property and safety from wildland fire has led to constraints on use of prescribed fire. States have formalized laws prohibiting purposeful ignition of fires during high-risk of wildland fire. Policies force burn cooperatives to conduct prescribed fires when conditions favor low-intensity fires with little potential for killing juniper trees.

Burn cooperatives can overcome some constraints by securing the labor and resources needed to conduct prescribed fire safely and efficiently in high-risk situations.

Individuals with training and experience conducting prescribed fire collaborate with inexperienced landowners to complete safe and effective burns. Burn cooperatives affect public and political attitudes towards use of fire by conducting safe and successful burns that attain objectives of restoring and maintaining high-quality grasslands.

Burn cooperatives obtain data that demonstrate positive results by making fire-effects monitoring part of standard operations. Monitoring and evaluation will be the next steps in the evolution of burn cooperatives.

IN CONCLUSION

Grasslands have changed drastically in the last century with the invasion of native juniper woodlands. Burn cooperatives not only facilitate the use of fire among landowners, but also can help to overcome the social resistance and political constraints to broad application of prescribed fire in fire-dependent systems. The training and expertise available within burn cooperatives could assure government regulators that cooperatives use qualified individuals to conduct safe actions that achieve positive results. Instituting monitoring and evaluating achievement of goals are the next steps in gaining public acceptance of fire as a management tool.

Summary of *Dirac Twidwell1, William E. Rogers, Samuel D. Fuhlendorf, Carissa L. Wonkka, David M. Engle, John R. Weir, Urs P. Kreuter, and Charles A. Taylor Jr. 2013. The rising Great Plains fire campaign: citizens' response to woody plant encroachment. Online Special Issue: Prescribed burning, Front. Ecol. Environ. 2013; 11 (Online Issue 1): e64–e71.*

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