Tallgrass Prairie and Oak Savanna Fire Science Consortium

JOINT FIRE SCIENCE PROGRAM

Research Brief for Resource Managers

Release: October 2015 | **Contact:** Tracy L. Hmielowski | **Phone:** 608-890-4713 | **Email:** thmielowski.tpos.firescience@gmail.com

Short term effects of returning prescribed fire to oak woodland

Stan, Amanda B., Lesley S. Rigg, and Linda S. Jones. 2006. Dynamics of a managed oak woodland in Northeastern Illinois. Natural Areas Journal 26(2):187-197.

Midwestern oak savannas and woodlands are a conservation priority. Once abundant on the landscape, these habitats have transitioned to closed canopy forest and oak regeneration is limited, giving way to non-oak species. Much of this is attributable to agriculture and development, fire suppression, and introduction of invasive woody species.

Prescribed fire is a management tool used to remove non-oak woody species and to promote oak regeneration through increasing light. However, there is a lack of information tracking the short and long term effects of fire on sites where restoration is taking place.

This study evaluated the effects of two prescribed fires conducted on a site being restored to a white oak dominated woodland. Stand structure, understory species composition, light levels, and soil nutrients were compared between burned and unburned units within the Kelly Hertel Woods section of the Marengo Ridge Conservation Area in northeast Illinois.

Prescribed fires were conducted in the late fall in 1994 and 1998 and were considered to be of low to moderate intensity. Data collection for this study took place from 2000-2002. Density and basal area were calculated for all stems > 5cm DBH and seedlings were counted to determine density. Vegetation plots were also established to compare community composition between burned and unburned sites.

Management Implications

- Low intensity prescribed fire alone will not favor oak regeneration in restoration sites.
- Higher intensity prescribed fire or mechanical removal may be necessary to remove non-oak species.
- Protecting oak seedlings and saplings from mammalian herbivory may be necessary to promote survival into larger size classes.

In addition to evaluating site characteristics, white oak seedlings were transplanted to the site and growth and survivorship recorded. However, the authors were unable to do an analysis on the transplanted white oaks due to high mortality and loss of individuals leaving only 8% of the transplanted oaks alive.

Sites were dominated by white oak and slippery elm, where slippery elm was typically < 10cm DBH, and white oak larger size classes. There were no significant differences in seedling and

sapling densities between the burned and unburned sites. With respect to white oak seedlings and saplings, the authors determined that regeneration was poor in both burned and unburned sites.

Further evaluation of the burned and unburned sites revealed that there was little difference between the species composition, understory light and canopy openness, and soil characteristics.

The authors point out that the size distributions recorded across all sites indicate the shift in forest composition. White oaks were found to occupy the larger size classes, while the smaller size classes were dominated by slippery elm, black cherry, and ash. Without intervention to promote the regeneration of oak at this site the landscape will transition to a non-oak forest.

Although the initial impacts of prescribed fire did not meet the long term restoration objectives of this site, fire is still an important tool in restoring oak woodland and savanna sites. This study demonstrates that researchers and mangers should not expect very few infrequent fires to change the landscape, and that restoration with fire may require additional management techniques.

The authors suggest that more mechanical methods should be used to remove non-oak species, and that applying fire with greater frequency and under conditions resulting in higher intensity may be necessary in the early restoration phase. Additionally, reducing deer, or otherwise protecting oak seedlings and saplings from herbivory, could promote oak regeneration.