



Research Brief for Resource Managers

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Comparison of restoration techniques in a Midwest oak barren

Scott Nielsen, Chad Kirschbaum, and Alan Haney. 2003. Restoration of Midwest oak barrens: Structural manipulation or process-only? Conservation Ecology 7(2):10.

Oak savannas in the Midwest have been reduced and degraded as the result of agriculture, development, and fire suppression. Without fire, oak barrens become closed canopy oak woodlands and lose herbaceous species. These areas are of particular conservation concern and restoration priority as they provide habitat for declining and endangered species, including the Karner blue butterfly.

This study compared the use of prescribed fire alone (referred to as the process-only method) to tree harvest followed by prescribed fire (referred to as the structural manipulation method). Restoration techniques were applied to degraded oak barrens located in central Wisconsin, on the Necedah National Wildlife Refuge and Quincy Bluff and Wetlands State Natural Area. Pre-treatment sampling was done over three years (1991-1994) and post-treatment sampling was completed at all sites in June 1999. Restoration and management activities were applied from 1995-1999.

The process-only method increased forb richness and decreased the number of small hardwoods, but did not influence canopy cover, species richness, diversity, and evenness. The structural manipulation method reduced canopy cover and increased species richness. **Warm season (C₄) grasses did not respond positively to either**

Management Implications

- Using *only* fire may not open canopies enough to achieve restoration objectives
- Restoration using harvest and fire may also need to incorporate seeding/herbicide to reintroduced herbaceous species lost and to reduce invasive species
- Warm season grasses may not respond positively to restoration at highly degraded sites

restoration method, possibly due to the history of fire suppression at these sites and dominance by competitive sedges.

The process-only method may not be able to open space by killing canopy trees due to the low intensity of prescribed fires used. Restoration of oak barrens with the process-only approach may be more successful with higher intensity fires, which are more likely to kill overstory trees. Timber sales may accelerate restoration and provide funds to offset management costs. Prescribed fire can then be used to maintain the reduced canopy cover and increase understory species richness. **Severely degraded sites, however, may require reseeding of herbaceous species and/or herbicide** to control invasive species that can take advantage of the newly opened canopy.

PROCESS-ONLY**STRUCTURAL MANIPULATION****PRE-TREATMENT****POST-TREATMENT**

Photos of study sites, pre-treatment and post-treatment, for the two restoration practices compared in this study. The process-only site (left column) is located at Quincy Bluff and Wetlands State Natural Area; the pre-treatment photo was taken in 1995 and post-treatment in 1999. The structural manipulation site (right column) is located at Necedah National Wildlife Refuge; the pre-treatment photo was taken in 1994 and post-treatment in 1999. All photos were taken by Scott E. Nielsen.