

The demise of fire and mesophication of eastern U.S. forests

Marc D. Abrams¹

Abstract

Prior to European settlement vast areas of the eastern U. S. deciduous forest were dominated by oak species. Evidence indicates that periodic understory fire was an important ecological factor in the historical development of oak forests. During European settlement of the late 19th and early 20th century much of the eastern U.S. was impacted by land-clearing, extensive timber harvesting, severe fires, the chestnut blight, and then fire suppression and intensive deer browsing. These activities had the greatest negative impact on the once dominant white oak, while temporarily promoting the expansion of other oaks such as red oak and chestnut oak. More recently, however, recruitment of all the dominant upland oaks waned on all but the most xeric sites. Mixed-mesophytic and later successional hardwood species, such as red maple, sugar maple, black birch, beech, black gum and black cherry, are aggressively replacing oak. The leaf litter of these replacement species is less flammable and more rapidly mineralized than that of the upland oaks, reinforcing the lack of fire. The trend toward increases in non-oak tree species will continue in fire-suppressed forests, rendering them less combustible for forest managers who wish to restore natural fires regimes. This situation greatly differs from the western U.S., where fire suppression during the 20th century has made a variety of conifer-dominated forests more prone to stand-replacing fire.

¹ Forest Resources Building
School of Forest Resources
Pennsylvania State University
University Park, PA 16802