

Ten-Year Responses of Oak Regeneration to Prescribed Fire

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Prescribed fire has proven effective in controlling vegetative competition of oak regeneration across many sites in the southeastern US. Most fire investigations have been performed in the Piedmont and Coastal Plain. Land managers lack definitive knowledge on how to use prescribed fire to improve long-term oak regeneration success in the southern Appalachians. Several short-term (less than 5 years) southern highland studies suggest that fire effects vary widely by site quality. I installed a shelterwood/underburn study in 1995 on a highly acidic cove in the southern Appalachians to test the hypothesis that prescribed fire would enable advanced oak regeneration to survive and grow to dominant status at canopy closure in the presence of aggressive tree and shrub competition. I theorized that fire would discriminate against competitors less well adapted to fire than the oaks. By 2005 the understory canopy had started to close; I found that prescribed fire did not improve the probability that oak seedlings would survive or attain dominance in the understory canopy. However, seedling basal diameter growth was positively related to fire-caused reductions in forest litter mass; many oak seedlings re-sprouted after fire and quickly gained stem girth. This increased basal diameter result mirrors that of many investigators. Increasing basal diameters and root systems caused by repeated disturbances can invigorate oak seedlings and enable them to quickly grow in height when they receive increases in photosynthetically active radiation caused by forest gaps.

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Regional Impacts of a Program for Private Forest Carbon Offset Sales

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Kalalau Valley from Kokee, Kauai, Hawaii
for details about Pacific Rim Forestry and more, see the Special Section
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