

USING PRESCRIBED BURNING TO RELEASE OAK SEEDLINGS FROM SHRUB COMPETITION IN SOUTHERN CONNECTICUT

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Abstract—In a managed forest, control of species composition is important for both the economic value and biological health of the forest. Regenerating oaks on better quality sites is often hampered by an extensive shrub layer that suppresses the shorter oak seedlings, especially following shelterwood harvests. The abundance of mature oaks in the present forest is due, in part, to a history of periodic burning and clearcutting prior to 1920 in Connecticut. Fire is a possible method of killing (or stunting) shrubs and allowing oak sprouts to grow above the shrub layer.

A shelterwood cut in 1987 in a mature oak stand had broken up a layer of mountain laurel that dominated the understory and increased the number of oak seedlings to nearly 4000/acre by 1989. However, most oak seedlings were less than 1 foot tall and were stagnating under a dense shrub layer. A prescribed burning study was established to determine whether fire can be used to release oak seedlings from shrub competition. Thirty-six plots were located on a nominal 150 foot by 150 foot grid. Seedlings and saplings were sampled by species and height class within 1/300 acre circular plots. Trees (> 4.5 inches dbh) were sampled with a 10-factor prism. Residual basal area was 60 ft²/ac with oak species accounting for 51 percent of the total.

Half of the 29 acre stand was burned by a surface fire on April 5, 1991, in cooperation with the Division of Forestry, Connecticut Department of Environmental Protection. The fire was implemented under mild burning conditions: dead fuel moisture 10-12 percent, winds 2-7 mph, and relative humidity 38-56 percent. The flame length of the head fire rarely exceeded 1 ft while burning in the hardwood litter. The fire extinguished itself in the wetter sections. The fire killed to the ground most stems less 1 inch in diameter. In June, it appeared that the oaks were competitive with the resprouting shrubs. Regeneration was sampled immediately before the burn and in the fall following the

burn. Regeneration was again sampled three and six years after the burn. Overstory removal was completed by the fall of 1994 (4 growing seasons post-burn).

Burning has increased relative and absolute oak seedling density. Two years after final harvest, oak density was 17,475/acre on the burned section compared with 5,125/acre on the unburned sections. More significantly, oak species accounted for fully 25 percent of tree stems ≥ 3 feet tall on the burned section and only 8 percent on the unburned section (fig. 1). Prescribed burning also reduced the density of red maple, sassafras, and shrubs. Prescribed burning may be a useful for controlling vegetation that competes with oak following shelterwood cuts.

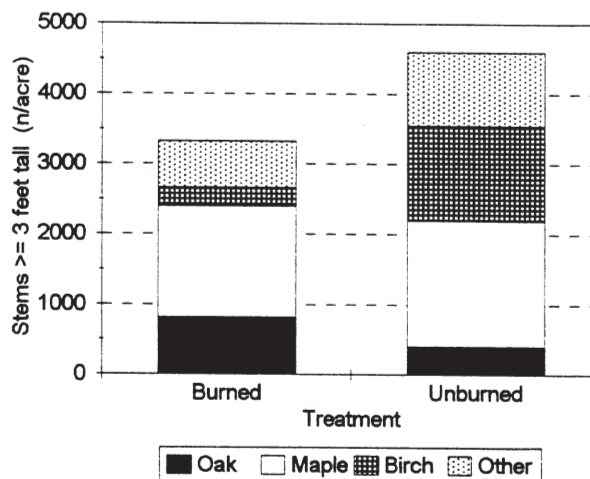


Figure 1—Distribution of stems ≥ 3 feet tall by species group 2 years after final harvest and 6 years after prescribed spring burn.

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