

EFFECTS OF PERIODIC FIRE ON COMPOSITION AND LONG-TERM DYNAMICS OF ARKANSAS UPLAND HARDWOOD FORESTS

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Prescribed fire (at historic periodic fire frequencies) is seen as an important but little understood tool in the assortment of management techniques that could help restore oak to Arkansas upland hardwood forests and facilitate the maintenance of these keystone species. However, no known periodic fire research has been done in Arkansas' unique upland hardwood forests. The objective of our study is to examine the effects of periodic fire on: (1) species dynamics, (2) renewal and survival of natural oak seedlings/saplings and planted oaks under varying overstory and understory treatments, (3) standing and down coarse woody debris, (4) fuel loading, (5) tree quality, (6) damage to residual trees, and (7) tree growth in fire versus non-fire areas.

Replications, each approximately 26 hectares in size, are now being installed in the Boston Mountains of northern Arkansas on three sites with medium and three sites with high site indices. Each replication is split so that half will receive periodic prescribed fire treatments and half will be protected from fire. There will be four overstory treatment and three understory treatment subplots within each main plot. Overstory treatments will consist of a shelterwood (40% stocking) harvest, 0.405 ha openings, improvement harvest (free thinning with a 16 m²/ha target) and no harvest. Understory treatments have begun and consist of: (1) manual removal of the subcanopy (trees > 30 cm tall and up to 14 cm d.b.h.) by manually cutting non-restoration tree species prior to prescribed fire, (2) cut surface herbicide treatment of the subcanopy (trees > 30 cm tall and up to 14 cm d.b.h.) by treating non-restoration tree species prior to prescribed fire, and (3) no treatment of understory trees or shrubs. Two to three prescribed fires will be applied during the first 5 years after harvest and then at 4 year cycles for at least 4 cycles.