Public Abstract
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Title:EFFECTS OF FIRE AND THINNING ON KANSAS OAK WOODLANDS

Prior to Euro-American settlement, a mosaic of prairie, savanna, woodland, and forest existed within the Forest-Prairie Transition Region of the United States, with anthropogenic fire acting as an important driver in the perpetuation of open-oak communities. As fire suppression became a regular practice throughout the 20th century, these historically open communities became threatened by encroaching fire-sensitive, and often shade-tolerant, tree species. This study evaluated the effects of prescribed fire and thinning treatments as methods to achieve woodland restoration objectives, which commonly include reducing stand density, reducing mesophytic oak-competitors, increasing canopy openness, increasing herbaceous plant cover, and promoting the regeneration of oak. We investigated the effects of six treatment types on the structure and composition of a Kansas oak woodland. Treatments included: prescribed fire (burn), thin to 60 ft²/acre basal area (T60), thin to 30 ft²/acre basal area (T30), the combination of fire and thin to 60 ft²/acre basal area (BT60), the combination of fire and thin to 30 ft²/acre basal area (BT30), and an untreated control. Additionally, we examined the effect of fire on advance regeneration survival probability for five tree species: chinkapin oak, black oak, bitternut hickory, sugar maple, and eastern redcedar. Following a single girdle and herbicide application thinning treatment, we found low mortality in the first year, especially for sugar maple. As a result, the reduction in overstory basal area did not meet our intended targets. A single dormant season prescribed burn was effective at reducing large and small seedling densities of sugar maple and other oak-competitors, and increased forb and legume cover in the understory. However, the burn only treatment had no effect on overstory stand metrics, including basal area, tree density, percent stocking, and canopy openness. Thinning of the overstory and midstory in combination with prescribed fire resulted in similar effects to seedling densities and ground flora cover as the burn only treatment, but also created reduced tree density in the sapling layer and greater canopy openness. Additionally, the effect of the burn only treatment on advance regeneration revealed that significant relationships exist between pretreatment stem basal diameter and height and the probability of surviving a single fire for some of the species. These initial results are for the first year following treatments and over time we expect vegetation dynamics to continue to respond to treatments.