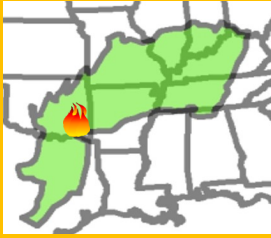


Pushmataha Habitat Research Demonstration Area

FIRE SCIENCE HOT SPOTS



In this feature, we bring into focus fire science on-the-ground



The Pushmataha Forest Habitat Research Demonstration Area compares the effects of different fire frequencies on native forage production for cattle and wildlife. It is located within the Pushmataha Wildlife Management Area, a mix of forests and savannas covering 19,247 acres in southeastern Oklahoma, on the western edge of the Ouachita Mountains. Shortleaf pine dominates, post oak is common, and the ground cover includes some 650 native plant species, all growing on sandstone-derived soils. Managed by the Oklahoma Department of Wildlife Conservation, the area supports populations of white-tailed deer, bobwhite quail, black bear, squirrels, turkey, and a small elk herd. In 1982, Pushmataha managers began long-term research on the effects of prescribed fire applied in 1-, 2-, 3-, and 4-year intervals, on 35 plots initially treated with various combinations of thinning and harvesting (plus untreated control plots). Plots burned on 2-year or 3-year rotations have yielded the greatest plant diversity, while annual burning promotes highest forage production. Outside the research plots, Pushmataha WMA managers annually burn different small patches within a large landscape (patch burning). This provides a good variety of succession stages for wildlife, as some species thrive on fresh burns, while others do well foraging on 1- and 2-year-old plant growth. In grazed areas, managers only allow livestock to eat about 25 % of the forage, reserving the remainder to serve as fuel during prescribed burns.



“In any place with rainfall capable of supporting a forest, a three-year fire return period is a significant tipping point for vegetation to shift from forest to woodland or grassland,” said Dwayne Elmore, a professor of wildlife management at Oklahoma State University during an October 2016 field tour (inset photo, upper right). Research at Pushmataha has shown that variations in the fire return interval significantly affect forage production, and that fire is a very cost-effective management tool for producing wildlife forage compared to food plots. Control treatments (inset photo, lower right) produced the least forage of any treatment, at about 142 lbs/acre/year, which will not support livestock grazing. Annual burn treatments (top left) produced the most forage, averaging 3,826 lbs/acre/year, but trees and shrubs there are too scarce for certain wildlife habitat needs. Indian grass (inset photo, top left), along with big bluestem, little

bluestem and switch grass, make up the “big four” prairie grasses, all of which are found on all treatments burned every three years or more frequently. All groundcover has grown from existing root and seed banks. Pictured top right are results of burning every two years. Here, big bluestem and shortleaf pine dominate, and forage production averaged 2,056 lbs/acre/year. Burning on a 3-year interval, pictured lower left, has eliminated the forest midstory, retained a shrub layer, and has averaged 1,670 lbs/acre/year of forage production. The lower right photo shows results of burning on a 4-year interval; it has produced forage at about 414 lbs/acre/year, and demonstrates the “tipping point” contrast (toward woody growth) between 3- and 4-year burn intervals. Click on each photo for a full-size downloadable image, or view all [HERE](#).

