

FIRE ECOLOGY



Fire frequencies and intensities upland hardwood forests prior to human influence are largely unknown. Lightning-caused fires are infrequent, but lightning-caused fires vary with topography and associated forest types. For example, fires were likely more common on dry ridges than in moist coves. However, widespread, frequent burning was historically used by native Americans, and later by European settlers to maintain an open understory and improve conditions for travel and game or livestock. In the 1930's forest fires began to be viewed as destructive, and were suppressed or excluded where possible. Today, prescribed burning is used as a forest management tool to reduce fuels and the risk of wildfire, and for [ecosystem restoration](#), oak regeneration, understory control, and wildlife conservation. Scientists within the Upland Hardwood Ecology and Management Research Work Unit 4157, along with many [collaborators and partners](#), are studying several aspects of fire ecology within the upland hardwood ecosystem, including:

- **Prescribed fire for fuel reduction**

- How prescribed fire and other fuel reduction methods affect birds, reptiles and amphibians, shrews, rodents, and arthropods in the southern Appalachian mountains of North Carolina (contact: Cathryn H. Greenberg; also see <http://www.srs.fs.fed.us/ffs>)
- How fuel loading affects fire behavior, and how fire affects fuels and potential damage to oak trees at the William B. Bankhead National Forest in [Alabama](#) (Contact: Stacy Clark)



- **Prescribed fire for [ecosystem restoration](#)**

- How prescribed fire and other silvicultural treatments affect the hardwood forest ecosystem, including the regeneration of oak and other hardwood species, as well as herbaceous plant communities in [North Carolina](#), [Tennessee](#), [Arkansas](#), and [Missouri](#). (Contact: Tara Keyser)
- How prescribed fire and other silvicultural treatments for oak [ecosystem restoration](#) affect birds, bats, reptiles and amphibians, and small mammals in the southern Appalachians of [North Carolina](#) and the Cumberland Plateau in [Tennessee](#) (Contact: Cathryn H. Greenberg)
- How frequent and infrequent prescribed fire alters stand structure, light, seedbed conditions and competition to influence the establishment, survival and growth of hardwood regeneration – with a focus on oak - in eastern [Kentucky](#) (Contact: David Loftis)
- How prescribed fire + thinning, and other silvicultural treatments designed to reduce tree mortality from gypsy moths and oak decline, affects forest regeneration, wildlife habitat, and [bat](#) communities, on the Daniel Boone National Forest in [Kentucky](#). (Contact: Callie Schweitzer; Susan Loeb)

- **Restoration** of oak-dominated forests through application of historic frequencies of periodic fire in **Arkansas**. (Contact: Marty Spetich; also see <http://www.srs.fs.fed.us/compass/issue9/07offirescars.htm> and <http://www.srs.fs.fed.us/compass/issue9/07oakspeople.htm>)
- How fire frequency and tree thinning affects plant community, composition, productivity and dynamics in a mixed pine-hardwood forest on the William B. Bankhead National Forest in the southern Cumberland Plateau, **Alabama**. (Contact: Callie Schweitzer)
- **Historical fire frequency – studying tree rings and fire scars**
 - Fire and other disturbance history in old-growth and second-growth forest on the Cumberland Plateau in **Tennessee** and **Kentucky** (contact: Stacy Clark), the **Arkansas** Ozarks, and the southern and eastern U.S. region. (Contact: Marty Spetich; also see <http://www.srs.fs.fed.us/compass/issue9/07offirescars.htm> and <http://www.srs.fs.fed.us/compass/issue9/07oakspeople.htm>)
 - A regional study of historical frequency using fire scar histories in the southern and eastern United States. (Contact: Marty Spetich; also see <http://www.srs.fs.fed.us/compass/issue9/07offirescars.htm> and <http://www.srs.fs.fed.us/compass/issue9/07oakspeople.htm>)
 - Fire histories in the Boston Mountains of **Arkansas** in relation to historic human populations, topography, and climate. (Contact: Marty Spetich; also see <http://www.srs.fs.fed.us/compass/issue9/07oakspeople.htm>)
- **Landscape modeling (LANDIS)** of changes in forest development in relation to changes in fire frequency in the Boston Mountains of **Arkansas** (contact: Marty Spetich). This spatially explicit forest succession and disturbance **model** is used to delineate the extent and dispersion of oak decline under two fire regimes over a 150-year period, and establishes risk ratings for these areas. This is a further step toward precision management and planning. (Contact: Marty Spetich)