



Golden leaves reveal an abundance of young sugar maple in the understory of this oak stand. Photo by Stephen R. Shifely, U.S. Forest Service.

Partners

Forest Service scientists affiliated with the PEF collaborate with other scientists from Purdue University and staff from the Hoosier National Forest.



Oak seedlings remain small in the low light levels that occur under a closed-canopy forest. Photo by Stephen R. Shifely, U.S. Forest Service.

Facilities

There are no facilities at the PEF.

U.S. Forest Service Experimental Forest and Range Network

Forest Service Research and Development (R&D) works at the forefront of science to improve the health and use of our nation's forests and grasslands. Research has been part of the Forest Service mission since the agency's inception. Today, Forest Service researchers work in a range of biological, physical, and social science fields; their research covers all 50 states, U.S. territories, and commonwealths. The Northern Research Station is one of six in R&D, and includes 20 states in the north-central and northeastern U.S., comprising both the most densely populated and most heavily forested portions of the country.

The Experimental Forest and Range (EFR) network contributes importantly to R&D's research infrastructure and is increasingly viewed as one of its most valued assets. There are currently 22 official experimental forests in the Northern Research Station, and 80 EFRs nationwide. Taken together, these sites provide a record of forests and forest change that dates back more than 100 years. Though initially focused on local and regional topics, EFRs are becoming increasingly networked to address issues of national and international concern such as climate change, carbon sequestration, air and water quality, and invasive plants and animals.

For more information about the Paoli Experimental Forest

Websites:

<http://nrs.fs.fed.us/ef/locations/in/paoli/>

Paoli Experimental Forest Manager

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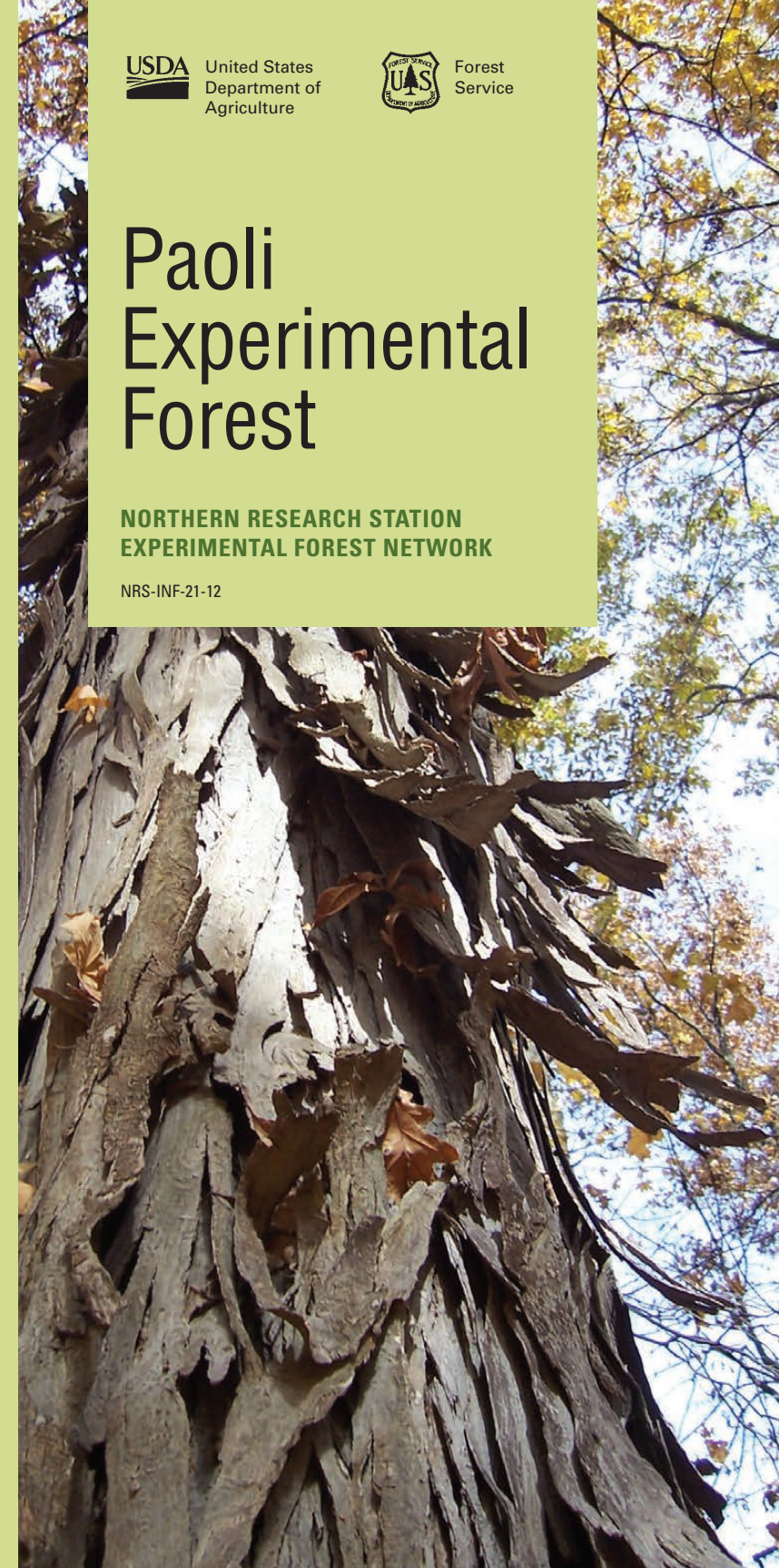
On the cover: The aptly named shagbark hickory is one of many species in the Paoli Experimental Forest. Photo by Stephen R. Shifely, U.S. Forest Service.



Paoli Experimental Forest

**NORTHERN RESEARCH STATION
EXPERIMENTAL FOREST NETWORK**

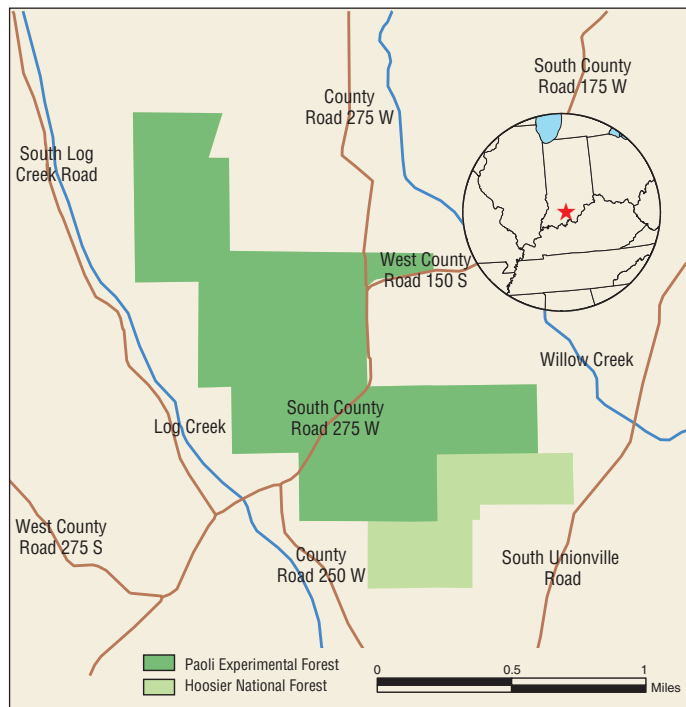
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Paoli Experimental Forest

The 632-acre Paoli Experimental Forest (PEF) is located in the Hoosier National Forest in south-central Indiana southwest of the city of Paoli. It was established as an experimental forest in 1963. The primary mission of the PEF is to conduct research on mixed-hardwood species to demonstrate how to increase the number and quality of high value tree species on sites of high site index. Research conducted on the PEF has been used to develop prescriptions for regenerating oaks in mesophytic forests of the Central Hardwood Region. The research has added to the knowledge about oak regeneration dynamics in the Eastern United States.

Map by U.S. Forest Service.



Features

Paoli forest types are typical for southern Indiana and other areas of good sites in the region. Mixed hardwoods occur on lower slopes, in valleys, and in coves. The oak-hickory type is found on the upper slopes and ridges. The predominant species are sugar maple, ash, beech, hickory, white oak, and elm in the mixed-hardwood type, and white oak, hickory, sugar maple, red oak, and black oak in the oak-hickory type. Yellow-poplar is not abundant in the overstory but scattered trees provide a seed source. Black walnut trees, though not numerous, are scattered through the mixed-hardwood stands. Several old pine plantations are on broad ridges in locations that were formally abandoned fields.

Paoli Experimental Forest is in the Crawford Upland and the Crawford Escarpment Subsections of the Shawnee Hills Section. The physiography of the PEF is typical of the unglaciated knobs region of southern Indiana and north-central Kentucky, where slopes range from gentle to steep and elevation ranges from 107 to 282 m (350 to 925 feet) above sea level. The soil parent materials include clayey, silty, or sandy colluvium and residuum derived from Mississippian and Pennsylvanian shale, limestone, and sandstone. Other features of the PEF:

- **Soils primarily of the series: Adyeville (coarse-loamy, mixed, semiactive, mesic Typic Hapludalfs), Wellston (fine-silty, mixed, active, mesic Ultic Hapludalfs), Apalona (fine-silty, mixed, active, mesic Oxyaquic Fragiudalfs), and Ebal (fine, mixed, active, mesic Oxyaquic Hapludalfs).**
- **Average annual precipitation is 1,140 mm (45 inches) and is evenly distributed throughout the year. Snowfall averages 43 cm (17 inches) but varies greatly from year to year.**
- **Average annual temperature is 12 °C (53 °F) and the average daily minimum temperature is 5 °C (41 °F) and the average daily maximum temperature is 18 °C (65 °F).**
- **Average frost-free period is 175 days.**

Research

Research on the PEF has included studies on white and northern red oak plantings; effects of nursery undercutting and shoot pruning on growth of out-planted oaks; prescribed burning to stimulate planted and natural stands of regenerated oak trees; the growth of black walnut as influenced by competition and site; control of oak competition by yellow-poplar, aspen, and maple; yellow-poplar seed viability in the forest litter; and the growth hardwood seedlings planted in old fields.

Science Delivery

Research conducted on the experimental forest has been used to develop prescriptions for regenerating oaks in mesophytic forests of the Central Hardwood Region. The research has added to the knowledge of how oak regeneration dynamics vary by ecoregion in the eastern United States and was recently incorporated into a landmark synthesis on oak forest ecosystems, “The Ecology and Silviculture of Oaks,” by P.A. Johnson, S.R. Shifley, and R. Rogers. Other research findings about oak regeneration mechanisms, oak sprouting probabilities, and the capacity for oak reproduction to compete with other species in a mesophytic environment have been published in refereed journals, conference proceedings, Forest Service General Technical Reports, and management guides.

Outcomes

The principal outcome of the research on the PEF can be summed up in three words: sustainably managed forests. Since 1963, the PEF has provided state-of-the-science information that has served as the foundation for sustainably managing oak and mixed-mesophytic hardwood ecosystems.