



Upland Hardwood Ecology and Management



Science Delivery

We provide science-based information to land managers, scientists, and the public through general and technical publications, analytical modeling tools, courses, workshops, tours, interpretive signs and trails, and presentations aimed at disseminating our research results to those who put them into practice.

To view and download recent USDA Forest Service Research and Development publications, visit:
www.treesearch.fs.fed.us
www.srs.fs.usda.gov/uplandhardwood

Contact us

UPLAND HARDWOOD ECOLOGY AND MANAGEMENT
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Upland Hardwood Ecology and Management (Research Work Unit 4157) is one of 15 research work units maintained by the USDA Forest Service as part of the Southern Research Station.

United States
Department of
Agriculture
Forest Service



Southern
Research Station

USDA is an equal opportunity provider and employer.

Disseminating knowledge and strategies for restoring, managing, and sustaining the vegetation and wildlife of upland hardwood forests in the Southern United States

Through experimental studies and modeling, **our research is designed to help forest managers understand how upland hardwood forests and wildlife are affected by natural disturbances and forest management.** Our goal is to enable land managers to better predict changes in forest structure, composition, tree regeneration, productivity, and habitat quality and to develop scientifically based methods to meet today's hardwood management and restoration goals.

Long-term studies, some established more than 85 years ago, are providing valuable information on forest stand development, stand dynamics, and timber growth and yield. This research has important implications for sustainable forest management, restoration, wildlife and habitat quality, and emerging issues such as prescribed fire and climate change.

PHOTOS CLOCKWISE FROM TOP LEFT: Interpretive signs showcase research results • Upland hardwood forests dominated by oaks and hickories • Examining effects of forest disturbances • Fire affects hardwood regeneration and wildlife • Forest management affects hardwoods and wildlife. All photos by USDA Forest Service.





Focus Areas

FOREST SITE CLASSIFICATION

- Models how forest composition, regeneration, and timber productivity vary across changing environmental conditions, such as temperature and moisture, associated with the varied topography and geology of the region.

HARDWOOD FOREST REGENERATION

- Investigates management techniques that alter light levels and affect natural regeneration of hardwood trees.
- Examines forest management techniques and biological mechanisms that affect the success of planted seedlings.
- Develops cutting-edge models to predict hardwood regeneration, stand development, timber growth and yield, site quality, landscape-level dynamics, fruit production, and more.
- Supports development of the Forest Vegetation Simulator, the agency's national framework for modeling forest growth and yield.

AMERICAN CHESTNUT RESTORATION

(in partnership with the University of Tennessee Tree Improvement Program, the American Chestnut Foundation, and the National Forest System)

- Studies the performance of American chestnut seedlings developed by the American Chestnut Foundation for resistance to chestnut blight.
- Works to identify optimal forest conditions for growth and survival of planted American chestnut seedlings.
- Develops prescriptions managers can implement to restore this species.

FIRE ECOLOGY

- Examines how prescribed fire affects wildlife.
- Studies how fire affects the regeneration of oak and other hardwoods.
- Examines prescribed fire and forest management prescriptions as tools to change fire behavior and reduce the risk of wildfire in upland hardwood ecosystems.
- Studies the historical frequency of fire in upland hardwood ecosystems.

WILDLIFE SPECIES AND COMMUNITIES

- Addresses how wildlife—including migratory birds, bats, small mammals, reptiles, and amphibians—responds to natural disturbances and management practices.
- Studies the ecology of endangered species and the effects of management on their populations.

PHOTOS TOP TO BOTTOM: Planting tree seedlings • Studying how forest management affects small animals—Amy Tomcho • Restoring American chestnut to the landscape—Tracy Powers, University of Tennessee research associate for the Tree Improvement Program. All photos by USDA Forest Service except where noted.

- Develops new methods to monitor populations.
- Examines the significance of forest structure—coarse woody debris, vegetation density, standing dead trees, and more—as habitat features important to wildlife.
- Studies acorn and forest fruit production as important wildlife food resources.

CLIMATE CHANGE

- Examines how forests can be managed to mitigate the impacts of climate change by capturing and storing excess carbon present in Earth's atmosphere today.
- Models the distribution of wildlife in response to climate change.
- Predicts soil moisture content in relation to topography and precipitation.
- Projects how tree growth may be altered under a changing climate.

Experimental Forests

- Our unit is headquartered on the 6,000-acre Bent Creek Experimental Forest near Asheville, NC. Established in 1925 to aid the rehabilitation of cutover, abused lands in the Southern Appalachian Mountains, our unit today addresses sustainable forestry through research on the Bent Creek Experimental Forest as well as in facilities in Normal, AL; Clemson, SC; Hot Springs and Jasper, AR; and Knoxville, TN.
- The 720-acre Henry R. Koen Experimental Forest was established in 1951 near Jasper, AR, as part of the Ozark National Forest. The site serves as the fieldwork base for Southern Research Station upland hardwood research throughout Arkansas and includes a handicapped-accessible interpretive trail and picnic area.
- The 4,300-acre Sylamore Experimental Forest was established in 1934 in Stone County, AR, near the community of Mountain View. Dominated by oak hickory forest, the Sylamore Experimental Forest today conducts research that includes fire history and long-term studies of forest dynamics.
- The 1,200-acre Blue Valley Experimental Forest was established in 1964 near Highlands, NC, to provide a focal area for research on eastern white pine and associated hardwoods.

Partnerships

We partner with scientists and land managers at colleges and universities, State forestry and wildlife agencies, national forests, and nongovernmental organizations.

PHOTOS TOP TO BOTTOM: Monitoring forest growth and condition • Red-bellied woodpecker—Johnny N. Dell, Bugwood.org • Examining how acorns affect regeneration and wildlife. All photos by USDA Forest Service except where noted.

