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Forest Service

Silas Little Experimental Forest

NORTHERN RESEARCH STATION EXPERIMENTAL FOREST NETWORK

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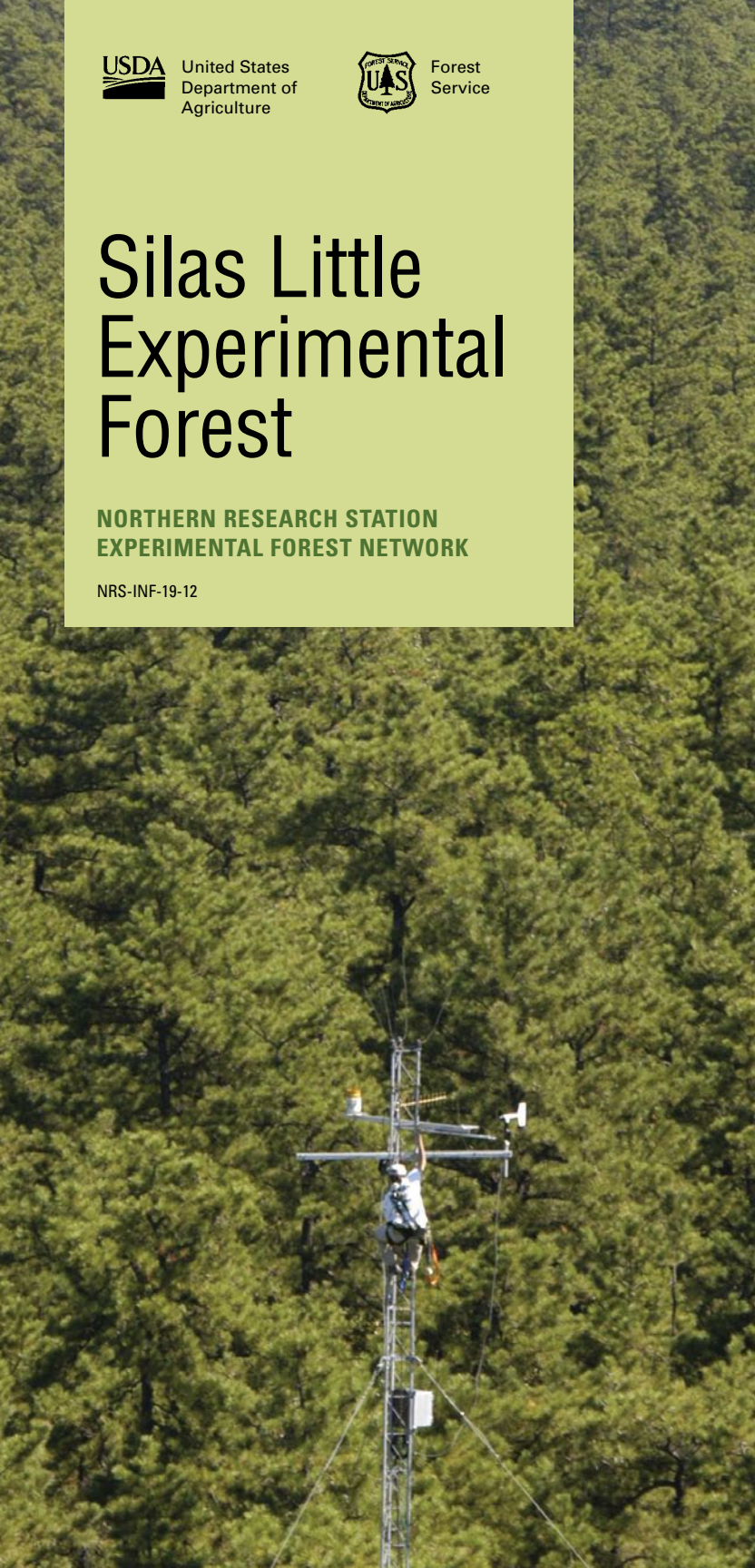
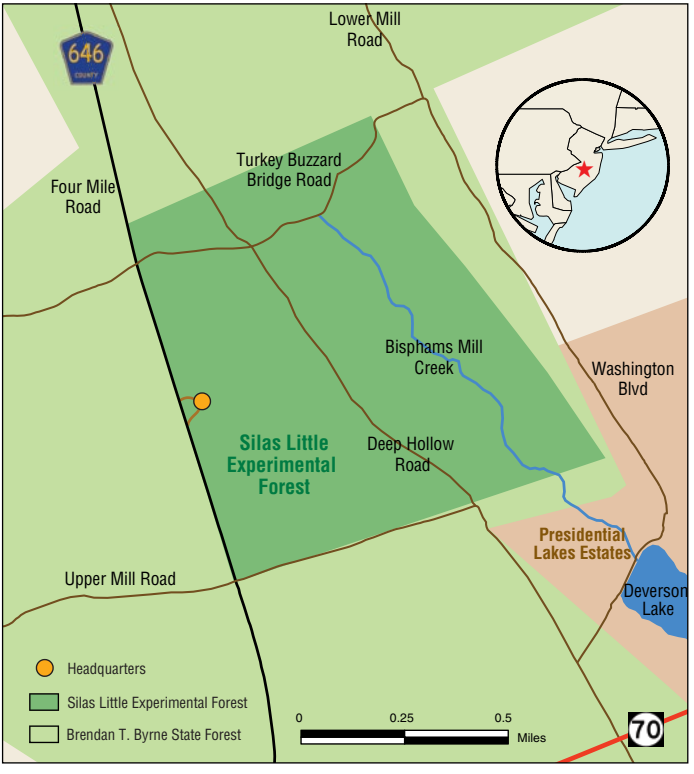


Silas Little Experimental Forest

The Silas Little Experimental Forest (SLEF) is located 3 miles south of New Lisbon, NJ, in the Brendan Byrne State Forest. This 530-acre experimental forest was established in 1933 through an agreement with the state of New Jersey, with the dual goals of reducing destructive wildfires while encouraging the regeneration of commercially important species. Originally named the Lebanon Experimental Forest, it was renamed the Silas Little Experimental Forest in honor of Dr. Silas Little, who was stationed at the forest from 1937 until his retirement in 1979. Two notable past research efforts are the earliest use of prescribed fires to reduce wildfire risk in the northeastern United States, and the development of a pitch/loblolly pine hybrid that has been planted extensively throughout the mid-Atlantic region.

Map by U.S. Forest Service.



Features

Silas Little Experimental Forest is located in the 1.1-million-acre Pinelands National Reserve, the largest forested landscape on the northern Atlantic coastal plain. The Pinelands consist of oak, pine, and wetland forests, and is the major recharge area for the Kirkwood-Cohansey aquifer, one of the largest unpolluted aquifers in the Northeast. Despite the widespread occurrence of sandy, well drained, nutrient-poor soils, upland forests in the Pinelands are moderately productive. Unlike many forests in the mid-Atlantic region, fire continues to be the major factor affecting stand age, species composition, and structure and biomass of forests in the Pinelands. In fact, stands dominated by pitch pine (*Pinus rigida* Mill.) are some of the most flammable forests in northeastern United States.

Research

Current research efforts are focused on providing wildland fire managers better tools to measure fire weather and fire danger, predicting the impacts of smoke emissions on local and regional air quality, and assessing forest structure and hazardous fuel loads using Light Detection and Ranging (LIDAR) systems. Parallel research efforts are using eddy flux measurements from towers, forest census plots, and simulation models to quantify and predict the impacts of disturbance due to fire and invasive insects on carbon, water, and nutrient cycles.

A wildfire burns in a pitch pine-scrub oak stand in the late spring. Photo by Photo by Nicholas Skowronski, U.S. Forest Service.

Science Delivery

Real time fire weather data from throughout the Pinelands is available through a partnership with the New Jersey State Climatologist at (http://climate.rutgers.edu/njwxnet), and a fast loading web page for fire managers at (http://climate.rutgers.edu/usfs/monitoring.php). SLEF is a member of the Forest Service Climate Tower Network, Ameriflux, and Fluxnet, which provide data at their websites (e.g., http://ameriflux.ornl.gov/fullsiteinfo.php?sid=78). Research results have been published in peer-reviewed scientific journals, including Global Change Biology, International Journal of Wildland Fire, Remote Sensing of the Environment, Forest Ecology and Management, and Ecosystems. Researchers at SLEF work closely with Rutgers University, and co-teach a number of undergraduate and graduate classes during the summer. We also host visiting student groups throughout the year.

Outcomes

- **Research efforts have helped identify why standard fire danger indices sometime fail in the Pinelands, and have demonstrated that the spring wildfire season is strongly driven by rapidly changing weather conditions, high solar radiation loads on the forest floor, and a seasonal depression in the needle moisture content of pitch pine.**

- **Carbon flux and forest census data have demonstrated that disturbances such as insect infestations and fire differ, and that recovery pathways are dependent upon the fate of nitrogen and phosphorus in foliage and on the forest floor following disturbance.**

- **Most forest simulation models predict carbon cycling correctly when forests are undisturbed, but inaccuracies arise when non-stand replacing disturbances, which alter leaf area and nutrient pools, but have little overall effect on forest structure, are simulated. A more precise treatment of within-season changes in leaf area is key to improving model performance.**

By mid-summer, epicormic budding by pitch pine and resprouting of oaks and shrubs can result in rapid recovery following wildfires. Photo by Inga LaPuma, Rutgers University.

Partners

The Experimental Forest is co-managed by Rutgers University as the Pinelands Research Station. Partners include New Jersey Forest Fire Service, New Jersey State Climatologist, and the New Jersey Department of Environmental Protection. Numerous universities and agencies conduct collaborative research with U.S. Forest Service scientists at SLEF, including: Rutgers University Newark, University of Pennsylvania, Drexel University, Villanova, Princeton University, Dartmouth University, Portland State University, Ohio State University, U.S. Geologic Survey, and National Aeronautics Space Agency (NASA). External funding from Joint Fire Science Program, NASA, U.S. Department of Energy and National Science Foundation has supported SLEF scientists and our collaborators.

Facilities

Facilities include a headquarters with offices and a library, a cabin that now serves as the U.S. Forest Service office, a workshop, and sample preparation area with additional office and meeting space, a dorm trailer with space for up to 10 students and researchers, a greenhouse, and three laboratory trailers that have complete instrumentation for plant, soil, and water analyses, and a microscopy laboratory. Five weather stations, an instrumented flux tower, and numerous forest census plots are on site.

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 Silas Little Experimental Forest

Websites:

nrs.fs.fed.us/ef/locations/nj/silas-little

nrs.fs.fed.us/disturbance/fire/silas_little/

nrs.fs.fed.us/ef/local-resources/downloads/silaslittle-ef.pdf

http://marine.rutgers.edu/pinelands/index.htm

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On the cover: Fire weather/eddy flux tower at a pitch pine-dominated stand in the Pinelands National Reserve. Photo by U.S. Forest Service.