USDA United States Department of Agriculture

Forest Service

# Argonne Experimental Forest

## NORTHERN RESEARCH STATION EXPERIMENTAL FOREST NETWORK

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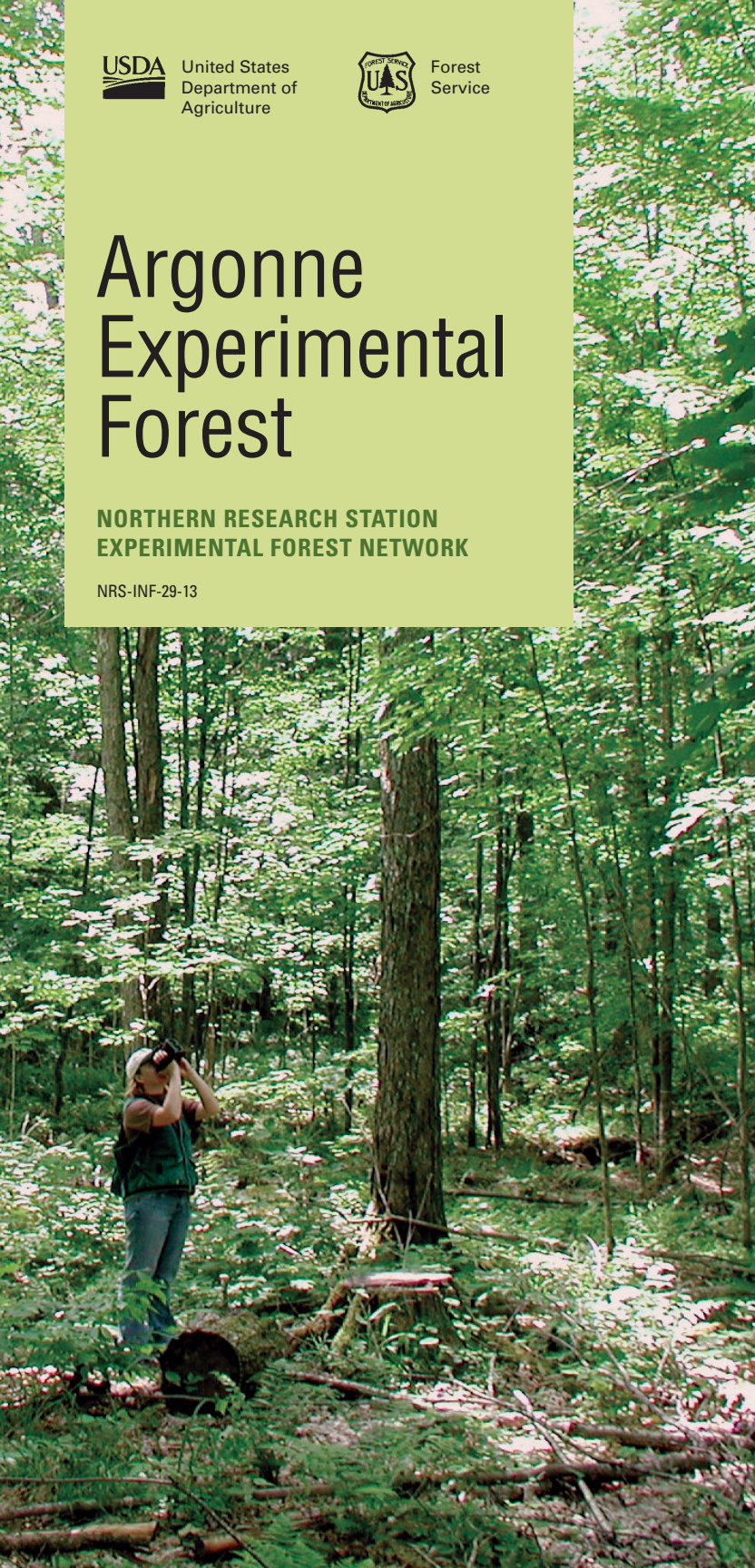
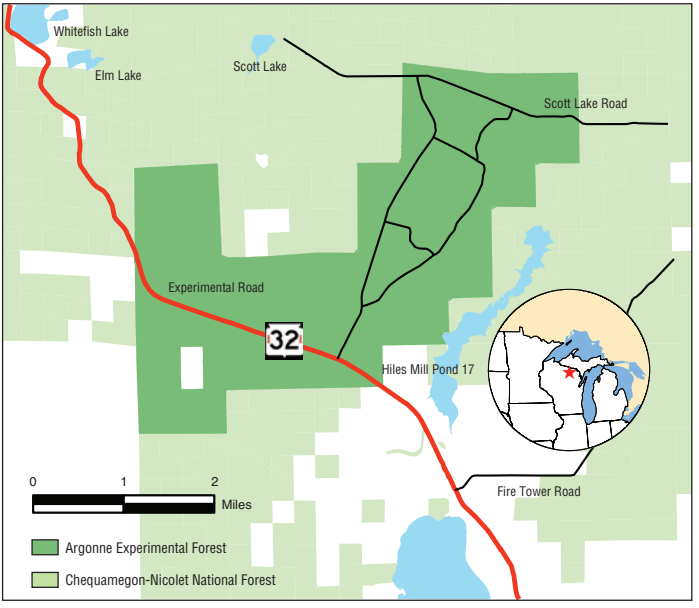


# Argonne Experimental Forest

**The 6,500-acre Argonne Experimental Forest (AEF) was established in 1947 on the Chequamegon-Nicolet National Forest in northeastern Wisconsin. The AEF is located about 25 miles east of Rhinelander. Studies at the AEF have focused on tree growth, stand development, logging damage, tree quality, and regeneration under various cutting methods to bring second-growth forests under management. Information from these studies has been used to develop management guides for northern hardwood forests in the Lake States. These guides are the primary source of management information throughout the region. The replicated and long-term data records and range of silvicultural treatments available for demonstration make the AEF an especially unique asset.**

Map by U.S. Forest Service.



## Research

Silvicultural studies have examined the effects of forest management on tree growth, forest development, logging damage, tree quality, and regeneration in second-growth northern hardwood forests, which have created numerous long-term databases. Currently, active long-term studies include the Cutting Methods Study (comparing nine different types of cutting; estab. 1951), Red Maple Growth and Yield Study (estab. 1981), and Managing for Old Forest Silviculture Study (estab. 2005). These studies, in addition to several new projects, reflect the AEF's research vision to: 1) maintain long-term studies for their original purposes, 2) establish new research, 3) use old studies for unforeseen opportunities, and 4) increase the scale of inference for various studies with models and cross-site comparisons.

## Science Delivery

For decades, the AEF has been an outdoor center for research, training, and educational tours. The Argonne serves as an excellent demonstration site. The Cutting Methods Study is readily available for scientist-led and self-guided tours with interpretive signs highlighting contrasting silvicultural treatments. In addition, thousands of land managers from the United States and beyond have toured and been trained in northern hardwood marking at the AEF. Research is also communicated through presentations and publications.

## Partners

Forest Service scientists affiliated with the AEF collaborate with the Chequamegon-Nicolet National Forest, Wisconsin Department of Natural Resources, Menominee Tribal Enterprises, Michigan Technological University, University of Wisconsin, University of Minnesota, and many forest industries.

# Features

The AEF lies among drumlin formations deposited by the Chippewa lobe of the late Wisconsin glacier. A broad ridge which runs in a northeast to southwest direction is about 50 feet above adjacent lowlands. The uplands are well-drained with glacial boulders, 1 to 4 feet diameter, on or near the surface, while the lowlands are less well-drained. Between 1900 and 1905, the forest was cutover, primarily in the uplands. At the time of the AEF's establishment, this resulted in a young, even-age upland forest with scattered old trees (more than 150 years old) and an uneven-age lowland forest (trees ranging from 50 to more than 150 years old).

- **Soils and forest types: Three soil types dominate the Argonne: Iron River loam, Carbondale peat, and Tawas sand. The Iron River loam supports northern hardwoods dominated by sugar maple, yellow birch, basswood, and hemlock. Other species found mixed in this type are white ash, black cherry, quaking aspen, northern red oak, and American hornbeam. The Carbondale peat supports mixed lowland conifers dominated by black spruce and tamarack. Jack and red pine, quaking aspen, and paper birch dominate the Tawas sand.**

- **Precipitation: Average annual rainfall is 30 inches, mostly occurring during the growing season. Snowfall averages 60 inches per year.**

- **Temperature: The climate is continental, with an average annual temperature of 41 °F. Summer maximums of 90 °F are common and winter minimums can reach -40 °F.**

- **Growing season: The growing season averages about 100 days.**

A tree designated and cut to increase downed woody debris in the Managing for Old Forest Silviculture Study. Photo by Wisconsin Department of Natural Resources, used with permission.

Sugar maple regeneration after shelterwood removal. Photo by U.S. Forest Service.

## Outcomes

Research results from the AEF are primary sources for silvicultural guides across the region. Study of even-age treatments developed shelterwood and thinning methods for northern hardwood regeneration and release to stimulate growth and quality development. Results of even-age treatments developed methods for converting even-age to uneven-age stands to sustain biodiversity, habitat, and timber production The lessons learned from the 50 years of research on northern hardwood ecosystems at the AEF have led to numerous publications and management guides, including the "Northern Hardwood Notes", and have impacted thousands of forestry professionals and millions of hectares of land.

## Facilities

There is a small field station located on the AEF, but the building is without water, heat, or bathroom facilities.

## 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 forest productivity, species diversity, economic management viability, and public participation/support are still important local, regional and national 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 Argonne Experimental Forest

**Website:**

http://www.nrs.fs.fed.us/ef/locations/wi/argonne/

**Contact:**

Christel Kern
USDA Forest Service
Northern Research Station
1831 Hwy 169 East
Grand Rapids, MN 55744
Phone: 218-326-7134
Email: cckern@fs.fed.us

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On the cover: Medium-intensity selection treatment in the Cutting Methods Study. Photo by Terry Strong, U.S. Forest Service.