



Forestry Sciences Laboratory, Durham NH



## Research and Development Center to Sustain Northern Forests



**Mission:** To help people sustain healthy and productive forests through basic and applied research, software and tool development, and delivery of information.

**Staffing and expertise:** The Center consists of four research work units, staffed by 23 research scientists and 17 support personnel. Center staff are based at the Forestry Sciences Laboratory in Durham, NH and the four experimental forests in New Hampshire and Maine. Research expertise includes silviculture, ecology, mensuration, wildlife, remote sensing, physiology, pathology, geology, biometrics, and modeling.

**Partnerships:** Partners are involved in essentially all phases of the research process and include the National Forests, other federal agencies, state agencies, universities, industry, and national and international nongovernmental organizations.

**Products:** Research findings are published in peer-reviewed scientific journals, government publications, and books. Research results and tools such as software and management guidelines are distributed to individuals, industry, and through professional and technical groups. Many of these materials are also available online. Center personnel participate frequently in public workshops and demonstrations of research findings within and outside of the USDA Forest Service.

### USDA Forest Service

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## **Research Work Unit NE-4104 Forest Carbon Dynamics and Estimation**

*Mission:* To further understanding of stocks and flows of forest ecosystem carbon and to provide information and tools for sustainable forest management



*Current investigations for the six project scientists and four support staff:*

- Relate the process of forest growth and carbon sequestration to forest management using information from eddy flux towers, remote sensing, and modeling
- Estimate carbon stocks and change in stocks for forest stands, regions, and the nation using transparent science-based procedures
- Methods for estimating, sampling, and forecasting tree biomass, mortality, woody debris, and the forest floor
- Tools and computer-based models to inform forest management decisions

(*Contact:* Dr. Linda S. Heath, Research Forester and Project Leader, Tel. 603.868.7612 email: [Lheath@fs.fed.us](mailto:Lheath@fs.fed.us), <http://www.fs.fed.us/ne/durham/4104/index.shtml>)

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## **Research Work Unit NE-4155 Ecology and Management of Northern Forest Ecosystems**

*Mission:* To provide fundamental scientific information and appropriate practical guidelines needed to manage northern forest ecosystems for both ecologic and economic sustainability



*Current investigations for the nine project scientists and five support staff:*

- Understand the effects of silvicultural treatments (various thinning and harvesting regimes) on regeneration, the growth and productivity of forest stands, and the economic implications of treatment alternatives
- Understand the relationships between the composition and structure of forest vegetation and the needs of wildlife throughout their life cycles
- Understand how natural and anthropogenic disturbances affect temporal and spatial ecological processes through the development of new applications of remote sensing technologies for forest assessment

(*Contact:* Dr. John C. Brissette, Research Forester and Project Leader, Tel. 603.868.7632; email: [jbrissette@fs.fed.us](mailto:jbrissette@fs.fed.us))

## Research Work Unit NE-4352

### Ecological Processes: A Basis for Managing Forests and Protecting Water Quality in New England

*Mission:* Conduct research to address environmental concerns in New England forests and streams including nitrogen saturation and cation depletion, ecosystem management, and to operate the Hubbard Brook Experimental Forest for long-term ecosystem research



*Current investigations for the five project scientists and six support staff:*

- The cumulative effects of disturbance and atmospheric deposition on the biogeochemistry of calcium, forest health, and ecosystem function
- The processes and conditions that control the response of forest and aquatic ecosystems to nitrogen deposition
- Improve understanding of mineral weathering input to soil nutrient capitals
- Develop guidelines for natural resource managers to protect stream quality, wetlands, and riparian areas

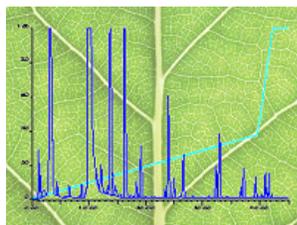
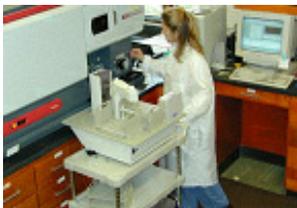
(*Contact:* Dr. Christopher Eagar, Research Ecologist and Project Leader, Tel. 603.868.7636; email: ceagar@fs.fed.us)

## Research Work Unit NE-4505

### Tree Response to Injury, Infection, and Environmental Change

*Mission:* To improve the sustainability of rural and urban forests through concepts, tools, and practices based on the biological response of trees to disease and disturbance

*Current investigations for the three project scientists and two support staff:*



- The effects of tree injury (from storms, fire, and people) on wood quality and tree health
- The role of specific biochemicals (polyamines, amino acids) in the tree response to environmental stress and their use as markers of tree health
- Tree ring anatomy and chemistry as a record of environmental change
- The role of wood decay to replenish forest soils

(*Contact:* Dr. Kevin T. Smith, Plant Physiologist and Project Leader, Tel. 603.868.7624; email: ktsmith@fs.fed.us)

## Experimental Forests in New Hampshire and Maine:



The **Bartlett Experimental Forest (BEF)** is 2,600 acres within the White Mountain National Forest [NH] dedicated to research on the ecology and management of New England's northern hardwood forests. The BEF, established in 1931, has one of the longest records of the effects of management (e.g., regeneration harvests and thinning) and natural disturbances on forest change. Forest Service scientists and university cooperators investigate the effects of management on forest composition and structure with resulting effects on wildlife. The BEF is a prime location for testing new airborne and orbiting remote sensing technologies. (*Contact:* Dr. John C. Brissette, Research Forester and Project Leader, Tel. 603.868.7632; email: [jbrissette@fs.fed.us](mailto:jbrissette@fs.fed.us))



The **Hubbard Brook Experimental Forest (HBEF)** is a 7,754 acre reserve dedicated to long-term study of forest and stream ecosystems. Located in the White Mountain National Forest of New Hampshire, HBEF was established in 1955 as a major center for hydrologic research and is designated as a Long Term Ecological Research (LTER) site by the National Science

Foundation. Ongoing cooperative efforts among diverse educational, governmental, and nongovernmental institutions have produced one of the longest and most extensive continuous databases on the hydrology, biology, geology, and chemistry of natural ecosystems. These data are the foundation for world-renowned research on the cycling of water, nutrients, and energy in forests and related aquatic ecosystems.

(*Contact:* Dr. Christopher Eagar, Research Ecologist and Project Leader, Tel. 603.868.7636; email: [ceagar@fs.fed.us](mailto:ceagar@fs.fed.us))



The **Massabesic Experimental Forest (MEF)** is in the process of revitalization following the ravages of wildfire in 1947 and windstorms in the 1950s. Located in the southwestern corner of Maine, the 3,700 acre research forest is dominated by eastern white pine and northern red oak and is representative of private forestlands in central and southern New England. The MEF is once again the setting for forest ecology and management research and demonstration. A conservation education project centered on the forest is a partnership with state and local organizations and supported by a number of local volunteers. (*Contact:* Dr. John C. Brissette, Research Forester and Project Leader, Tel. 603.868.7632; email: [jbrissette@fs.fed.us](mailto:jbrissette@fs.fed.us))



The **Penobscot Experimental Forest (PEF)** was established in 1950 as a site for forest management research in the northeastern spruce-fir forest. The 4,000 acre property is owned by the University of Maine and managed jointly by the University and the Northeastern Research Station of the USDA Forest Service. A long-term study of regeneration and stand management alternatives was started by the Forest Service in the 1950s and today represents one of the longest running forest manipulation experiments in the USA. University faculty and students conduct a broad range of ecological and management studies, often in conjunction with the Forest Service study. (*Contact:* Dr. John C. Brissette, Research Forester and Project Leader, Tel. 603.868.7632; email: [jbrissette@fs.fed.us](mailto:jbrissette@fs.fed.us))