Harvard Forest

Site name: Harvard Forest, Harvard University (candidate core)
Domain name: Northeast
Contact: David Foster (drfoster@fas.harvard.edu)
Web page: www.harvardforest.fas.harvard.edu
Location: 42.506 N**;** -72.194 W
NEON Themes: Climate; Land Use (pollution, land change), Invasives (plant, animal, pest, pathogen, infectious disease); Disturbance (hurricane) Aquatic (lake, stream, reservoir, river)

Founded in 1907, the Harvard Forest is Harvard University's center for research and education in ecology and conservation and comprises one of the longest and most intensively studied landscapes in North America. The Harvard Forest has been an LTER site since 1988; a center for DOE-NIGEC (Nation Institute of Global Environmental Change) from 1990-2006; a NSF-REU program serving approximately 30 students annually since 1992; and a center for a A.W. Mellon-United Negro College Education Foundation undergraduate program since 1990. Integrated research embraces the physical, social, and biological sciences; all data reside on a comprehensive web-based information system. Through collaborative agreement with the state of Massachusetts the Harvard Forest Core
Site will include the adjacent Quabbin Reservoir and Reservation, 40,000 ha of forest and water that provides the major water source for metropolitan Boston and 40% of the Massachusetts population. A comprehensive overview of Harvard Forest research is available in *Forests in Time: The Ecological Consequences of 1000 Years of Change in New England* (Foster & Aber 2004; Yale Univ. Press). A full-time staff of 45 oversees research and educational programs.

Centrally located in the Northeast domain, the Harvard Forest is representative of Northeastern wildlands and has an unparalleled legacy of research, including extensive historical, archaeological and paleoecological reconstructions of the site and region. The Forest's 1200 hectares include habitats representative of New England, including northern, transition, and central forest types, marshes, hardwood swamps, conifer bogs, and forest plantations. At the height of agricultural development (ca. 1850) approximately 75% of the land was cleared; at present, 95% of the land is forested. The soils on gneiss and schist bedrock are mainly sandy loam glacial till, with some alluvial and colluvial deposits. Soils are moderately to well-drained in most areas and acidic, with an average depth of 3 m. Aquatic systems include a 70-acre pond, a major tributary to the Quabbin Reservoir, and two headwater streams. Weirs were installed on these streams in 2004 to support a growing watershed and aquatic ecology research program.

Harvard Forest infrastructure includes three eddy-flux towers that support the longest running record of net-ecosystem carbon exchange in a North American forest. A stationary walk-up tower and a mobile canopy lift provide access to the forest canopy. Meteorological records since 1964 include air temperature, relative humidity, dew point, precipitation, global solar radiation, PAR radiation, net radiation, barometric pressure, scalar wind speed, vector wind speed, peak gust speed (1-second), vector wind direction, standard deviation of wind direction, and soil temperature (10 cm depth). A wireless sensor-net operates over a core 350 ha portion of the land, including a suite of long-term experimental manipulations on warming, drought, N deposition, hurricane impacts and invasive species. There are several arrays of permanent soil respiration plots and vegetation plots; a comprehensive vascular plant flora and herbarium; and a non-vascular plant survey is underway.

Existing facilities include offices, classrooms, dormitories and laboratories for paleoecology, dendrochronology, morphology, plant physiology, soils and biogeochemistry. Two greenhouses, two shade houses and a 30 x 30 m common garden plot are available for research. Document and sample archives and a library are located on site. Housing is available for 50 people; meeting space includes a 125 person lecture hall and museum of ecology. Additional systematics collections are available through the Harvard Herbarium and Museum of Comparative Zoology in Cambridge.