Study Area Description - Harvard Forest

Harvard Forest, established in 1907, is a forest biology and conservation research and education center located in north-central Massachusetts (42.5°N, 72°W) [1, 2]. Topics researchers have investigated have included forest management, soils, plant ecology, landscape history, conservation biology, and ecosystem dynamics [3]. In 1988, the Harvard Forest Long Term Ecological Research (LTER) program funded by the National Science Foundation was established to examine how natural disturbances, environmental change, and human impacts influence the ecological dynamics in the New England region [1, 4, 5].

The area of Harvard Forest is predominantly composed of 1,200 ha of forest in the town of Petersham, Massachusetts and a majority of the research is conducted in the five tracts located here: Prospect Hill (375 ha), Tom Swamp (475 ha), Slab City (200 ha), Simes Tract (125 ha), Schwarz Tract (15 ha) [2, 6].

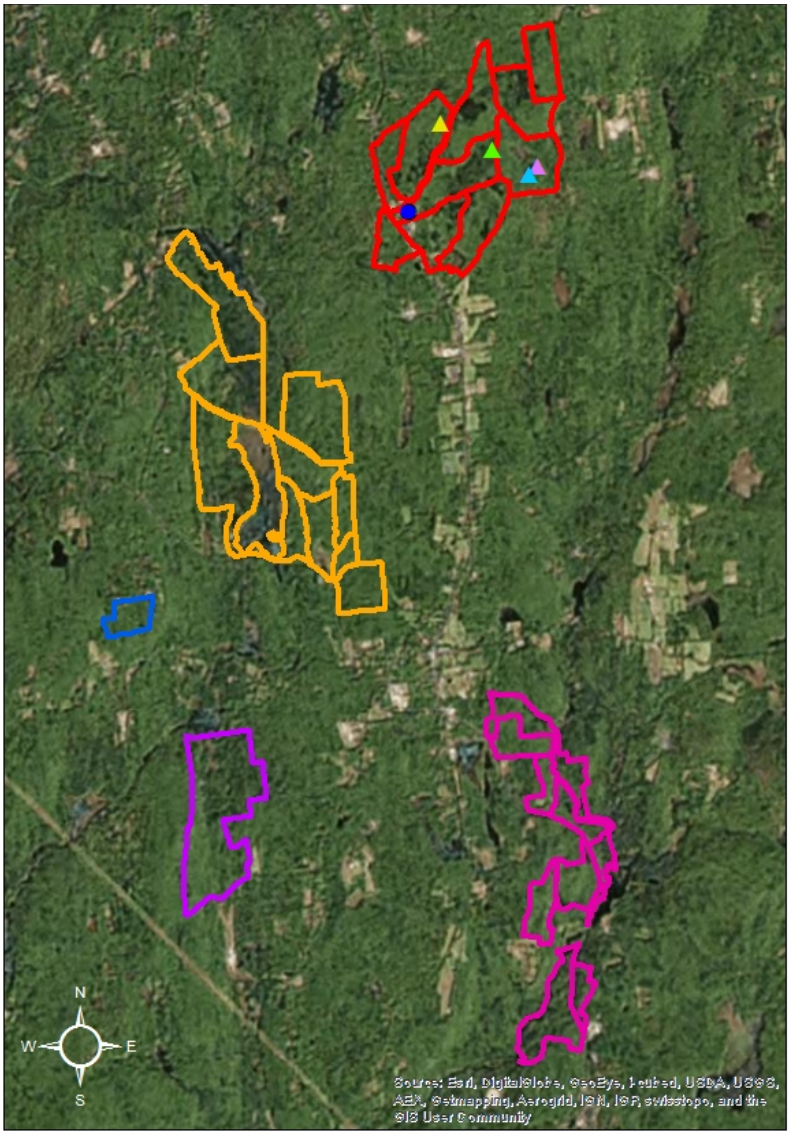
The climate consists of cool, moist temperatures with a mean temperature of 20°C in July and a mean temperature of -7°C in January [2]. The annual mean precipitation of 110 cm is fairly evenly distributed throughout the year [2].

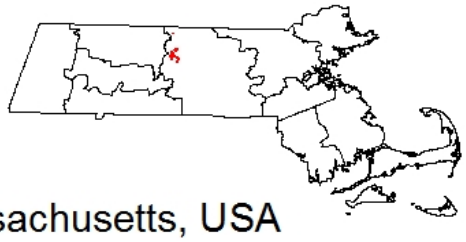
Located in the New England Upland Region, Harvard Forest's elevation ranges from 220 m to 410 m above sea level [2]. The soils are mainly sandy loam glacial till with some alluvial and colluvial deposits [2]. The soils are acidic, average a depth of 3 meters, and are moderately to well-drained in most areas [2].

The varied habitats found in Harvard Forest are typical of the landscape throughout southern New England [2]. The transition hardwood-white pine-hemlock forest is dominated by red oak (*Quercus rubra*), red maple (Acer rubrum), black birch (*Betula lenta*), white pine (*Pinus strobus*), and eastern hemlock (*Tsuga canadensis*) [2]. White oak (*Quercus alba*), black oak (*Quercus velutina*), hickory (*Carya ovata*), and chestnut (*Castanea dentata*) (presently only found in understory because of chestnut blight) are commonly found on drier soils [2]. On moist, cool, but well-drained sites, yellow birch (*Betula alleghaniensis*), beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), paper birch (*Betula papyrifera*), white ash (*Fraxinus americana*), hemlock, and white pine are commonly found [2].

Research plots are located in the Prospect Hill, Tom Swamp, Slab City, and Simes Tracts, including some data from experimental and/or disturbance studies. The majority of the data collection is from the Prospect Hill tract. In the Prospect Hill Tract, the research towers include one meteorological station, three eddy flux towers, and two walk-up towers [6, 7].

- The Fisher Meteorological Station, located about 200 m north of Shaler Hall, reports 15-minute and daily data [8].
- Established in 1990, the Environmental Measurement Station Eddy Flux Tower (EMS) is a 30 m eddy flux tower that takes atmospheric measurements that include carbon dioxide, nitrogen oxides, and ozone [7].
- The EMS Annex Walk-Up Tower, a canopy-level walk-up tower, is located 130 m southwest of the EMS [9].
- Approximately 0.5 km from the EMS, the canopy-level Hemlock Walk-Up Tower is located in a mature hemlock forest [7].
- Installed in October 2013, the Hemlock Flux Tower is located 10 m east of the Hemlock Walk-Up Tower and began flux measurements in July 2014 [7].
- In 2001, the Little Prospect Hill Eddy Flux Tower was installed in a younger mixed hardwood forest type approximately 1.2 km from the EMS [7]. It measured carbon dioxide exchange from May 2002 until December 2010 [7].





Massachusetts, USA

Tracts

- Prospect Hill (majority of data collected here)
- Tom Swamp
- Slab City
- Swartz
- Simes

Research Towers

- Environmental Measurement Station Eddy Flux Tower
- Environmental Measurement Station Annex Walk-Up Tower
- Hemlock Flux Tower and Walk-UpTower
- Little Prospect Hill Eddy Flux Tower
- Fisher Meterorgological Station

0 1.25 2.5 5
Kilometers

0 0.75 1.5 3
Miles

Reference List

1. http://harvardforest.fas.harvard.edu/research-topics
2. http://harvardforest.fas.harvard.edu/research/HF-tract
3. http://harvardforest.fas.harvard.edu/sites/harvardforest.fas.harvard.edu/files/FINAL_SymposiumBooklet_2013_sm,.pdf
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