

# LONG-TERM ECOLOGICAL RESEARCH AT THE HARVARD FOREST

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Permanent plots are a key component of a long-term ecological research program. They provide direct insight into forest development, complement reconstructive and space-for-time techniques, and serve as controls to experimental areas. Sites in which the trees are mapped provide detail into disturbance processes and spatial patterns of forest dynamics. Permanent plot studies have been part of the Harvard Forest's mission since it was established in 1907; we present a few examples to illustrate some of the insights that they have provided.

Since 1909, quantitative forest inventories of the Harvard Forest have been undertaken regularly. One of these inventories was completed in 1937, fortuitously providing detailed baseline data to compare to the post-1938 hurricane forest. In 1992, an augmented inventory of the 1937 plots was completed; analyses highlighted how past land-use is a dominant force in determining current forest structure and function (Motzkin et al. 1999). This extensive plot system is complemented by a 3-ha stem-mapped site that has been remeasured decadal since 1969.

The Soil Warming Plots and Nitrogen Saturation Plots were established in 1990 as part of the Harvard Forest Long-Term Ecological Research program. These are very long running plots for experimental manipulations, and have yielded surprising, non-linear trends over time (Melillo et al. 2002, Aber 2004). A large stem-mapped hemlock plot was also established in 1990, and its intensive reconstruction provides a valuable base from which to observe its anticipated decline as the hemlock woolly adelgid invades the site.

Maintaining field sites and records for long-term plots is a major commitment, especially when results do not easily lend themselves to publication at each remeasurement cycle. Harvard Forest has a research assistant, an archivist and a data manager engaged in this activity. Even with this commitment, it is a challenge to keep up with plot remeasurements and data management, especially as new studies are simultaneously developed. However, the insights from the long-term plots are irreplaceable and this continuing legacy is central to the value of Harvard Forest.

## Literature Cited

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