

LONG-TERM STUDY OF A PINE – OAK FOREST ECOSYSTEM: HOLT RESEARCH FOREST

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The Holt Research Forest (HRF) was established in 1983 on a 120 ha (300-acre) parcel in Arrowsic in mid-coastal Maine. A 40-ha study area was established with half to be used as an experimental area and the other as a reserve. Research and management protocols were established by Hunter and Kimball for two broad goals to direct the activities at HRF. One is research based: undertake long-term research to understand the structure and dynamics of an oak-pine forest ecosystem. The other is management based: develop a demonstration forest where state-of-the-art multiple use management techniques can be presented to the public. Long-term baseline data has been collected on many components of the forest including woody and herbaceous vegetation, birds, mammals, salamanders, seed and fruit production, and soils.

The study area is bisected by the property line of two old farms and the current condition of the vegetation has been significantly influenced by the past land use. The northern farm was abandoned in the 1930s and the forest canopy is dominated by white pine, while the southern half has longer history as a woodlot and is more mixed. Several forest floor species of plants show distributions that are linked to the land use history as well. The importance of land use history in determining the present biodiversity of a parcel should not be underestimated.

A group-selection harvest in 1987/1988 in 10 ha of the experiment area resulted in removal of 42% of the basal area and created canopy gaps ranging in size from 25 to 3000 m². This harvest provided the opportunity to measure the impacts of the harvest on growth rates of adjacent trees, tree regeneration, understory plants, birds, small mammals, salamanders and a host of other components. The direct impacts of the harvest resulted in some significant changes in plant species composition and created fluctuations in bird species composition and abundance. Changes on the overall structure of the forest as a result of this low-impact harvest have been minimal.

Overall, the study has shown the importance of long-term studies for giving us a better understanding of the temporal changes in populations. The relative stability of some populations becomes more apparent while other species populations are cyclic and others seemingly fluctuate randomly. Understand these populations, in relationship to forest harvesting, has become of critical importance as we incorporate ecological integrity into our management systems.