

ABSTRACT OF THESIS

Vegetational Change in a Mature Oak

Forest: A Thirty Year Study

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Forest vegetation of a mature, mixed oak forest, Hutcheson Memorial Forest (HMF), New Jersey, was sampled in permanent quadrats previously sampled in 1950 and 1969. In the understory, herb cover showed a significant seven-fold increase over the 30 years, with all predominant species increasing in cover and frequency. Yet herb species diversity declined, with rare herbs decreasing or disappearing from the plots. Shrub cover did not change, but shrub diversity increased. Vines increased significantly both in the shrub and herb layers. Tree seedling density fluctuated significantly, with marked changes in species composition. Tree sapling density did not change significantly. Canopy tree density decreased significantly only in the past decade, while basal area did not change significantly. Cornus florida was the only tree species to decrease significantly in the past decade. Understory changes were the most dynamic, and correlate with an increased light availability within the forest.

Light availability increased as a result of canopy gap formation. Natural disturbance agents such as wind and drought appear to be the most important factors in producing gaps during this 30 year period. The 30 year changes detected in this investigation, reveal the value of this type of long-term research in helping to elucidate forest dynamics. Because of the unique history of HMF, and the scarcity of long-term data from other oak forests, the results obtained can be used to develop a hypothesis about generalized trends.