Metadata

Dataset Title:

Cary_Forest_Plots_1984_Sapling_Data.csv
Cary Institute of Ecosystem Studies, Cary Forest Plot Data, Saplings

Abstract

This dataset is a contribution to the Cary Institute of Ecosystem Studies. The Cary Forest Plots were established in 1984 as part of The Cary Vegetation Study, which described the vegetation of the then Cary Arboretum. The project established 76 permanent plots referred to as the "Cary Forest Plots". Data collection in the plots was extensive and included a survey of mature trees, saplings, seedlings, shrubs and herbaceous species as well as soil analyses, tree ring data and physical descriptions of each plot. Subsequent re-surveys of the plots were done in 20 of the 76 original plots as part of the Forest Response to Stress and Damage (FORSTAD) project, which took place over approximately 10 years in the 1990's. These surveys included an annual canopy census of trees. Canopy census data were also collected in other plots studied in the FORSTAD project, including Nutrient Cycling Plots A & B and in the control plots in the Yellow, Teahouse grid and the Red, Henry Grid. Another resurvey of 43 of the Cary Forest Plots was done in 2006 by Dan Katz as part of his Research Experience for Undergraduates (REU) project and his senior thesis project at Bard College. His surveys included mature trees, saplings, seedlings, shrubs and herbaceous species as well as soil analyses. This repository includes Cary Forest Plot data from the 1984 Cary Vegetation Study.

Publications:

GLITZENSTEIN, J. S., C. D. CANHAM, M. J. MCDONNELL, AND D. R. STRENG. 1990. Effects of environment and land-use history on upland forests of the Cary Arboretum, Hudson Valley, New York. Bull. Torrey Bot. Club 117: 106–122.

Katz, D.S.W., Lovett, G.M., Canham, C.D., & O'Reilly, C.M. 2010. Legacies of land use history diminish over 22 years in a forest in southeastern New York. Journal of the Torrey Botanical Society 137: 236–251.

Data provided in this dataset include the number of saplings of different size classes in two of the four quadrants of each plot.

Those wishing to publish data from Cary Institute of Ecosystem Studies, Cary Forest Plots are encouraged to contact the data manager at datamanagement@caryinstitute.org.

Investigators

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Keywords

Cary Institute, Cary Institute of Ecosystem Studies, data, hardwood forest, tree inventory, land-use history, vegetation survey

Timeframe

1984

Geographic location

The Cary Institute of Ecosystem Studies is located in Millbrook, NY USA.

Methods

The sampling of Cary Forest Plots was done by two field assistants in 8 weeks in the summer of 1984. The size of each plot was deliberately small (500 m^2, 1/20 of a hectare) because of the apparent heterogeneity of site conditions within the Cary Arboretum. At this intensity of sampling, there was one plot for every 3 adjacent grid squares that were entirely within the contiguous forest areas of the Cary Arboretum. Note that a grid system consisting of 1 ha grid squares was established on the Cary Arboretum prior to this project. Each grid square was numbered and corners posted with fiberglass stakes and metal tags.

STAND LOCATIONS - Stands were located at predetermined, random distances along transects that ran parallel to grid square lines, midway between grid lines. Under certain conditions, the location of a stand was adjusted because of field conditions, specifically where continuous forest cover was interrupted by: streams, paved or forest roads, or fields. When the edge of a stand extended within 20 m of one of the features listed above, the center of the stand was moved back along the transect until the edge of the stand was 20 m away from the forest edge created by the feature. The new location of the stand (distance along the transect) was recorded on the data sheet for the stand. Stand locations were altered because of temporary pools (e.g. standing water in local depressions that were not part of an open drainage system).

STAND LAYOUT - Each stand consisted of a circular 500 m^2 plot (radius 12.62 m) centered at the predetermined location along a transect running midway between grid lines. Within this plot, a variety of smaller quadrats were used to sample specific components of the vegetation and environment of the site.

SAMPLING PROCEDURE Trees: The DBH and crown class of all stems greater than 10 cm DBH (1. m above the ground) in the 500 m^2 plot were recorded by species. Four crown classes were recognized: C = Canopy: trees with greater than 25% of crown cross-sectional area exposed to the sky, SC = Sub-canopy: trees with less than 25% of crown area exposed to the sky, U = Understory: trees whose crowns were entirely overtopped by adjacent canopy and sub-canopy trees, and D = Standing Dead: for standing dead trees. Saplings: Sapling density was recorded in two of the four quadrants of the main circular plot. The two quadrants were randomly chosen. The numbers of all tree sterns greater than 1 m height but less than 10 cm DBH were recorded by 2 cm size classes for each species. The size classes were: 1 = 0-2 cm DBH, 3 = 2-4 cm DBH, 5 = 4-6 cm DBH, 7 = 6-8 cm DBH, and 9 = 8-10 cm DBH. The presence of all species of saplings

within the entire 500 m^2 plot was also recorded.

Shrubs: Shrub abundance was estimated from a line intercept sampling scheme. Shrub cover was recorded along the entire 25.23 m length of the main transect. The presence of all shrub species within the 500 m^2 plot were also recorded.

Seedlings and Herbaceous Species:
The density of tree seedlings and the cover of herbaceous species were recorded in 8 – 1 m x 0.5 m rectangular quadrats located at random distances along the 25.23 m transect running through the plot. The cover of exposed rocks, bare soil, mosses, lichens and fallen logs were also recorded in each quadrat. A species list of all vascular plants present in the 500 m^2 plot was also compiled.

Topographic Variables: The following topographic variables were recorded for each stand: Slope, Aspect, Slope Position in one of the following classes: ridge top, crest of slope, mid slope, foot of slope, local depression, and Approximate Elevation: from topographic maps.

Soil Sampling: At 4 randomly chosen distances along the central transect, 10 cm deep soil cores (starting from the top of the mineral soil) were collected using an Oakfield tube sampler and combined in a single sample bag for a composite sample. The depth of the litter layer (L, F and H horizons combined) were also recorded at each of the 4 locations. Samples were analyzed for pH, texture, percent organic matter and chemistry. Note that descriptions of methods were not saved for all analyses.

Stand Structure: The following were recorded for each plot: Maximum Canopy Height: using a clinometer and tape measure to record the height of the tallest tree on the plot, and Crown Closure: as the number of grid intersections of the camera field that were exposed to the sky. The camera was positioned vertically at the center of the plot.

Stand History: The age of the forest stand and the history of disturbance at the site was estimated through a series of types of observations. The presence or absence of mound and pit microtopography was recorded. The largest tree in the stand was cored. If the tree had a hollow core, the next largest tree was also cored (repeating this procedure as necessary to get a complete core). All cores were saved. If a core missed the center of the tree by more than approximately 1 cm, the tree was cored again. The presence of stone walls within the stand were recorded. Evidence of selective logging or other recent disturbance to the canopy was also recorded.

Data Table

Column name	Description	Unit or code explanation or date format	Empty value code
Plot_Number	Plot number, associated with grid square number within which plot was located		
Species	4-letter tree species identification		
Size_Class1_Number	Number of saplings of size class 1 = 0-2 cm DBH		
Size_Class3_Number	Number of saplings of size class 3 = 2-4 cm DBH		
Size_Class5_Number	Number of saplings of size class 5 = 4-6 cm DBH		

Size_Class7_Number	Number of saplings of size class 7 = 6-8 cm DBH		
Size_Class9_Number	Number of saplings of size class 9 = 8-10 cm DBH		

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