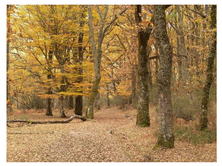

Exton County Park: Forest Composition and Importance Values

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Abstract

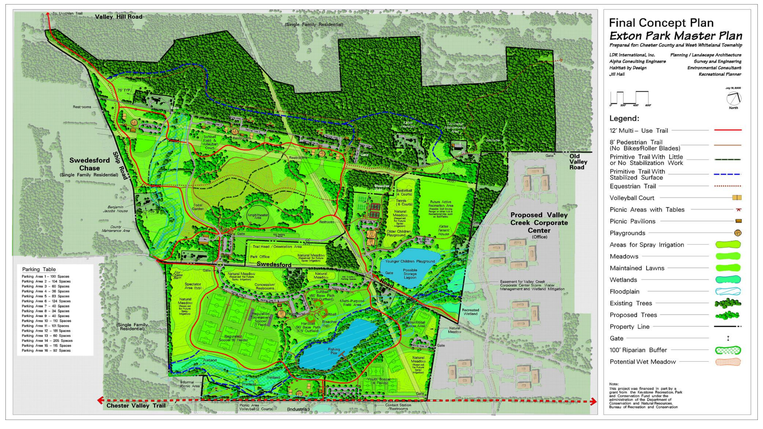
The main focus of the research project is to determine if the Exton County Park contains a balanced forest structure cable of supporting bio-diversity. The forest structure is divided into overstory trees (≥10 cm dbh) and understory trees (<10 cm dbh) classifications. The understory layer also includes lower level plants. A well developed understory provides habitat for a large number of plants and animals and is essential for forest renewal. To determine if Exton County Park contains a well developed understory layer, this study analyzes eight random 10 square meter plots. The Exton County Park is divided into eight zones, each containing one study plot. Our data includes tree species, dbh for all trees within each study plot and low-level plant mapping. Results to date indicate a low level of understory and limited species diversity. We suspect that the 227 deer and buck sightings between October 7th and November 16th, 2012 contributed to low level of understory.

Study Question:

Does Exton County Park contain a well developed understory layer?

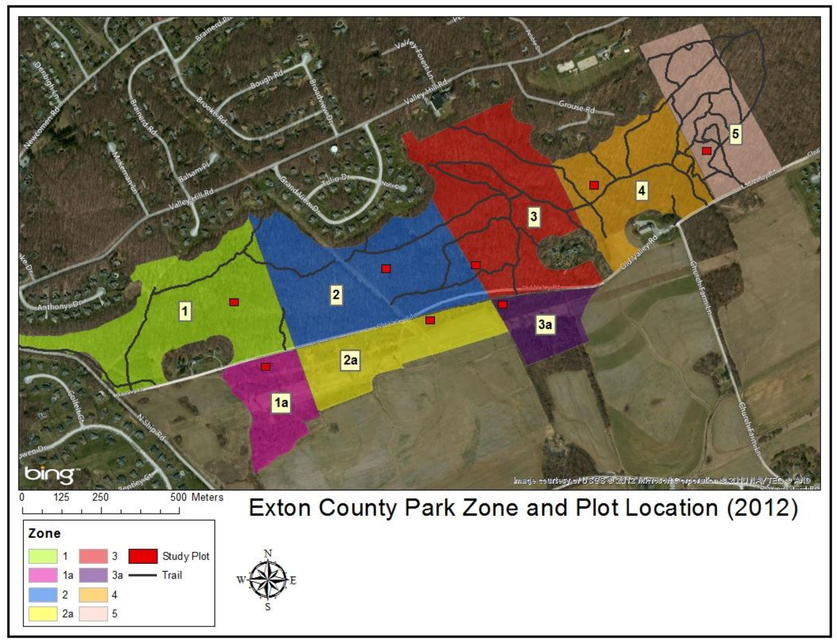
History Of Study Site:

According to the master plan, Exton County Park is located in West Whiteland Township, Pennsylvania and is a 727-acre tract that is now referred to as Exton Park. The Exton Park site was purchased jointly between the Township and the County from Church Farm School for $12,000,000 with the focus of open space preservation as well as recreational needs catered to the growing population of the surrounding area. This location currently has a park proposal that will have both active and passive recreation. The study that the group is doing on wildlife management is the first of its kind at the location and serves as valuable information for the park. The map below shows the final plan for the Exton County Park.



West Whiteland Township: Exton County Park Plan

Site Map and Plot Locations:



Exton County Park Zone and Plot Location (2012)

Methods:

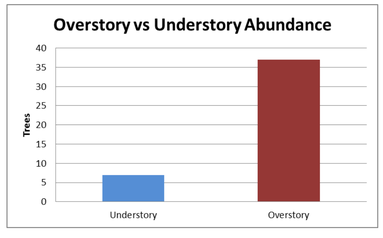
- Set up 8 random 10m x 10m plots.
- Mapped tree location and shrubs in each plot.
- Measured trees >5 DBH (cm).
- Determined Tree species
- Any tree found with a DBH <10 cm was set as understory. Trees found >10 cm were classified as overstory

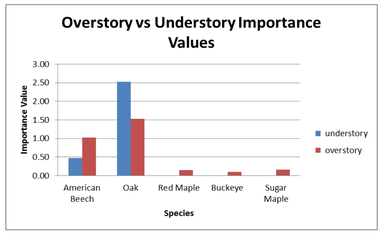
Values Calculated

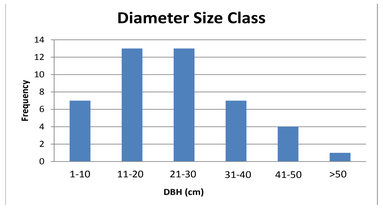
- Basal Area (BA): = Pi()*(r^2)
- Relative Density (RD): = n/sum(n)
- Relative Frequency (RF): = f/sum(f)
- Relative Coverage (RC): = C/sum(C)
- Importance Value (IV): = RD + RF + RC

(Kent and Coker 1992)

Results:







Species	RD under	RD over	RF under	RF over	RC under	RC over	IV under	IV over
American Beech (Fagus grandifolia)	0.14	0.32	0.26	0.38	0.72	0.33	0.47	1.02
Oak (Quercus spp.)	0.86	0.55	0.75	0.44	0.93	0.54	2.53	1.53
Red Maple (Acer rubrum)	0.00	0.03	0.00	0.06	0.00	0.06	0.00	0.15
Buckeye (Aesculus glabra)	0.00	0.03	0.00	0.06	0.00	0.02	0.00	0.11
Sugar Maple (Acer Saccharum)	0.00	0.05	0.00	0.06	0.00	0.05	0.00	0.16

Conclusions:

- The forest composition consisted of 15.9 % understory trees and 84.1% overstory trees suggesting understory disturbance.
- Forest renewal guidelines suggest 20 seedlings per 10 m^2 constitute healthy forest regeneration (McWilliams et al. 2002)
  - All plots fall short of this guideline, with only a combined total of 7 seedlings
- The presence of only 5 tree species suggest a predation.
- 227 deer and buck sightings reported between October 7th and November 16th suggest that high levels of deer and buck populations are the cause of the disturbance. (A. Spurlock, Chester County Ranger, Personal Communication 2/12/2012)
- We conclude that high deer population affects predominantly the understory resulting in an unhealthy forest.

Further Study:

- The seasonal collection of data could reveal the rate of forest growth.
- The enclosure via a temporary fence could determine impact of deer on understory.
- The removal of invasive species could reveal the impact on the forest growth and health.