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GEO 585 Final Project: A study in the Gordon Natural Area

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A photograph of a forest with tall, thin trees and a dirt path. The trees are mostly evergreens, and the ground is covered in brown leaves and dirt. A wooden fence is visible in the lower right corner.

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Introduction:

- There have been recent events by the Pennsylvania electric company (PECO) which has possibly affected the biodiversity in the Gordon Natural Area.
- New clear cutting techniques by PECO has disrupted life to large sections of the over story and understory.
- This was counter to the original relationship that PECO had with WCU in regards to maintenance of power lines.



Previous Studies:

- Previous studies has suggested fragmentation of once continuous habitats is one of the key threats to global biodiversity (Reino, Beja, Arujo, Dray, Segurado 2013)
- Fahrig also support this with his views 'Habitat loss has large, consistently negative effects on biodiversity' (Fahrig 2013)
- There have been no previous studies at the Gordon Natural Area in this particular topic to date.

Research Question:

- The purpose of this project is to establish a baseline inventory of the woody plant life in the GNA and answer a few key questions;
 - What is the composition and structure of woody plants in and near the areas recently cleared for the utility pole maintenance?
 - Given the current woody composition and structure of these areas, how might the forest change over time as a result of this fragmentation?
 - To what extent are these areas inhabited by invasive species?

Method:

- We established 15 10x10 m² plots in a grid format.
- The plots central point is where the forest fragmentation occurred with PECO clearing the trees and vegetation.
- In each 10x10 m² plot we recorded the latitude and longitude of each tree that we inventoried as part of our baseline.



Plot 11	Plot 12	Plot 13	Plot 14	Plot 15
Plot 6	Plot 7	 Plot 8	Plot 9	Plot 10
Plot 1	Plot 2	Plot 3	Plot 4	Plot 5



 = Power Line Pole

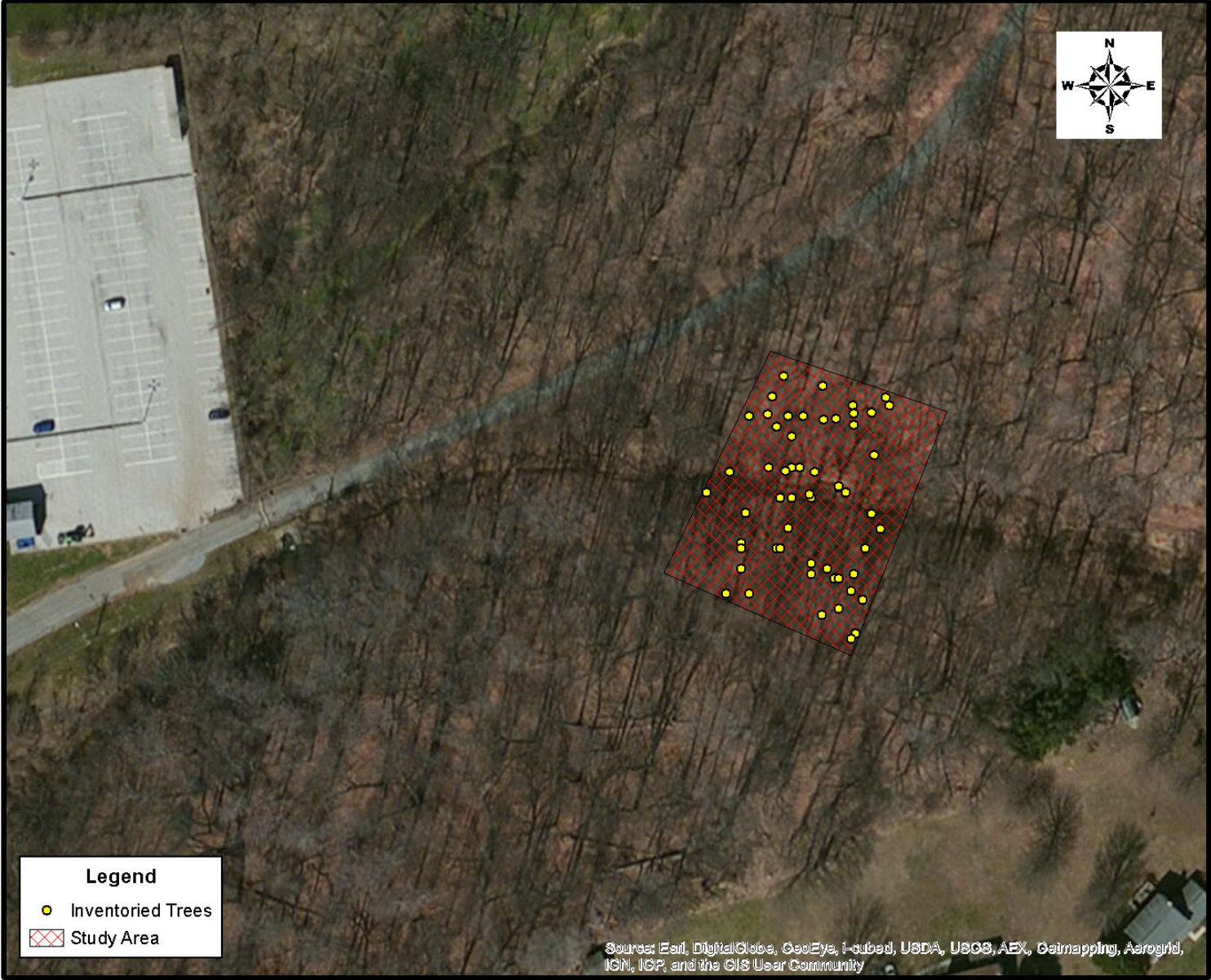


Measurements

- In our 15 plot study area we collected a variety of measurements in our to distinguish the woody composition of the affected edge.
 - DBH of trees (cm)
 - Species
 - Latitude
 - Longitude
 - Dead or Alive
 - Number of branches removed



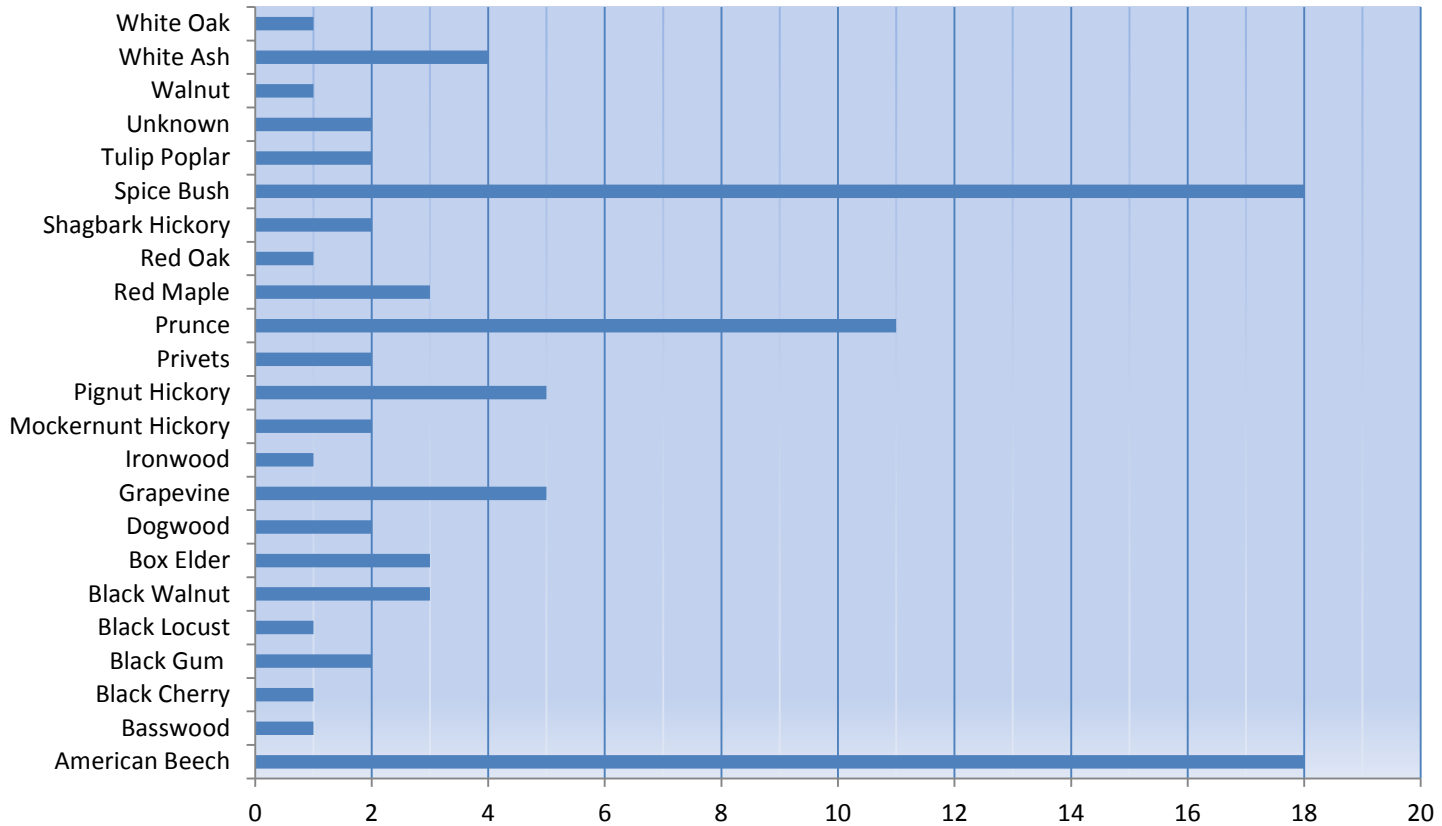
Study area in the Gordon Natural Area



0 62.5 125 250 Feet

Results:

Species Frequency



Discussion:

- Due to a number of trees which were totally removed this created space in the understory for invasive species, thus fragmenting the GNA
- The soil moisture and sunlight amount will be affected because of the greater space in the canopy
- Due to recent removal of trees and the insertion of wooden pallets for vehicles there was little new growth in the study area
- A number of trees had limbs cut off, possibly making them more vulnerable to disease.

Conclusion:

- The establishment of a baseline through this study was vital to track the changes on the GNA that will occur because of the forest fragmentation and to provide more empirical evidence for edge effect studies
- We found that there was a great human impact that occurred in the GNA, contrary to the ideals of the creation of it
- A large amount of ground cover was removed from the forest floor due to human actions with the power lines, paving the way for an invasive species of worm.

Further Question:

- Continued evaluation of the study area to determine growth rates of the trees and invasive species.
- Determine long term affects of trees that will continue to grow in the GNA
- Determine a best practice procedure with PECO if this method of clear cutting was detrimental to the trees.



References:

- Fahrig, L. 2003. Effects of Habitat Fragmentation on Biodiversity. *Annual Review of Ecology, Evolution, and Systematics*. 34: 487-515
- Reino, Luis, Pedro Beja, Miguel B. Araujo, Stephane Dray, and Pedro Segurado. 2013. Does Local Habitat Fragmentation Affect Large-scale Distributions? The Case of a Specialist Grassland Bird. *Biodiversity Research* 19: 423-432.
- **Acknowledgment:**
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