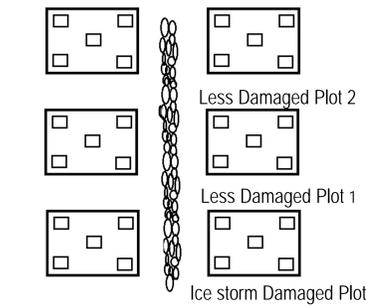
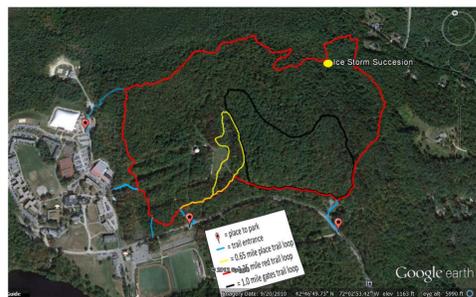


Introduction:

Natural disturbances constantly change the species composition of forest in central New England (Motzkin et al. 2004). In my study I looked at the effect the ice storm of 2008 had on the forest here at Franklin Pierce University. This storm created openings in the forest canopy resulting in an increase in light reaching the forest floor. The main objective of my project was to study whether the forest understory plants have changed in response to the increase in available light. I compared the species present today in the permanent plot off the red trail with the species that were present prior to the ice storm.



Layout of sampling plots. Large plot were 20mx 20 m. Small plots were 1m x 1m.

This map shows where my field site was located off the red trail on the Franklin Pierce University Campus

Methods:

- In each of the 1m x 1m plots depicted above, I identified the species present, counted the number of stems and estimated the percent coverage.
- In total I sampled 30 plots, 15 in the old plowed forest and 15 in the forest that was never plowed.
- My results were compared to the data collected in 2008.

Data Analysis:

- The species present in the plots severely damaged by the ice storm were compared to those in the less damaged plots. T-tests assuming equal variance were performed, and charts and tables were made to represent the results. Chi-squared analyses were done to compare species composition present before the ice storm in 2008 to the species composition present in the forest today.

Results:

Total Understory Plant Abundance in Ice Storm Damaged Plot Compared to Less Damaged Plots

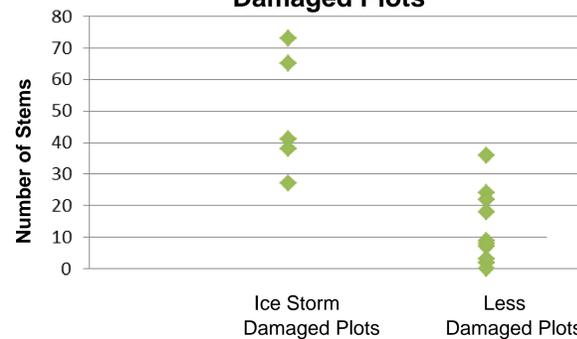


Figure One. Comparisons of the number of stems in the ice storm damaged plots to less damaged plots. The difference in the mean number of stems was statistically significant (P- Value= 0.00028 Degrees of Freedom = 13).

Fern Density In Each Plot

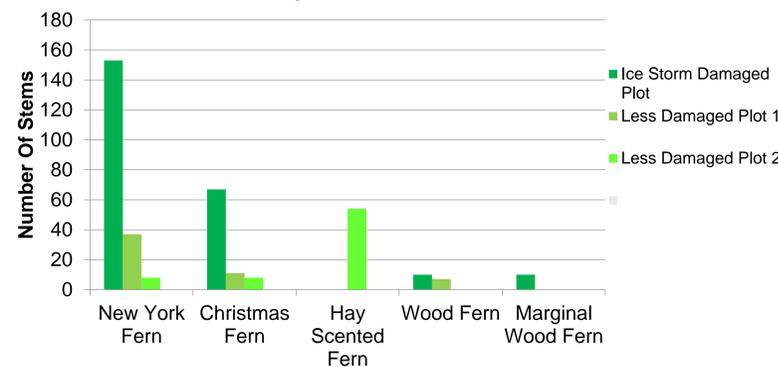


Figure Two. Bar graph comparing the fern species found in each of the three plots. The ice storm damaged plot had a larger number of stems and the species composition of fern was significantly different. Chi Square Results Ice Storm Plot vs Less Damaged Plot 1 ($X^2= 21.78$ $df=4$ $p\text{-value}= 0.000221$) Ice Storm Plot vs Less Damaged Plot 2 ($X^2= 817.11$ $df=4$ $p\text{-value}= < 0.0001$).

Discussion :

All my results are statistically significant, indicating that there is an increase in the number of stems and percent coverage of the understory plants in the plots that were damaged by the ice storm. Comparing the species composition in the most damaged plot to the data collected prior to the ice storm in 2008 indicates an increase in ground coverage and a change in the fern species composition, most likely caused by the opening in the forest canopy. These results show how the forests around us are constantly changing and how an increase in the amount of sun light can drastically alter the species composition on the forest floor.

Additional Photos and Results

Fern Density

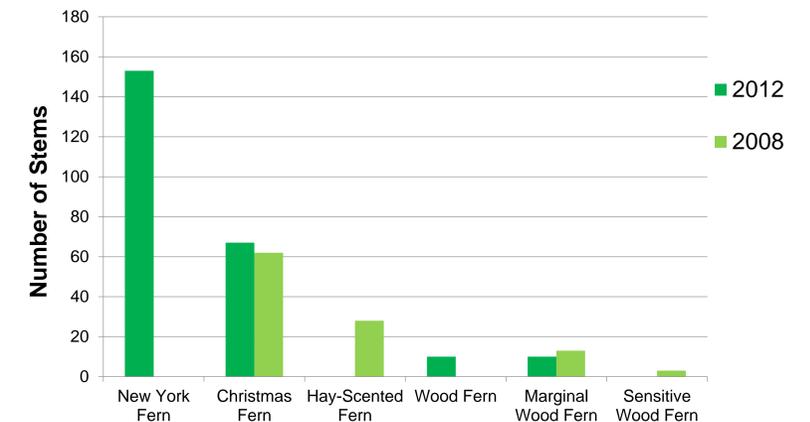


Figure Three. Bar Graph comparing the species found in the most damaged plot compared to the data collected in that plot prior to the ice storm. Chi-Square results ($x^2=121.38$ $df=5$ $p\text{-value}= 1.6x E-24$).



Figure Four shows the rock wall that divides the two forest types. The forest on the left side of the wall had been plowed.



Figure Five: This picture shows a Christmas fern located in the permanent plot that was damaged by the ice storm in 2008.

References:

G. Motzkin, D. Foster, A. Allen, K. Donohue, P. Wilson. 2004 Forest Landscape Patterns, Structure, and Composition 172-188 in D.R. Foster and J.D. Aber (eds.), Forests in Time. Yale University Press, New Haven.