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Comparing Community Structure of Vascular Plant Species on Nurse Logs and Ground Plots in the Arcata Community Forest

Isabella H. Norton

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INTRODUCTION

Fallen trees, or nurse logs, are important features in forest ecosystems that can provide diverse wildlife habitat, substrate for vascular and nonvascular plants, and be a crucial mechanism in energy flow and nutrient cycling (Harmon et al. 1986).

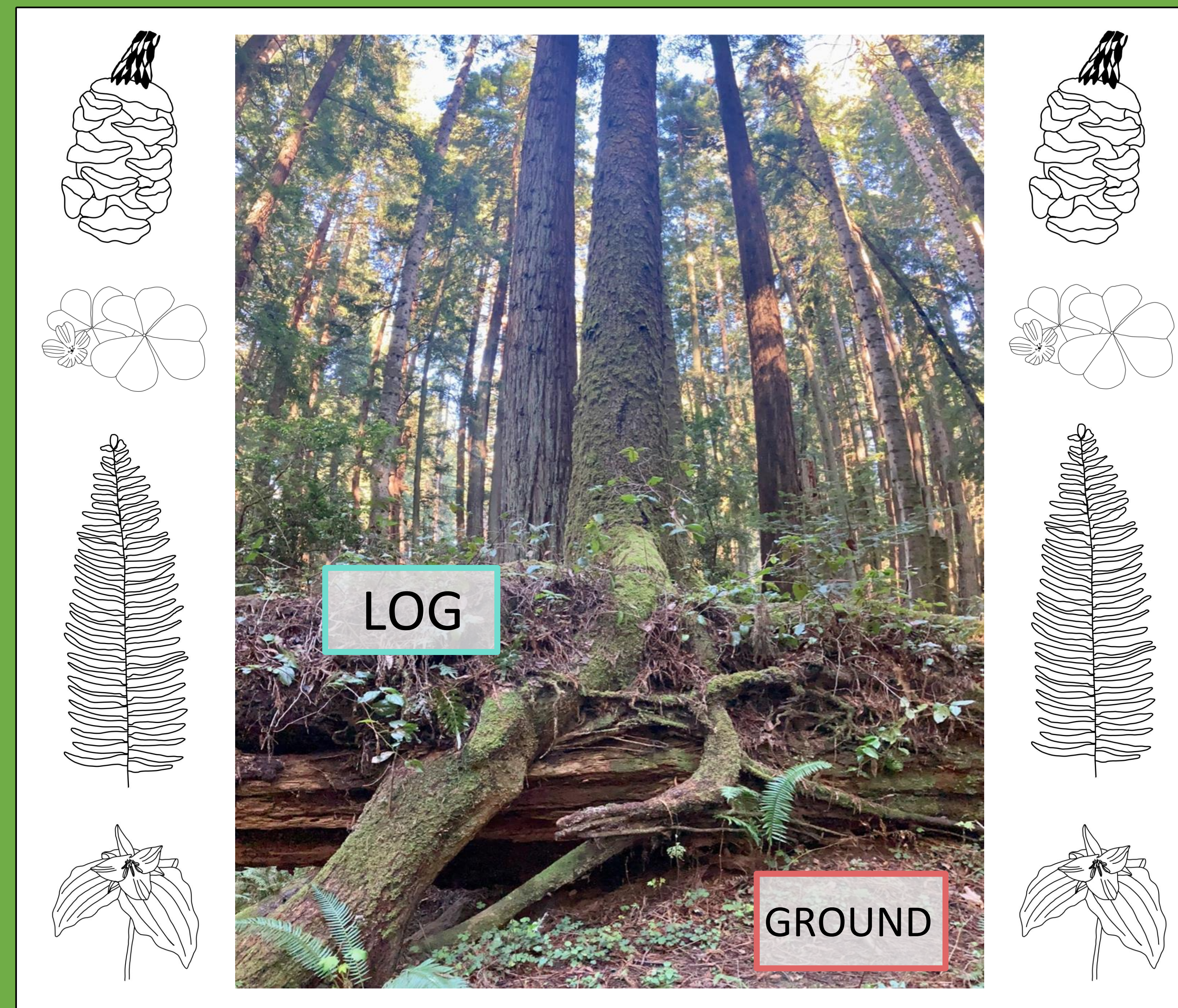
Sustainable forest management has been a growing focus of recent decades in the Pacific Northwest redwood forests, and nurse logs could be an important tool in maintaining these healthy stands (Andre 2015).

I hypothesized that nurse logs were an important feature that should be included in healthy forest management because they promoted vascular plant heterogeneity in the forest habitat.

METHODS

I gathered data hiking along the trails in the Arcata Community Forest, located in Humboldt County, CA during the months of February to March 2022. I used a half meter quadrat on log and ground plots where I recorded data on all species present, number of individuals, and percent of cover for each species. For logs I also collected diameter and length measurements. Ground plots were located 1 meter away from the center of the logs.

I conducted paired t-tests to compare the species richness, abundance, and plant coverage between ground and log plots. I also did an MDS and PERMANOVA analysis to address the differences in community structure between plots.



Community Composition on Logs and Ground

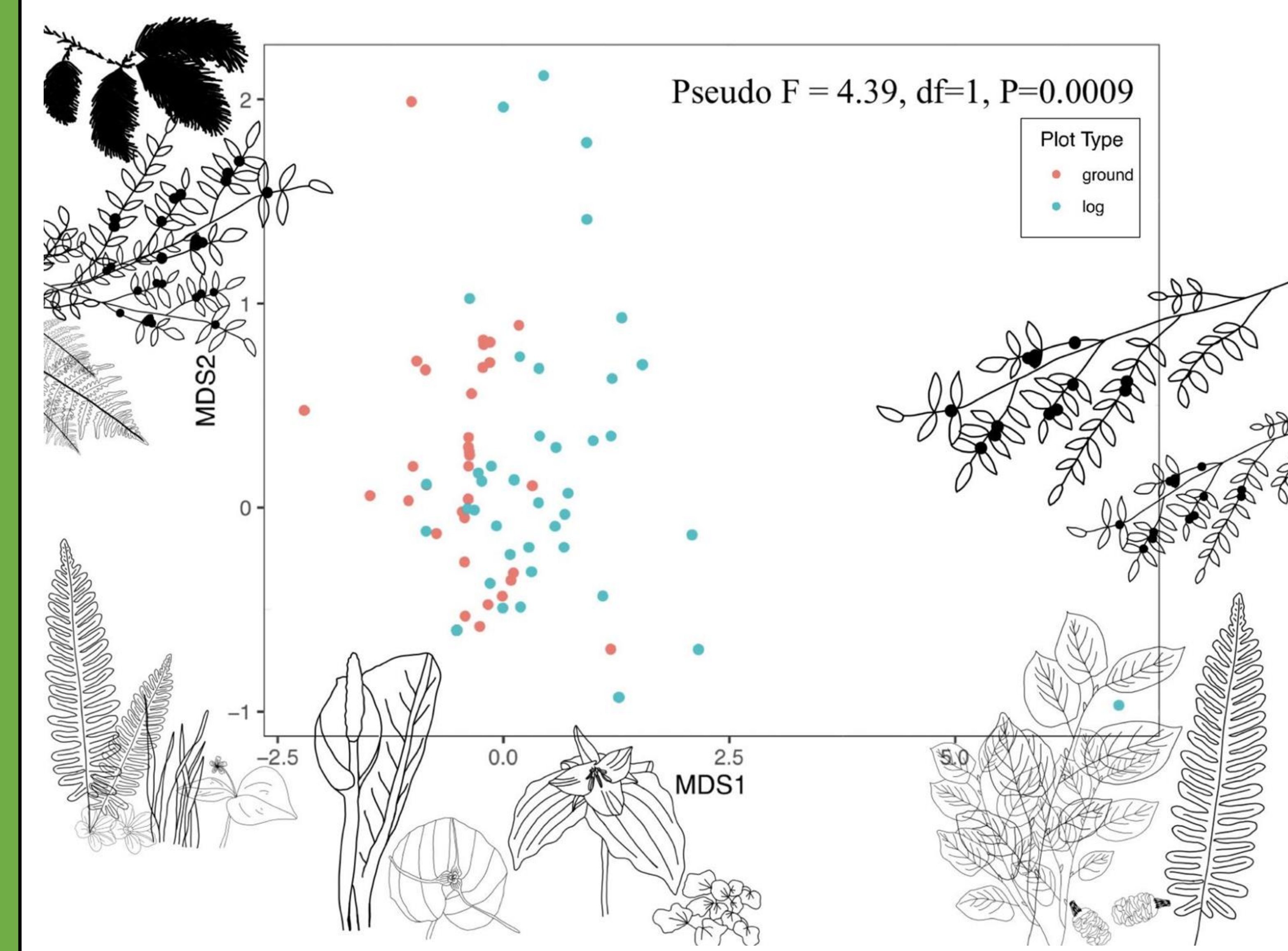


Figure 1: Vascular plant community structures differed between ground and log plots. Drawings correspond to the 4 most common species found on that axis.

RESULTS

Based on my MDS and PERMANOVA analysis, vascular plant communities differed on logs and the ground (Pseudo- $F_{1,105} = 4.39$, $P = 0.0009$). I found that species richness did not differ significantly between log and ground plots ($t_{54} = 0.21$, $P = 0.83$). I also determined that total plant coverage and abundance was not significantly different between log and ground plots ($t_{54} = 1.24$, $P = 0.22$ & $t_{54} = 1.98$, $P = 0.052$).

DISCUSSION

Simple metrics analysis did not show a significant difference between ground and log plots in terms of species richness, plant coverage, or abundance. I did find a difference, however, in the overall structures of vascular plant communities on logs and the ground through further analysis.

My hypothesis was supported that logs are home to a different habitat compared to the floor of the redwood forest. Logs provided a different habitat in the ecosystem, with potentially different substrate characteristics, light levels, less competition, and protection from herbivores (Harmon et al. 1986). I would recommend that some downed logs are left on the forest floor to promote health and heterogeneity in our forest.

LITERATURE CITED

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