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An unusual understory: The impacts of mowing on groundcover and tree regeneration in the Hadwen Arboretum, Clark University

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Introduction

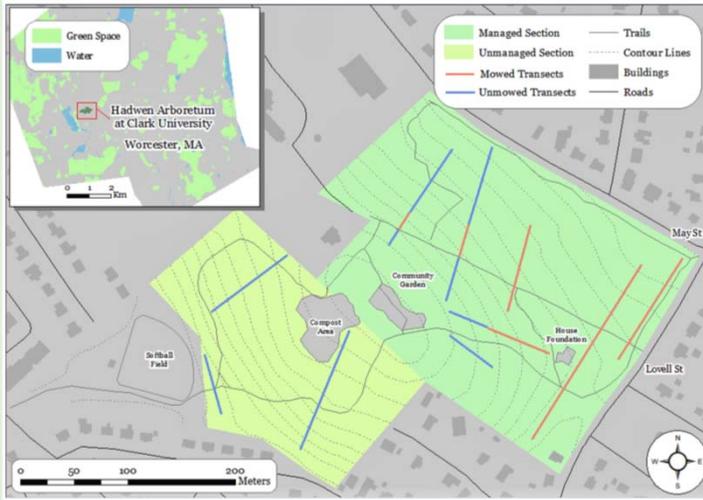
Urban forests offer myriad ecosystem benefits including cooler air during summer heatwaves and shaded space for community recreation. As factors such as climate change, urban densification, and invasive species threaten their ability to provide these services, informed management is crucial. However, ecologically-based practices contrast with aesthetic preferences and can be impractical for foresters with limited financial resources. Forestry mowing offers a time and cost-efficient method for establishing manicured landscapes. This study investigates how mowing impacts understory vegetation of the Hadwen Arboretum in Worcester, MA to evaluate the seasonal and long-term implications of this practice.

Research Objectives

- 1) Determine how groundcover responds to mowing on a seasonal basis.
- 2) Determine if groundcover and seedling characteristics differ between mowed and unmowed sites within the same forest, reflecting long-term implications.

Study Area

The Hadwen at Clark University contains mature trees of regionally rare species, some of which are propagating. Invasive plants have rapidly proliferated in recent years.



Mowing has been implemented for at least half a decade. The property is split into a managed section – containing mowed and unmowed sites – and an unmanaged section that is left undisturbed.

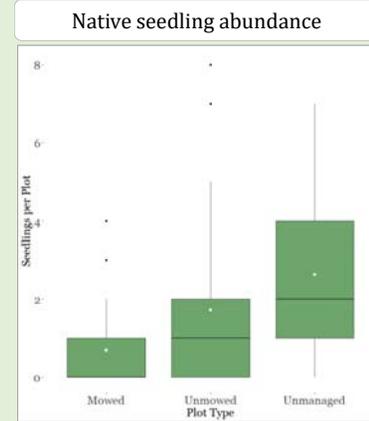
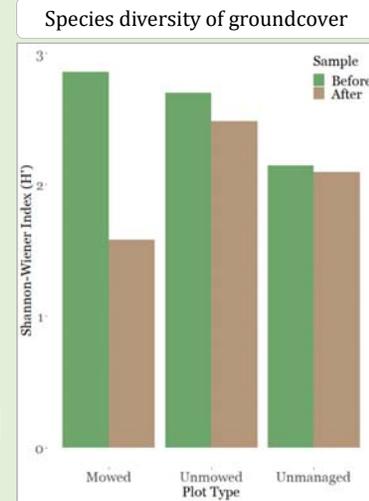
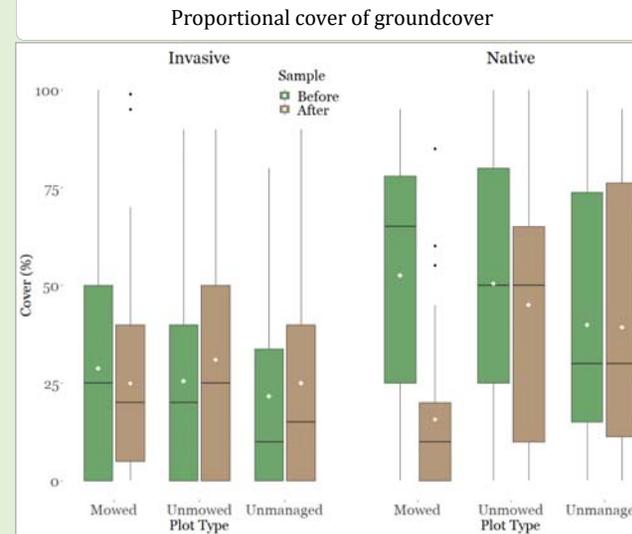


Methods

Before the mowing occurred, straight-line transects were placed throughout the Hadwen and sampled at 10-meter intervals from June 18-25, 2020. Mowing was carried out by facilities management using a utility vehicle from July 20-27. All transects were re-sampled Sept 9-11.

Findings

- Species diversity (H') was lower ($P < 0.01$) in mowed plots
- Proportion of invasive groundcover did not change in mowed plots, nor did it differ between mowed and unmowed plots
- Proportion of native groundcover decreased by 37% ($P < 0.01$) in mowed plots, though it did not differ between mowed and unmowed plots prior to mowing
- Mowed plots had a median abundance of 0 native shrub and tree seedlings per plot
- Mowed plots averaged 1 fewer seedlings than that of unmowed plots and 1.9 fewer ($P < 0.01$) than that of unmanaged plots



Conclusions & Recommendations

Species diversity and prevalence of native cover was significantly lower after the mow. While native groundcover appears to have recovered from mowing in years prior, constant disturbance will favor dominance by shade-intolerant invasive species in the long term. This practice has also had a detrimental impact on forest regeneration. Therefore, mowing regimes in managed forests should consider balancing public visitation with preserving understory health through the designation of undisturbed areas. Where mowing is implemented, timing should be restricted to winter dormancy. Planting efforts are crucial in these areas to provide the next generation of trees.

Acknowledgments

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