



Analysis of Tree Health and Structure in the Worcester, Massachusetts, Longhorned Beetle Regulation Zone

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Worcester Urban Tree Health History

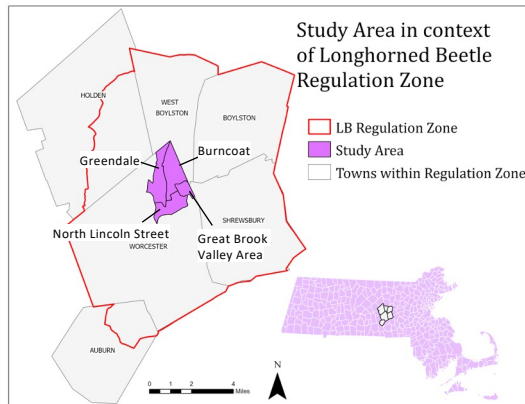
The Longhorned Beetle (LB) (*Anoplophora glabripennis*) is a destructive invasive species, first found in Worcester, MA, 2008. The United States Department of Agriculture (USDA) removed 34,196 host trees were removed within the LB regulation zone. In response, tree planting initiatives were created with the goal of increasing urban canopy in areas of canopy loss. The Department of Conservation and Recreation (DCR) planted ~17,000 trees within the regulation zone.

Research Objectives

The goal of this study was to evaluate the biophysical health and structure of trees planted by the DCR on residential and institutional properties between 2010 and 2012 in the LB regulation zone, and compare that information to surveys conducted in 2014-2016.

Study Area

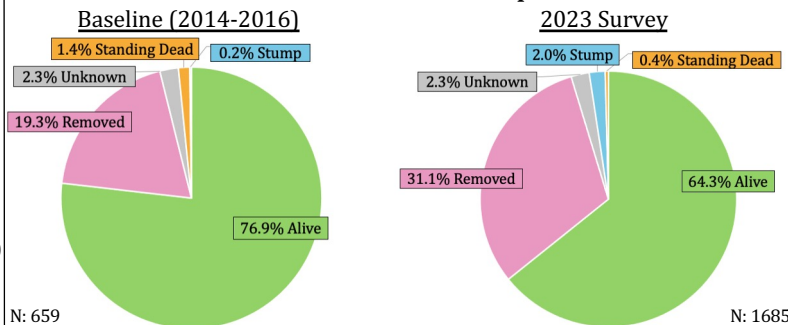
This study area consists of Burncoat, Greendale, North Lincoln Street, and Great Brook Valley Area neighborhoods, within Worcester, Massachusetts.



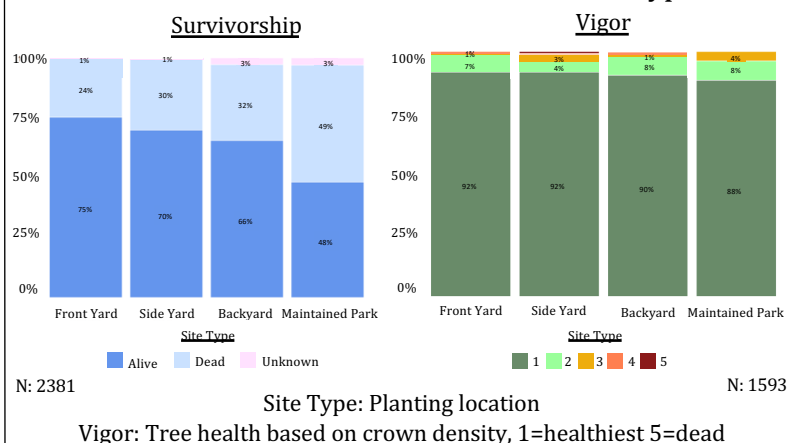
Data

DCR provided a database including tree location, species, and date planted. 800 trees were surveyed in 2014-2016 to establish a baseline. Tree data including diameter at breast height, tree height, survivorship, vigor, site type and land use were collected by HERO fellows during June and July 2023 for 2,381 trees.

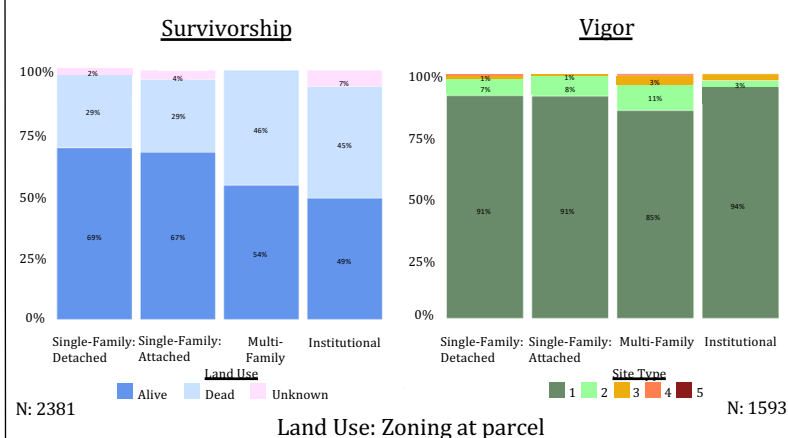
Tree Survivorship



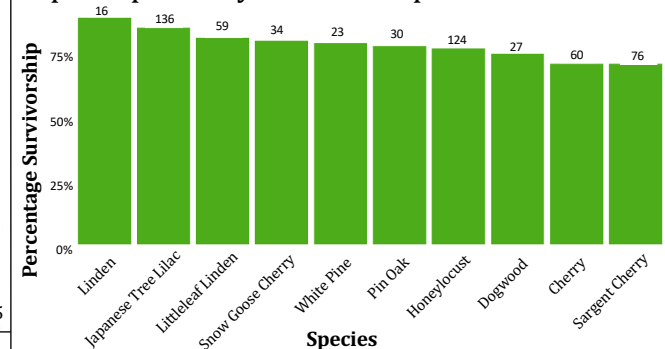
2023 Health Characteristics Across Site Type



2023 Health Characteristics Across Land Use



Top 10 Species by Survivorship With Count > 15*



*Does not include American Arborvitae or White Fir because they did not provide comparable ecosystem services to other species or had poor planting stock, which skewed the data.

Summary

Trees in single-family residences and duplexes had the highest survivorship especially in front yards (75%) and side yards (70%). Species with the highest survivorship are Linden (88%), Japanese Tree Lilac (84%), and the Snow Goose Cherry (79%). Trees on institutional property (49%) as well as those in residential backyards (66%) have lower survivorship. While overall survivorship in 2023 (67%) decreased from the baseline survey (76%), the annual rate of survivorship for most species increased by 2023. Individual trees were either in good condition with high vigor or removed from the site.

Recommendations

- Improved communication needed with DCR staff at institutional and multi-family sites
- Prioritize shade trees to replace the canopy with the target of at least 3 shade trees per acre
- Tree care contracts for up to 5 years
- Community watering programs increase survivorship and growth
- Tree health assessments performed by the DCR every 5 years



Professor Martin and Aaron survey a 43 foot tulip (*Liriodendron tulipifera*)

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Acknowledgements: The Clark University O'Connor Fund, Deborah Martin, John Rogan, Nicholas Geron, DCR: Mat Cahill, US Department of Agriculture, Worcester Technical High School, City of Worcester, Clark University Geography Department Administration, Worcester Tree Initiative