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Dr. Elisabeth B. Ward
Dept. of Environmental Science and Forestry
The Connecticut Agricultural Experiment Station
123 Huntington Street
New Haven, CT 06511
Website: https://portal.ct.gov/caes

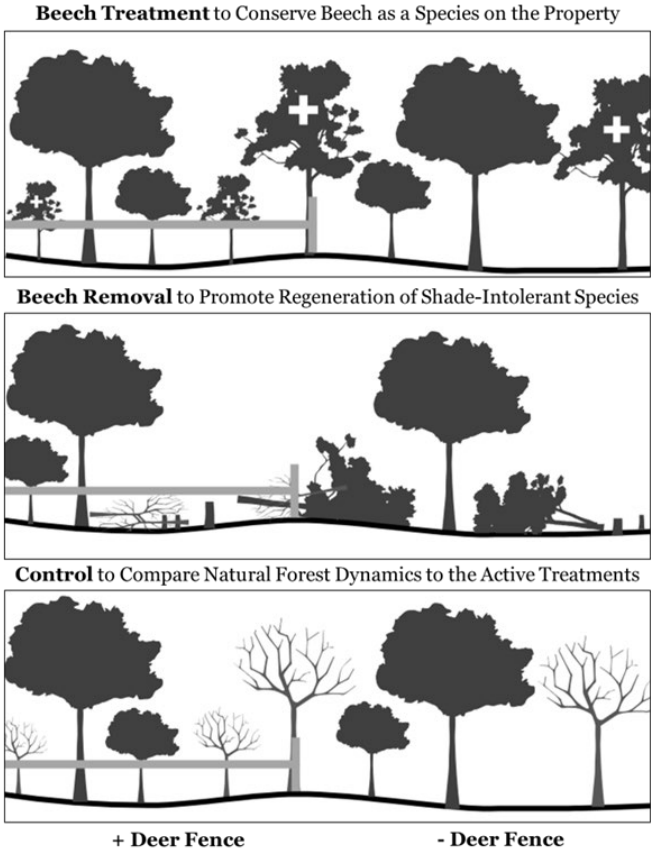
PROMOTING FOREST HEALTH IN NEW HAVEN PARKS IMPACTED BY BEECH LEAF DISEASE

What is beech leaf disease?

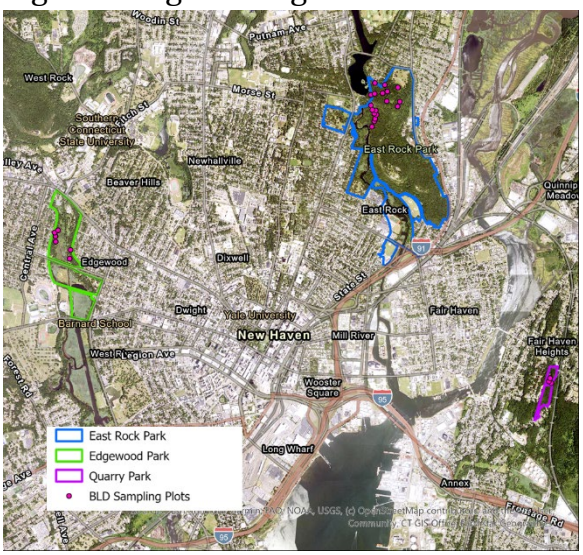
American beech (*Fagus grandifolia*) is a native tree species that acts as a crucial food and shade source in Connecticut's forests. Beech leaf disease (BLD) is threatening beech populations not just in Connecticut but throughout the eastern U.S. It was first detected in Ohio in 2012 and spread to Connecticut in 2019. The disease is caused by a non-native foliar nematode (microscopic worm) that feeds on beech buds and modifies their development. Early symptoms include dark, interveinal banding, followed by leaf thickening, shrinking, and curling as the disease progresses. Successive years of BLD cause bud failure and canopy thinning, which impact the ability of beech trees to photosynthesize. Widespread beech mortality is expected due to the depletion of the tree's energy reserves.

Forest management treatments

Decline of beech from BLD could make forests susceptible to understory plant invasions, particularly in urban parks with high invasive plant pressure. This project aims to increase tree recruitment and native understory plant diversity in New Haven parks severely impacted by BLD. Study areas include East Rock (18 plots), Edgewood (6 plots), and Quarry (3 plots) parks, which collectively include 27 plots divided between three experimental treatments: (1) Beech Treatment, (2) Beech Removal, and (3) Control. In addition to the three canopy



treatments, we are constructing deer fences around half of each plot to protect regenerating seedlings from browse.



We will monitor changes in tree regeneration and understory plant composition in response to these treatments for five years. Further details about the purpose of each of these experimental treatments are provided below along with maps of the plot locations in each of the parks.

Beech Treatment with Phosphite Bark Spray

We will treat upper canopy beech in one third of the plots with a phosphite bark spray product that has been shown to mitigate BLD symptoms. Phosphite-based products are registered for use in forest settings, relatively inexpensive, and have low environmental toxicity, making them the only known BLD treatment option suitable for natural forest settings. The phosphite products function by activating plant defenses that interfere with the ability of the nematodes to form gall tissues required for their survival in leaves and buds. We will apply the phosphite product as a bark spray two times per year for three years. This experimental treatment is designed to conserve canopy beech as a species on the property but is unlikely to promote new tree recruitment due to the high shade cast by beech trees.

Beech Removal

We will remove all beech from one third of the plots to increase understory light availability to promote new tree recruitment. All woody material from the removed beech will be left on site since the decomposition of downed wood is an important source of carbon and nutrients for forest soils. This silvicultural treatment is designed to transition forested areas currently dominated by declining beech to other tree species. Oak, for instance, requires high light conditions to regenerate. The goal of this treatment is to accelerate forest recovery in the aftermath of BLD by enhancing tree regeneration.

Control

In the remaining one third of the plots, we will monitor natural forest development following canopy beech decline. These plots will be used as a point of comparison for the two active management treatments to assess whether intervention is needed to promote forest health and recovery in the aftermath of BLD.

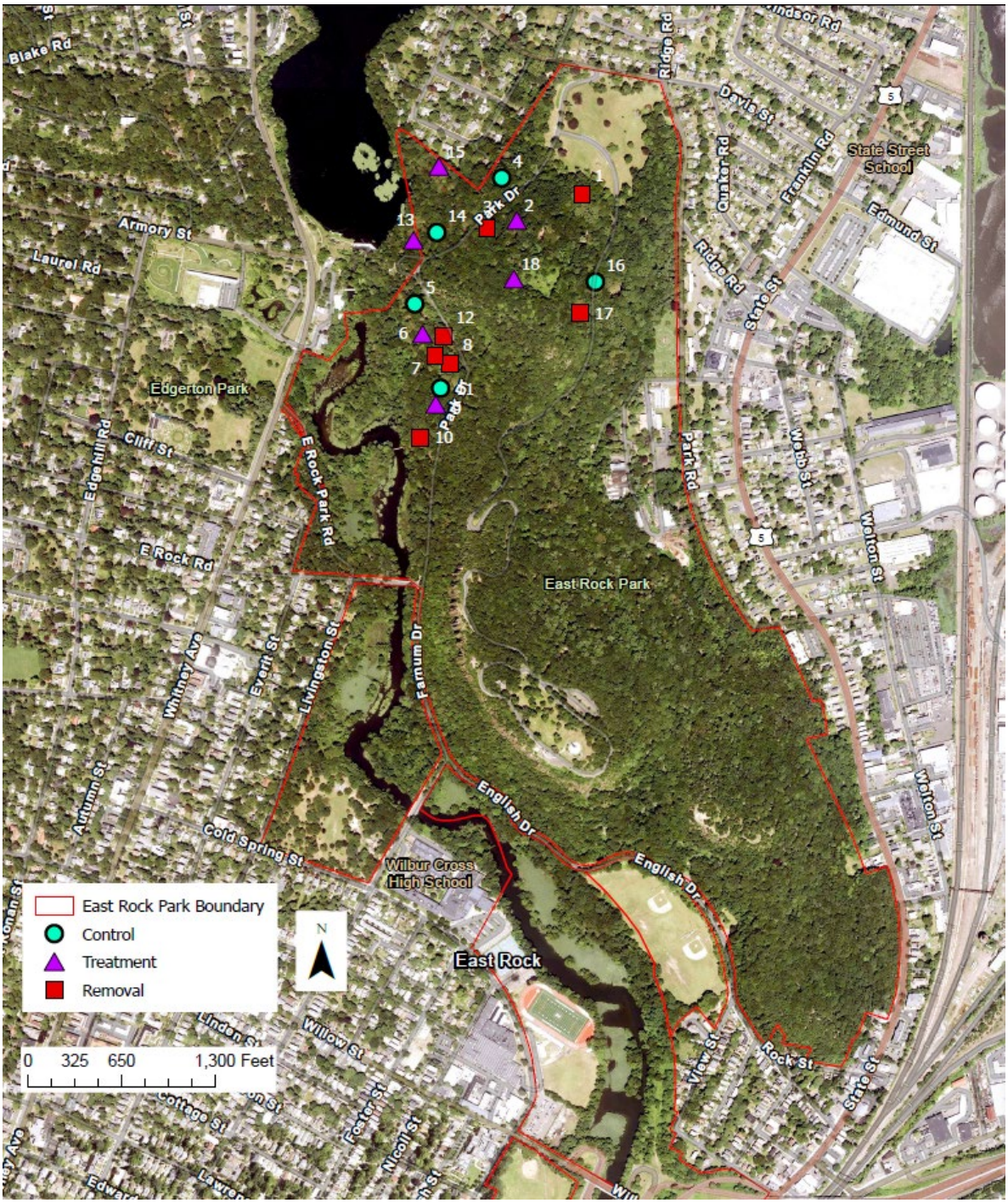
Deer Fencing

We will enclose half of each of the 27 plots in a deer fence to protect regenerating tree seedlings from white-tailed deer browse. Deer overpopulation is a major issue throughout Southern New England that contributes to regeneration failure following forest canopy disturbances. Selective browsing of certain native tree species by deer can decrease native plant diversity and favor the growth of non-native plant species that are less palatable (e.g., Japanese barberry or burning bush). The deer fencing treatment is temporary; once regenerating trees exceed browse height (~6ft), we will remove all fencing from the parks.

Further resources

Cowles et al. 2025. Updated Beech Leaf Disease Biology and Management Fact Sheet. The Connecticut Agricultural Experiment Station. https://portal.ct.gov/-/media/caes/fact-sheets/fact-sheet-bld-may-2025.pdf?rev=b64a6e1017474705b549fdc4328fc88f&hash=86ECADB5471BAED56513EB9E9D3A2567

Map of plot locations in East Rock Park



Map of plot locations in Edgewood Park

Map of plot locations in Quarry Park