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CONTENTS



**Abstract.** Background: Stewarding newly planted urban trees to maturity involves consideration of above- and belowground factors. While landscape architects and urban planners often focus on aboveground tree aspects, understanding root structure and function is crucial, especially in urban areas with limited underground space and diverse soil conditions. To address the importance and challenges of belowground planning for urban tree roots, we propose a protocol for site assessment and demonstrate root growth forecasting as a complement to existing urban planning approaches. Methods: This paper describes adaptations to a plant root architecture simulator, RootBox, and its subsequent application in 4 scenarios created to assess its efficacy as a complement to the phase of urban planning that prescribes vegetation type and planting location in the context of a myriad of other site considerations. RootBox was parameterized based on observed conformity of root growth simulations to generalized tree root architecture reported in the literature. Results: Root growth forecasts for each scenario illustrate that plausible urban tree root system architectures—specifically, commonly observed root growth habits—can be produced by RootBox. *In-situ* root detection (e.g., with an air spade or hydro-vac) at predetermined time intervals can provide model validation and the opportunity to backward reconfigure RootBox parameters for forecast accuracy. Conclusion: The adapted RootBox is a flexible, proof-of-concept solution for predicting urban tree root architecture, considering the site and soil conditions pre-established in the planning process. When used with other relevant tools, RootBox can offer valuable insights during the design or rejuvenation of urban spaces.

**Keywords.** Belowground; Forecast Model; Greenspace; Landscape Design; RootBox; Tree Roots; Tree Survival; Urban Planning.



**Abstract.** Background: Trees in towns and cities provide many benefits, but also disservices such as risk and conflicts. Structural pruning of young trees can reduce future conflicts and risk as trees grow larger; it also can reduce future maintenance costs. Volunteers can perform important urban forestry tasks such as planting, watering, and conducting inventories. It was hypothesized that, with training, they could also learn to structurally prune young street trees. Methods: Forty-seven volunteers in three cities in Massachusetts were trained to structurally prune trees. Twenty volunteers trained in a classroom lecture; twenty-seven trained with a hands-on approach. The volunteers' performance was evaluated with a written exam and *in situ* assessments of their ability to specify and explain pruning recommendations and make pruning cuts. Training type and covariates (e.g., volunteers' familiarity with trees, number of branches) influence on volunteers' performance were investigated. Results: On the assessment of volunteers' ability to explain pruning recommendations, volunteers who received hands-on training achieved higher mean scores (79%) than volunteers who received classroom training (74%). All volunteers who received hands-on training did not leave a stub when making a reduction cut, but only 70% of volunteers who received classroom training did not leave a stub. Volunteers who received classroom training achieved higher scores on the exam (93%) than volunteers who received hands-on training (85%). Conclusions: Results suggest that with minimal training volunteers successfully learned structural pruning. This is an encouraging finding that may help municipal arborists accomplish more with limited urban forestry budgets.

**Keywords.** *Carpinus caroliniana*; *Nyssa sylvatica*; *Ulmus americana* 'Princeton'.



**Abstract.** Background: Public engagement is needed to make sure urban forestry management efforts align with the values of the public being served. Noting this, we determined current and desired urban forest access of Florida (United States) residents using the criteria from the 3-30-300 rule (i.e., 3 trees visible from home, 30% urban tree canopy in neighborhood, and a green space within 300 meters of home). Methods: A

survey of 1,716 Florida residents was conducted to assess canopy coverage and green space access. Respondents were then asked if this level of urban forest access was sufficient. We also asked their perceptions of the benefits and drawbacks of urban trees and whether they had any negative interactions with trees in the past. Results: We found that 37.3% of Florida residents met all 3 criteria of the 3-30-300 rule. Despite this, half the respondents would prefer more trees in their neighborhoods. When asked to name the top benefits provided by trees, the most common responses were shade, beauty, and attracting wildlife. The most common drawbacks to urban trees included the risk of damage to property, leaves/debris, and fears regarding storms and hurricanes. Conclusions: Florida residents largely value their urban forest and would like to see it maintained or enhanced. Improving access to greenspaces for recreation is the most pressing concern for urban forest managers in Florida looking to meet the requirements of the 3-30-300 rule. Results from this study can inform urban forest management efforts in Florida and beyond.

**Keywords.** Ecosystem Disservices; Ecosystem Services; Environmental Equity; Planning; Urban Forest Management.