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Abstract. Background: Urban tree canopy (UTC) is often proposed as a mitigation strategy for simultaneously decreasing carbon emissions and urban heating in cities. Not only can trees reduce outdoor temperatures through shading and transpiration, but research also suggests that microclimate regulation by trees surrounding buildings can lead to cooler indoor temperatures and a subsequent decrease in summertime energy use. Methods: We analyzed summertime cooling electricity consumption for 21,048 single-family homes in a semi-arid city in northern Colorado, USA. Using Pearson's correlation coefficients and multiple linear regression models, we evaluated the potential impact of UTC on cooling electricity use in 16 different zones around each house. We hypothesized that trees closer to the home, and trees located on the west and south sides of homes, would have the greatest impact on cooling electricity use. Results: UTC in all 16 zones around residential buildings was associated with negative correlation coefficients, indicating that UTC may be having an impact on energy use. Our regression results showed that UTC on the east side of single-family homes had the greatest effect. Conclusions: Although our results indicated that trees in landscapes around residential buildings can lead to some decreases in household-level energy consumption, the reductions in electricity usage were not as substantial as previous studies have predicted. Past research has shown that tree location matters, and our results indeed show that where UTC is located in reference to a building can change how much impact trees have on energy use. However, our results also show that trees on the east side of buildings have the most impact on household energy consumption in a semi-arid city in Colorado during the summer months. These results directly contradict predictions offered by popular ecosystem service models that show trees on the west and south sides of buildings as having the most impact on energy use in the Northern Hemisphere. Furthermore, many studies have suggested that the energy benefits provided by urban trees outweigh their carbon sequestration potential, and our results indicated this assumption may not hold true in all cities.

Keywords. Residential Energy; Tree Benefits; Urban Ecology; Urban Forestry.

Abstract. Background: Urban forestry is a crucial sector of the green industry and increasingly a tool used to address ecological and sociopolitical challenges in urban landscapes. Along with a number of public agencies and nonprofit organizations, various private industry types are directly involved in the development and management of urban trees and landscapes. The main purpose of this study is to evaluate the outlook of private green industry businesses on their urban forestry activities in the Northeast-Midwest region of the United States. Methods: Based on a survey of private businesses involved in the green industry in late 2020, we developed an empirical model by incorporating industry types, business metrics, and issues related to urban forestry perceived by private businesses. Results: Results from an ordered logistic regression model suggest that nursery and florist's supplies merchant wholesaler businesses are less likely than other businesses to have a positive outlook on urban forestry activities. We found that survey respondents who reported a higher percentage of urban forestry employees had a higher likelihood of a positive outlook of their business. Conclusion: Many respondents referenced how COVID-19 has been an overall deterrent to economic growth, implying that the state of their business depends on the recovery of the economy. The findings provide useful policy and management insights on how private businesses perceive the future outlook of urban forestry. These study results benefit the private sector and public agencies involved in urban forestry for better planning and programming in the Northeast-Midwest region of the United States.

Keywords. COVID-19 Pandemic; Green Industry; Ordered Logistic Regression; Urban Forestry.

Abstract. Background: Highway rights-of-ways (ROWs, or verges) contain multiple stressors which can influence tree growth, including compacted soils, soils with little topsoil, poor drainage, air and soil pollutants, construction activities, and de-icing salts in cold climates. Yet highway ROWs often provide ample planting space for growing trees, which can contribute to the mitigation of negative environmental impacts associated with highways. Methods: For this study, we assessed the trunk diameter of 1,058 trees from 11-, 22-, and 31-year-old planting cohorts along a highway in the Chicago metropolitan region (Illinois, USA) to examine factors which could influence long-term growth. We analyzed the impact of location factors within the ROW (e.g., distance and elevation relative to highway, slope, and aspect) on trunk diameter at breast height (DBH), since these factors are relevant to the landscape design process. Using estimates from i-Tree, we compared carbon sequestration, carbon storage, runoff reduction, and air-pollution removal within and among the 3 cohorts. Results: Of the 6 site location characteristics we evaluated, no single characteristic consistently impacted DBH, though some characteristics were significant within a single cohort. DBH measurements of most species were smaller than model predictions based on existing urban tree models. Since all cohorts included large- and small-statured trees, and even within species DBH could be highly variable, the range in per-tree ecosystem services varied substantially within cohorts, especially the 31-year-old cohort. Conclusions: These findings highlight both the potential for and challenges of growing trees alongside highways.

Keywords. Ecosystem Services; i-Tree; Roadside Woody Vegetation; Site Conditions; Urban Tree Growth.