UIC Tree Trends

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Abstract

- On UIC's West Campus, we conducted a study on the growth of the trees.

- We identified the 13 most abundant trees out of 5000, and selected 5 random trees from each species to measure.

- We measured Diameter at Breast Height (DBH) and Tree Height, and compared those results to previous data to understand trends.

- Out of the 13 trees, we identified again, the most abundant trees. This time 5 species- 2 were native, while the other 3 were non-native.

- We took the study one step further by comparing the growth of the trees based on whether or not they were native to the Chicagoland area.

- Native species showed a higher rate of growth.

Introduction

- The University of Illinois at Chicago is one of the leading universities in the Chicagoland area, it has significant positive impact on environmental, human health and quality of life on its campus and surrounding communities.
- UIC's trees have an accumulated value of 4.8 million dollars, which sequesters an estimate amount of 760 metric tons of carbon dioxide from the atmosphere.
- The tree species biodiversity is represented by different species of:
- Maple, Honeylocust, Maidenhair trees, Kentucky Coffee trees, Chonosuki Crabapple tree, Elm trees, Callery Pear trees, Hackberry and Little Leaf Linden trees.
- The five most abundant trees at UIC forest community are Honeylocust, Serviceberry, Red Maple, Chonosuki Crab and Little Leaf Linden; and, they account for 58.27% of tree species diversity.
- Although other studies have been conducted to show that, in fact that non-native trees do grow and thrive, and are just as abundant as native trees, our study shows that quantitative growth of the native trees is greater than that of the non-native trees.
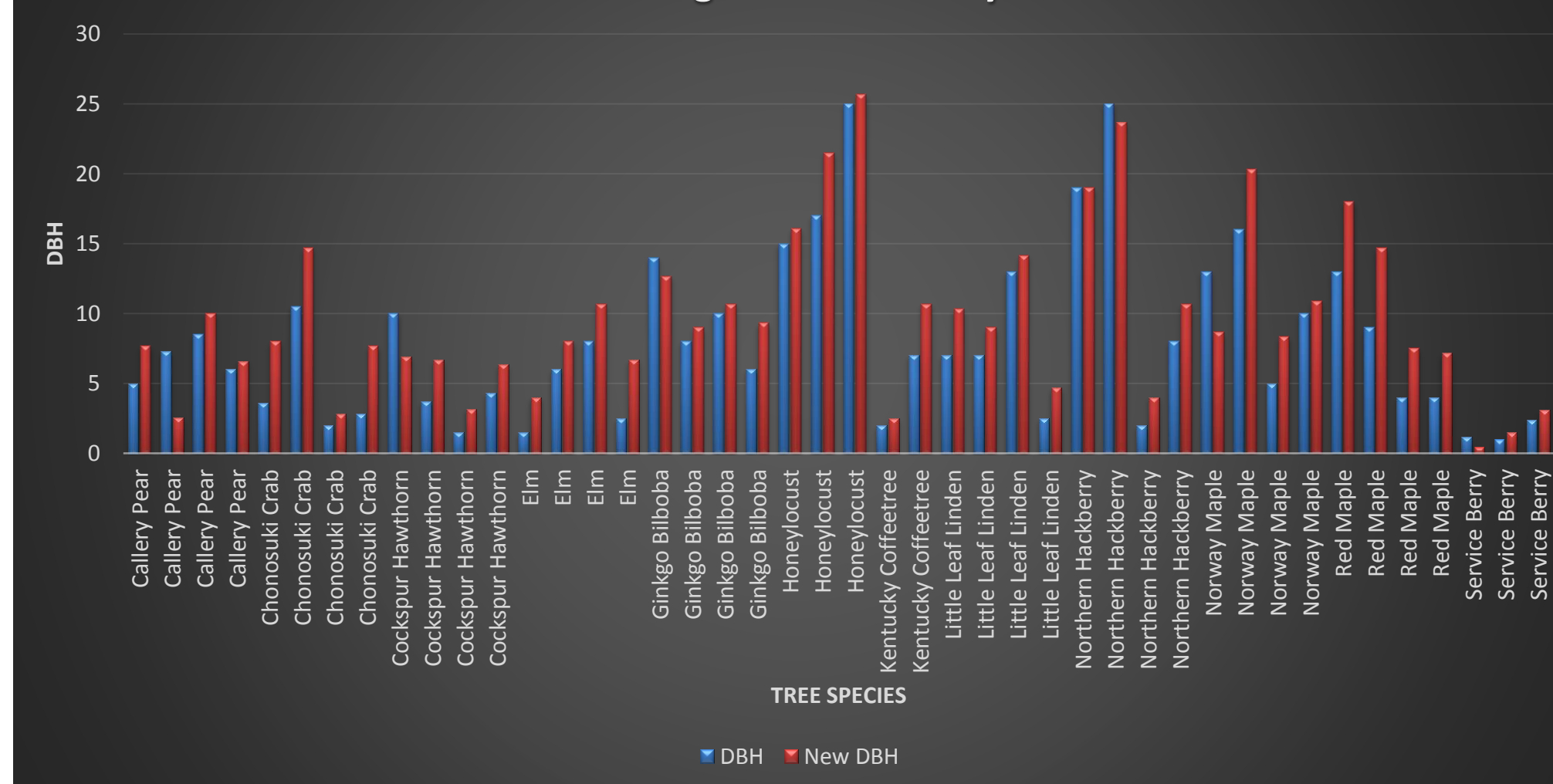

One-Sample t-Test
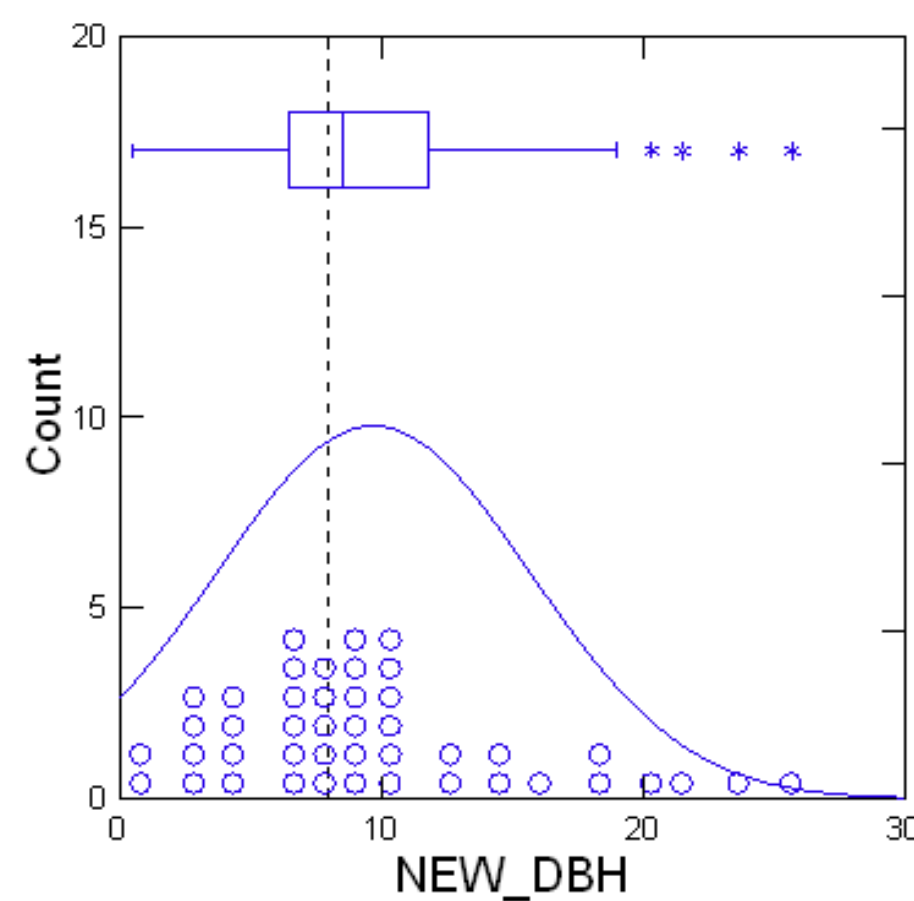
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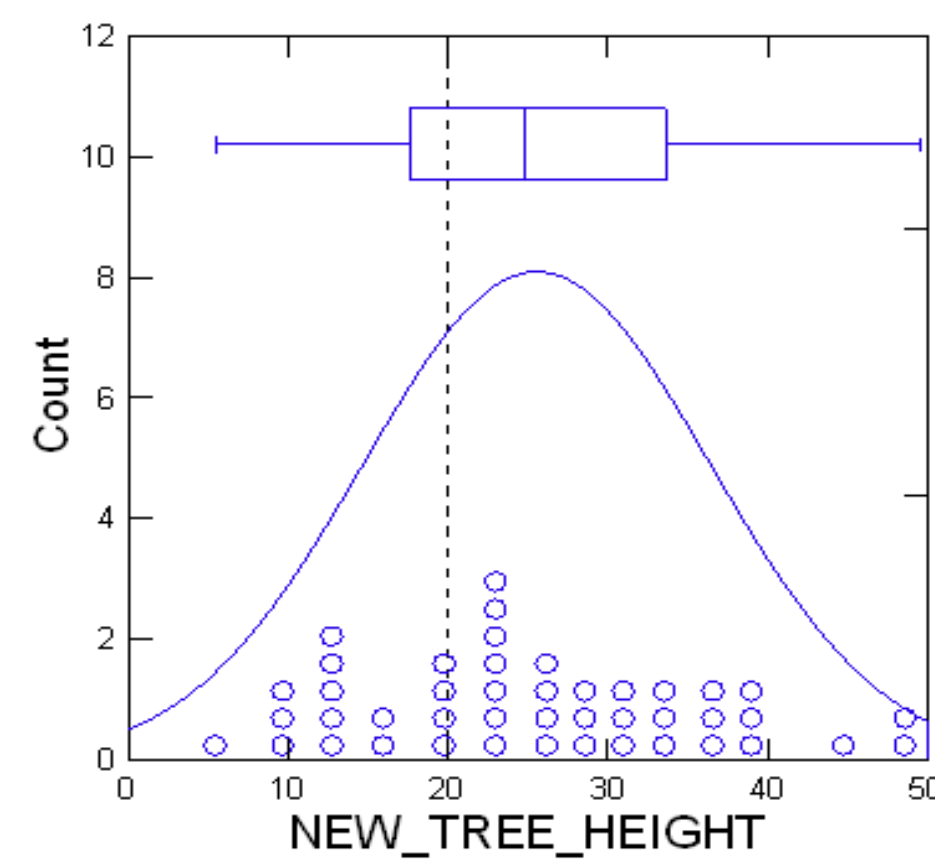
Methods and Materials

- From UIC's 5000 trees, the top 13 most abundant trees species were identified; each tree species were represented by four samples that were selected at random by Psychic Science software.
- The DBH and Tree Height were measured for all 52 trees to assemble a data set for growth analysis.
- Using a measuring tape, we measured 66 feet from the base of the tree. Once we obtained that 66 feet, we used a Baltimore meter stick to obtain the tree height. We also used a smaller measuring tape to measure the Diameter at Breast Height of the tree.
- Using these measurements we compared them to data collected last year to assess the growth of trees on campus using SYSTAT software.
- Quadrat Sampling was used to estimate the abundance of tree on west campus.
- Single variable t-test and single variance chi-square analysis were performed on data collected to illustrate the significance of data.
- Trees of Illinois book and online resources were utilize to identify the common species of trees located in west campus tree canopy.
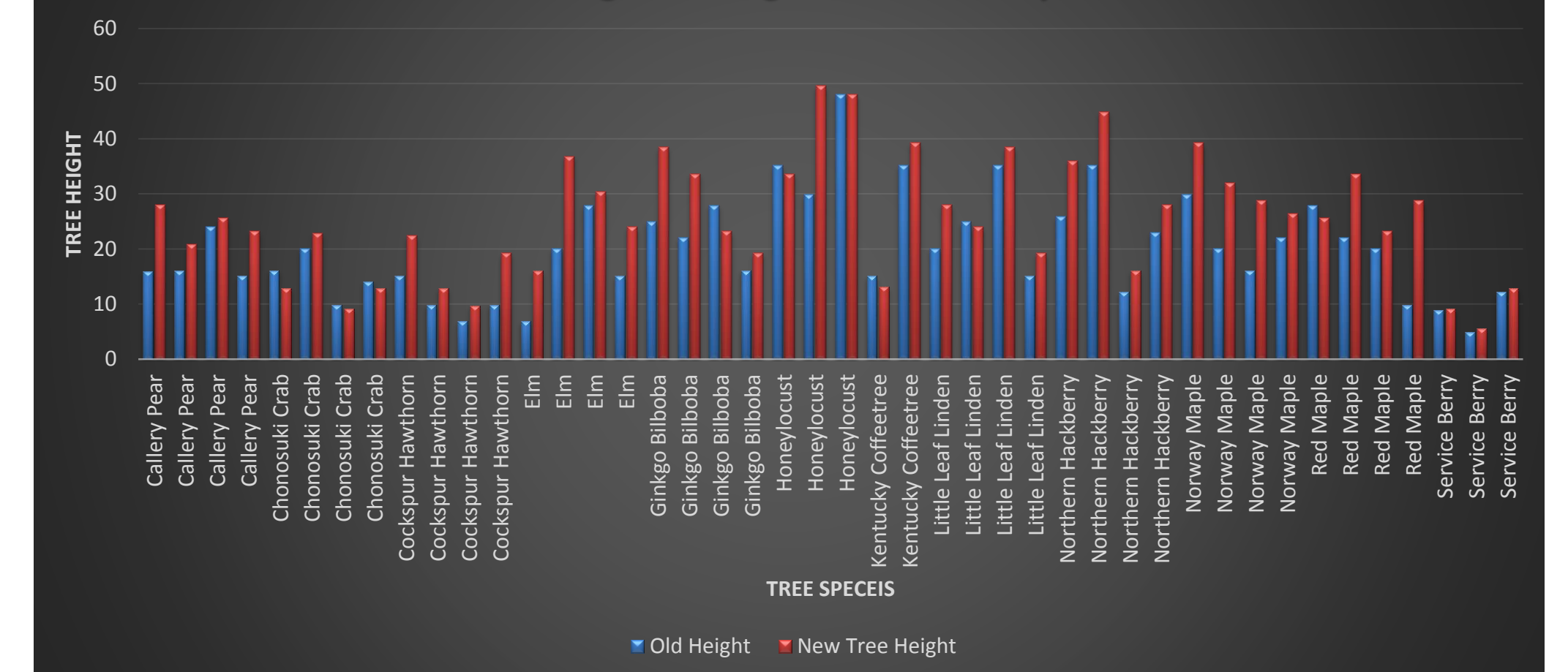
Results

- Microsoft excel was used to generate 4 graphs and it revealed an overall trend of positive growth for DBH and Tree Height. However, Tree height had a greater increase in its growth than DBH.
- Single Variance Chi-square and one sample t-test analysis for all 13 species generated a p-value of **0.955** for DBH and **0.943** for Tree Height.
- The data set revealed that Native species had higher growth in both DBH and Tree Height than Non-native species.
- One sample T-test and Single Variance Chi-square analysis were conducted on the collected data set to explicate the significance of the results. Both analyses generated a DBH p-value of **0.957** and Tree Height p-value of **0.997** for Native Species, while Non-native species received a DBH p-value of **0.422** and Tree Height p-value of **0.936**.

Tree Height change within two years

Discussion

Among the top 13 species growth analysis, there was an overall increase for positive growth. However, change in tree height had a significant increase when compared to DBH. One sample T-test results revealed a slope was phased more to the right of the graph's median line, **translating to significant increase from 2013's previous Tree Height records**. Chi-Square analysis was performed and results showed that old DBH p-value **[.945]** and old Height p-value **[0.298]** compare to new DBH **[0.955]** and new height **[0.943]**, are significant and can be safely ignored. Of those thirteen species, five most abundant tree species were selected to juxtapose the growth rate among Native versus non-native species. Trends observed from the data collected for top five species followed the same trend as seen for top thirteen abundant trees. Single variable t-test conducted on native species revealed the slope phased to the right of graph's median line elucidates **the overall increase in DBH and height over two year time frame.** Chi-Square results from native species showed that old DBH with p-value **[0.93]** and old height with p-value **[0.93]** compared to new DBH p-value **[0.202]** and new height **[0.002]**. This explicated that old DBH and height values are insignificant, and hypothesis, which is old DBH and height are equal to the new DBH and height, can be safely rejected. **Native Species exhibited elevated level of growth when contrasted with non-native species**. This reduction in growth rate could be explained by impact of biotic and abiotic factor affecting realized ecological niche of tree species.

Stakeholders

- Office of Sustainability, University of Illinois at Chicago, UIC student community, UIC grounds department.

Drivers (Relationship to Sustainability)

- Changing ecological niche, CO_2 Sequestration, Health of the trees , Health of the students.

Recommendation for Continuation:

- Keeping an updated inventory of trees, Maintain Tree Campus USA certification.

Contact

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OFFICE OF SUSTAINABILITY UIC

TREE CAMPUS USA

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