

Spring 5-11-2022

Using LiDAR to Estimate Carbon Sequestration of Evergreen Trees at Eastern Washington University (EWU) Campus, Cheney, Washington

Kristy A. Snyder
Eastern Washington University

Follow this and additional works at: https://dc.ewu.edu/srcw_2022

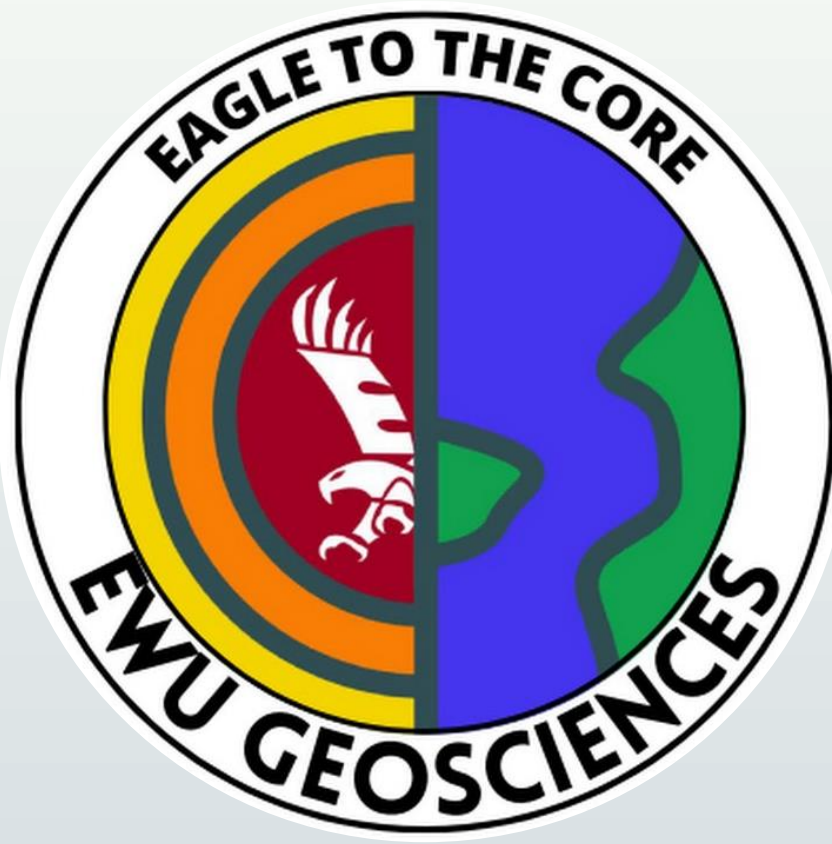


Part of the [Geographic Information Sciences Commons](#), [Nature and Society Relations Commons](#), [Other Forestry and Forest Sciences Commons](#), [Physical and Environmental Geography Commons](#), [Remote Sensing Commons](#), [Spatial Science Commons](#), and the [Sustainability Commons](#)

Recommended Citation

Snyder, Kristy A., "Using LiDAR to Estimate Carbon Sequestration of Evergreen Trees at Eastern Washington University (EWU) Campus, Cheney, Washington" (2022). *2022 Symposium*. 25.
https://dc.ewu.edu/srcw_2022/25

This Poster is brought to you for free and open access by the EWU Student Research and Creative Works Symposium at EWU Digital Commons. It has been accepted for inclusion in 2022 Symposium by an authorized administrator of EWU Digital Commons. For more information, please contact jotto@ewu.edu.



Using LiDAR to Estimate Carbon Sequestration of Evergreen Trees at Eastern Washington University (EWU) Campus, Cheney, Washington



Kristy Snyder, Dr. Brian Buchanan, Department of Geosciences, Eastern Washington University

Background

- EWU has many different species of deciduous and evergreen trees on campus, but there is no comprehensive record of the total number, location, species, or ages of these trees
- This project develops a record of the trees on the EWU campus by classifying the LiDAR data
- LiDAR is a remote sensing, noninvasive technique that creates a precise model that can be used to measure tree height and assessment of tree age
- The dataset created by this project can be used to estimate how much carbon is sequestered by trees across the EWU Cheney campus

Objectives

- This ongoing project assesses the location and age of evergreen trees on campus through the manipulation of LiDAR point clouds
- Create visualizations for use in sustainable campus planning
- Estimate the carbon sequestered by evergreen trees on campus
- Project future species and planting locations

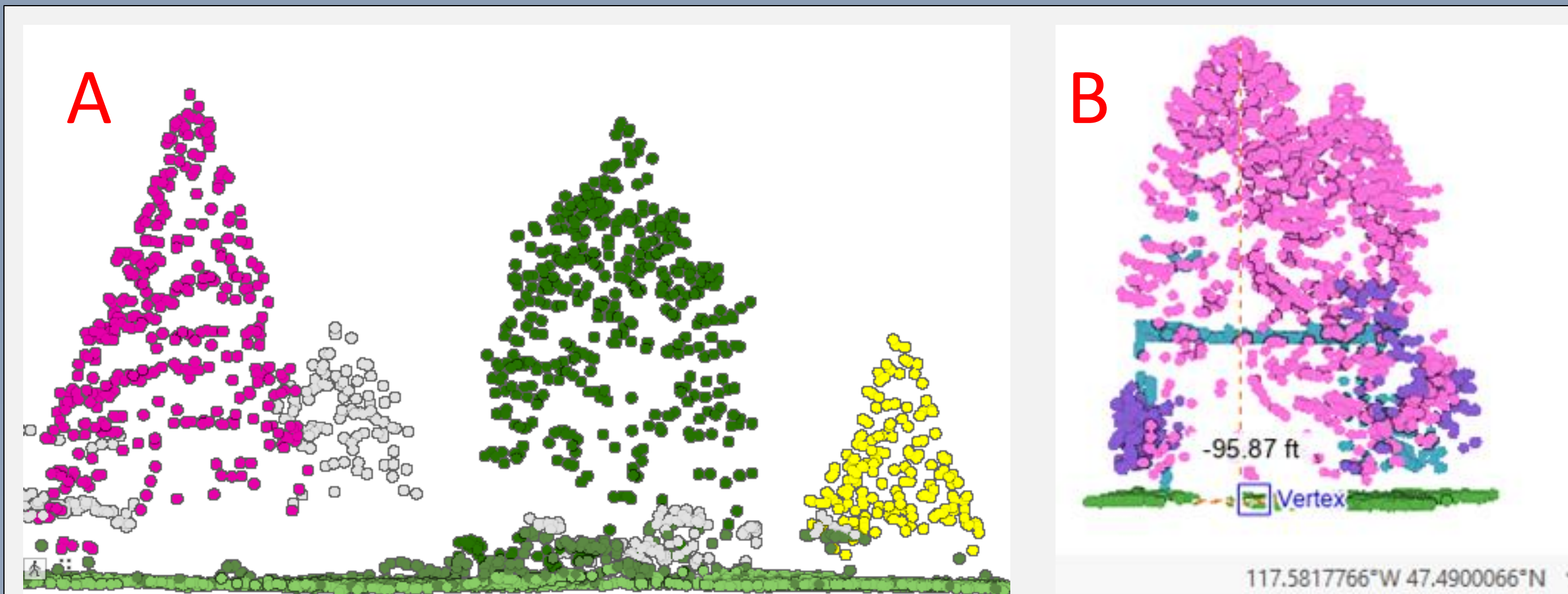


Figure 1. Methods for how different tree species and height were assessed. Trees have different overall shapes according to species (A) and heights were estimated in profile view (B).

Methods

- On the ground measurements of individual tree locations, species, and DBH were mapped in Collector (started Winter 2022 and ongoing)
- The trees identified in point clouds were classified by genera, and their heights were extrapolated using the profile view (WA DNR LiDAR Portal, Turnbull 2013 8, Figure 1)
- Area around Showalter was used as a pilot study area due to the easily recognizable evergreen trees in its environment (Figure 2)
- Visualizations were created in scene view (Figure 3 and 4)
- i-Tree Eco was used to estimate carbon sequestered by individual evergreen trees (Figure 5)

Results

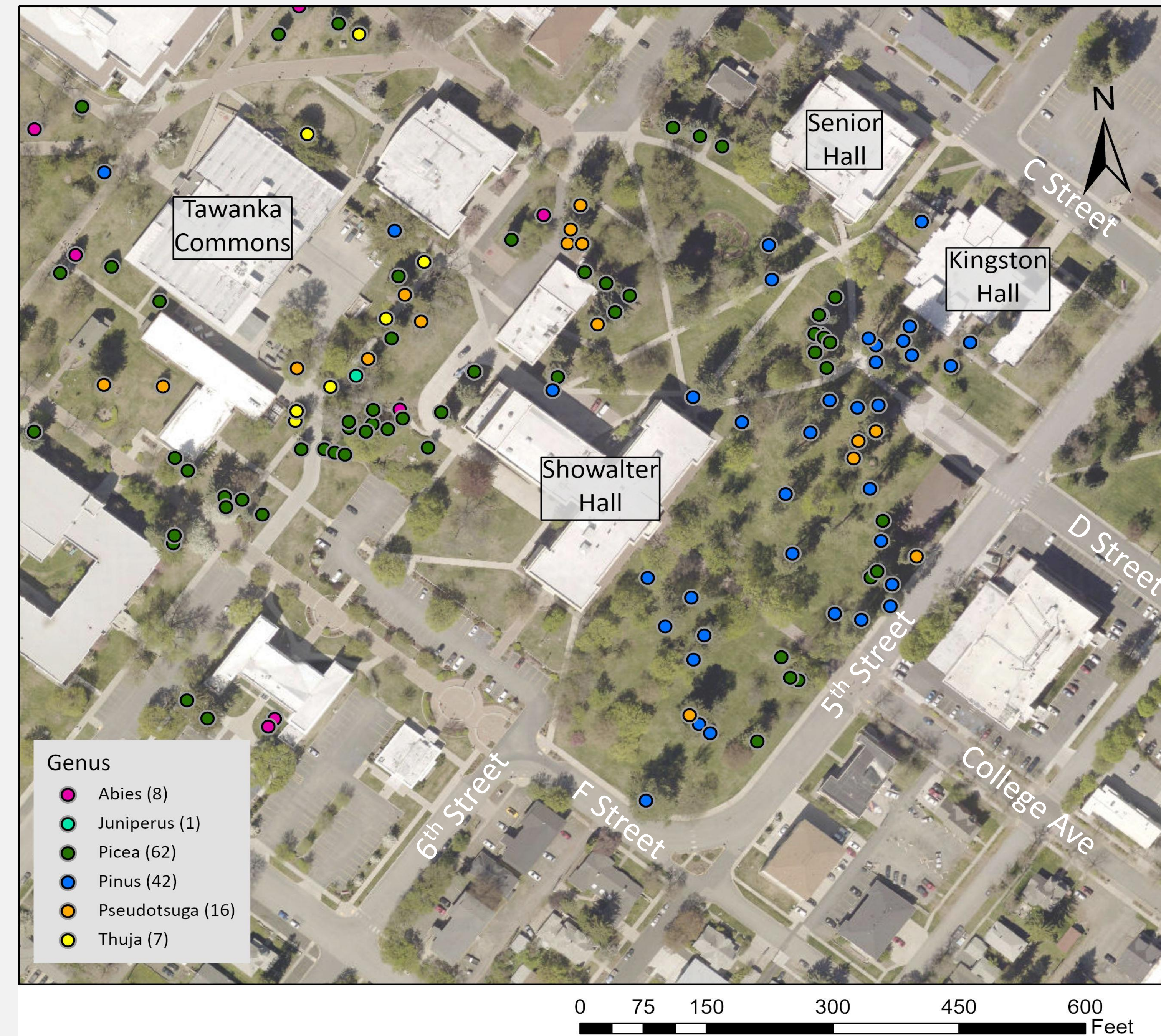


Figure 2. Location and type of evergreen trees around Showalter Hall.

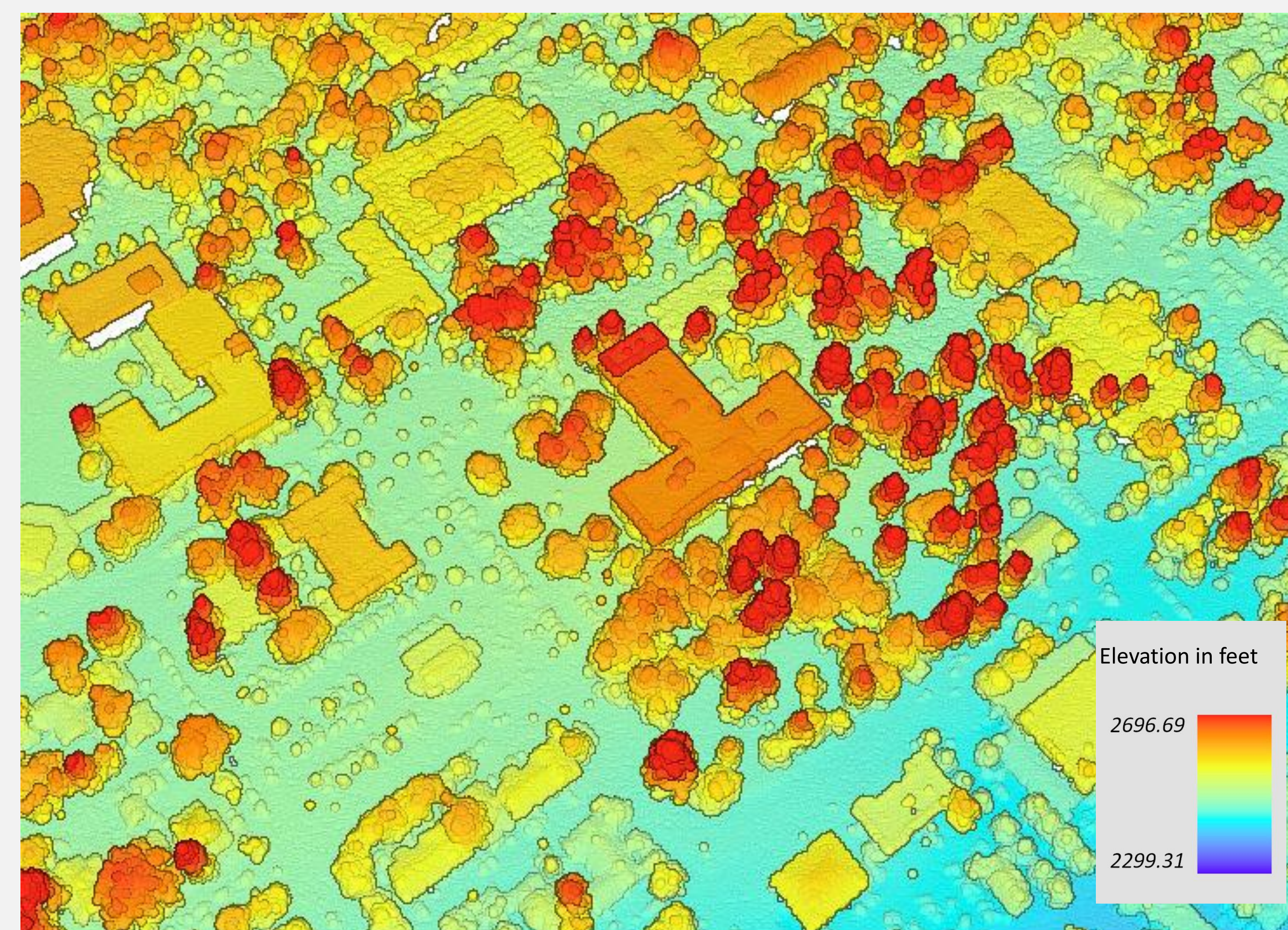


Figure 3 . Visualization of elevation around Showalter hall using LiDAR point cloud derived data. The warmer the colors, the higher the elevation.

Results (continued)

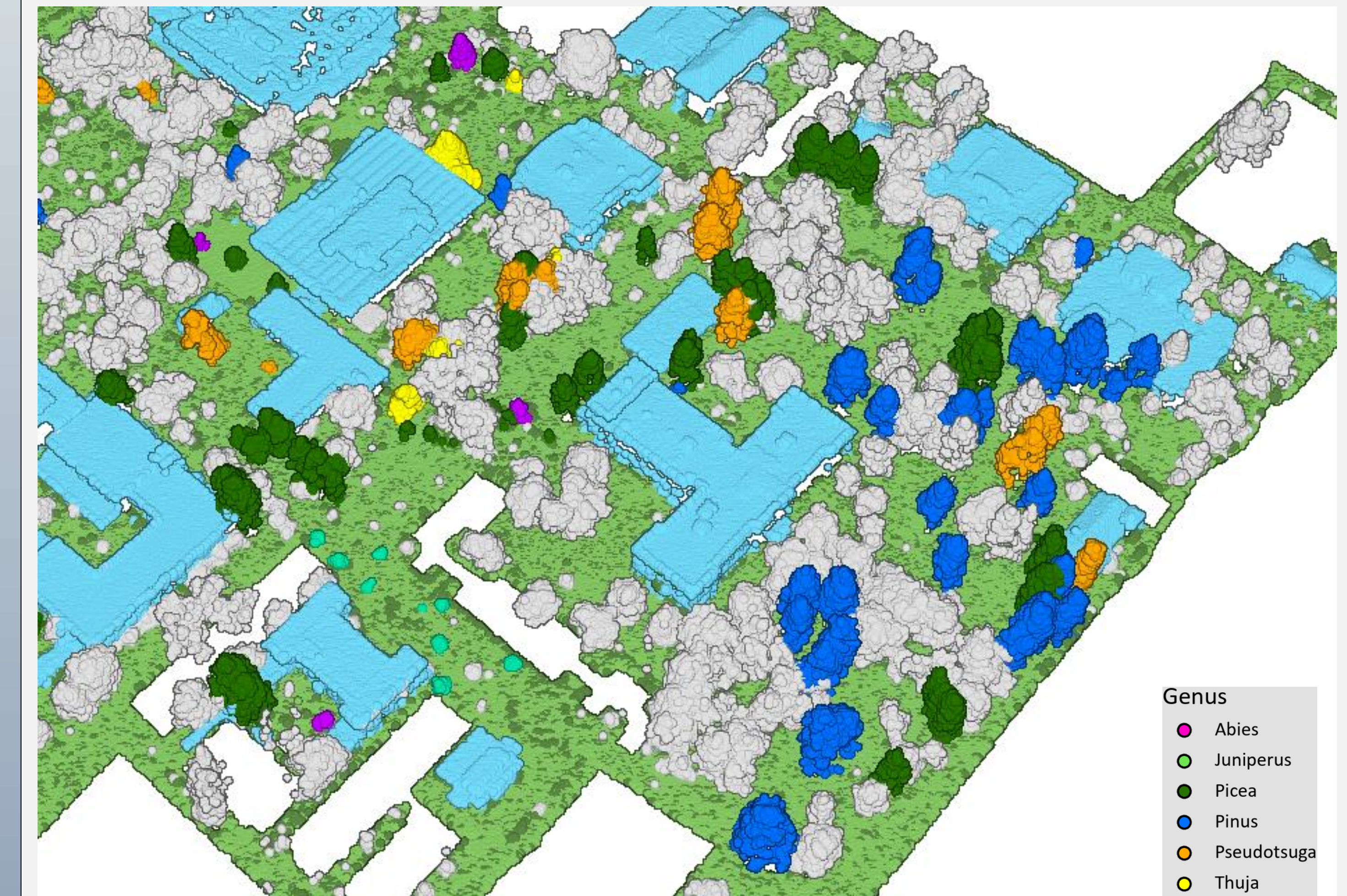


Figure 4 . Classification of individual tree point clouds.

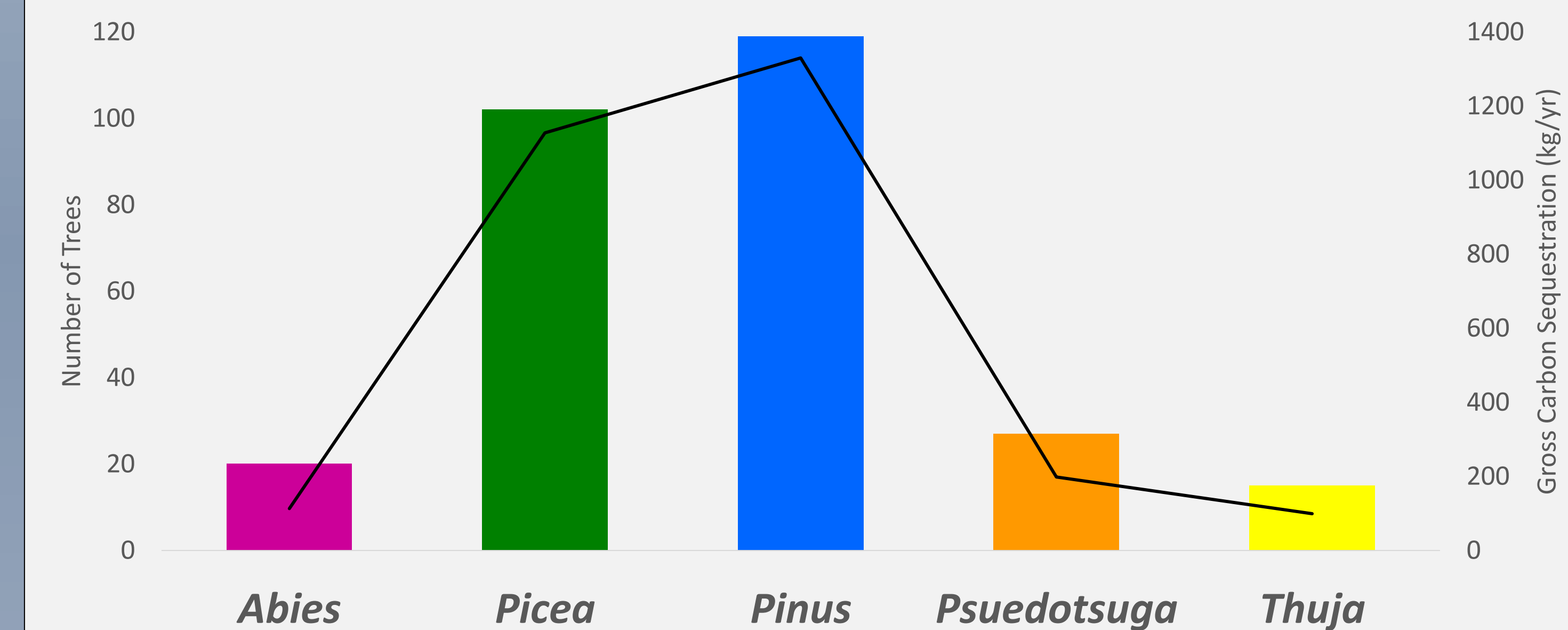


Figure 5. Total gross carbon sequestered, grouped by tree genus.

Take Away

- Preliminary results suggest that 279 evergreen trees, of 14 different species, sequester 2.868 tons of carbon per year
- Future research will continue to map the deciduous trees on campus using the same methodology
- Project places for future tree plantings and recommend the species that would be the most beneficial to plant
- This record will be given to facilities and the department of sustainability to use for ground maintenance and the campus master plan

Acknowledgments

I would like to thank Dr. Erik Budsberg and Dr. Lauren Stachowiak for their assistance with this project.