

New Project

The effects of dominant tree height definition on loblolly pine (*Pinus taeda* L.) growth and yield model outputs

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Justification

- Dominant height definitions has the potential to greatly impact site index estimations and, subsequently, growth and yield model outputs. Therefore, it is important to examine how dominant height definitions influence a growth and yield model's predictions and projections on a stand growth characteristics.
- Additionally, growth and yield model outputs guide silvicultural management (e.g., mid-rotation treatments) and timber investment (e.g., optimal rotation age) decisions. This investigation will highlight the implications on silvicultural treatment schedule and financial investment assessments based on dominant height definition usage.



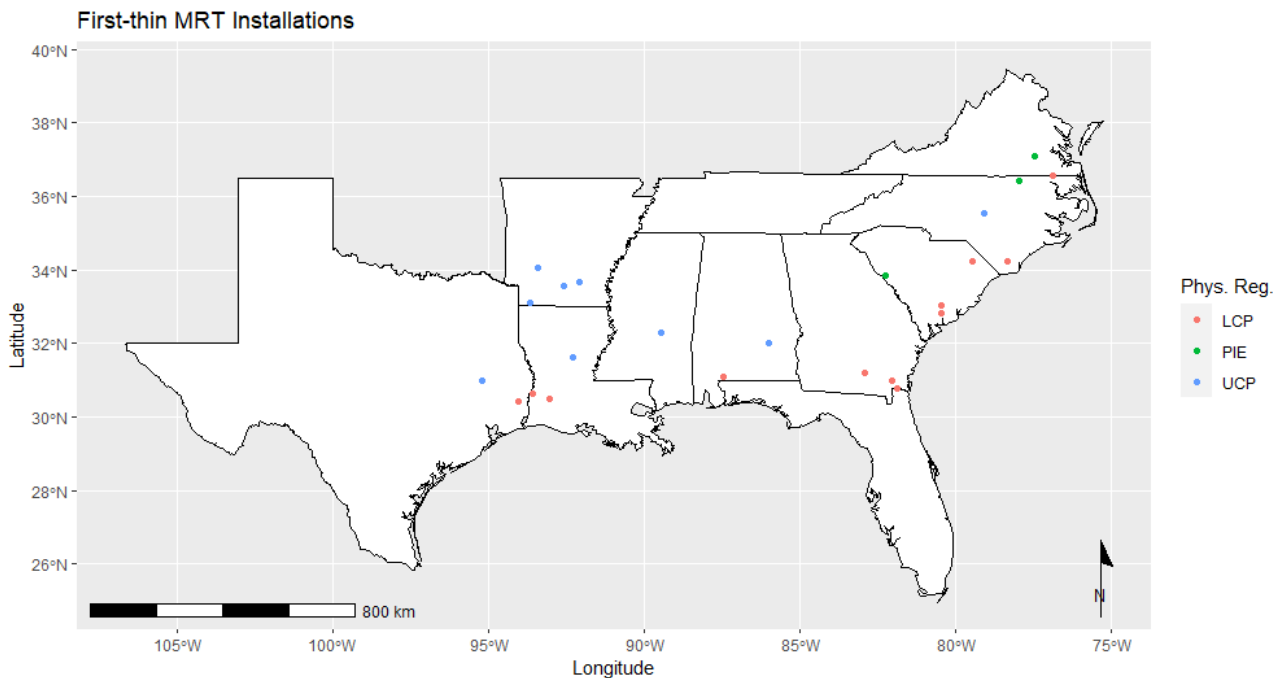
Hypotheses or Objectives

1. Highlight the consequences between the evaluated dominant height definitions on growth and yield model outputs
2. Based on different stand characteristics and silviculture treatments, analyze the changes on dominant tree height estimations with each evaluated definition.
3. Explore a new metric to capture the average dominant tree height using an UAV (unmanned aerial vehicle) with LiDAR (Light Detection and Ranging) capability to compare with traditional forest inventory height measurements
4. Lastly, examine the combined effects from measuring tree heights, tree height definition usage, and stand characteristics on growth and yield model outputs of stand-level volume and economic returns.



Methods

- **Study Area** - Mid-rotation loblolly pine plantations in the Southeast region of the United States from the Plantation Management Research Cooperative's (PMRC) MRT Study
- **Data** - MRT first-thin loblolly pine plantation research installations throughout the Southeast, provided by the University of Georgia's Plantation Management Research Cooperative (PMRC)

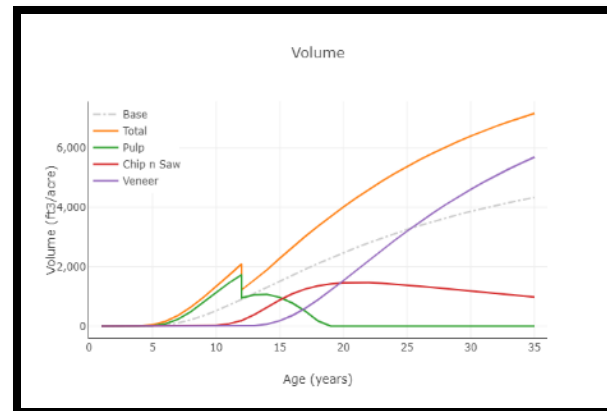


Methods

- **Data Analysis** - Individual tree height measurements used to calculate a range of dominant tree height estimations, descriptive statistics, paired t-test, ANOVA, and various other statistical models



- **Growth & Yield Model** - simulations used to demonstrate the variability between dominant tree height definition usage and growth & yield model outputs as well as corresponding bare land value (BLV) estimations



Short-term (1-year)

- Literature review and background information completed
- Initial statistical analysis completed on pilot project
- A poster on project progress

Long-term

- A graduate student thesis on this topic
- Publications in peer-reviewed literature
- Presentations at several regional professional meetings
- Summary reports for member companies



Company Benefits

- Greater understanding of the impacts of dominant height definitions on growth and yield model outputs in loblolly pine
- Identify the most appropriate dominant tree height definition from those considered over a range of stand conditions and silvicultural treatments
- Highlight any potential influence on forest management decisions (e.g., thinning recommendations and final harvest) and on financial investment decisions in terms of BLV as a result of the variability between different dominant tree height definitions



Summary

- The project will examine the implications derived from different dominant height definition usages on growth and yield models
- This will include highlighting any statistical significances between different dominant height definitions and silvicultural treatments (e.g., thinnings), stand conditions (e.g., trees per acre), and physiographic regions
- Additionally, the project will investigate how bare land value estimations vary based on dominant tree height definition
- The results will help inform decisions around dominant height definition and impacts on growth and yield estimates in loblolly pine.

