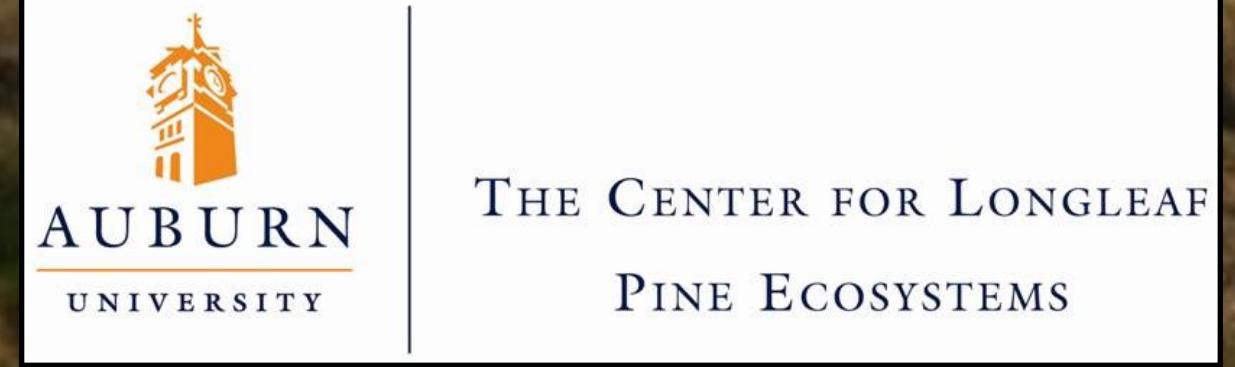


# Extending PINEMAP Tier 3 to Longleaf Pine: Is Longleaf Pine more Drought Resilient than Loblolly Pine?

Lisa Samuelson<sup>1</sup>, Tom Stokes<sup>1</sup>, Michael Ramirez<sup>1</sup>, Jake Blackstock<sup>1</sup>, George Matusick<sup>2</sup>, and Michele Elmore<sup>2</sup>

<sup>1</sup>School of Forestry and Wildlife Sciences, Auburn University, AL; <sup>2</sup>The Nature Conservancy Georgia, The Chattahoochee Fall Line Project, Ft. Benning, GA



## A New 40% Throughfall Reduction Study in an 11-Year-Old Longleaf Pine Plantation

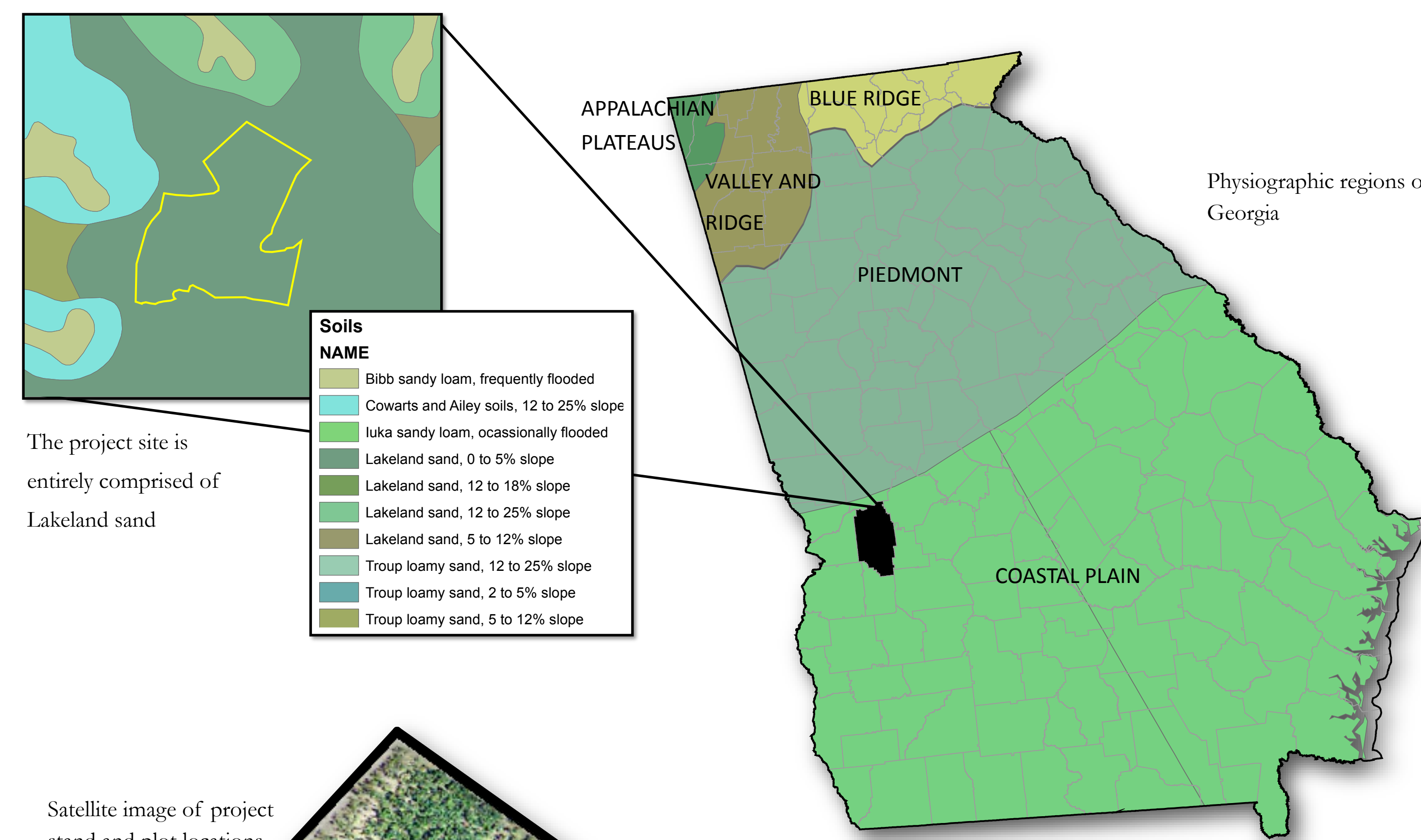
### Summary

The PINEMAP Tier 3 platform is being extended to longleaf pine (*Pinus palustris*) in a cooperative study between Auburn University and The Nature Conservancy. Growth and physiological responses of an 11-year-old longleaf pine plantation will be studied in response to a 40% reduction in throughfall. The experiment is located outside of Junction City in Marion County, Georgia (32.553° N, -84.476° W) on a former agricultural field along the Chattahoochee Fall Line, the boundary between the Piedmont and East Gulf Coastal Plain regions. Soils are Lakeland Series and excessively drained with 0-5% slope. Treatment plots are 0.065 ha in size and range in pre-treatment basal area from 17.4 to 20.8 m<sup>2</sup> ha<sup>-1</sup> and density from 1077 to 1223 trees ha<sup>-1</sup>. Given the variability in forest structure among plots, plots were blocked based on basal

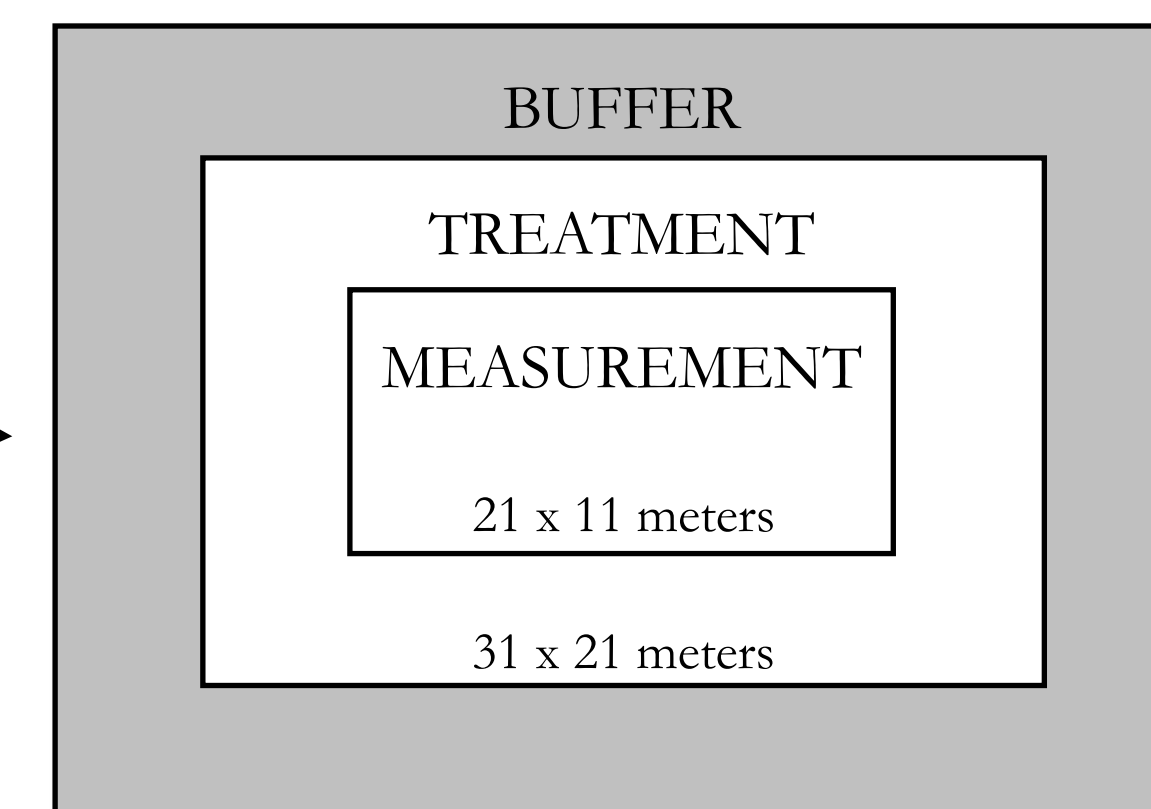
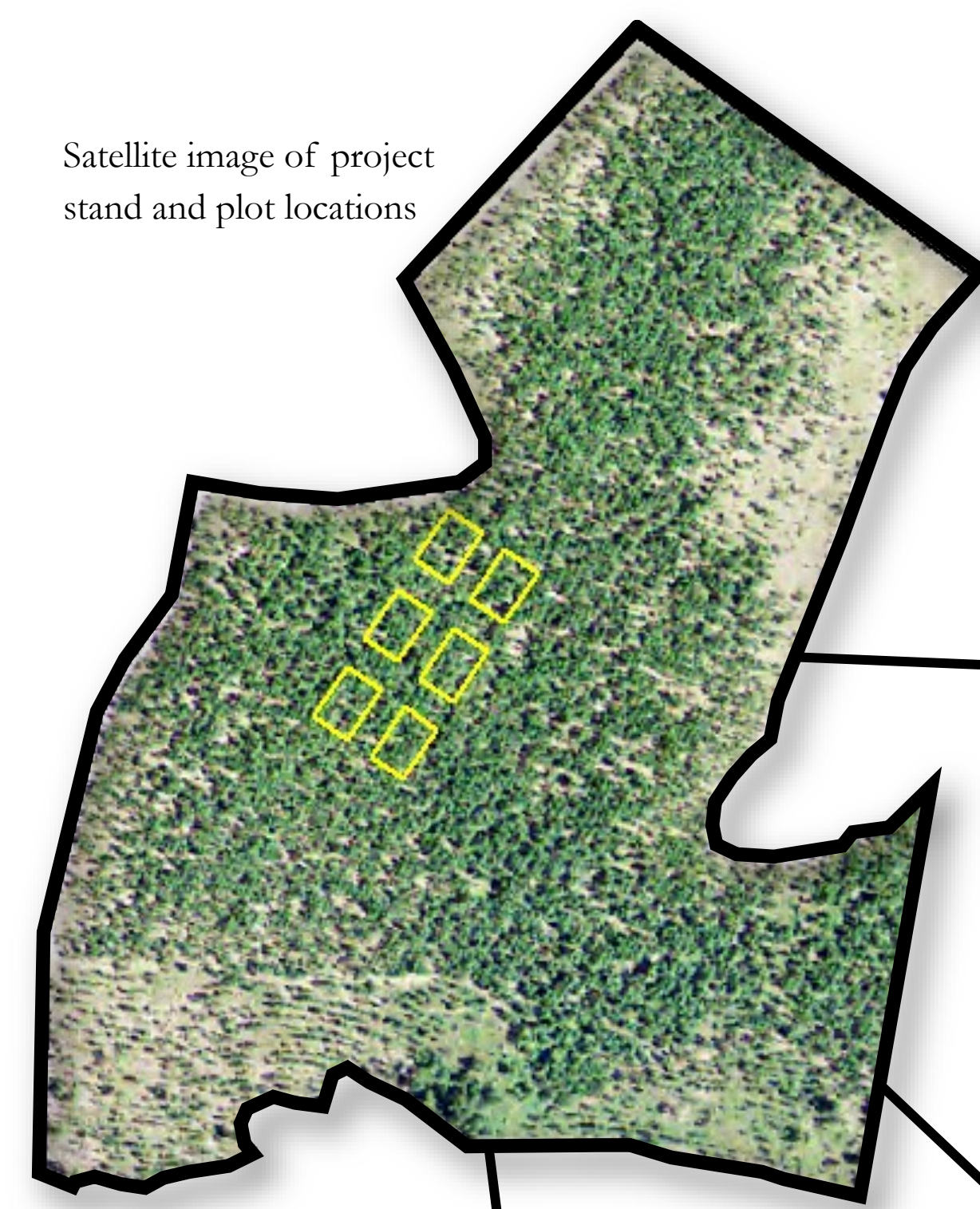
area. A controlled burn was conducted in winter 2016 and exclusion trays were recently installed. Sap flow, leaf-level physiology and phenology, leaf area, IPAR, growth and soil carbon fluxes will be monitored. **Our goal is to use this new research platform to attract funding to expand the measurements and modeling approaches, increase the number of study sites, and incorporate a factorial density/thinning treatment to better understand the role of density management in enhancing drought resilience in plantation established longleaf pine.**



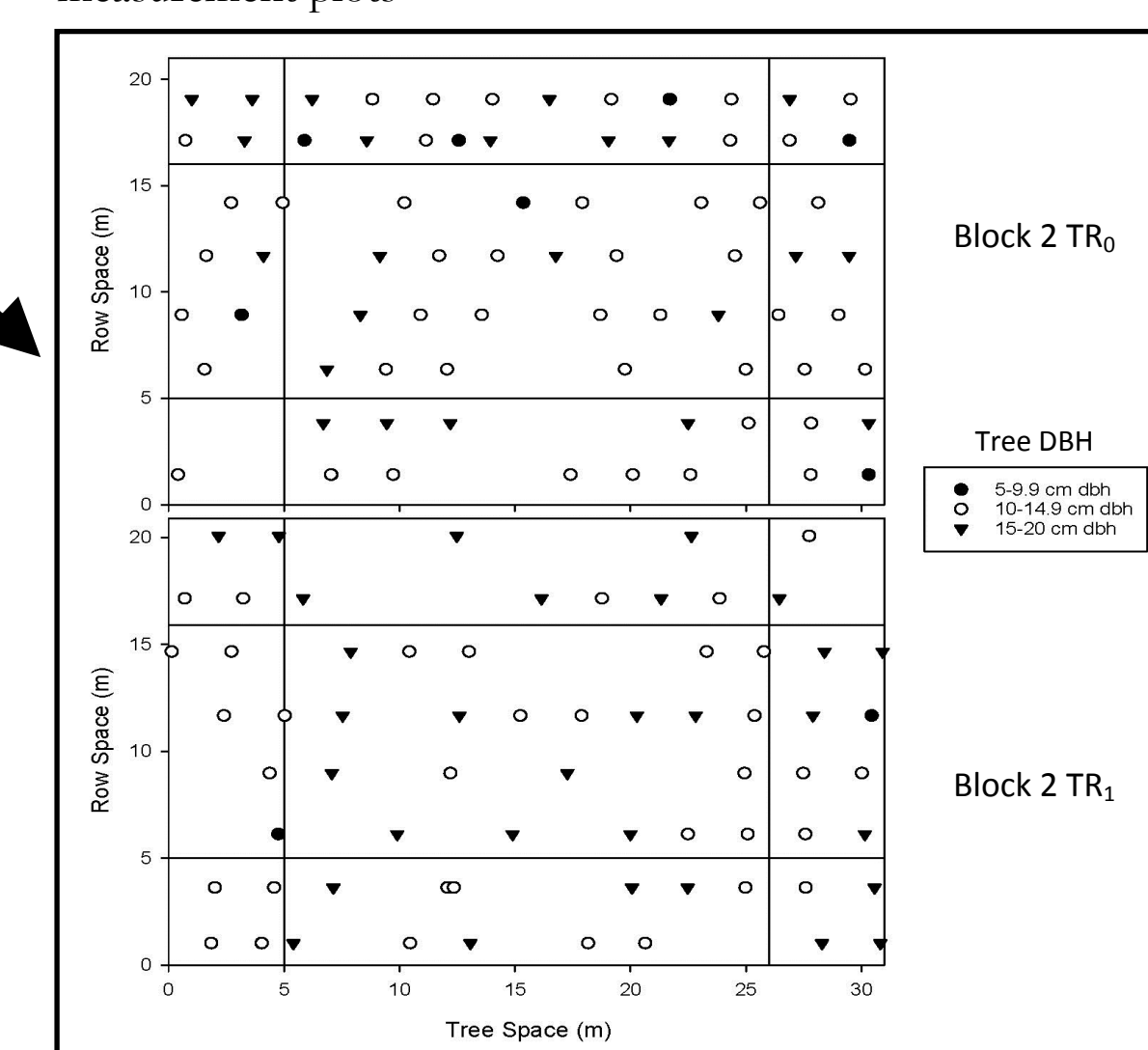
### Study Site



Satellite image of project stand and plot locations



Example of stem maps of treatment and center measurement plots



Pretreatment characteristics of measurement plots in an 11-year-old longleaf pine plantation

Block	Treatment	Basal Area (m <sup>2</sup> ha <sup>-1</sup> )	Density (stems ha <sup>-1</sup> )	DBH (cm)	Height (m)
1	TR <sub>0</sub>	20.4	1000	15.9	9.7
	TR <sub>1</sub>	19.8	1130	14.7	9.3
2	TR <sub>0</sub>	15.0	956	13.9	9.6
	TR <sub>1</sub>	17.0	1000	14.4	9.1
3	TR <sub>0</sub>	19.4	1130	14.5	9.6
	TR <sub>1</sub>	17.5	956	15.0	9.6

### Variables to be Measured

- Foliar <sup>13</sup>C
- Growth
- Leaf Area Index (LAI)
- Leaf-level Physiology and Water Relations
- Litterfall
- Hydraulic Vulnerability
- Net Primary Productivity
- Net Ecosystem Productivity
- Phenology
- Root Mass
- Sap Flow and Canopy Conductance
- Soil Moisture at 15, 25, 50, 75, 100, and 200 cm
- Soil and Heterotrophic Respiration
- Microclimate



Interested in collaborating?