

Estimation of Southern Pine and Hardwood Forest Canopy Structure Using Small Footprint Lidar

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Accurate, cost- and time-effective estimates of canopy structure are essential for the successful management and restoration of southern pine forest ecosystems. Remote sensing techniques, particularly LIDAR, have the potential to significantly improve the assessment of forest structure over traditional field measurements and provide valuable information about the dynamic nature of fire-dependent ecosystems. Remotely sensed measurements and estimates of forest structure are compared to measurements collected in the field across a wide range of conditions at the Tall Timbers Research Station (TTRS), a 1600 hectare research forest located north of Tallahassee, FL. This study site within the Red Hills region consists of a variety of ecosystem types with different structural conditions including dense hardwood forest, pine plantations, open canopy mixed southern pine ecosystems with multiple degrees of hardwood encroachment and open grasslands/fields. This preliminary study includes a large database of plot-based field data collected by TTRS staff (2003-2005), as well as diverse transect-based data collected throughout 2005. Basal area, tree height, live crown dimensions and canopy cover measurements from the field are compared and cross-validated to the measurements obtained from the high spatial resolution (footprint spacing < 1m), multiple return lidar data collected in 2002. This accuracy assessment of the LIDAR - derived forest structure over a variety of conditions and scales provides the necessary foundation to use this information for natural resource management and conservation in the Red Hills region.

Keywords: Lidar remote sensing, canopy structure, southern pine forests

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