USING LIDAR AND FIELD DATA TO ANALYZE CANOPY STRUCTURE IN A SAND PINE FOREST

James J. Angelo
Department of Biology
University of Central Florida
4000 Central Florida Blvd
Orlando, Florida 32816

John F. Weishampel
Department of Biology
University of Central Florida
4000 Central Florida Blvd
Orlando, Florida 32816

Hilary M. Swain
Archbold Biological Station
P.O. Box 2057
Lake Placid, FL 33862

Edwin M. Everham III
College of Arts and Sciences
Florida Gulf Coast University
Ft. Myers, Florida 33965

Abstract

LiDAR (LIght Detection And Ranging) is a high-resolution, active remote sensing technology that can potentially provide cost-effective and highly accurate measurements of the three-dimensional structure of forest canopy over a broad spatial scale. In this study, small-footprint (≈0.1 m horizontal resolution) LiDAR technology was used to characterize the canopy structure of a predominantly sand pine scrub forest system of approximately 3 km^2 in the Archbold Biological Station, located on the Lake Wales Ridge of central Florida. Canopy height and other field measurements from transects established within recently-burned and unburned forest units were used to validate the LiDAR data, and strong relationships between the field-based measurements and the LiDAR-derived metrics were found. Detailed vertical canopy profiles were created with the LiDAR data and a statistically significant difference ($p < 0.05$) was detected between the average canopy height of the burned and unburned transects. The LiDAR data was also used to generate canopy structure signatures for sand pine scrub habitat and southern ridge sandhill (turkey oak), the second most predominant vegetation type in the study area. The canopy profile signature of the sand pine scrub was found to differ significantly from that of the southern ridge sandhill habitat, suggesting that LiDAR can facilitate the identification of major vegetation types on a landscape scale. The findings of this study point to an important future role for LiDAR data in habitat suitability analysis.

[Abstract Only]

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