

Stephen F. Austin State University

SFA ScholarWorks

Faculty Presentations

Spatial Science

2009

Evaluating Forest Volume Estimation at Barksdale Air Force Base Using Lidar and Multispectral Imagery

Richard E. Brooks

Daniel Unger

Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, unger@sfasu.edu

Hans Michael Williams

Arthur Temple College of Forestry and Agriculture Division of Stephen F. Austin State University, hwilliams@sfasu.edu

I-Kuai Hung

Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, hungi@sfasu.edu

Follow this and additional works at: https://scholarworks.sfasu.edu/spatialsci_facultypres



Part of the [Forest Management Commons](#)

[Tell us](#) how this article helped you.

Repository Citation

Brooks, Richard E.; Unger, Daniel; Williams, Hans Michael; and Hung, I-Kuai, "Evaluating Forest Volume Estimation at Barksdale Air Force Base Using Lidar and Multispectral Imagery" (2009). *Faculty Presentations*. 14.

https://scholarworks.sfasu.edu/spatialsci_facultypres/14

This Conference Proceeding is brought to you for free and open access by the Spatial Science at SFA ScholarWorks. It has been accepted for inclusion in Faculty Presentations by an authorized administrator of SFA ScholarWorks. For more information, please contact cdsscholarworks@sfasu.edu.

**EVALUATING FOREST VOLUME ESTIMATION
AT BARKSDALE AIR FORCE BASE
USING LIDAR AND MULTISPECTRAL IMAGERY**

Richard E. Brooks, Dr. Daniel R. Unger, Dr. Hans Williams, Dr. I-Kuai Hung

Arthur Temple College of Forestry and Agriculture

Stephen F. Austin State University

Nacogdoches, Texas

unger@sfasu.edu

ABSTRACT

Hardwood and pine stand volume estimates compiled from past field plot samples were compared to Lidar volume estimates through the interpretation of Lidar assessed height, crown width and trees per acre to ascertain if Lidar derived volume estimates can be used in lieu of traditional volume measurements.

KEYWORDS

Volume, Lidar, field plot, crown width

Initially, a map representing all hardwood and pine forest stands at Barksdale Air Force Base, Louisiana were extracted from a map encompassing the entire base. Once extracted, sample points for all pine stands were determined to mimic the sampling density of already existing sampling points for hardwood forest volume estimates on the base (Figure 1). Once determined, field crews visited each pine stand sample point to assess pine volume estimates per acre using 1/10th acre sample plots identified within the pine forest area using traditional field measurements of species, DBH, total height and crown width.

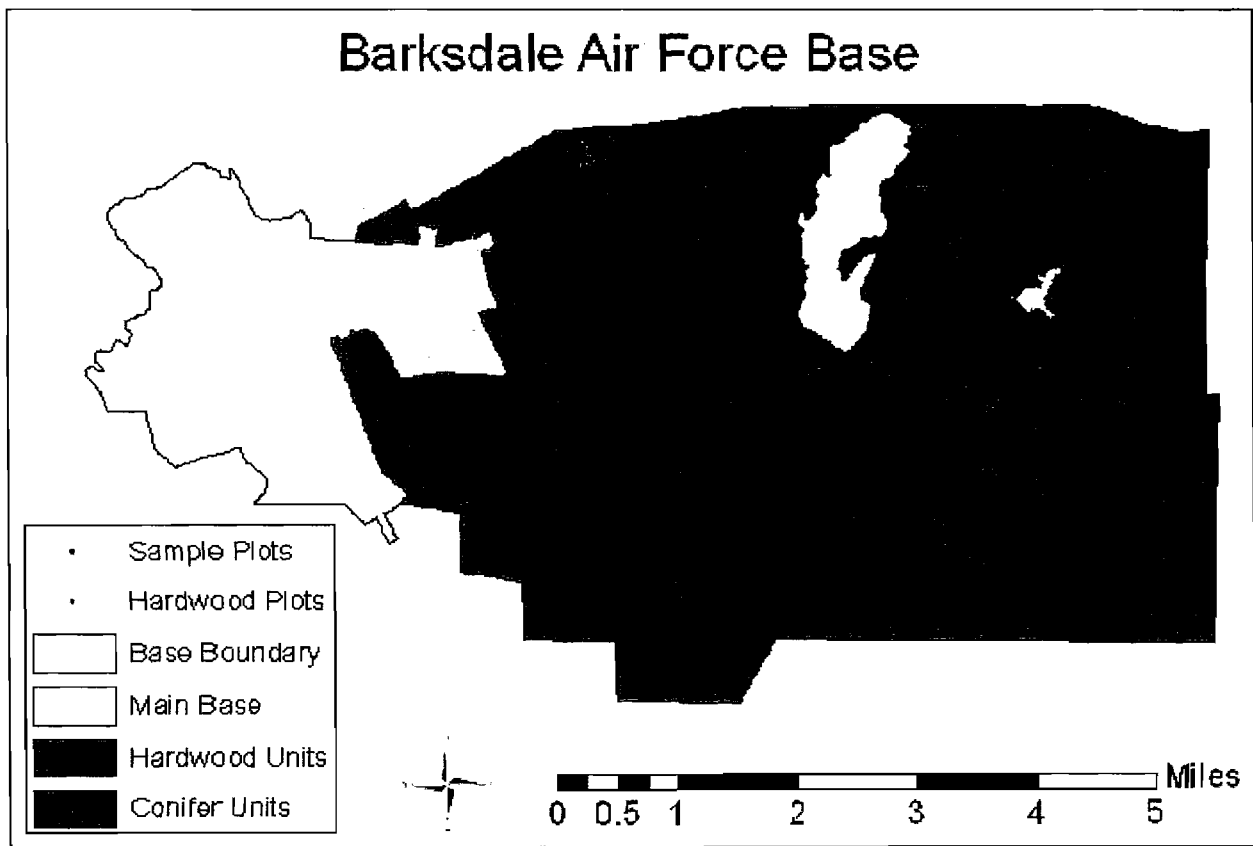


Figure 1. Hardwood and pine forest stand sampling points stratified within Barksdale Air Force Base.

In conjunction with field plot estimates, Lidar data of the base were acquired and manipulated to create a digital surface model and digital elevation model of the forested areas of the base. A canopy height model was then created with forest stand parameters of height and crown width extracted from both the hardwood and pine sample points for comparison with field collected volume estimates (Figure 2).

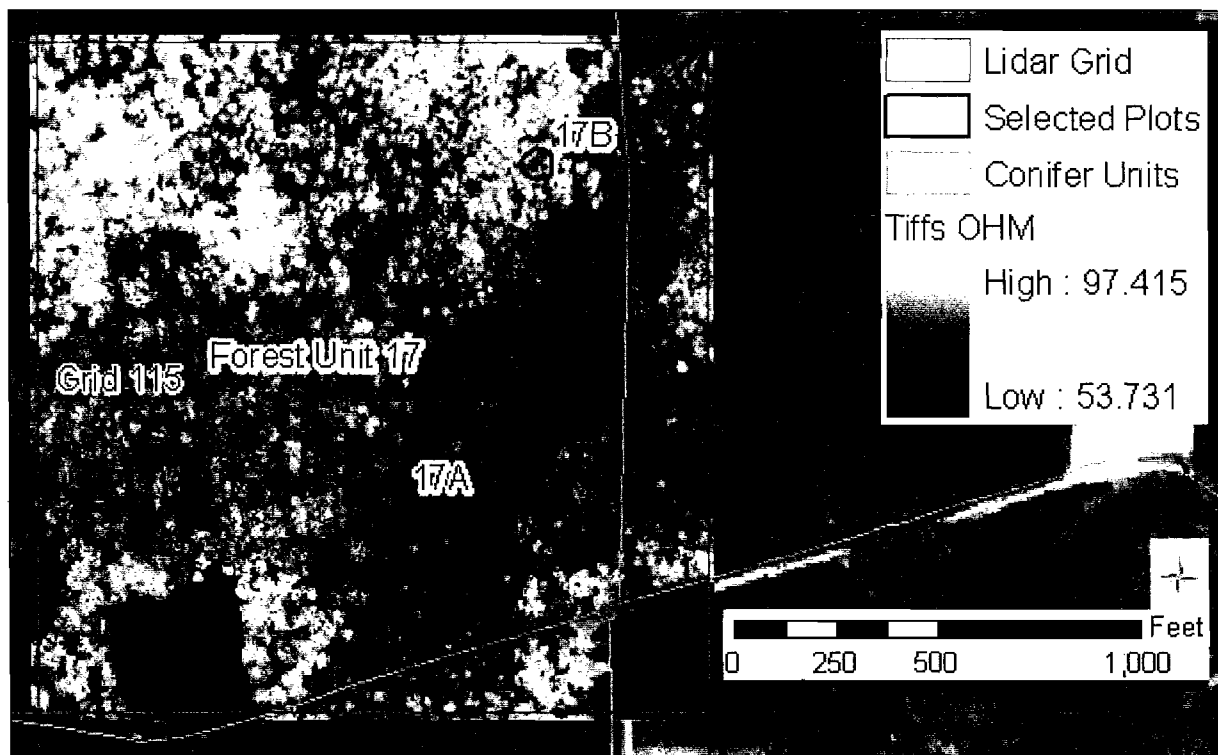


Figure 2. Example of a canopy height model for forest stand 17 and sample points 17A & 17B.

Lidar derived forest parameters were compared with field volume estimates for both the hardwood and pine forest stands to ascertain if Lidar derived forest parameters of height and crown width are highly correlated with field estimates of volume (Figure 3). Initial results indicate that measured field volume was slightly correlated with Lidar derived height while measured field volume was not correlated with Lidar derived crown width.

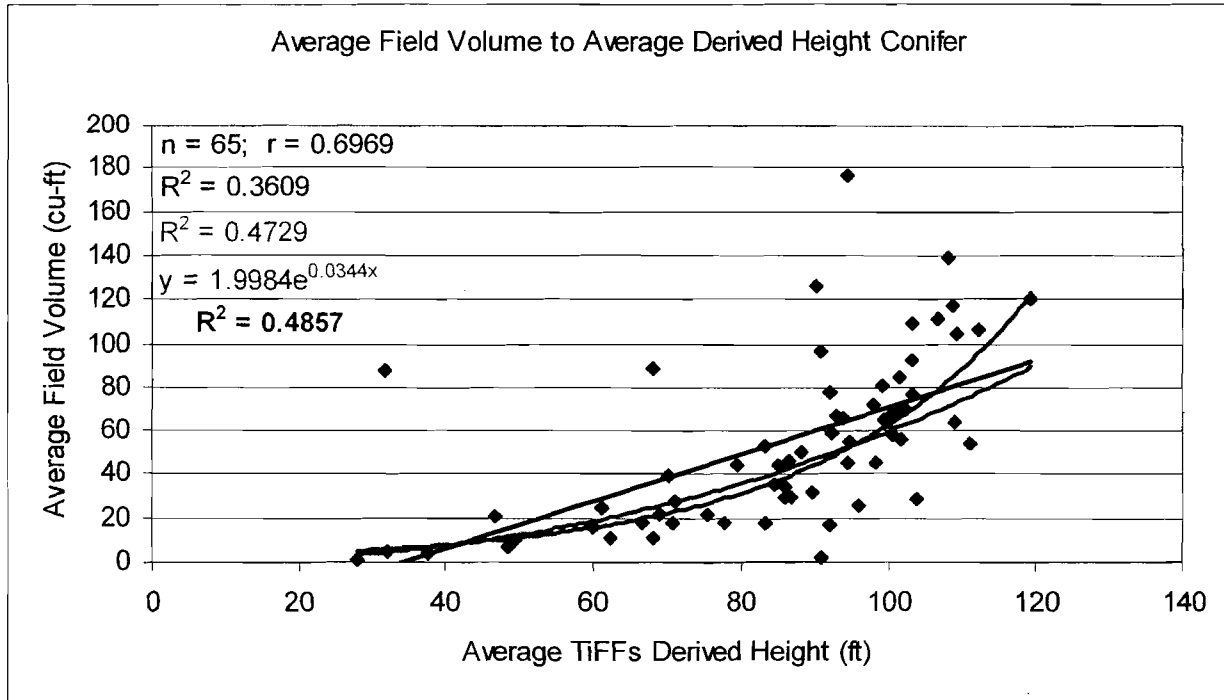


Figure 3. Correlation between field estimates of volume and Lidar derived average stand height.