ISPRS Technical Commission I Symposium, Sustaining Land Imaging: UAVs to Satellites
17 – 20 November 2014, Denver, Colorado, USA, MTSTC1-216

LANDSCAPE PATTERN AND CHANGE BY INTEGRATION OF MULTI-SENSOR REMOTE SENSING AND STONEWALL FEATURE IDENTIFICATION

R. J. Trueman [a], Y.Q. Wang [b]

[a] MS Student, Department of Natural Resources Science, University of Rhode Island, Kingston, RI 02881, USA- rebeccatrueman@my.uri.edu
[b] Faculty, Department of Natural Resources Science, University of Rhode Island, Kingston, RI 02881, USA- yqwang@uri.edu

Commission VI, WG VI/4

KEY WORDS: LIDAR, Orthoimage, Identification, Extraction, Landscape

ABSTRACT:

Expanding across the New England landscape are vast rows and columns of stonewalls. These walls are the most noticeable relics existing as evidence of the historical agricultural civilization that once flourished and serve as a reminder of previous human presence on a landscape now overtaken by second growth forest. Identification of these linear features can enhance landscape analyses applied in the north-eastern region of the United States, which take an historical approach by integrating land-use history in assessment of the present day landscape. Additionally, spatial identification of stonewalls will result in a dataset serving as a historical record to assist in recreation of historical land cover and subsequent landscape change assessment. Recent improvements in remote sensing technology has facilitated the information extraction of both stonewall spatial distribution and pattern. This research selected the town of New Shoreham, known as Block Island, located 9.4 miles south of the Rhode Island mainland as the study area. Block Island has extensive networks of stonewalls and a well-documented record of land-use history. Datasets utilized in this research include multispectral digital orthoimagery collected using a Z/I Digital Mapping Camera system in the spring of 2011 with a 15.25 cm spatial resolution, and point cloud data retrieved from airborne LiDAR with a 1-m ground spatial distance collected in the winter and spring of 2011. By combining these data products with field based observations, we extracted stonewall information from grids generated by models which filter LiDAR elevation and intensity values. Additionally, this study utilized data processing techniques involving Geospatial Object Based Image Analysis (GEOBIA). Implementation of identification, segmentation and vectorization processes were used create a functioning workflow for the extraction of these linear features as individual objects. Challenges involving pixel processes, noise, and scale are also considered.