

LAND COVER CLASSIFICATION WITH MULTISPECTRAL IMAGERY, LIDAR DATA AND OBJECT-BASED IMAGE ANALYSIS

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ABSTRACT:

This presentation will describe as case studies the methods and results to improve the accuracy and thematic specificity of land cover classifications. The first for the seven-county Twin Cities Metropolitan Area included: (1) lidar data, providing height and elevation information to increase the separability of some classes such as trees and grass, and (2) use of an object-based image analysis (OBIA) for classification. The OBIA, implemented in eCognition software, enables taking advantage of the spatial information, including shape, pattern, texture, and context, which is available in objects. The data used included four dates of multispectral Landsat data and several variables derived from lidar, including vegetation height, elevation, compound topographic index, slope, dissection, and buildings. Five level 1 classes were classified with an overall accuracy of 93%, and 10, more specific level 2 classes, at 91% (well above the usual 10-15% drop in accuracy from level 1 to level 2). The maps and area statistics are being used by the Metropolitan Council and other agencies for applications such as managing storm water runoff and storage.

A second project used a combination of QuickBird multispectral imagery and lidar data, along with OBIA, to classify and map the cities of Minneapolis and St. Paul at 0.6 meter resolution. The classes included tree canopy, grass/shrub, bare soil, water, buildings, streets and other impervious. Classification accuracies were greater than 90%. Given its aesthetic, environmental and economic benefits and values, the cities were particularly interested in the urban tree cover which they are using to assist in management, preservation and planning for future tree cover.

In summary, the combination of either high or moderate resolution multispectral image and lidar data, together with object-based image analysis, provides the capability to generate accurate classifications and maps of land cover for inventory, management and planning.