IKONOS imagery for resource management: Tree cover, impervious surfaces, and riparian buffer analyses in the mid-Atlantic region.

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Abstract

High-resolution imagery from the IKONOS satellite may be useful for many resource management applications. We assessed the utility of IKONOS imagery for applications in the mid-Atlantic region, including mapping of tree cover, impervious surface areas, and riparian buffer zone variables in relation to stream health ratings. We focused on a 1313-km^2 area in central Maryland using precision-georeferenced IKONOS products. We found the IKONOS imagery to be a valuable resource for these applications, and were able to achieve map accuracies comparable to manual aerial photo interpretation. We were also able to use derived data sets for consistent assessments over areas that would be difficult to accomplish with traditional photographic mapping methods. For example, we found that a stream health rating of excellent required no more than 6%

example, we found that a stream health rating of excellent required no more than 8% impervious cover in the watershed, and at least 65% tree cover in the riparian zone. A rating of good required less than 10% impervious and 60% tree cover. A number of issues associated with application of the IKONOS data arose, however, including logistics of image acquisition related to phenological and atmospheric conditions, shadowing within canopies and between scene elements, and limited spectral discrimination of cover types. Cost per unit area was also a nontrivial consideration for the image data products we used, but allowed us to provide valuable derived products to agencies in support of their planning and regulatory decision-making processes. We report on both the capabilities and limitations of IKONOS imagery for these varied applications.

Keywords

IKONOS imagery; Resource management; Mid-Atlantic region

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