



## Land Cover Accuracy Assessment for Southern Guam



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Land cover change (LCC) is caused by human disturbances and/or natural events such as climate variation and flooding. The quantitative analysis of LCC has been of major concern to scientists and researchers around the world over the last few decades. Identifying land cover change in a watershed can help determine ecological and hydrological changes in the watershed over time. Satellite remote sensing, geographic information systems (GIS), geo-statistics, and global positioning system (GPS) can all be used to identify LCC in watersheds. These technologies provide the basis for developing landscape composition and pattern indicators as sensitive measures of environmental change and thus, may provide an effective and economical method for evaluating changes in watershed conditions related to disturbances from human and/or natural stresses.

Landsat observations have evolved from an experimental system in 1972 to a sophisticated means of monitoring changes in the Earth's surface using a multi-date satellite imagery databases. These include Landsat Multi-Spectral Scanner (MSS) imagery, Landsat Thematic Mapper (TM) imagery, and Landsat Enhanced Thematic Mapper Plus (ETM+). Recent surveys indicate that land cover/use changes have a direct and enormous effect on water quality and environmental change. Watershed water quality and ecosystem are threatened constantly by both human impacts, such as forest fires and development as well as natural phenomena like storms and droughts. In addition, the combined uses of GIS, remote sensing and GPS tools have been highlighted with respect to their advantages in watershed applications and management.

Spatial and temporal modeling of changes in wetlands and badlands in Southern Guam

watersheds was one of the highest priority research needs recently identified for Guam. Previously, five (5) temporal Landsat images, including Landsat MSS image of November 14, 1973, and Landsat TM images of June 18, 1989, September 22, 1989, May 11, 1993, June 12, 1993, and March 15, 2001, were used to extract land cover information for watersheds in Southern Guam. The 1978 topographic map and 1975 digital raster graphics (DRG) for Guam were also utilized with the Landsat MSS image of 1973 to obtain land cover information. The classification process now completed, the next step of the investigation involved an accuracy assessment to compare the classification to ground truth or other data. Recent IKONOS and QuickBird imagery were used as reference data to assess Landsat imagery extracted land cover accuracy. Aerial orthophotos of 1975 were also available and were used as reference data. GPS and a GPS compatible digital camera was used to collect field data for ground truthing and land cover classification accuracy assessment. By this means, a land cover accuracy assessment for each watershed in Southern Guam was conducted. The objectives of this project were to:

1. Select reference pixels at random for classification accuracy assessment
2. Use a GPS unit to collect field data as reference for accurate assessment
3. Use a GPS compatible digital camera to take photos as reference for the GPS collected data for ground truthing
4. Conduct accuracy assessment, and achieve results.

