



Land Cover Change Detection in Saipan



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Land cover change (LCC) has been a subject of concern for the past few decades. Land cover change is not only affected by human-induced activities, but also biophysical drivers such as droughts, flooding, earthquakes, climate change and sea level rise. Traditionally, many of the changes have been recorded qualitatively through the use of comparative photographs and historical reports. With advancement and development of geospatial technologies, it is possible to monitor land cover change and determine impacts of human activities on environment and ecosystem in islands, particularly tropical islands where water quantity and quality is essential to sustainable development and quality of life. Satellite remote sensing, spatial statistics, geographic information systems (GIS), and global positioning system (GPS) can be used to identify land cover information and determine land cover changes if temporal data are employed. Considering the global warming, sea level rise and human induced activities, many island nations or regions are facing serious problems with environmental sustainability, water resources and water quality. In order to mitigate the impacts of biophysical and human factors on environment, it is important to obtain land cover information, and determine land cover change, and evaluate whether human induced activities affect environment and water quality.

The land cover changes and the Impact of historical and recent land use activities on ground and surface water quality and production were identified as one of the highest research needs for Saipan on the CNMI Research Advisory Meeting of

October 16, 2012. This project will focus on derivation of land cover information from satellite images and or aerial photos, and land cover change detection in Saipan, CNMI. Available data for this project include DRG data of 1925 and 1980, Landsat MSS image of 1978, Landsat ETM+ imagery, and Aster L1B imagery. The DRG data of 1925 may be used as comparison purpose, and the DRG data of 1980 may be utilized with Landsat MSS data for land cover classification. This project will use moderate spatial resolution data for land cover classification and land cover change detection. Higher spatial resolution data including QuickBird, GeoEye, IKONOS data, and historical aerial photos may be employed as reference data. Geospatial technologies such as GIS, spatial analysis and remote sensing will be applied to complete the project. The main objectives of this project are:

1. Apply moderate satellite imagery such as Landsat and ASTER data to derive land cover information to determine land cover change from late 1970s to late 2000s or most recently depending on whether such data are available, i.e. about three decades period,
2. Preprocess the images such as georeference, projection and georectification if such procedures have not been done,
3. Classify land cover information using satellite images and/or aerial photographs,
4. Determine land cover changes, and Provide land cover and land cover change detection data and maps.