CHANGE DETECTION IN PROTECTED LANDSCAPES FOR ADAPTIVE PROTECTED AREA MANAGEMENT: A PRACTICAL GEOINFORMATICS APPROACH

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The Department of Wildlife Conservation (DWC), the entity which is entrusted with the mandate to conserve fauna and flora of the country manages 14% of total land area of Sri Lanka, which are designated as Protected Areas (PA) under the Fauna and Flora Protection Ordinance (FFPO). Conservation of biodiversity and non destructive uses of wildlife resources especially for recreationl purposes within the PAs is a challanging task for the DWC. Horton Plains National Park is a one such PA which support higher diversity of montane fauna and flora in the country. The PA is at present also subjected some habitat changes, which are taking place naturally. Managing such a sensitive landscape requres timely and accuarare scientific information regarding the species richness of the area and their spatial and temporal distribution patterns. It is also important to understand the extent of habitat change, where it occurs and what habitats are converted into a different habitat.

In conventional wildlife management approach thematic management plans are prepared for a ten year time frame. The review interval of such a plan is generally five years. However, in Sri Lankan context, due to the nature of the dynamics in protected areas and the task environment, DWC uses a concept called "adaptive management" where the reviewing and adjustments of the activities are done frequently depending on the previous periods' experiences, usually less than five years. In this context temporal change detection of the habitats is a task which should be carried out as frequent as possible.

This study focuses on developing classified vegetation map for two time periods (1998 and 2008) and quntify the temporal area variation of the vegetation.Vegetation map was developed using IRS LISSA III images. The vegetation classes were classfied into dense forest, open forest, carpet/ *Pennisetum* grass, tussocky grass, and marsh / dwarf bamboo. The methodology was developed intergrating Normalize Difference Vegitation Index (NDVI) and Tasseled Cap Transformation(TCT). Finally the landscape of the PA was classified into different vegetation types using pixel based unsupervised classification algorithum. User and producer accuracies were calculated with the field observation data.

The results clearly indicate that all the vegetation types within the PA have changed between 1998 and 2008. Open forest cover increased from 23.56% to 28.41%, marsh / dwarf bamboo cover was increased from 5.35% to 8.76% during the period of ten years. It was also noted that the dense forest area reduced from 48.19% to 47.52%, carpet grass/ *Pennisetum* dominant area reduced from 2.12% to 1.68% and tussock grass cover was reduced from 20.78% to 13.63%. In general, forest cover of the PA has increased from 71.75% to 75.93% and grass cover (carpet/ *Pennisetum* and tussock) was reduced from 28.25% to 24.07% between 1998 and 2008 period.With the user accuracies of 83% in 1998 and 82% in 2008, and producer accuracy of 87% in 1998 and 80% 2008 it can be concluded that the methodology adopted in the study is sufficient in accuracy for practical usage. Hence, technique proposed in this study could be practiced periodically to detect the vegetation changes quantitatively and effectively for the management activities of the park.