

Geodatabase Development for Forest Restoration and Biodiversity Conservation in the Mt. Makiling Forest Reserve, Philippines

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A GIS-based database (or geodatabase) was developed for the Mt. Makiling Forest Reserve, on Luzon Island, Philippines toward the establishment of a management decision support system. The study presents initial results in the development of a geodatabase, as well as the use of geographic information system (GIS) in the planning, design and implementation of programs for forest renewal and biodiversity conservation. GIS use for data encoding is already extensive but its use as a planning and analytical tool is limited, if not altogether lacking. An outline for the establishment of a geodatabase is presented that will allow processing, analysis and modeling and, ultimately, the sustainable development and conservation of the mountain forest reserve, which is a significant watershed area and an important catchment for Laguna de Bay – the largest freshwater lake in Southeast Asia.

The database design is patterned after the GAME model earlier developed. GAME is an acronym for GIS-based assessment, monitoring and evaluation which uses regular-shaped polygons to provide a full description of the watershed. There are five (5) levels of detail or precision that can be used to characterize and map watershed phenomena: 100-ha grids, 25-ha quadrants, 1-ha cells, 0.04-ha squares and 0.01-ha granules. Depending on the level of detail required for analysis, the appropriate precision level can be used to describe land use/land cover, especially degraded areas, habitats, species distributions and conservation hotspots, among others. The geodatabase for the Mt. Makiling Forest Reserve already contains data and information on soils, slope, elevation and land use.

Key Words: geodatabase, GIS, forest restoration, biodiversity conservation

Abbreviations: GIS – geographic information system, GAME – GIS-based assessment, monitoring and evaluation

INTRODUCTION

The use of GIS in forest restoration and biodiversity conservation in the Philippines is limited. Although some GIS encoding is pursued through georeferencing of important points of interest and other landmarks, its use has been primarily for cartographic presentation. GIS processing is lacking in analytical form mainly due to reasons such as lack of understanding of its basic concepts and principles, lack of trained personnel and inadequate institutionalization of GIS within organizations.

More often than not, GIS processing is contracted to private GIS companies. Unfortunately, the GIS service provided is limited by the requirements imposed by the client organization – requirements that are essentially carto-

graphic in nature. It is an unfortunate situation given the urgency by which rehabilitation of degraded and critical lands should proceed. In a period of four centuries, the Philippine forestry situation deteriorated to a situation where the country has become a net importer of timber. From 1900 until 2003, the Philippines lost 13.1M ha of tropical forests – an annual loss of about 127,000 ha. For the period covering 1974–1994 alone, the country lost 3.4 million ha of forest. During this period, the average forest loss was up to 200,000 ha annually with a dismal renewal rate of 28,000 ha per year. Currently, of the country's 7.168 million ha of forests, only 0.33 million ha are plantations (Bantayan 2006).

To date, there has been no significant attempt at gathering and organizing studies on tropical forests and mountain ecosystems into a comprehensive compilation of plant