

Forest Landscape Changes in Ulu Sat Forest Reserve and Its Surrounding

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Abstract

Globally, human land use activities increase the pressure on the forest landscape. It becomes a major challenge to reduce human disturbances on the landscapes. To address this issue, forest reserves were established to protect biodiversity and ecosystem services. There are about 8% of Malaysia's total land area classified as a forest reserve. Forest reserves are often established in remote areas, unsuitable for economic land uses and can be easily set aside for conservation. However, rapid population growth and urbanization have expanded into forest reserves, increasingly induces pressure from human activities on the forest reserves. This paper presents the types of human land use and their changes in Ulu Sat Forest Reserve including the surrounding area by using multivariate Landsat TM imagery. The land use/land cover (LULC) data encompassing the inside and outside Ulu Sat Forest Reserve in 1988, 2003 and 2017 were processed to calculate the percentages of changes between each type of LULC inside and outside the reserve. Landscape change inside and outside Ulu Sat was analyzed using landscape transition analysis, rate change and annual rate change at the landscape level. The results showed that between 1988 and 2003, and between 2003 and 2017 the forest landscape inside and outside the Ulu Sat Forest Reserve have decreased due to the development of the built-up area. Thus, the results will hopefully take into consideration for land use planning and forest protection for sustainable management planning of the forest reserve.

Keywords: Human activities, buffer, land use changes, reserve area, healthy ecosystem

1. Introduction

The basis and concept that underline the practices of sustainable forest management (SFM) in Malaysia are to set aside adequate natural forest lands as Permanent Reserved Forest (PRF) that are strategically located throughout the country to be managed in perpetuity. In 1999, the total forested areas in Malaysia is about 19.01 million ha (about 60%), of which about 14.33 million ha is classified as Permanent Reserved Forest (PRF). The PRF is classified into two basic management categories (production and protection forests) (Nagel et al., 2017). Of that total, approximately 10.84 and 3.49 million ha are classified as production forest and protected forest, respectively. The production forests are commercially logged and managed for sustainable timber production. On the other hand, no logging is allowed in the protected area and they are maintained very much in their natural state to protect the hilly areas and to conserve biological diversity. The management strategy for the production forest relies very much on the types of the forests but based on a common goal, which is to ensure forest renewal and sustained yield. As a result, many reserve areas become sensitive to future land use change due to development and human land use activities. The alterations caused by human land use hold major implications to sustainable development and can be a major threat to ecosystem as a result of the destruction of natural habitat and the fragmentation or isolation of nature areas