Chapter 7
Landscape Biodiversity Characterization in Ecoregion 29 Using MODIS

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ABSTRACT

Biodiversity conservation is a challenging task due to ever growing impact of global warming and climate change. The chapter discusses various aspects of biodiversity parameters that can be estimated using remote sensing data. Moderate resolution satellite (MODIS) data was used to demonstrate the biodiversity characterization of Ecoregion 29. Forest type map linked to density of the study area was also developed by MODIS data. The outcome states that remote sensing and geographic information systems can be used in combination to derive various parameters related to biodiversity surveillance at a regional scale.

1. INTRODUCTION

A natural environment is self-renewing, self-perpetuating and stable one, in which every organism contributes in some way, however, small to the overall stability. In natural ecosystems, the plants and animals have evolved at their own pace and in their own way under the influence of natural selection to fit in the constellation of certain environmental factors or niches. In the process, they help to sustain others, each species controlling its own population growth and at the same time limiting of other species, so that a reasonable ecological balance may be achieved and maintained for hundreds of years The satellite remote sensing can identify the important parameters for biodiversity characterization like size, fragmentation, porosity, patchiness, interspersion and juxtaposition at the landscape level. The role of remote sensing is emphasized in quick appraisal of regional biodiversity surveillance. This becomes of high importance in present context of biodiversity loss due to climate change.

Table 1.

Ecoregion Name	:	Kayah-Karen Montane Rain Forests
Bioregion	:	Indochina
Major Habitat Type	:	Tropical and subtropical moist broadleaf forest
Ecoregion Number	:	51
Political Unit(s)	:	Myanmar, Thailand
Ecoregion Size	:	119,200 km^2
Biological Distinctiveness	:	Globally outstanding
Conservation Status	:	Relatively intact
Conservation Assessment	:	III

Table 2.

Ecoregion Name	:	Tenasserim-South Thailand Semi-evergreen Rain Forests
Bioregion	:	Indochina
Major Habitat Type	:	Tropical and subtropical moist broadleaf forest
Ecoregion Number	:	53
Political Unit(s)	:	Myanmar, Thailand, Malaysia
Ecoregion Size	:	96,900 km^2
Biological Distinctiveness	:	Globally outstanding
Conservation Status	:	Relatively intact
Conservation Assessment	:	III

There is an urgent need to inventory and monitor indicators of biological diversity such as species richness and habitats. Remotely sensed data provide a means to accomplish part of this task, but there has been no comprehensive scientific framework to guide its effective application (Stoms & Estes, 1993). Most of the discussion concerning potential roles for remote sensing in biodiversity assessment has come from conservation biologist and ecologists (Soule & Kohm, 1989; Noss, 1990; Lubchenco *et al*., 1991). The remote sensing community has had little involvement to date in supporting biodiversity research, largely concentrating instead in the global change domain (Stoms & Estes, 1992). Very little quantitative analysis has been accomplished to determine the actual value of remote sensing and geographic information systems in biological research.

Remote sensing provides spatial data, which are less used but they are the powerful source to acquire accurate, up-to-date information essential for conserving biodiversity and wildlife habitat mapping. Although technically complex, the remote sensing techniques have revolutionized the process of data gathering and map making. The combinations of Remote Sensing (RS) and Geographical Information System (GIS) have proven to be very effective tools to analyze the landscape patterns for biodiversity characterization at various levels.

2. STUDY AREA

Kayah-Kayin and Tenisserim ecoregion (Ecoregion 29) are the richest in species in mainland Southeast Asia, for this area is the cross road to exchange species among different geographic regions of Holartic, Oriental and Greater Sundas Island. On the other hand, this ecoregion forming a juncture of the Indo-Chinese, Indo-Burmese, and Malaysian floral and faunal elements. Formerly, it is divided into the Kayah-Karen Montane Rain Forests (ecoregion 51: Table 1) and the Tenasserim-South Thailand Semi-evergreen Rain Forests (ecoregion 53: Table 2). In the year 2000, World Wide Fund For Nature (WWF) scientists team combined these two regions and defined as ecoregion (29). The flora and fauna in this region is distinct and includes several endemic species. Among the ecoregions of Indochina, this ecoregion contains some of the highest diversity of both bird and mammal species found in the Indo-Pacific region

This ecoregion encompasses the mountainous, semi-evergreen rain forests of Thailand, Myanmar and Malaysia, and includes the extensive lowland

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