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BIODIVERSITY OF MANAGED FORESTS SURROUNDING THE CALAKMUL BIOSPHERE RESERVE IN MEXICO

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ABSTRACT Forest management for both ecosystem health and human provisions should be an important part of ecological engineering practice, the interface between conservation and natural resource utilization. Agroforestry for production and ecosystem health is a centuries-old form of ecological engineering utilized in many indigenous villages in Mesoamerica. Agroforestry systems relying on traditional ecological knowledge (TEK) can result in improved soil quality and forest biodiversity, as well as a critical abundance of numerous agricultural products. This study evaluates management differences in agroforestry systems of Southern Mexico and investigates if differences in forest management have an impact on forest biodiversity in areas bordering the Calakmul Biosphere Reserve. Agroforestry systems were studied in three village communities surrounding the Calakmul Reserve in Campeche Mexico. Each village had similar community structure, population, ecotype, and utilized agroforestry as their primary means of forest management. Tree and bird diversity were analyzed in each stage of the rotation, 5-10, 10-20, and >20 years using twenty meter grids for a total of forty samples in each stage. Results were computed using the Simpson's diversity index and ANOVA analysis. These sampling techniques will be applied in mature, unmanaged forest within each community, to act as a reference ecosystem. Interviews regarding species use, management, plantings, and origin of management knowledge were conducted at each sample site. Findings suggest that species richness and diversity were higher in communities utilizing a greater diversity of forest products, and employing a variation of management practices. It is thought that micro-management practices found in communities with higher diversity such as the planting of nurse trees, and removal of select species may also have contributed. This study will contribute to ecosystem management tools and design in sensitive areas such as those surrounding bioreserves, where inhabitants directly depend on the area's natural resources for survival.

Keywords: ecosystem, agroforestry, management, Calakmul