The Potential of Optimising Connectivity Conservation Using Unmanned Aerial Vehicle - A Case Study in Itaocara, Brazil

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Abstract

Forest ecosystems host high level of biodiversity providing numerous ecosystem services. Globally, forests experience intense fragmentation due to various human activities such as expansion of agricultural and development areas. This also applies to Brazil's Atlantic Rainforest, one of the most biodiverse centers of Brazil that currently has around 12 % of its natural vegetation left. The ongoing loss of forest cover, prompts the need for more efficient techniques to preserve biodiversity. The last decade saw a growing number of research on connectivity conservation. In the context of forest ecosystems, several studies have shown the effects of different forest features on biodiversity distribution and dynamics. However, so far there is no indicator set linking forest features to connectivity conservation concepts. Apart from that, limited availability of data for the assessment of biodiversity at small scales poses a major challenge to ensure optimisation of biodiversity conservation. Recently, the use of unmanned aerial vehicles (UAV) and geographic information system (GIS) are seen as important tools to improve data collection and assessment in connectivity management. This study conducted in Itaocara Brazil aims to develop a methodology to measure forest quality in order to assess the feasibility of implementing *in-situ* conservation measures like designated Private Reserve of Natural Heritage (RPPNs) areas. In a first step, this research develops a weighted indicator set of forest characteristics that affect overall biodiversity. Data for the selected indicators (forest density and size, vegetation height and cover, indicator vegetation) has been acquired by means of UAV and ground truth. This approach allows to draw conclusions on the applicability of using aerial images for the assessment of forest characteristics. Since RPPNs designated areas are located within private properties, interviews with landowners were conducted to get an indication of the social acceptance of the proposed measure. Finally, by using least cost path method, connectivity maps were developed taking the results of the interviews into account. The results show UAV can be an important tool for connectivity conservation. Additionally, generated maps illustrate that consideration of social acceptance plays a major role in development of conservation measures.

Keywords: Biodiversity, indicator set, private reserve of natural heritage

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