

Landscape fragmentation in the Brazilian Amazon - An analysis based on deforestation data derived from Landsat imagery

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Deforested area in the Brazilian Amazon increased from 10 million hectares in the 1970s to some 70 million hectares today. Most of the deforestation is known to be concentrated near major roads and areas of pioneer colonization, producing important landscape fragmentation. However, few studies have focused on how this process has evolved during the last decades. In this paper we evaluate spatial effects of forest fragmentation based on two landscape metrics - percent cleared and percolation (a measure of landscape connectivity) - for two relatively extensive areas in Pará and Rondônia investigated under the Milênio-LBA and LBA-ECO (LC-34) projects. Land cover data included two major data sets, one derived from Landsat MSS imagery for the 1970s and a second one derived from Landsat TM imagery for the 1990s and the 2000s. After land cover maps were intersected with regular 1/4-degree grid cells, the progression of the percent-cleared metric was analyzed for the period of study. The percolation metric was calculated for two sub-areas of pioneer colonization projects with similar spatial designs around the Cuiabá-Porto Velho highway in Rondônia and the Transamazon highway in Pará. The results can be perceived as an attempt to develop a measure for the pace of deforestation that would capture the effects of concentrated forest clearing, the relatively slow diffusion of deforestation into new frontiers, and the different patterns of forest and cleared areas within the transformed landscape.

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