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Forest Fragmentation and Its Potential Implications in the Brazilian Amazon between 2001 and 2010

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ABSTRACT

In recent decades, human development pressures have results in conversions of vast tracts of Amazonian tropical rain forests to agriculture and other human land uses. In addition to the loss of large forest cover, remaining forests are also fragmented into smaller habitats. Fragmented forests suffer several biological and ecological changes due to edge effects that can exacerbate regional forest degradation. The Brazilian Amazon has had greatly contrasting land cover dynamics in the past decade with the highest historical rates of deforestation (2001-2005) followed by the lowest rates of forest loss in decades, since 2006. Currently, the basin-wide status and implications of forest fragmentation on remnant forests is not well known. We performed a regional forest fragmentation analysis for seven states of the Brazilian Amazon between 2001 and 2010 using a recent deforestation data. During this period, the number of forest fragments (>2 ha) doubled, nearly 125,000 fragments were formed by human activities with more than 50% being smaller than 10 ha. Over the decade, forest edges increased by an average of 36,335 km/year. However, the rate was much greater from 2001-2005 (50,046 km/year) then 2006-2010 (25,365 km/year) when deforestation rates dropped drastically. In 2010, 55% of basin-wide forest edges were < 10 years old due to the creation of large number of small fragments where intensive biological and ecological degradation is ongoing. Over the past decade protected areas have been expanded dramatically over the Brazilian Amazon and, as of 2010, 51% of remaining forests across the basin are within protected areas and only 1.5% of protected areas has been deforested. Conversely, intensive forest cover conversion has been occurred in unprotected forests. While 17% of Amazonian forests are within 1 km of forest edges in 2010, the proportion increases to 34% in unprotected areas varying between 14% and 95% among the studied states. Our results indicate that the Brazilian Amazon now largely consists of two contrasting forest conditions: protected areas with vast undisturbed forests and unprotected forests that are highly fragmented and disturbed landscapes.

KEYWORDS

Amazon; Forest Fragmentation; Forest Degradation; Conservation

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