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Land tenure and deforestation patterns in the Ecuadorian Amazon: Conflicts in land conservation in frontier settings

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Abstract

The Cuyabeno Wildlife Production Reserve (Cuyabeno Reserve), located in the northeastern Ecuadorian Amazon, is a special protected area. Using a satellite image time-series, landscape ecology and evolving boundary definitions, shifts in landscape composition are described that focus on the spatial and temporal dynamics of land use and cover change (LUCC) within the vicinity of the Cuyabeno Reserve. Changes in local land tenancy and the implementation of protection buffers have accelerated the process of fragmentation and exacerbated the conflict between development and protection. Further, variations in management strategies and ownership histories confound LUCC patterns, rates, and trajectories.
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Introduction

In recent years, there has been renewed discussion related to the conflicts and benefits of people living in protected areas (Peres & Zimmerman, 2001; Schwartzman, Moreira,

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& Nepstad, 2000; Terborgh, 1999). A case study is presented of how the presence of people, the interactions among them, and the unique social and physical relationships within and around the Cuyabeno Wildlife Production Reserve (Cuyabeno Reserve) has shaped the landscapes within the protected area and the trajectories for future land use patterns. The Cuyabeno Reserve, a special protected area within the protected areas of Ecuador, was created in 1979 to promote the "production" of wildlife. The wildlife production was intended to offer alternative subsistence for inhabitants of the area, incorporate the rich indigenous traditions of the region, and also reflect social, economic, and political realities (Coello-Hinojosa, 1992). As time passed, the Cuyabeno Reserve was seen as an example of a protected area that combined the protection of plant and animal species with service to human indigenous populations. Unfortunately, the area quickly became an area of multi-scale conflict between extractive oil activities, colonists, indigenous communities, and ecosystem services (Kimerling, 1990). In 1993, the boundary of the Reserve changed. Land was surrendered to colonists who had settled in the Reserve, and a restricted land use category, "patrimony forest," was created that allowed colonization and communal land titles. Collocated communities further exacerbated land use and cover change (LUCC) patterns in direct and indirect ways. What followed was a mosaic of land tenure systems involving colonists and indigenous groups, a set of communities linked through a road located at the Reserve's edge, changes in the composition, rate, and fragmentation patterns of land use and cover, and conflicts between land conservation and protection and the development goals of the primary stakeholders. The transformation of the boundaries of the Cuyabeno Reserve shows how the failed cross-linkages between local and national interests and institutions have generated spatially explicit responses in the landscape.

Study area

Ecuador has approximately 26%, excluding the Galapagos Biological Marine Reserve, of its territory under some kind of protection (World Resource Institute, 2003). The Cuyabeno Reserve (see Fig. 1), which is part of the Ecuadorian System of Protected Areas, covers approximately 12% of the protected land and encompasses high biological (Balslev, Valencia, Paz y Miño, Christensen, & Nielsen, 1998; Valencia, Balslev, & Paz y Miño, 1994) and cultural diversity (Araya & Peters, 2000). The Cuyabeno Reserve, created in 1979 with an initial area of 256,760 ha, was the result of the National Conservation Strategy created in 1974 by consultants of the Food and Agriculture Organization (FAO), invited to Ecuador to assess the natural resources of the region. Initially, the Cuyabeno Reserve was delimited to include the entire Cuyabeno River Basin, the main tributary of the Aguarico River. The Cuyabeno Reserve protects an ecosystem located in an area of unique hydrologic and biologic characteristics. The Cuyabeno Lakes district sits at the confluence of both black and white water rivers, which, when seasonally inundated, merge to form an interconnected 14 lake complex that creates a rare combination of rainforest and wetlands (Nations & Coello-Hinojosa, 1989). The Cuyabeno Reserve is also rich in cultural and ethnic diversity. It is home to several indigenous and unrelated communities: Siona, Secoya, Cofán, Quichua, and Shuar. These indigenous groups have different migration histories, degrees of acculturation and market integration (Holt, Bilsborrow, & Ona, 2004), and, in any case, have strong links to the ecosystems services within the Cuyabeno Reserve (Vickers, 1993; Vickers & Plowman, 1984).

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