



Characterization of environmental quality of forest fragments changes in Jundiaí-Mirim river basin-Brazil using the Markov Chain model

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In Brazil is common practice the concurrency of large urban centers water catchment in distant sites. There's no policy to preserve strategic springs in the urban territory. Thus, rural areas, located in the surrounds of municipals, usually provide water and others environment services to the population that reside on cities. The Jundiaí-Mirim river basin, located in the most urbanized state in Brazil, São Paulo, composes an interesting example of this situation. It is located in a rural area near large urban centers, with large industrial parks, near the capital of state. As result of expansion of the cities on its surrounds their lands have had a historic of monetary valorization, making its territories attractive to the housing market. Consequently, the region has an intense process of urbanization that resulted in an increasing environmental disturbance in the areas of natural vegetation. In the other hand, the watershed is the principal water supplier of Jundiaí city, and houses forest remaining of an important Biome in Brazil, the Atlantic Rain Forest. Given the need to preserve its water production capacity and the forest remnants there, this study modeled the environmental quality of forest fragments through indicators of disturbance and evaluated the changes that occur between 1972 and 2013 using the Markov Chain model. The environment quality was determined by nine indicators of environmental disturbance (distance of urban areas, roads, edge land use, size, distance of others forest fragments, land capacity of use, watershed forest cover, number of forest fragments in the watersheds, shape of the forest fragment), obtained by techniques of Geoprocessing, and integrated by Multicriteria Analysis. The Markov Chain model showed a constant tendency of deteriorating in natural vegetation environmental quality, attributed to the intense process of occupation of the river basin. The results showed a historical trend of transformation in forest fragments with very low environmental quality to others uses and a static behavior of forest fragments with high environmental quality. It was explained by the tendency of occupation in forest fragments near urban areas, roads, with small size and high perturbation, and difficulties in occupation of forest fragments with high size, isolated from urban areas end roads. It was concluded that: (a) urbanization and deforestation of natural vegetation were primarily responsible for changes in environmental quality; (b) there is a need to create public policies to preserve the natural vegetation in the Jundiaí-Mirim river basin.