

GIS APPLIED TO THE IDENTIFICATION OF LAND COVER AND ENVIRONMENTAL CHANGES CAUSED BY SAND AND CLAY MINING IN THE PARAÍBA DO SUL RIVER FLOODPLAIN

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The Vale do Paraíba region in the São Paulo, Brazil, is one of main sand production areas in the country. The Paraíba do Sul river floodplain and channel have been used for sand and clay extraction from the late 1940s onwards. This activity has produced environmental changes both in the floodplain and river channel, as former agricultural land has been transformed into open pits, open-water ponds, or bare land. In this study, land cover data from around 30 km² of Paraíba do Sul river floodplain with variable mining intensity were compiled from large-scale vertical aerial photos for three different moments: 1962, 1986 and 1998. These data were manipulated and analyzed using a geographic information system. The study revealed that in 1962 the sand/clay extraction activity was very restrict, reaching only 1.37% of the floodplain, which was predominantly (83%) cover by pasture or plantations. After this, aggregate mining expanded at high rates, as the population and infrastructure in the region and in São Paulo Metropolitan region was growing fast. The surface disturbed by mining activities grew by 1000% in the period 1962-1986, reaching 4.4 km². On the other hand, the area covered by natural vegetation decreased from 1.2 km² to 0.8 km², partly due to mining. Other environmental attributes measurable by the application of an aerial photo/GIS methodology include extent of tailings deposits, vegetation growth in reclaimed areas, river channel morphology and mining encroachment on legally protected riverside zone.