

ABSTRACT

PRADO, R.B.(2004). *Geotechnologies applied to spatial and temporal analysis of the land use and land cover basin related to the water quality Barra Bonita reservoir to support water resources management*. 172 p. Tese (Doutorado). Centro de Recursos Hídricos e Ecologia Aplicada, Escola de Engenharia de São Carlos, Universidade de São Paulo, São Carlos. 2004.

Nowadays, water quality deterioration is a common problem related to pollution inputs from point and nonpoint sources. The situation becomes worse in the reservoirs due to multiple water uses. Barra Bonita reservoir was selected for this study because it is located in an overpopulated area of the São Paulo State, southern Brazil. Moreover, it is a region of many industries and intensive agriculture. The data used to carry out the study included physical features (pedology, geomorphology, geology, drainage, precipitation and flow) provided by several public agencies in different scales and formats; land use and land cover maps derived from interpretation of Landsat TM ETM satellite images; limnological variable measurements derived from field work and literature spanning the period comprised between 1979 and 2002 and census data (population density and agriculture production). The first step in the study was to build a limnological database to compile and organize all the information available regarding water quality in the Barra Bonita reservoir. A second major step was to implement and feed the Bacia do Médio Tietê Geographic Information System with the selected pollution forcing variables. After that, the geotechnologies were applied to diagnose physical features, to map land use and land cover and to model potential pollution instances for each sub-basin. This data was analyzed in the space and time considering the water quality degradation from 1990 to 2002. The results showed an increase in the eutrophication level of Barra Bonita reservoir in the period considered in response to changes in land use and land cover patterns. The water-land integrated analysis allowed to verify that the water degradation is related to the land use and land cover changes and population increase (diffuse and point contribution). Therefore, the water resources management is paramount in order to improve the water quality in this basin. It is expected that information and methodologies applied in this research can be used to support this sustainable process.

Key words: water quality, reservoir, basin physical features, land use and land cover, geotechnologies and water resources management.