

SPATIO-TEMPORAL WATER QUALITY CHANGES AS REFLECTIONS OF LAND COVER CHANGE IN LAGUNA DE BAY, PHILIPPINES

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ABSTRACT

Lake environments provide numerous ecosystems services that range from provisioning to regulating. In some cases, the number and variety of functions these environments serve also lead to conflicts between uses and users. Water quality monitoring provides a measure for understanding how a lake and its rivers are faring relative to both natural and anthropogenic activities within the watershed. Laguna de Bay in the Philippines is a lake of interest in this regard. It is a good example of a multi-use resource that continues to experience significant changes due to expansive urbanization, continued agricultural activities, aquaculture, power generation, rapid land use changes, and climate change, among others. Impacts from these activities are initially reflected in the watershed's rivers prior to being reflected in the lake environment itself. In the 2005 Millennium Ecosystem Assessment's Sub-Global Assessment of the Laguna de Bay and its environments, most of the rivers that drain into this basin were considered in very poor conditions, based on various physicochemical parameters. In fact, most of the major rivers in the basin were declared as "virtually dead." This study reviews the results of the sub-global assessment and compares them with more recent data for three of the lake's rivers: San Cristobal, San Juan, and the Molawin-Dampalit Rivers. Variations in basic parameters, such as dissolved oxygen (DO), pH, and temperature were analyzed from the years after the assessment report up to the present. Initial observations indicate that, despite measures put in place through legislation by the national government, key parameters indicate that the rivers have not improved at all, and that in some respects, the rivers' health levels have continued to decline. These figures are examined relative to how changes in land cover within the sub watersheds, have potentially influenced these observed continued environmental degradations.

Keywords: Land Cover Change; River Water Quality; Spatial and Temporal Watershed Analysis; Spatial Analysis; Remote Sensing and GIS

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