

Land use impact on benthic macroinvertebrate assemblages in selected lotic ecosystems in a government-declared protected landscape

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The Upper Marikina River Basin Protected Landscape (UMRBPL) was established to rehabilitate the Marikina watershed. However, these areas remain prominently residential and agricultural; which in turn may create disturbances to the ecosystem. One way to investigate the condition of the lotic systems is through the use of biomonitoring. In this research, ten sites (residential, agricultural, and combined land use) were sampled for physicochemical parameters and benthic macroinvertebrates. A total of 2,385 samples were identified belonging to 70 genera from 38 families of 12 orders. Principal component analysis determined the environmental gradients among sites. Hierarchical clustering analysis determined site clustering based on conductivity and taxa density, despite the difference in land use. Canonical correspondence analysis showed the affinity of *Paraleptophlebia* sp., *Sparsorythus* sp., *Afronurus* sp., *Acentrella* sp., and *Baetiella* sp. to temperature; *Baetiella* sp. and *Cheumatopsyche* sp. to pH; and *Caenis* spp. to DO. It also showed the sensitivity of *Ceratopsyche* sp. to DO and conductivity; *Thiara* sp., *Melanoides* spp., *Corbicula* sp., *Naucoris* sp., *Microcylloepus* sp., *Neoperla* sp., *Elodes* sp., *Parochlus* sp., *Chimarra* sp., and *Oestropsyche* sp. to conductivity. The study also found out that the presence of anthropogenic factors may be the leading cause to the changes in water quality, which, in the case of this study, shows that the rampant use of pesticides in the studied agricultural areas of the UMRBPL caused the water's acidic pH. This resulted to a negative impact on stream biodiversity as compared to residential and combined-use areas. It would therefore be necessary to assess the types and kinds of pesticides used in these agricultural areas as they have shown to decrease stream biodiversity.

Keywords: Upper Marikina River Basin Protected Landscape, Biomonitoring, Stream biodiversity