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Land use alters the impact of pollution on water quality and assemblages of
phytoplankton, zooplankton and macroinvertebrates in a tropical river.

BY

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Abstract

The ecological integrity of riverine systems around Zimbabwe is under severe environmental stress emanating from various land uses by human beings. There is paucity in information about how land use alters the effects of pollution on water quality, and the assemblages of zooplankton, phytoplankton and macroinvertebrates in the riverine systems around the city of Bulawayo. The study focused on assessing if land use alters the effect of pollution on ecological indicators and water quality around the city of Bulawayo. Characterization of the ecological indicators and physicochemical variables was done in May and June, during the cold dry season. Two distinct riverine systems were identified by the level of disturbance in them. Amongst the two different riverine systems, agricultural activities were identified as the most prominent land use. Conductivity and Total dissolved solids significantly differed between the disturbed and undisturbed sites ($P < 0.05$). A Principal Component Analysis identified how land use influences ecological indicator assemblages. Land use divided the ecological indicators according to the level of tolerance to disturbance. In macroinvertebrates, Orders Hemiptera and Coleoptera (pollution sensitive taxa) were replaced by order Diptera (pollution tolerant taxa) as the level of impact increased. *Pinnularia*, *Ulothrix* were species that characterized the undisturbed sites, whereas *Gomphoena* and *Anabaena* were prominent in disturbed sites. Copepods were also prominent in undisturbed sites whilst Rotifers were found in disturbed sites. Physicochemical parameters such as Conductivity and Total Dissolved Solids influenced the abundance of most pollution tolerant species. The results of this study show that land use alters the effect of pollution on water quality and zooplankton, phytoplankton and macroinvertebrate assemblages in a tropical stream. There is a need for the Bulawayo City Council to improve on land use systems by enforcing existing and new environmental legislation.

❖ **Key words:** *Bulawayo, Riverine system, Land use, Pollution Macroinvertebrates, Zooplankton, Phytoplankton, Disturbed Sites, Undisturbed Sites.*