

Spatial and temporal variation of stream communities in a human-affected tropical watershed

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Abstract – We explored the spatial and temporal variability of benthic macroinvertebrate communities (density, taxon richness, evenness and taxonomic composition) in a tropical Panamanian stream that is potentially affected by organic and chemical pollution resulting from human activities. As predicted, pristine headwaters of Site 1, located within the Altos de Campana National Park, showed the lowest macroinvertebrate densities, suggesting an increase in pollution-tolerant taxa at downstream sites located near human settlements and agricultural land. Moreover, Site 1 had higher accumulated taxon richness than downstream sites (except Site 5), although evenness was higher at Site 3. Density and taxon richness were higher and more variable in the dry season, while evenness was only higher in the dry season at Site 1. Multivariate analysis showed that the fauna responded to a natural longitudinal gradient, but there was also a strong water quality signal associated with human settlements. Community composition was related to abiotic variables commonly associated to pollution, such as alkalinity, dissolved solids, phosphates, and total organic carbon.

Key words: Stream macroinvertebrates / Panama / spatial variation / seasonality / tropics