Abstract

Tropical rivers display profound temporal and spatial heterogeneity in terms of environmental conditions. This aspect needs to be considered when designing a monitoring program for water quality in rivers. Therefore, the physico-chemical composition and the nutrient loading of the Upper Mara River and its two main tributaries, the Amala and Nyangores were monitored. Initial daily, and later a weekly monitoring schedule for 4 months spanning through the wet and dry seasons was adopted. Benthic macro-invertebrates were also collected during the initial sampling to be used as indicators of water quality. The aim of the current study was to investigate the physico-chemical status and biological integrity of the Upper Mara River basin. This was achieved by examining trends in nutrient concentrations and analyzing the structure, diversity and abundance of benthic macro-invertebrates in relation to varying land use patterns. Sampling sites were selected based on catchment land use and the level of human disturbance, and using historical records of previous water quality studies. River water pH, dissolved oxygen, electrical conductivity (EC), temperature, and turbidity were determined *in situ*. All investigated parameters except iron and manganese had concentration values within allowable limits according to Kenyan and international standards for drinking water. The Amala tributary is more mineralized and also shows higher levels of pH and EC than water from the Nyangores tributary. The latter, however, has a higher variability in both the total phosphorus (TP) and total nitrogen (TN) concentrations. The variability in TP and TN concentrations increases downstream for both tributaries and is more pronounced for TN than for TP. Macro-invertebrate assemblages responded to the changes in land use and water quality in terms of community composition and diversity. The study recommends detailed continuous monitoring of the water quality at shorter time intervals and to identify key macro-invertebrate taxa that can be used to monitor changes of the water quality in rivers of the Mara basin as a result of anthropogenic changes.