INTERRELATION BETWEEN CHEMICAL CONCENTRATION LEVELS OF SIX FACTORY EFFLUENTS AND THE DISTRIBUTION OF MACROINVERTEBRATES IN SOSIANI RIVER.

BY

OSANO ALOYS MOSIMA

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MOI UNIVERSITY

P.O. BOX 3900

ELDORET

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ABSTRACT

The study was conducted in Sosiani River Eldoret between April-1997 and February-1998. The relationships between three principal variables was investigated: (i) aquatic pollutant (zinc, copper, lead, phosphates and nitrite) concentration levels, (ii) metal bio-accumulation by benthic organisms and, (iii) the distribution of benthic macro-invertebrates at stations located upstream and downstream from water treatment works. The objectives of the study were; (i) to determine the pollutant concentration levels in water and in tissues of macro-invertebrates, (ii) to determine the distribution and abundance of macro-invertebrates downstream and (iii) identify a possible indicator species in various concentration levels of pollutants.

The concentration of metals and non-metals were determined using Atomic Absorption Spectrophotometry (AAS) and Spectronic-21D spectrophotometer, respectively. Macro-invertebrates were sampled using netting material and their counts were recorded. The study showed that the concentration levels of the pollutants (zinc, copper, and lead) in the water and tissues were both higher (range,3.0-6.5, 0.005-0.035, and 0.05-0.4ppm plus 5-70, 0.05-0.4 and 0.1-1.6mg/g respectively) than the threshold levels (0.3, 0.01 and 0.27ppm) in sites located within town compared with those located away from town in the dry season. Pollutant concentration (for zinc and copper) was higher during the dry seasons than the wet seasons (range,0.05-0.75 and 0.003-0.015ppm) but lead was higher (0.1-0.65ppm). Species richness varied downstream. Some macro-invertebrates occurred upstream that were absent or reduced in numbers downstream. Similarly, some species recorded in low numbers upstream occurred in larger numbers downstream. Apparently, some macro-invertebrates responded differently to different

levels of lead, zinc, copper, phosphates and nitrites. For example, *Ishnura elegans* and *Hydropsyche instabilis* predominantly occurred in sites where the concentration levels of lead, zinc, copper, phosphates and nitrites were highest.

The study provided evidence consistent with the hypothesis that industries release untreated effluents into Sosiani river. Findings strongly suggested that continued monitoring of wetlands in Eldoret and other urban centers be carried out and treatment of effluents from industries be done before discharging into close by wetlands.