

Title: Application of Mass Transport Model to Study Temporal Variation of Concentration of Lead in Riverine System

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Abstract: Heavy metal contamination within river systems is a major environmental problem around the world. An environmental model was developed to simulate the temporal variation of concentration of lead discharged into a riverine system. The model was developed by solving the transport equation which governs the concentration of lead. The equation has advection, dispersion, sink and source terms. The equation was discretised and converted into a language compatible with a computer. A computer program was developed using C++ programming language. The program divides the Nairobi River into blocks. Using the governing equations the program distributes the lead emitted from the source to all the blocks depending on the prevailing conditions. The resulting flow equations were solved by a suitable computer code developed in this work. There was a close agreement between the measured and simulated values. A correlation coefficient of 0.9124 was found. The data of lead concentration in Nairobi River is used to calibrate and validate the model as well as make its predictions.