Geophysical Research Abstracts, Vol. 9, 01836, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-01836

Application of new fluorometric technology for the detection of point source pollution in urban drainage systems

C.H. Mines (1), A. Ghadouani (1) and J. Seow (2)

(1) School of Environmental Systems Engineering, The University of Western Australia, Crawley, Australia, (2) Pollution Response, Department of Environment and Conservation, Perth, Australia (cmines@westnet.com.au / Fax: +61 8 6488 1015 / Phone: +61 40 777 1049)

The management of contaminants entering surface water systems is complicated by difficulties in identifying point sources of pollution. This problem is particularly relevant to closed pipe stormwater systems where contaminants may not be identified until they have traveled substantial distances from their source. Given these difficulties, an innovative method has been identified of tracing water between points within a drainage system, and hence to prove connections between pollutant and polluter, through the use of rhodamine WT as a proxy for soluble contaminants moving through such systems. The method may also be extended to trace pollutants back to their source. This work involves quantifying the effects of the concentration of rhodamine WT, and the pH, temperature, salinity and background fluorescence of the natural waters on the accuracy of the fluorometric analysis of rhodamine WT within a controlled laboratory environment. Short term studies were then conducted in the field, involving the release and in-situ fluorometric detection of rhodamine WT within the Whaleback Lake drainage system (Parkwood, Western Australia). Longitudinal dispersion formulae were also successfully applied to the collected field data.

Laboratory results demonstrate that underestimation of rhodamine WT can occur in solutions with pH less than 3.9 and temperatures below the calibration temperature of the instrumentation. Overestimation of rhodamine WT was also found to occur in solutions at temperatures greater than the calibration temperature of the instrumentation. The field work conducted at Whaleback Lake resulted in readings of one to two orders of magnitude greater than background concentrations of rhodamine WT and

hence satisfactorily proved connections between release and sample points. The work conducted in this study demonstrates that the use of rhodamine WT is a valid method to prove connections between points within urban drainage systems and hence to act as a proxy for soluble contaminants in such systems.