ISSN 0511-5728
The West Indian Journal of Engineering
Vol.35, No.2, January 2013, pp.72-82

Identification and Remediation of Water-Quality Hotspots in Havana, Cuba: Accounting for Limited Data and High Uncertainty

Jeffrey J. Iudicello[a Ψ], Dylan A. Batterman[b], Matthew M. Pollard[c], Cameron Q. Scheid[d], and David A. Chin[e]

Department of Civil, Architectural, and Environmental Engineering, University of Miami, Coral Gables, FL, USA
[a] E-mail: jeffrey.iudicello@drbc.state.nj.us
[b] E-mail: d.batterman@umiami.edu
[c] E-mail: m.pollard@wustl.edu
[d] E-mail: c.scheid@umiami.edu
[e] E-mail: dchin@miami.edu

[Ψ] *Corresponding Author*

(Received 19 May 2012; Revised 26 November 2012; Accepted 01 January 2013)

Abstract: *A team at the University of Miami (UM) developed a water-quality model to link in-stream concentrations with land uses in the Almendares River watershed, Cuba. Since necessary data in Cuba is rare or nonexistent, water-quality standards, pollutant data, and stormwater management data from the state of Florida were used, an approach justified by the highly correlated meteorological patterns between South Florida and Havana. A GIS platform was used to delineate the watershed and sub-watersheds and breakdown the watershed into urban and non-urban land uses. The UM model provides a relative assessment of which river junctions were most likely to exceed water-quality standards, and can model water-quality improvements upon application of appropriate remediation strategies. The pollutants considered were TN, TP, BOD_5, fecal coliform, Pb, Cu, Zn, and Cd. The key model result is that the river junctions most likely to exceed water-quality standards are at the intersections of upstream sub-watersheds, and the best way to reduce the concentrations is via better management of the runoff from the upstream sub-watersheds. Dilution and attenuation were significant factors in reducing the concentration at downstream river junctions. The model was conservative in that it did not consider point-sources or groundwater dynamics in the Almendares River, and was found to be comparable to an established USGS water-quality model. The UM model is a valuable tool in assessing the water quality in the Almendares River and can be applied similarly to other rivers in Cuba or in similar countries with water-quality problems and limited data availability.*

Keywords: *Almendares River, water-quality model, infrastructure, Cuba*