

# **Characterization of Suspended Sediment Concentration into a Closed-basin Stormwater System**

M.E. Arias, M.T. Brown.

Howard T. Odum Center for Wetlands, Department of Environmental Engineering Sciences,  
University of Florida, Gainesville

## **Abstract**

Stormwater pollution has become an area of major concern in the United States. Stormwater has a different origin and behavior than other polluted waters; therefore, analyzing pollutants loads is critical in design and management of stormwater systems. The objective of this study was to characterize stormwater suspended-sediments concentrations (SSC) into a closed-basin system during rainfall-runoff events. The system studied receives runoff from a 12-ha catchment on a residential development in Gainesville, FL. The system consists of collection pipes, a hydrodynamic separator (HDS), and a wet detention pond, from which the water percolates or flows into a sinkhole. Ten runoff events were characterized by collecting samples at the HDS inlet at frequencies according to the event intensity. Samples were analyzed for the three classes of SSC particle classes: suspended, settleables, and sediments. Moreover, composite samples were analyzed for total phosphorus (TP) and particle size distribution (PSD). Rainfall intensities for these events varied from 1.4 to 20.4 mm/hr, which generated flows averaging 20-637 L/s. SSC varied from 23.7 to 194.4 mg/L, and event average loads varied from 0.56 to 24.1 kg. The SSC even mean concentration (EMC) of 82.6 mg/L was composed of 64.2% sediments, 14.9 % settleables, and 20.8% suspended solids. Cumulative plots of flow versus mass demonstrated that a strong first flush behavior was encountered for five events, but the strength of this varied with SSC class. TP EMC varied from 0.162 to 0.673 mg/L, 47.4% of which was in the dissolved fraction, 21.9% in the suspended fraction, and 30.6% in the particulate fraction (settleables and sediments combined). Because of the significance of these stormwater loads, this study recommends that management practices such as wetland vegetation establishment, frequent street sweeping, and HDS cleaning are imposed on this catchment to mitigate the ecological impairments that stormwater pollution is causing.

Keywords: Stormwater, best management practices, first flush, suspended sediments, phosphorus.