SCCWRP Annual Report 2008

Comparison of stormwater pollutant loading by land use type

Eric D. Stein, Liesl L. Tiefenthaler and Kenneth C. Schiff

ABSTRACT

Urban stormwater is recognized as a major source of pollution to many of the nation's waterways. Managing stormwater is complicated by the extreme variability associated with runoff patterns from different land use (LU) types under different rainfall conditions. Models are an increasingly common tool for understanding the processes that influence variability in urban stormwater and incorporating this understanding into management decisions. Unfortunately, routine monitoring programs seldom provide the data necessary to adequately calibrate and validate watershed models. This study provides a regionally representative calibration data set by characterizing event mean concentrations (EMC) and fluxes of total suspended solids (TSS), metals, polycyclic aromatic hydrocarbons (PAHs), and bacteria from representative land-uses and investigates within- storm patterns in order to identify mechanisms that influence constituent loading. Pollutant concentrations and flow were measured over the entire storm duration from 8 different LU types over 11 storm events in 5 southern California watersheds for the 2000-01 through 2004-05 storm seasons. Mean TSS EMCs were significantly higher at recreational sites compared to all other LU sites. For trace metals, Cu, Pb, and Zn values were significantly higher at industrial sites than at other LU types. Despite some general variability among LUs, no significant differences in PAH concentration among LU types were observed. All LU sites had clear signatures of pyrogenic (combustion by-product) derived PAHs. Recreational LU sites had significantly higher levels of both *Escherichia coli* and enterococci, compared to other LU types. For all constituents, the greatest concentrations occurred during the rising limb of the storm hydrograph. Concentrations stayed high for relatively short periods and decreased back to base levels within one to two hours. Results of this study can be used to calibrate watershed models used for water quality assessments, contaminant load allocations, and TMDL development. These data sets can also assist stormwater engineers in the design of more effective monitoring programs and better performing treatment practices (i.e., BMPs) that address differences between LU types and specific rainfall/runoff conditions.

Full Text

ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2008AnnualReport/AR08_015_027.pdf