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Temporal variability patterns of stormwater concentrations in urban stormwater runoff

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ABSTRACT

Stormwater runoff is currently perceived as a major source of pollutants discharged to the coastal oceans of southern California, but the quality and quantity of stormwater runoff is highly variable. In this study, nearly 2,000 samples were collected at 15-min intervals during the 1997/98 wet season from the Santa Ana River, an urbanized watershed in Orange County, California, to assess the magnitude of “first flush” versus seasonal flushing, and to assess pollutant variability within and among storm events. All samples were analyzed for total suspended solids (TSS); and a selected subset was analyzed for total organic carbon (TOC), total nitrogen (TN), and trace metals (cadmium, chromium, copper, lead, nickel, and zinc). Flow ranged up to five orders of magnitude and constituent concentrations routinely varied among storms by two orders of magnitude. Flow was the largest factor that accounted for changes in TSS concentrations. The second largest factor was pollutant build-up and wash-off, but the “first flush” effect of concentrations (within-storm variance) appeared in only a limited number of storm events. However, significant seasonal flushing (among-storm variance) was observed. There were 220 non-rain days prior to the season’s first event, and the first four storms had significantly higher concentrations of TSS and trace metals than the remaining storms of the season.

Full Text

ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/1999AnnualReport/04_ar04.pdf