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Metals and bacteria partitioning to various size particles in Ballona Creek storm water runoff

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ABSTRACT

Many storm water best management practice (BMP) devices function primarily by capturing particulate matter to take advantage of the well-documented association between storm water particles and pollutants. The hydrodynamic separation or settling methods used by most BMP devices are most effective at capturing medium to large particles; however, these may not be the most predominant particles associated with urban runoff. The present study examined particle size distribution in storm water runoff from an urban watershed in southern California and investigated the pollutant–particle associations of metals (Cu, Pb, Ni, and Zn) and bacteria (enterococci and Escherichia coli). During small storm events (_0.7 cm rain), the highest concentration of pollutants were associated with a <6-mm filter fraction, which accounted for 70% of the per storm contaminant mass but made up more than 20% of the total particle mass. The pollutant–particle association changed with storm size. Most pollutant mass was associated with >35mm size particles during a 5-cm rain event. These results suggest that much of the contaminant load in storm water runoff will not be captured by the most commonly used BMP devices, because most of these devices (e.g., hydrodynamic separators) are unable to capture particles smaller than 75mm.