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Effects of Rainfall Intensity and Duration on the First Flush from Parking Lots

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ABSTRACT

Urban stormwater with large impervious (paved) areas often produces runoff with a variety of contaminants. Although southern California is among the most urbanized coastal areas in the United States, the effect of rainfall variations on washoff efficiency of contaminants from pervious and impervious surfaces is largely unknown. The goal of this study was to investigate the effect of varying rainfall intensities and duration on runoff composition from highly impervious parking lots. In order to control the tremendous natural variability in precipitation of the arid climate in southern California, rainfall simulators were used to generate and quantify pollutant washoff at changing intensities and durations. Washoff of suspended solids, total and dissolved trace metals, and polycyclic aromatic hydrocarbons was strongly inversely correlated with rainfall duration. Rainfall intensity only affected washoff at the smallest measured duration; higher intensities produced decreased concentrations. The effect of rainfall duration was a reflection of the first flush observed in pollutographs for every duration and intensity sampled. Peak concentrations, up to an order of magnitude higher than concentrations later in the event, occurred during the first 10 min after the onset of rainfall. Longer simulated storms effectively diluted the first flush.

Full Text

http://ftp.sccwrp.org/pub/download/DOCUMENTS/JournalArticles/941_EffectsOfRainfallIntensityFromParkingLots.pdf