

# Quantifying Urban Stormwater Suspended Sediment Particle Size Class Distribution in the Central U.S.

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## ABSTRACT

Stormwater samples were analyzed from 17 urban monitoring sites (n=272) during spring 2011 to better understand urban land use suspended sediment contributions to receiving water bodies in central Missouri, USA. Samples from receiving water bodies had higher total concentrations of suspended sediment (323  $\mu\text{l/l}$  and 319  $\mu\text{l/l}$ , respectively) relative to urban sites (205  $\mu\text{l/l}$ ), which contained approximately 35% less total sediment. However, mean particle size was significantly lower ( $p < 0.001$ ) from urban sites (59  $\mu\text{m}$ ) relative to receiving waters (167  $\mu\text{m}$  and 131  $\mu\text{m}$ , respectively). Receiving waters had higher silt volumes (173  $\mu\text{l/l}$  and 148  $\mu\text{l/l}$ , respectively) relative to urban sites (124  $\mu\text{l/l}$ ). The percentage of silt volume to total sediment volume for urban stormwater and receiving water bodies was 60%, 46%, and 53%, respectively. Over the course of the study period, silt volume increased by more than 43% and 53% in receiving waters. Collectively, results indicate a disproportionate contribution of fine sediment from the urban environment. Receiving waters' particle size class dynamics suggest the presence of a climate-driven punctuated equilibrium of sediment transport, which was not apparent in urban areas. This study represents one of the first suspended sediment particle size class investigations of an urban environment and holds global implications for urbanizing watersheds and aquatic ecosystem health.