



Sediment-sensitive Stormwater Management: Understanding the Urban Coarse Sediment Regime to Prevent Stream Degradation

Kathy Russell¹, Tim Fletcher¹, Geoff Vietz^{1,2}

¹University of Melbourne, Burnley, Australia, ²Streamology Pty Ltd, Bright, Australia

The physical degradation of urban rivers has a negative impact on life in our cities and is driven by changes to incoming flow and sediment regimes. Coarse or bedload sediments play a vital role in forming streambed habitat and preventing erosion, but their response to urbanization is poorly understood. Catchment land cover and drainage paths are profoundly changed by urbanization, altering the coarse sediment sources and transport pathways from source to stream. Our observations of bedload sediment yield and particle size distributions in small streams in eastern Melbourne indicate that bedload yields tend to be greater and bedload sediments tend to be coarser-grained in more urbanised catchments. Event bedload sediment yield and median grain size are strongly related to peak flow. This indicates that the increase in bedload yield and calibre in urban catchments is driven by the increase in stormwater runoff produced by impervious surfaces and traditional drainage systems. These findings suggest the best way to protect urban stream geomorphology is to restore the flow regime through stormwater control measures. However, stormwater control measures may require sediment bypass or replenishment arrangements to ensure sediment supply is maintained at appropriate levels. Managing urban streams in a sediment-sensitive way depends on a better understanding of the sediment budget and sediment dynamics of urban catchments.