
# Implications of recent research on stormwater quality targets and practices

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Over the past decade there have been several new studies into the quality of stormwater coming off urban catchments, and multitude of studies into how bioretention systems perform in field, rather than laboratory, conditions.

Many jurisdictions in Australia have load-based pollutant reduction targets, expressed as a relative reduction in pollutant loads compared with unmitigated development. These targets are typically derived by configuring a MUSIC model to a certain suite of input water quality and bioretention system parameters, and then developing treatment performance curves—for TSS, TP and TN—from which a point is nominated where further increases in bioretention size would not achieve appreciable improvements in treatment performance (i.e. a point of diminishing return). The pollution reduction at that point is deemed to be best practice target.

A review of eight field studies of bioretention systems, collectively covering 128 storm events, found a weighted average volumetric loss of 60%. Many of the systems tested had impermeable liners or where on clayey soils, and many of the storm events were relatively large. The loss of water is about 20 times higher than is predicted by MUSIC when configured in accordance with standard guidelines. Some of the studies found negligible change in pollutant concentrations, with volumetric loss being the primary mechanism for pollutant load reductions. When there are changes in our understanding of both input pollutant concentrations, and the performance of bioretention systems, then this necessarily has implications for targets that are derived from them.

This research, suggesting bioretention systems perform much more like sponges and filters, and have a large capacity to manage urban hydrology, indicated bioretention systems have the potential to deliver significant benefits in management of frequent flood events. Ultimately this could lead to a better integration of the quality and quality aspects of urban stormwater management.

The findings alter many common assumptions underpinning current stormwater quality practice and could have widespread implications for water sensitive urban design practice.