‘Pooh’ Sticks, Pollution and Healthy Habitat

Delivering & Evaluating Sediment, Debris and Habitat Benefits of Blue-Green Cities

FACTSHEET

Project area: *Sediment transport; urban debris movement; river habitat analysis*
Intended readership: *practitioners, academics, interest groups*

The development of water centric Blue-Green Cities increases awareness and implementation of alternative stormwater management measures. As awareness and adoption increases, so does the need to understand Blue Green Infrastructure benefits and risks.

This research looks into the functions and dynamics of sustainable urban drainage and urban watercourses, focusing on debris and sediment transport within the new Blue-Green urban form and the influence of river modification on water quality and habitat benefits. The conveyance, deposition, re-suspension, choke and pinch point blockage are key flood risk and water quality considerations of vegetated surface stormwater management systems.

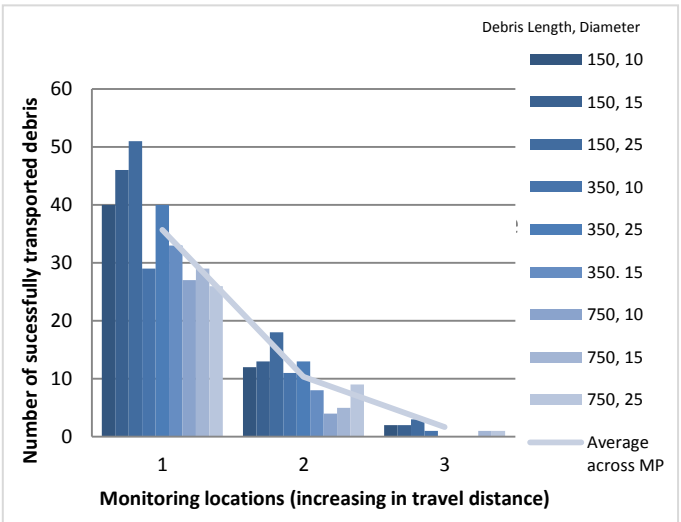
Passive Integrated Transponder tagged urban woody debris being monitored in an urban stream.

SuDS, as part of the Blue-Green network, have the potential to influence flood control/mitigation, water quality, public amenity and safety within the local urban environment. Urban river restoration, including the use of large woody debris for bank stabilisation, flow control and habitat provision, influence the pollutant movement within the receiving watercourse the therefore the surrounding riparian habitat.

Debris movement in urban watercourses

Culvert blockage by ***Debris*** is a key risk factor in daylighting watercourses, floodplain management and restoration. Passive Integrated Transponder technology has been used to monitor and analyse small wood debris movement in the urban environment. This research aims to:

- Define Blue-Green Infrastructure debris transport pathway;
- Identify factors influencing debris transport in urban waterways;
- Examine pinch point blockage risk; and,
- Provide urban debris flood risk analysis framework



Dimension of successfully transport debris within Murray Burn experimental reach

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Tracer deposition within an urban established swale

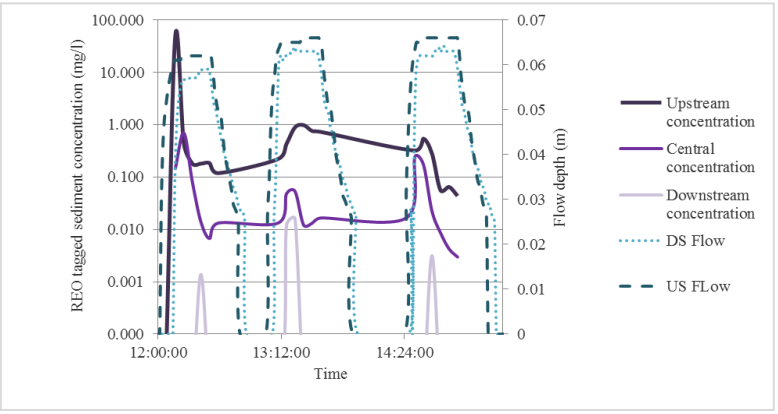
Sediment transport through sustainable urban drainage systems (SuDS)

Up to 85% of urban pollutants are transported by ***Sediment***. A key indicator of long-term SuDS performance is source to sink mapping of sediment. By monitoring sediment transport, deposition, resuspension and multiple event movement the efficiencies and water quality benefits of Blue-Green Infrastructure such as SuDS can be determined.

Using a novel tracing approach, this field study is investigating:

- Blue-Green Infrastructure sediment transport process;
- Urban source-pathway-deposition process ;
- Blue-Green Infrastructure conveyance and trapping efficiency; and,
- Analyse receiving waterbody impact.

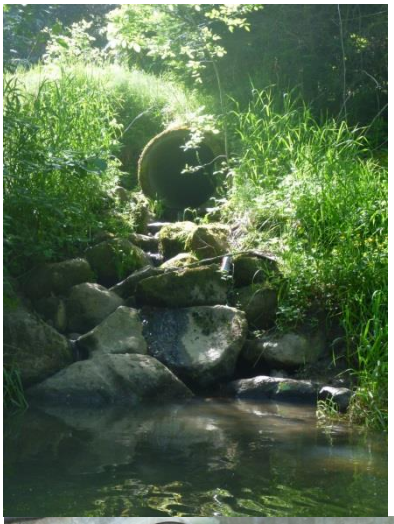
Mass transport of tagged sediment illustrated the change in sediment detention efficiency of individual SuDS elements and treatment trains. Initial research illustrates that deposition and resuspension occurs within the monitored SuDS.



Multiple event sediment movement within an established urban swale

River restoration and modification influence on receiving waterway quality

Stormwater outlet characteristics



Implementation of green belts, filter strips, wetlands and river restoration work can act to enhance ***Habitat*** values of Blue Green Cities. The influence of large woody debris, bank restoration, sustainable drainage networks and set back outflows illustrate the influence these measures have on water quality and habitat.

To understand the habitat benefits of Blue-Green Cities, the following elements are being investigated congruently:

- Microbial respiration rates of sediment within city outfalls and urban waterways;
- Heavy metal concentrations and rate of change due to stormwater and land management changes;
- Estimation of pollutant build-up related to stormwater management mechanisms; and
- River habitat and modification values.

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