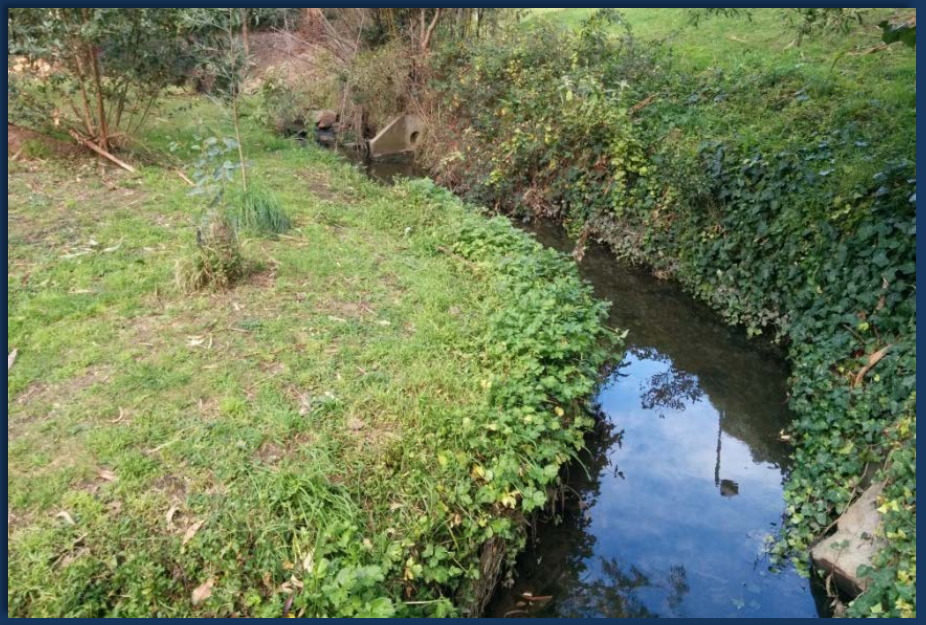
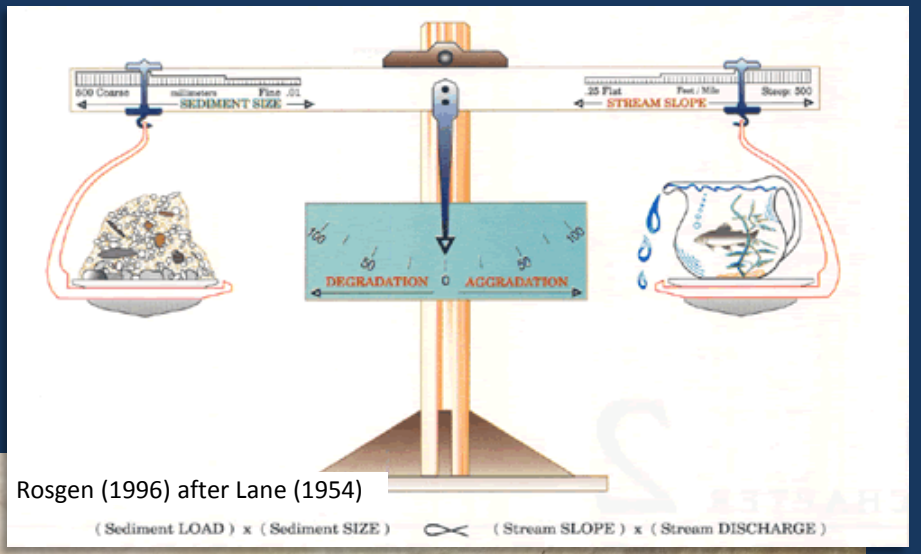
URBAN STREAMS: SEDIMENT REGIME DISTURBANCE AND ITS CONTRIBUTION TO STREAM DEGRADATION

Kathy Russell
Supervisors: Tim Fletcher and Geoff Vietz

The urban sediment problem

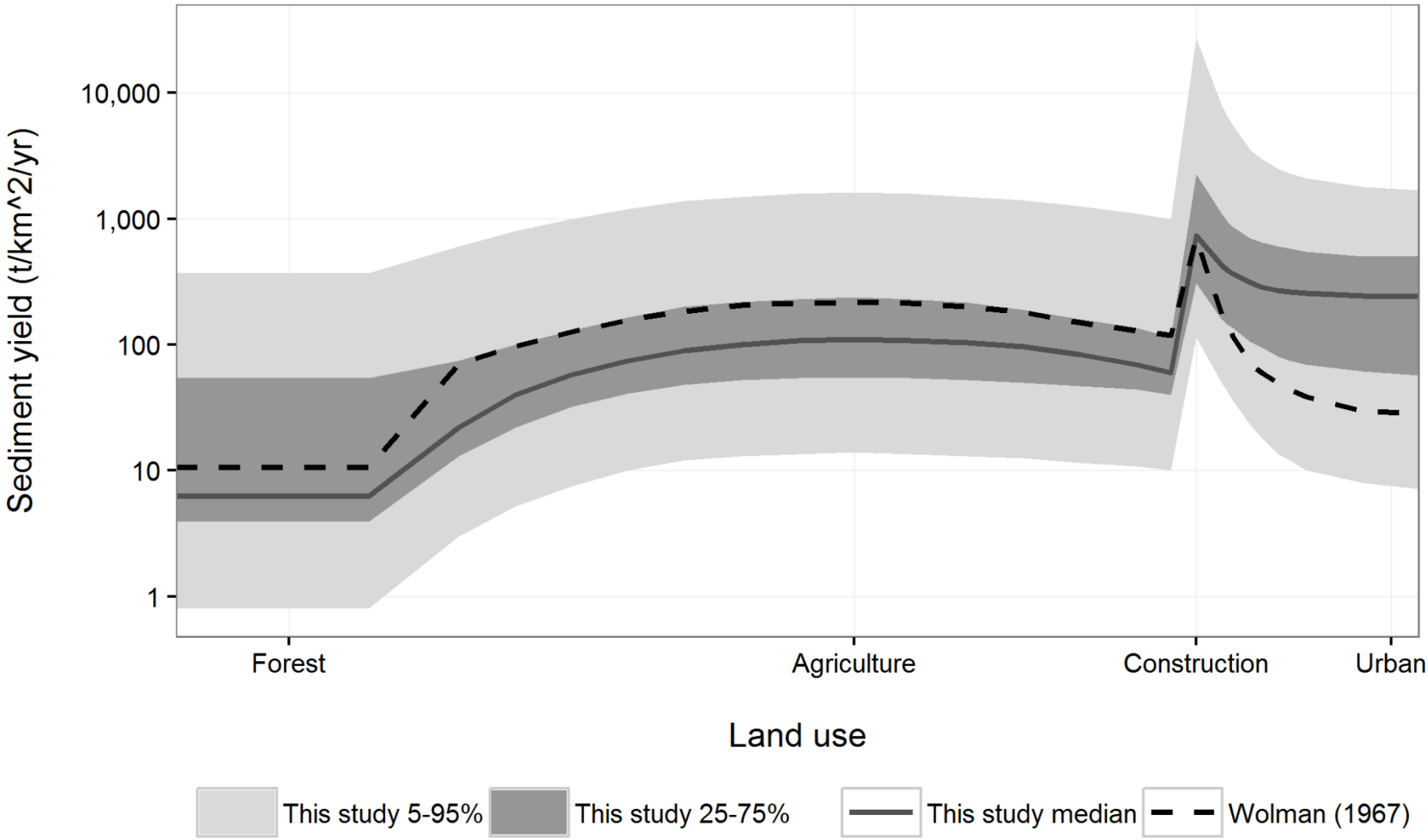


Flow and sediment disturbance



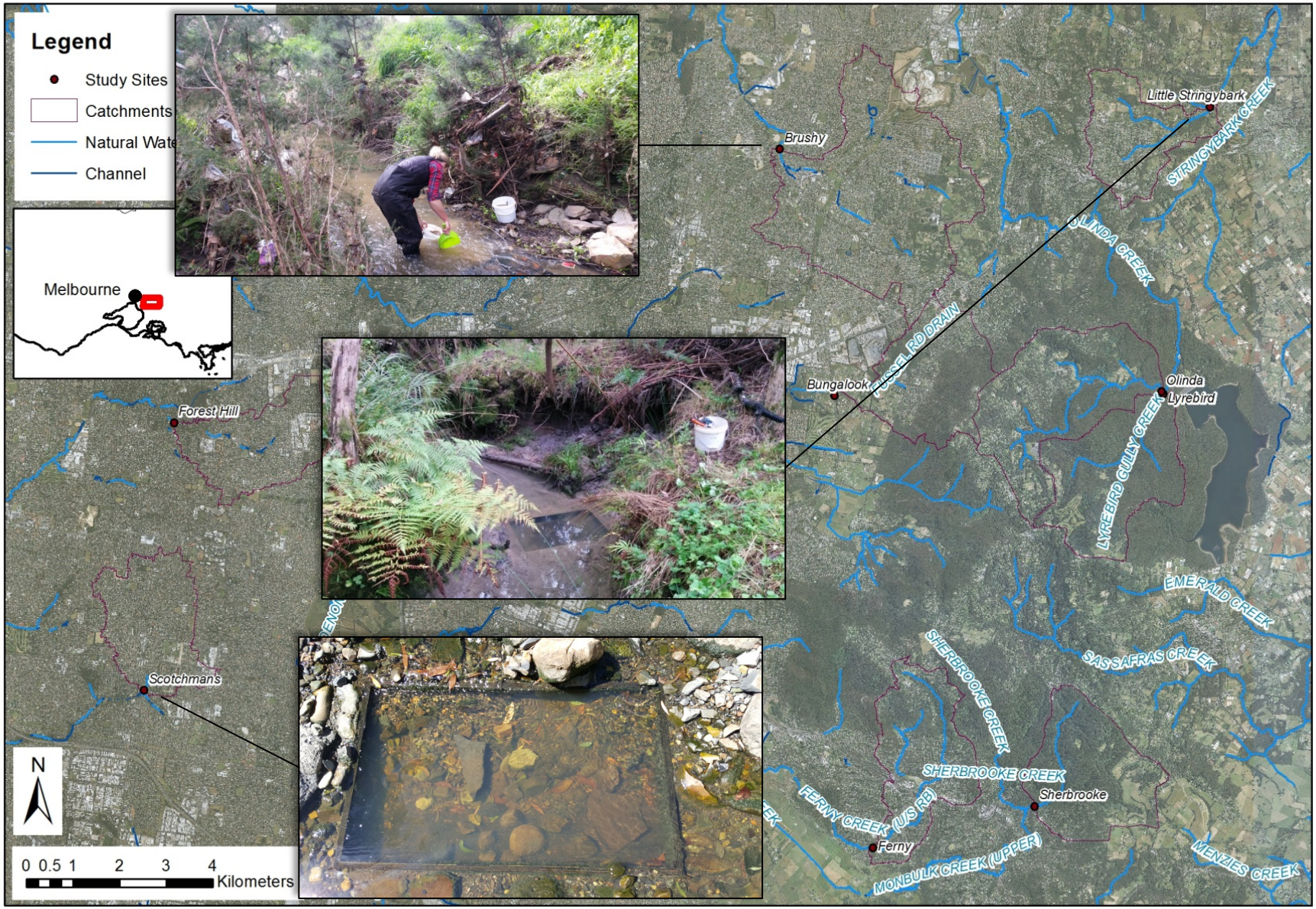
Rosgen (1996) after Lane (1954)

Historical and worldwide context

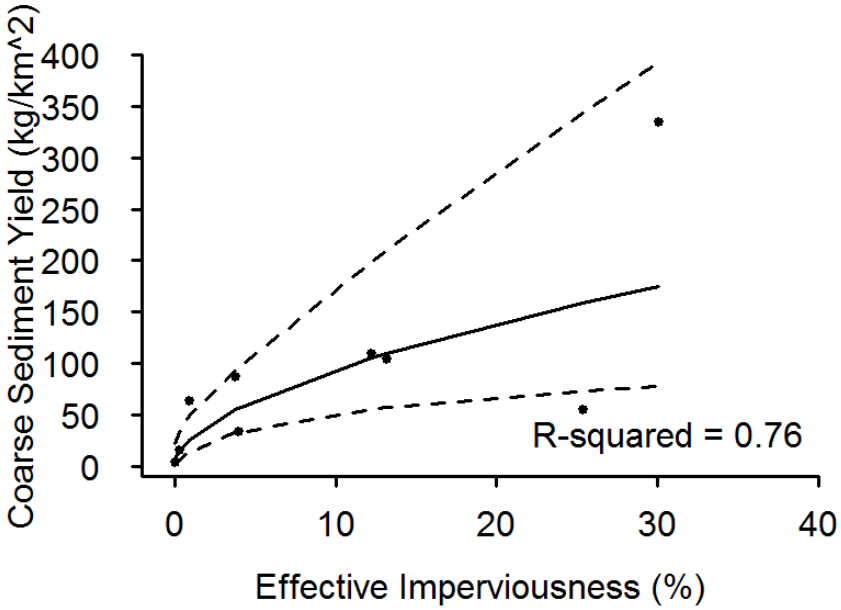


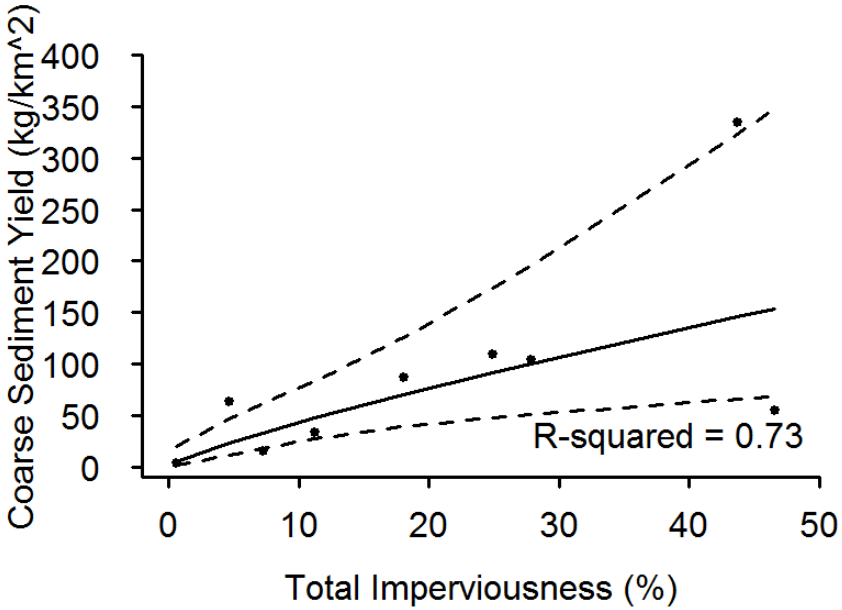
Russell, K. L., Vietz, G. J., & Fletcher, T. D. (2017). Global sediment yields from urban and urbanizing watersheds. *Earth-Science Reviews* 168, 73-80

Bedload monitoring study



Bedload monitoring study - results



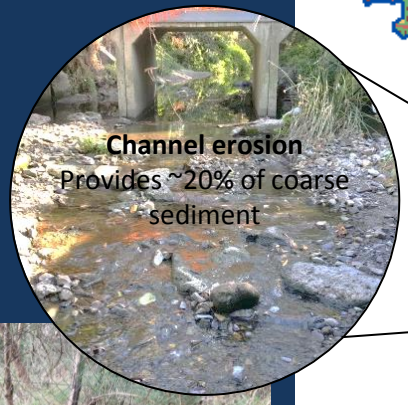


Why does coarse sediment yield increase with urbanisation?

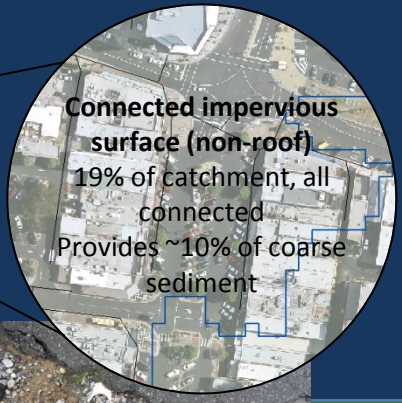
Typical Suburban Sediment Sources: Scotchmans Creek

Construction and resurfacing
1.5% of catchment, unknown connectedness to drainage network.
Provides ~40% of coarse sediment

Gravel landscaped surface
Unknown proportion of catchment (~10%?), unknown connectedness to drainage network.
Provides ~30% of coarse sediment



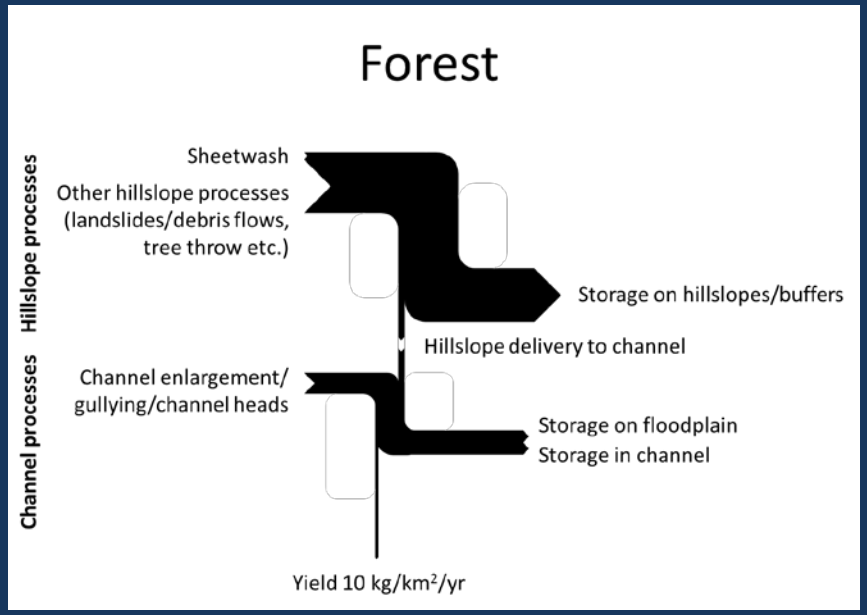
Channel erosion
Provides ~20% of coarse sediment

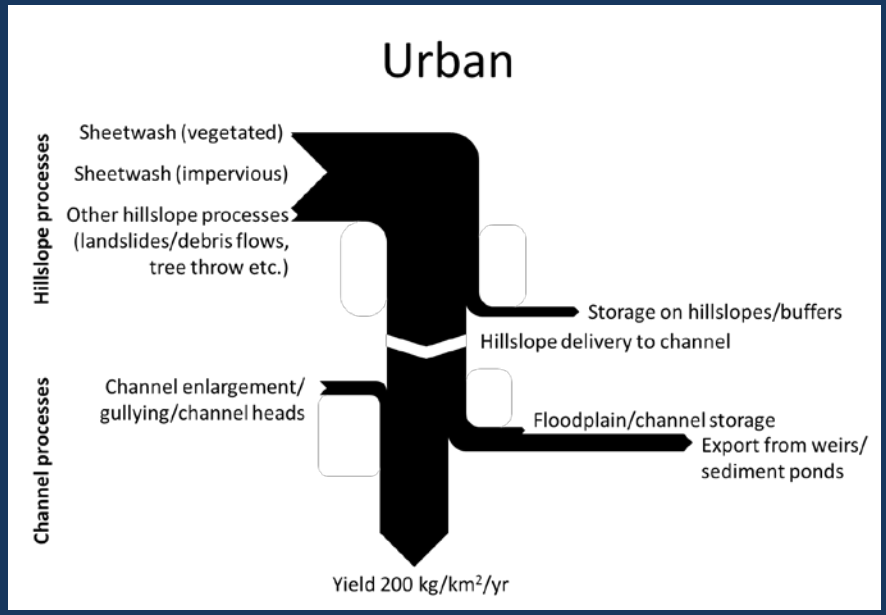


Connected impervious surface (non-roof)
19% of catchment, all connected
Provides ~10% of coarse sediment

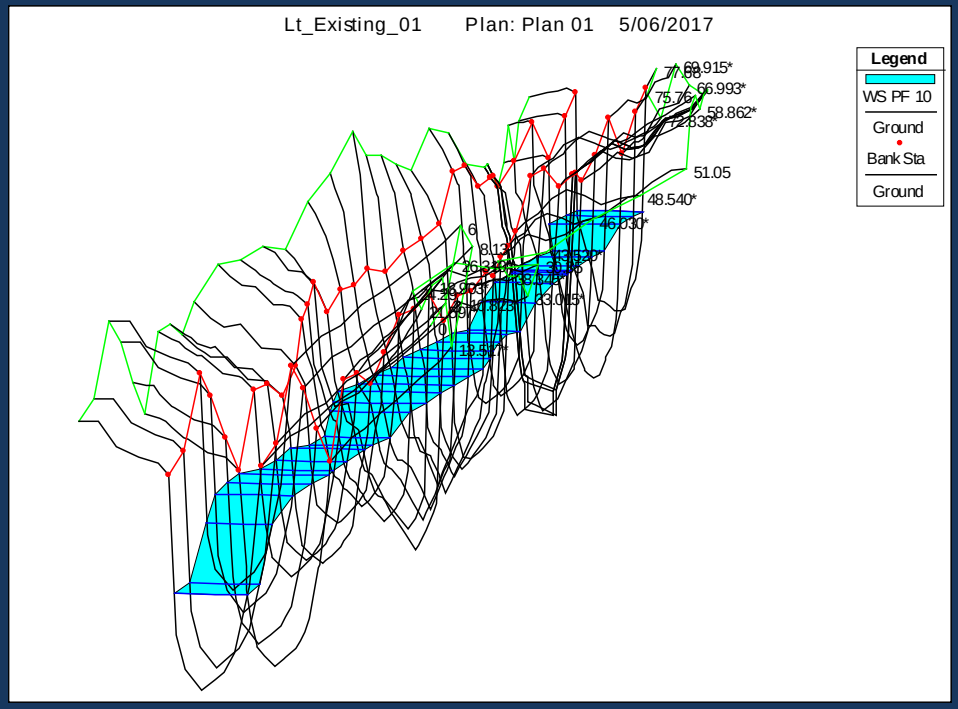
The power of connection

Conceptual sediment budgets





Current/Future Work



Some preliminary implications for management of coarse-grained sediment in urban catchments

It's all about flow!

- Reduce stormwater flows that mobilise bed sediment
- Minimise sediment barriers and replenish or bypass coarse sediment
- Maintain natural catchment processes and provide freedom space for streams to self-adjust