

Project Summary

How can retention, use and treatment of urban stormwater protect or provide natural flow regimes for waterway health?

Project C1: Urban Flows

This project will influence stormwater management policy; support delivery of Healthy Waterways Strategy objectives for stormwater management and environmental flows; and inform management of flood mitigation, urban microclimate and resilience to climate change.

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This project aims to test the assumption that stream protection and restoration is possible through catchment-based stormwater control measures (SCMs). It asks if stormwater runoff from urban developments can be adequately retained, used and treated to protect or restore stream ecosystem structure and function, degraded by urban development with conventional stormwater drainage.

The Little Stringybark and Dobsons Creek project, has demonstrated improvements in flow and water quality regimes, and tentative indications of some ecological improvement in streams in response to sufficiently intensive catchment-based SCMs.

This project builds on that work, continuing assessment of response in those streams, and expands to new catchments in which the limitations of insufficient space (for stormwater control measures) and demand (for harvested stormwater) are likely to be overcome.

The project also expands, through two sub-projects, to investigate specific stormwater control techniques, including (i) real-time control rainwater harvesting systems (Monbulk Creek catchment), and (ii) novel stormwater storage systems incorporating street trees (western urban growth area).

Methods

The primary new location is the eastern part of the Sunbury growth area for which a large integrated water management (IWM) project is proposed. This project is planning on maximising large demands for harvested stormwater, which provide potential for restoration of flow- and water-quality-regimes that are predicted to be adequate for the protection of the small ephemeral tributaries draining the development, and its main receiving water, Emu Creek.

A monitoring program is proposed to establish background data on stream structure and function to permit robust assessment of the effects of the development and its IWM

system.

Other studies to be included in the project, as integrated sub-projects, include:

- Little Stringybark Creek: ongoing hydrologic and water quality monitoring.
- Real-time-control rainwater harvesting systems: testing a network of remotely controlled tanks for provision of environmental flows.
- Smaller-scale assessment of SCM performance: testing alternative streetscape designs for street trees that retain runoff and support expansion of the urban forest.

Outcomes to date

Sunbury growth area:

- Bi-monthly and event-based water quality monitoring of 21 river sites.
- Hydrologic instrumentation and continuous monitoring of 9 small ephemeral tributaries.
- Sampling of stygofauna and macroinvertebrate communities across ephemeral tributaries and river sites respectively.
- Trialing of novel methods for water quality and ecological sampling in ephemeral tributaries
- Investigation of carbon decomposition rates across ephemeral tributaries.

Little Stringybark Creek:

- Continued bi-monthly and event-based water quality monitoring.
- Optimization of Bayesian model structure for final analysis and publication of research findings

Real-time-control rainwater harvesting:

- Preliminary modelling of the Monbulk Creek catchment to support an ARC Linkage Project.

Smaller-scale assessment of SCM performance:

- Passive irrigation of street trees project commenced in Melton.