Project Summary

W3: Sunbury & Headwaters: Protecting Sunbury streams and headwaters from urbanisation.

Objective(s)

This project will contribute to: i) testing if stormwater runoff can be adequately retained, used and treated to protect stream ecosystem structure and function; ii) the development of key conceptual models of headwater stream ecosystem structure and function; and iii) identification of the key drivers and mechanisms of headwater stream degradation.

Why this research is important

The distributed harvesting, infiltration and treatment of urban stormwater close to source and across large spatial scales for the purposes of stream protection is a central tenet of the HWS. Yet up until now there has been no demonstration project that clearly illustrates this is possible in the context of urbanizing areas. The Sunbury IWM and its associated monitoring program is a critical demonstration project that will prove the science and provide a strong and defensible case for the continued application of IWM approaches for new developments both in stormwater priority areas and across the MW management region more broadly.

Headwater streams make large contributions to regional biodiversity and provide the dominant source of water, sediment, and organic matter, and are critical filters of inflows. Despite their importance, research is lacking on the mechanisms and fates of headwater streams, particularly in urbanizing areas. There is insufficient understanding of key fundamental processes, how they vary in response to climatic and geographic variability and how they respond to the application of current approaches to stormwater control and other land-use management practices. This lack of understanding places their protection at risk, because it means that Melbourne Water and its stakeholders are currently unable to demonstrate how and if, headwater streams can be protected in the face of urban development.

Contribution to Key Research Areas

- Hydrology and environmental flows: *Investigating opportunities for managing stream flows in urban catchments to protect and improve aquatic biodiversity, amenity, recreation and reduce flooding.*

Achievements to date

- Technical Report: *Understanding the role of small headwater streams in urbanizing catchments for supporting waterway health*.
- Development and trialed numerous different surface and subsurface water quality, hydrological and ecological monitoring methods.

Approach for Year 3

In Year 3, the project will reduce monitoring effort and increase focus on the consolidation and communication of project findings to support the current Sunbury IWM project design review and inform future monitoring opportunities. Monitoring will now only include: i) nine intermittent tributary sites (measuring both aquatic ecosystem structure and function); and ii) four sites on Emu Creek (water quality, biological structure, channel form & in-stream vegetation).

Key Outputs for Year 3

- Interactive online decision support spatial tool for rapid access to spatially organized data collected across the Sunbury region between 2018-2026.
- A final project report including a Sunbury IWM project water health monitoring plan for 2026 and beyond.
- Journal manuscripts on: i) effects of land use change on headwater stream hydrology, structure and function; and ii) the development of interpretative frameworks for the use of cotton decomposition to assess stream health.
- Draft research grant (ARC Linkage Project) that incorporates Sunbury streams and measures of ecosystem function.

Expected benefits

- Support the preparation of Drainage Schemes and Precinct Structure Plans, and to communicate objectives to developers.
- Provide a database of data on the structure, function and hydrology of headwater streams through time.
- Support the identification of solutions to achieve HWS stormwater targets.
- Use evidence-based approaches to update UPD guidelines to better protect headwater streams from urban and agricultural development.
- Facilitate the selection and interpretation of functional indicators for the next HWS.

For more information

Contact Dr Moss Imberger:
Moss.imberger@unimelb.edu.au