

W10 Waterway Functional Indicators: Developing methods, metrics and strategic management frameworks for waterway function as a key environmental value.

Objective(s)

How best to monitor, report, and manage waterway function as an environmental value for the next Healthy Waterways Strategy.

Why this research is important

A healthy waterway is one that maintains its ecological structure (what is in an ecosystem) and function (what happens in an ecosystem) over time. However, Melbourne Water only assesses changes to, and prioritises management actions for, ecosystem structure. Only a broader program that monitors and assesses ecosystem function alongside ecosystem structure will holistically characterise and evaluate changes to waterway health.

What remains a challenge is not the development of suitable methods but their application in waterway monitoring programs and strategic management frameworks. Of particular importance will be (a) selecting functional indicators that perform well at the required spatial and temporal scale, (b) identifying reference or benchmark values that should be used, and (c) understanding what constitutes a significant change in response to changing conditions including due to management actions.

An understanding of how the chosen functional indicator(s) respond to natural variation and environmental stressors may lead to guidance on how particular actions such as environmental flow delivery can impact ecosystem function and assist with future waterway planning to maximise ecosystem health.

Contribution to Key Research Areas

- Water Quality
Quantifying ecosystem services in waterways for improving water quality to better account for the benefits of healthy waterways.

Achievements to date

- Completion of waterway functional indicators technical report.
- Liaison with other organisations that monitor and report on waterway function
- Synthesis of existing functional indicator data from the Sunbury IWM and Headwater projects
- Trialing of potential functional indicators for selected streams and rivers

Approach for year 3

This year, the project will focus on the following elements:

- Trial of functional indicators. Finalise the fieldwork component of the study, which is testing methods and collecting data to support benchmarking, target setting and our understanding of how the indicators respond to natural variation and environmental stressors.
- HWS integration. Desktop-based work that will support the integration of waterway function into the next HWS.
- Continued synthesis of existing functional indicator data (especially cotton strips).
- Nutrient limitation experiment. A new component focusing on understanding coupled microbial-nutrient dynamics in Melbourne's streams.
- Peer review of method and results.
- Begin scoping work for a research grant (ARC Linkage).

Key Outputs year 3

- Improved understanding of which nutrients drive key changes in stream microbial communities and their activity in the Melbourne region
- Peer review (by international academics) of methods and results for monitoring functional indicators.
- Completion of trial of potential functional indicators for selected streams and rivers, and preliminary data synthesis.

Expected benefits

- A greater understanding of the importance of understanding waterway function alongside waterway structure.
- Methods describing functional indicator(s) for use in the next Healthy Waterways Strategy.
- A conceptual understanding of how the chosen functional indicator(s) relates to environmental conditions, other values, and management actions.

For more information

Contact Dr Ryan Burrows:
Ryan.burrows@unimelb.edu.au