



## Project 4.4 Prioritisation and effectiveness of rural land runoff control interventions

Melbourne Water invests considerable funds in the management of rural runoff, to protect waterway health and quality of drinking water. However, the efficiency of such investments is potentially diminished by two important knowledge gaps. There is often limited information on which to make decisions about prioritisation of pollutant sources. This means that treatment systems may be constructed in the wrong location or may tackle the “wrong problem”. Secondly, the performance of given treatment measures is quite uncertain. Attempts to deal with the second area of uncertainty have often been limited by the difficulty in finding appropriate sites, and particularly by the lack of mature systems already in place.

In 2015 the focus of this project changed from a single property in Wandin to the Tarago catchment, which represents an ideal opportunity to address the research question, and to do so in a way that will provide lessons applicable to many open drinking water catchments.

### Project aims

This project will contribute to addressing these two question, aiming to:

- Develop and test a pollutant source-tracking approach to identify and quantify pollutant (predominantly pathogen-related) sources within

a mixed land-use catchment, and to prioritise the mitigation of key pollutant sources;

- Measure the performance of commonly-applied rural land interventions (focussed around Tarago),
- Use the outcomes of 1 and 2 to develop: (i) a novel spatially-explicit prioritisation tool for implementation of RLP interventions and (ii) a adaptation of MUSIC to use in prediction of performance of interventions.



Figure 1. One of the flow and water quality monitoring stations in the Tarago catchment.

### Project methods

**Pollutant source-tracking:** This component focuses on understanding pollution sources and developing a spatially relevant prioritisation tool for mitigation efforts. The project will achieve this through a combination of monitoring and modelling methodologies.

Monitoring methodologies will rely on the concept of fingerprinting for source identification.

**Performance of runoff control measures:** The project will monitor mature rural runoff control measures within the Tarago catchment, using a BACRI (Before-After-Control-Reference-Intervention) experimental design. It will target riparian buffer planting and will involve flow measurement and water quality sampling at:

- A forested gully (acting as a reference)
- An unplanted agricultural gully (acting as a control)
- A revegetated agricultural gully (intervention)
- A second unplanted agricultural gully (which will be fenced and planted half-way through the project with the aim of continuing to monitor its performance).

**Spatial Prioritisation Modelling Tool:** Data and models developed from the above methods will be joined to accurately model (1) sources of pollution and (2) treatment of these sources using Runoff Control Measures. This modelling tool will be spatially explicit and will enable Melbourne Water to conduct accurate hypothesis testing scenarios, to help them better determine the most effective and efficient mitigation.

#### **Progress to date**

The Beenak work is now complete. The primary focus of work in 2017 has been in the Tarago catchment, extensive fieldwork undertaken by PhD students, Rob Sargetn and Piyumi Thilakaratne. Rob's work has focussed on performance of the established buffer strips; to date his work shows a moderate but significant benefit of the buffer strips in reducing pollutant

load export. Piyumi's work is attempting to understand the sources and transport of pathogens. Her pilot work is identifying the primary sources and will soon examine the extent to which buffer strips may be a sink (or source) for pathogens.

#### **Project team**

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