



# Monitoring water bug responses to environmental water flows in the lower Goulburn River

## What is water for the environment?

Water for the environment is water set aside to improve or maintain the health of rivers, floodplains, wetlands and estuaries - including the plants and animals that depend on them.

## Why is the lower Goulburn River important?

The lower Goulburn River includes the river and associated wetlands and floodplains between the Goulburn Weir and the Murray River (235km). The river supports large areas of river red gum forest, numerous floodplain wetlands, a range of native fish (including Murray cod, trout cod, silver perch and golden perch) and a variety of recreational activities such as fishing and boating. The river also has many important cultural heritage sites and provides water for agriculture and urban centers.

Regulation of the Goulburn River has affected natural flow patterns and volumes.

This, along with recent droughts and floods, has led to a decline in the environmental health of the river.

## How is water for the environment used?

The Commonwealth Environmental Water Holder (CEWH), the Victorian Environmental Water Holder and the Murray-Darling Basin Authority hold environmental water entitlements available for use in the Goulburn River. To date environmental water use in the lower Goulburn River has focused on:

- increasing base flows throughout the year to increase habitat for native fish and invertebrates; and
- providing 'freshes' (short pulses of flow) - generally during the cooler months - to provide life cycle cues for native fish, maintain water quality and support the establishment of vegetation on the riverbank.

## What is the FLOW-MER Project?

The CEWH has established the FLOW-MER project to monitor and evaluate the ecological outcomes of water for the environment use. The FLOW-MER project builds on the work of the Long-Term Intervention Monitoring project (2014 to 2019) at seven Selected Areas including the lower Goulburn River.

Monitoring and evaluation is essential to ensure water for the environment is used as effectively and efficiently as possible, and that the Commonwealth Environmental Water Holder meets its obligations under the *Water Act (2007)*. The project aims to evaluate the large-scale effect of environmental flows, as well as specific responses in each Selected Area.

Data from this project will also be analysed with data from the other six Selected Areas to inform a Basin-scale evaluation of the contribution of environmental water to the environmental objectives of the Basin Plan (<https://flow-mer.org.au/>).

*The Flow-MER program team acknowledges and respects the Traditional Owners of the land and waterways. We pay our respects to Elders past, present and emerging.*

### Why are bugs (invertebrates) being monitored?

Monitoring has been established in the lower Goulburn River to assess the effect of environmental flows on a range of values, including invertebrates.

Invertebrates are small animals without backbones, such as insects.

Invertebrates are an essential component of river foodwebs. They eat algae and other plant material and breakdown woody material that falls into the river. They also provide a very important food source to many fish, as well as other animals that spend time in or near the water such as birds. Invertebrates live within the sediment, on rocks and on aquatic vegetation within rivers. Across the world, invertebrates are the single most widely used biological indicator of river environmental health.

Water flows and 'freshes' at the right time of the year maintain the habitat that invertebrates need and also provide food.

Monitoring invertebrates helps us understand how environmental flows influence the range of species present, their biomass (amount) and their ability to reproduce.

### The invertebrates of the Goulburn River

A wide variety of invertebrates can be found in rivers such as the Goulburn, including dragonflies and damselflies, mayflies, beetles, snails, water fleas, worms, mussels and crayfish. Large lowland rivers such as the Goulburn River often tend to have species that are common to simple habitats and those that are tolerant to quite poor water conditions.

### What do the invertebrate surveys involve?

Most invertebrates go through changes in appearance during their lifecycle, known as metamorphosis. Thus

invertebrate surveys are designed to be able to detect eggs, larvae, nymphs (immature stages) and adults.

Two sampling methods are used to monitor invertebrates :

- Sweep samples – a hand net is swept through the water to sample habitats along the river's edge.
- Bait traps - Five bait traps are deployed overnight at each site, preferably among complex habitat (eg. snags) where possible.

### Who is undertaking the work?

Our project team is a collaboration between the Goulburn Broken Catchment Management Authority, University of Melbourne, the Arthur Rylah Institute (Department of Environment, Land, Water and Planning), RMIT University, Monash University, Streamology, Yorta Yorta Nation Aboriginal Corporation, and Jacobs.

### How can I find out more?

For further information contact Simon Casanelia at the Goulburn Broken Catchment Management Authority (simonc@gbcma.vic.gov.au).



*Monitoring during 2014-19 showed that macroinvertebrates, and particularly crustaceans (shrimp and prawns), tend to increase in numbers and biomass following spring freshes. However, the largest increases in biomass were observed following natural overbank flows (eg. in 2016-17) when presumably large amounts of organic carbon were washed into the river and subsequently consumed by macroinvertebrates. More research is needed to understand the relationship between flows and macroinvertebrate numbers.*

**FLOW** | Monitoring  
Evaluation  
Research



Lower Goulburn River

<https://flow-mer.org.au/>