Understanding the interactions between groundwater, surface water and Groundwater Dependent Ecosystems

Groundwater
Project B4

The project will help Melbourne Water identify GDEs that could be at imminent risk of contamination, as well as provide guidance on the selection, design, scale and location of stormwater control measures to mitigate the risks of adverse outcomes on groundwater flow and quality.

Project Team:
University of Melbourne
Matthew Burns
Tim Fletcher
Peter Poelsma
Andrew Western
Meenakshi Arora
Fern Yong

Melbourne Water
Marion Urrutiaguer
Sarah Gaskill
Richard Akers

External:
Ian Cartwright (Monash University)

Melbourne Water makes substantial investments in Groundwater Dependant Ecosystems (GDEs), however, there is some uncertainty around the potential for contamination. Melbourne Water also promotes stormwater infiltration as an important strategy in the restoration of baseflows, which are typically depleted in urban streams. But again, there is substantial uncertainty on the fate of that infiltrated stormwater. Questions remain around how much infiltrated stormwater becomes baseflow; how much is used by downslope vegetation and the potential for infiltrated stormwater to mobilise legacy pollutants to the stream.

This project seeks to increase our understanding of the interactions between groundwater, surface water and GDEs in key locations across the Port Phillip and Westernport region. In particular, it will seek to quantify the age and transit time distribution of ground- and surface waters. This new information will help identify GDEs that could be at risk of contamination, particularly those where water travel times are very short.

Progress to date

The project has been working to answer these questions through an existing ARC Discovery Project, which is almost complete. This work has shown that vegetation downslope of infiltration systems can use infiltrated stormwater. This has important implications on the use of stormwater infiltration systems not only for baseflow restoration, but for urban greening and microclimate amelioration.

Additionally, the work to date has revealed how stormwater infiltration influences the biogeochemistry of the subsurface, with preliminary results suggesting that local site factors (e.g. previous land-use and geology) likely play a major role in water chemistry.

Expected outcomes

- Improved understanding on the influence of bioretention basins on groundwater levels and evapotranspiration by nearby trees.
- Improved understanding of the mechanisms at play in SCM and ground water interactions re: pollutants.
- Contribution to Melbourne Water's development of infiltration guidelines.
- Advice and guidance on the selection, design, scale and location of SCMs to mitigate the risks of adverse outcomes on groundwater flow and quality.

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Waterway Ecosystem Research Group