

A2: Understanding the threat of climate change to water quality in waterways to inform mitigation opportunities

Objective(s)

To understand the threat of climate change to waterway water quality and key environmental values across the region to identify risks and opportunities to build climate resilience in the coming decades.

Why this research is important

Climate change is recognized as a significant threat to waterway health in our Healthy Waterways Strategy. While we currently have predictions of climate change impacts to air temperatures and rainfall and can predict habitat suitability for environment values (e.g. macroinvertebrate, fish and platypus Habitat Suitability Models) under a range of possible climate futures, we lack an understanding of the impacts of climate change to water quality (e.g. stream temperature, dissolved oxygen, salinity) and how that relates to the tolerances of particular species. This project proposes to address experimental knowledge gaps through provision of data on ecological responses (acute and chronic thresholds) to predicted changes in water quality due to climate change.

Contribution to Melbourne Water research priorities

Key Research Area: Water Quality - Understanding the impact of climate change on water quality and management implications for the protection of aquatic biodiversity, amenity and recreation along waterways.

Achievements to date

- Systematic knowledge review on the impacts of climate change on water quality, focusing on elucidating macroinvertebrate, fish and frog species' thresholds to temperature increases and changes in dissolved oxygen (due end Year 2).
- Set up of lab equipment to determine local species' thresholds to changes in water quality parameters.

Approach for Year 3

This project is a joint project between A3P and MWRPP through research being undertaken by MWRPP (Project W4).

Having identified water temperature as a key parameter impacted by climate change, toxicological assessments will be undertaken to determine tolerance thresholds for key vulnerable species. The initial focus will be on developing laboratory methods for assessing the impacts of temperature on key values and trialling methods. Followed by subsequent experiments evaluating field-collected animals from various regions within Greater Melbourne

Key outputs for Year 3

- Development of tolerance thresholds for impacted water quality indicators (temperature initially) and key environmental values.
- Summary report outlining tolerance thresholds for temperature for laboratory cultured and field collected macroinvertebrates

Expected benefits

- Information to help identify the most vulnerable environmental values to climate change and management opportunities to build waterway climate resilience
- Identification of climate risks and management priorities to support the development of Performance Objectives and management targets in the next HWS.

For more information, contact Jackie Myers, jackie.myers@rmit.edu.au.