

Transitioning to a resilience approach to managing environmental water under a variable and changing climate

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Abstract: Climate change is projected to decrease river flows by 20% in the Murray Darling Basin, and under current policy settings the riverine environment will be most impacted by these changes (Prosser et al., 2021). The adverse impacts of climate change on river ecosystems are occurring at a faster rate than previously predicted. Unfortunately, the current generation of management tools are largely based on a stationary view of historic climate, and new approaches are urgently needed to guide river ecosystems management in an uncertain and changing future (Horne et al., 2019, Horne et al., 2017c, Poff, 2018).

There is now a wide body of literature exploring decision making under deep uncertainty (Marchau et al., 2019). However, there has been limited application of these approaches to large scale river basins (Fowler et al., 2022a). This presentation will discuss the feasibility and utility of applying vulnerability assessments to large scale regions for the purpose of environmental objectives (Figure 1). In order to shift the way we think about climate change and uncertainty, there are a range of both technical and modelling challenges, but also transitions needed in the way we consider objective setting and participation in decisions. I will provide an overview on the progress on these “building blocks” that will allow us to shift to thinking about resilience in the way we plan for environmental water. The presentation will touch more broadly on resilience as a concept in government policy for water resource and the implications for modelling to support water management decisions.

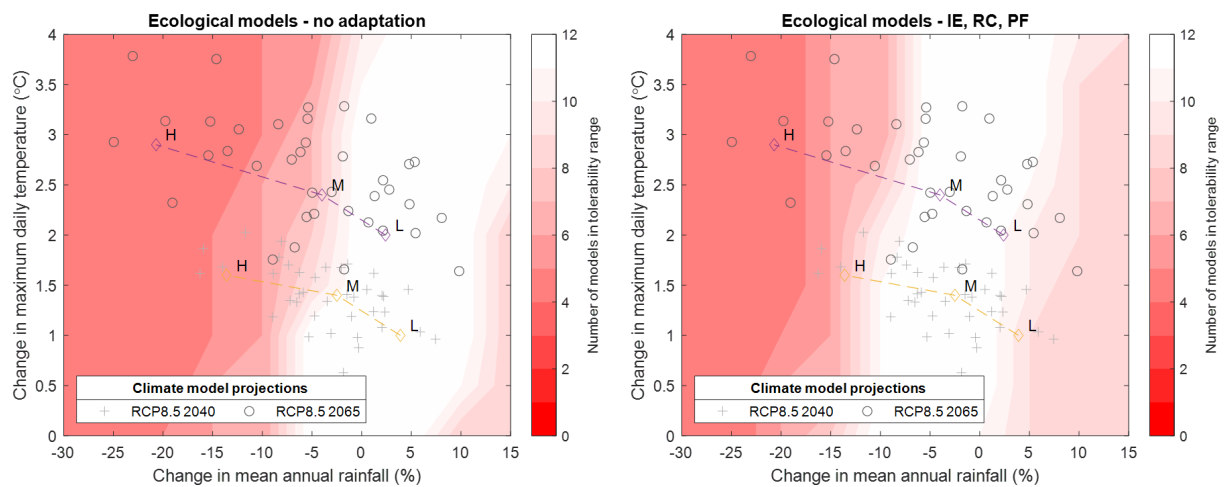


Figure 1. Examining adaptation options based on changes to vulnerability. (a) shows the environmental vulnerability of the system under current policy and management. (b) shows how the vulnerability surface shifts, providing better outcomes for the environment across a range of drier climates, under changes to constraints (RC), environmental entitlements (IE) and passing flow rules (PF). Policy options can be assessed individually or in combination to understand how well they address stakeholders risk appetites.

Keywords: Environmental water, climate change, resilience, vulnerability assessment