

W13 Climate Impacts & Vegetation: Approaches to increasing the resilience of vegetation in a changing climate.

Objective(s)

To better understand strategies that can foster remnant vegetation and revegetation resilience to the range of climate and compound impacts, what these strategies involve, the relative merits of candidate strategies and the implications for knowledge needs, planning, management and implementation.

Why this research is important

Vegetation management and revegetation are key activities of Melbourne Water for the maintenance and improvement of riparian and waterway habitat and condition. Climate change is a major threat to and challenge for vegetation management. Updated projections show that we have likely underestimated predicted impacts to environmental conditions and values.

Sustained warming and drying patterns are expected to be accompanied by extreme events such as heatwaves, extreme rainfall, dangerous fire weather, droughts, floods, and compound events. Given the non-stationary changes to climate, risk management will need to be iterative, learning-oriented and adaptive.

Contribution to Key Research Areas

- Streamside vegetation and instream habitat
Understanding the potential impacts of climate change on riparian vegetation communities and opportunities to effectively build resilience or transition vegetation communities

Achievements to date

- Technical report synthesizing background and context on climate change impacts and vegetation management, providing a foundation for understanding the range of climate change impacts and their implications for vegetation management planning, practices, systems and governance.
- Preliminary findings from a traits-based study, providing a more mechanistic perspective for investigating and understanding plant performance and resilience to climate impacts.

Approach for year 3

This project will be delivered through the four actions:

- *Synthesis of climate change impacts and vegetation management.* Working with

Melbourne Water teams to develop and deliver a communication plan for the synthesis report.

- *Lessons learnt in climate-adjusted planting projects.* Collate and document past and current Melbourne Water attempts at implementing climate-adjusted planting projects
- *Trait-based approaches to understanding plant performance and resilience to climate impacts.* Trait measurements for 10 functional traits for 16 graminoid, herbaceous and woody species, to characterise the degree of plasticity of these traits for each species, across a climate gradient. Further develop trait database for species of interest to Melbourne Water.
- *Assessing the effectiveness of climate-adapted plant provenances for Climate Future Plots.* PhD project to assess the growth, survival and traits of different species from hotter and drier and local provenances.

Key outputs for year 3

- Communication of synthesis report content and recommendations
- Report on the lessons learnt from attempts to implement climate adjusted provenancing.
- Communication of Year 2 climate-resilient plant traits research findings, insights & utility.
- Further development of the traits database with data from studying traits plasticity & phylogenetic mapping.

Expected benefits

- Better understanding of climate phenomenon and extremes, and the implications for vegetation management.
- Better understanding of intervention options for supporting vegetation resilience—ones already in use, ones that can be implemented in the near-term, and ones that could be added if knowledge gaps and dependences/requirements for application are addressed.
- Better understanding of the range and nature of challenges and benefits associated with implementing climate-adjusted provenancing.
- New knowledge and understanding of multiple plant traits and how they relate to climate-resilient strategies for multiple climate stressors (e.g. drought, fire)

For more information

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