Surveys and Modelling   **Statewide**

Understanding the effects of flows (and non-flow factors) on riparian vegetation.

Aims

To quantify the effects of flows (and non-flow factors) on riparian vegetation.

The project aims to fill key knowledge gaps around how flow events and regimes influence vegetation, and quantify the impact of key factors that may limit responses to flows. These include:

• Determine the magnitude of vegetation changes in response to different environmental flow events.

• Determine how these vegetation changes accumulate over time, under different flow regimes and within different waterways.

• Identify interactions with species and physical parameters such as soil and riverbank structure.

• Determine how this information can be used to predict changes in riparian vegetation under potential future management and climate scenarios.

Victorian Environmental Flows Monitoring and Assessment Program

Background

Protecting riparian vegetation is a major priority for environmental flow management in most regulated Victorian waterways, in recognition of its critical functional role in riparian ecosystems. Many seasonal watering proposals include vegetation objectives. Flows at the appropriate time, frequency, magnitude and duration promote plant dispersal, recruitment, growth, and also provide a competitive advantage over terrestrial species. Encroachment of terrestrial species can lead to a loss of riparian plant abundance and diversity, altered habitat availability and functional performance as well as make riparian ecosystems less resilient to large flooding events.

Since 2016, VEFMAP has collected valuable monitoring data regarding vegetation responses to environmental flows. A data collection and analysis approach was developed to demonstrate vegetation outcomes from individual flow events, compare the magnitude of outcomes between waterways, and subsequently guide flow management decisions. However, this work is far from complete and new data and evaluation are needed.

Research questions

1. How important are environmental flows for achieving riparian vegetation outcomes in different waterways, given limiting factors (e.g. livestock grazing, exotic vegetation cover) and the broader flow regime?

2. What is the predicted outcome of recent environmental flow regimes in different waterways?

3. How can the timing of delivering a fresh be optimised to develop and maintain fringing and emergent plant populations in the riparian zone?

4. How transferable are riparian vegetation responses to environmental flows within and between waterways?

Approach

The project expands on the field monitoring and statistical modelling approaches developed in VEFMAP Stage 6. The following will be conducted in 2022-24:

Field Surveys

• Conduct vegetation surveys along the Moorabool and Glenelg rivers on three occasions (spring, summer, autum 2022/23) and once in the Campaspe River in summer, after recent flooding. Monitoring will include vegetation cover, species' diversity, vegetation assemblages (communities within and among sites) and vegetation distributions (within and among sites). This monitoring will include the existing grazing exclosure plots.

Hydrological Data

• Collect data regarding past and present water regimes, particularly flow elevation, from water level loggers on site as well as from relevant long-term gauge stations.

Data analysis and modelling

• Collate new and existing vegetation data.

• Construct and validate statistical models. Determine statistical relationships between hydrological treatment variables (related to flow events and flow regimes) within and among sites and other predictor variables on riparian vegetation cover and species' richness.

• Use predictive models to assess past flow interventions via counterfactual models of responses if flows had not been delivered, and predict outcomes of proposed interventions and under alternate climate scenarios.

Timeline July 2022 - June 2024

Outputs

• Brief **Field Updates** will be distributed to key stakeholders after each field trip.

• A **Final Report** will be produced, outlining the project background, methods, results, discussion and recommendations for management.

Outcomes

• Evidence of vegetation responses to environmental flow events and regimes.

• Improved understanding of the effectiveness of environmental flow management, including quantifying the effects of past interventions and predicting the outcomes of future interventions.

• Advice for managers to inform seasonal and annual watering decisions to benefit riparian vegetation.

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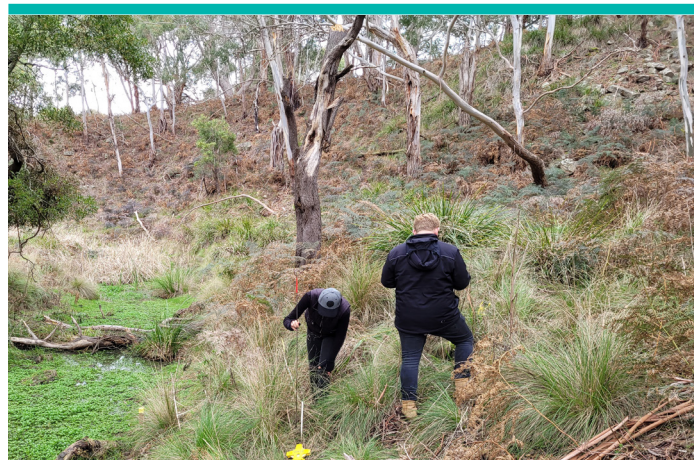
Ana Backstrom (consultant) and Greg Robinson (Wadawurrung Traditional Owners Aboriginal Corporation) monitor riparian vegetation at a site along the Moorabool River.

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