



Hydrology assessment + expert elicitation

Statewide

## Comparing flow and non-flow drivers of riparian vegetation communities and their interactions

### Aim

**To identify and quantify the effects of flow and non-flow factors on riparian vegetation responses to environmental flows.**

The project aims to provide information to water managers to improve the benefits of environmental flow releases to riparian vegetation. It will:

- Determine reaches or waterways where environmental flows make up a relatively large part of the flow regime and therefore may be expected to provide the greatest benefits for riparian vegetation.
- Determine factors which are likely to reduce or prevent environmental flow benefits so that they can be taken into account in setting management objectives and expectations.
- Determine where these flow and non-flow drivers are occurring and co-occurring in Victorian waterways (where data/knowledge are available) so that management scenarios of flow and non-flow factors can be identified.
- Quantify through expert knowledge the relative influences of flow and non-flow factors and their interactions on vegetation so that management scenarios can be tested and prioritised.
- Identify other management actions that, if taken, could increase the benefits of environmental flow releases on riparian vegetation.

**Victorian Environmental Flows Monitoring and Assessment Program**

# The effects of flow and non-flow factors on riparian vegetation

## Background

**Providing environmental flows is a key tool used in the management of regulated rivers. The expected response of native vegetation to environmental flows can however be influenced by a range of factors, many of which are unrelated to river flows. These non-flow factors include livestock grazing, and exotic plants and animals. Understanding how, and to what degree, these non-flow factors may limit the beneficial outcomes of environmental flows to native vegetation is vital in determining what can be achieved by these environmental flows and under what circumstances. This knowledge could also guide the use of complementary actions to enhance the outcomes of water management.**

There is a need for a comprehensive, evidence-based understanding of the relative importance of flow and non-flow factors, the strength of their effect, how they interact with each other and how their impact may vary under different circumstances. This understanding will provide guidance to managers on how native riparian vegetation is likely to recover if these factors are managed in combination with environmental flow deliveries. It can also help focus management effort on the non-flow factors that could maximise environmental flow benefits. Integrated catchment management requires multiple factors to be addressed simultaneously.

### Research questions

1. What are all the non-flow factors that are currently thought likely to influence the benefits of environmental flows for native riparian vegetation in Victorian rivers?
2. What are the relative effects of flow and non-flow factors on native riparian vegetation in Victorian rivers?
3. How do these factors interact with each other?
4. What are the priority knowledge gaps that should be addressed to improve Victoria's environmental flow program?
5. What are the management implications for native riparian vegetation responses to environmental flows, given the above?

This project complements a related project which is using monitoring and modelling approaches to quantify the effects of environmental flows, and non-flow factors, on riparian vegetation.

### Approach

#### *Hydrological and hydraulic assessment - target reaches*

- Evaluate flow data to determine the priority environmental flow components for vegetation and how often they are delivered as specified within environmental flow plans.
- Identify the water level and portion of riverbanks that are inundated by environmental flow components.

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- Quantify the relative contribution of environmental flows towards the total flow regime.
- Quantify how much the recent flow regime differs from estimated unregulated conditions.

#### *Expert elicitation*

- Undertake a literature review of flow, and non-flow factors which affect riparian vegetation in Victorian waterways. Rank the importance of each factor in interacting with environmental flows, to assist in developing questions for expert elicitation.
- Undertake a workshop with riparian vegetation experts from Victoria to answer questions, discuss, collate and analyse responses.
- Develop a quantitative predictive model, using the data from the literature review and expert elicitation, to test flow scenarios and compare management options to deliver vegetation outcomes.

**Timeline** August 2022 - June 2024

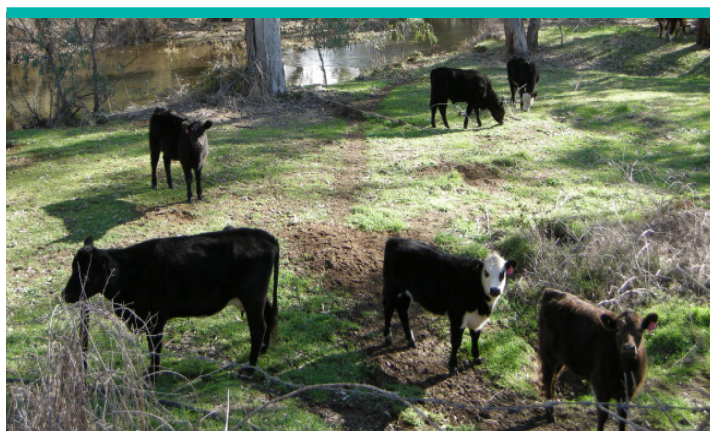
#### **Outputs**

- A **Summary Report** of the hydrological analysis.
- A **Final Report** will be produced, outlining the project background, methods, results, discussion and recommendations for management.

#### **Outcomes**

- Improved understanding of the importance of flow and non-flow factors in the responses of native riparian vegetation to environmental flows.
- Advice for managers to inform seasonal and annual watering decisions to benefit riparian vegetation, including the use of complementary actions.

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*Cattle damage is a non-flow factor which affects riparian vegetation*