

Evacuation modelling is advancing – but what is needed to make it response-ready?

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Supporting evacuation decisions: What modelling can – and can't – do yet

Community evacuation is a critical life-saving strategy requiring decisions under uncertainty. Evacuation modelling supports understanding community risk and movement under hazard scenarios; however, despite evidence of use in planning, integration into live emergency response remains a major gap. This research examines current use across Australia and identifies priority requirements to support operational, decision-ready evacuation modelling.

Current use in Australia

Five evacuation modelling tools were identified as being in use across Australia for a range of hazards – bushfire, flood, tsunami and cyclone. Evacuation models are used (or not) to varying extents across jurisdictions and currently support planning, emergency training and community education (refer to Figure 1. below).

Current models primarily represent road and pedestrian movement.

What current models can do

- Simulate traffic flow and congestion
- Estimate evacuation timing and clearance
- Assess impact of road closures and network constraints
- Explore 'what-if' scenarios to test evacuation plans and assumptions.

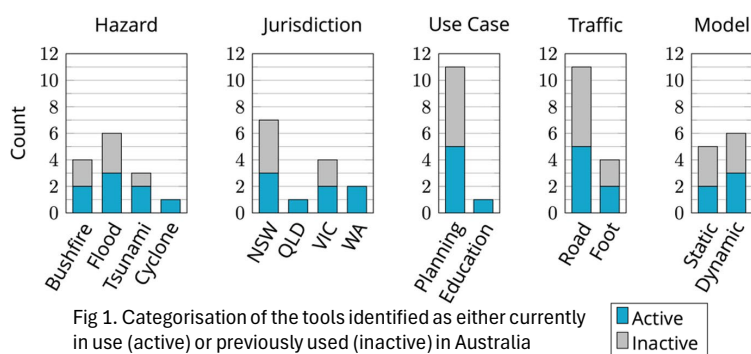


Fig 1. Categorisation of the tools identified as either currently in use (active) or previously used (inactive) in Australia

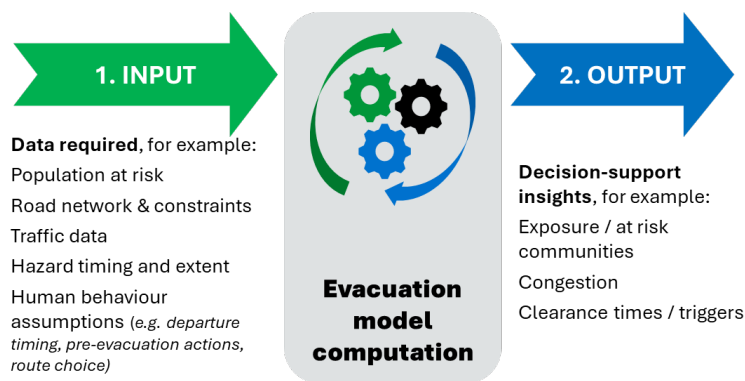
This project

Using a highly collaborative, multi-hazard approach, this project has:

- Developed a paper that outlines the current use of tools in Australia,
- Conducted multi-jurisdictional, multi-hazard workshops to identify user needs for evacuation decision support tools.

This project will develop a nationally agreed and prioritised roadmap, and explore potential uses for evacuation modelling across different contexts.

Decision-support tool concept



Used for planning → not yet used in response.

Emerging themes and requirements

Theme	Requirement <i>Decision-maker questions for evac models</i>
Community capacity and response	1.1 Effective warnings and public information (scope?) <i>Do warnings reach people, do they trust them and do they act on them?</i> 1.2 Behavioural response insights <i>Who will act, who can act and who needs support?</i>
Emergency Management preparedness and response	2.1 Clear and timely triggers <i>When to act? How much time do we have?</i> 2.2 Common operating picture <i>Are we all seeing the same thing and can we act on it?</i>
Infrastructure planning	3.1 Stronger route and traffic planning <i>Can the traffic network cope, where will it fail and how do we move people through it?</i> 3.2 Resilient infrastructure and system reliability <i>Where will the system fail (e.g. energy, telecommunications, supply chain)? What's happening now and where do we act first?</i>
Assisted evacuation planning	4.1 Facility planning and preparedness <i>Who is at risk and how do we help them?</i>

Fig 2. Themes and requirements emerging from multi-hazard workshops

