Natural Hazards Research Australia

Multi-hazard public information and warning platforms for the future

T7-A1

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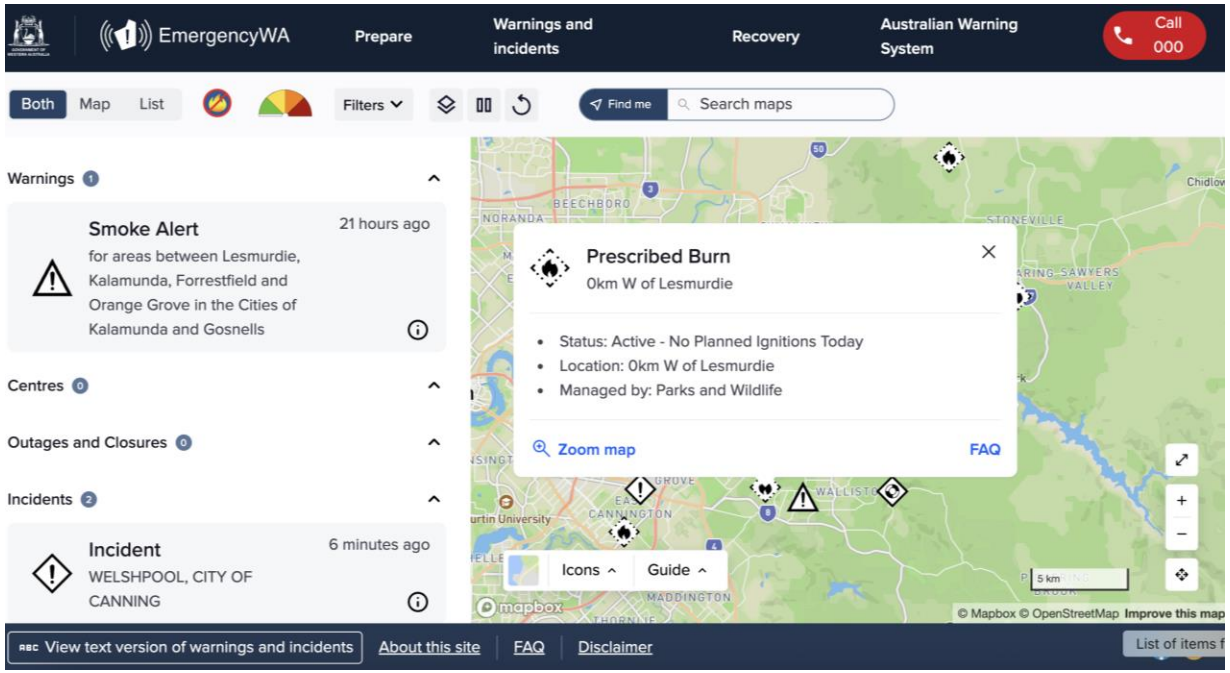
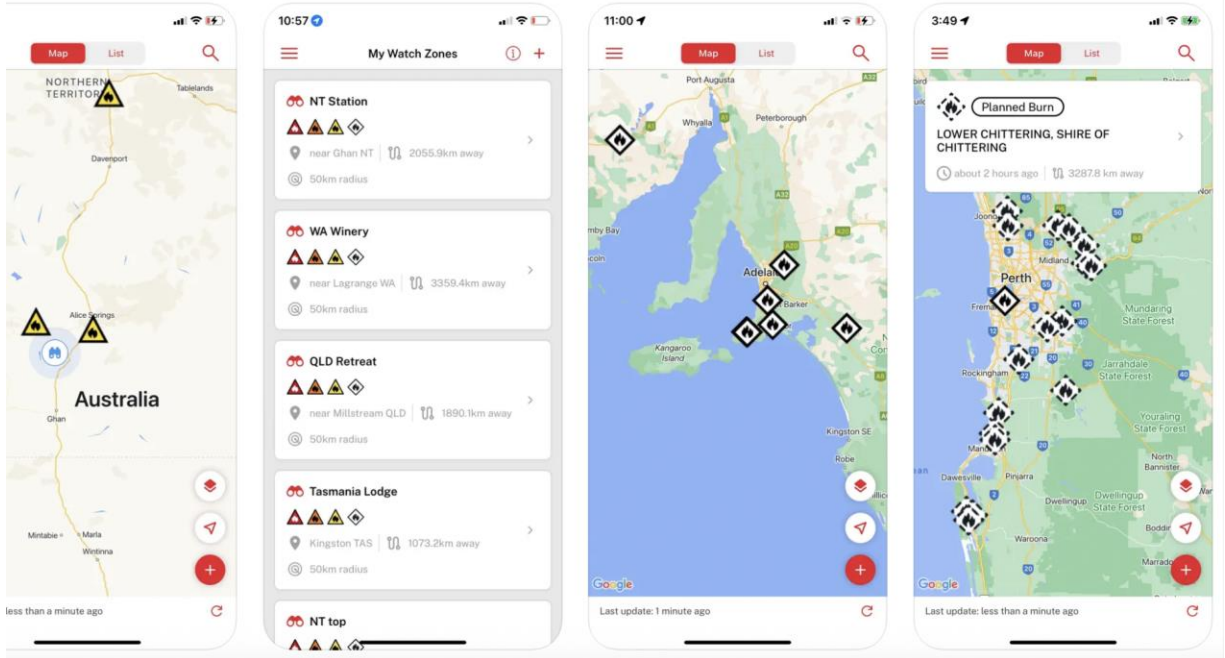
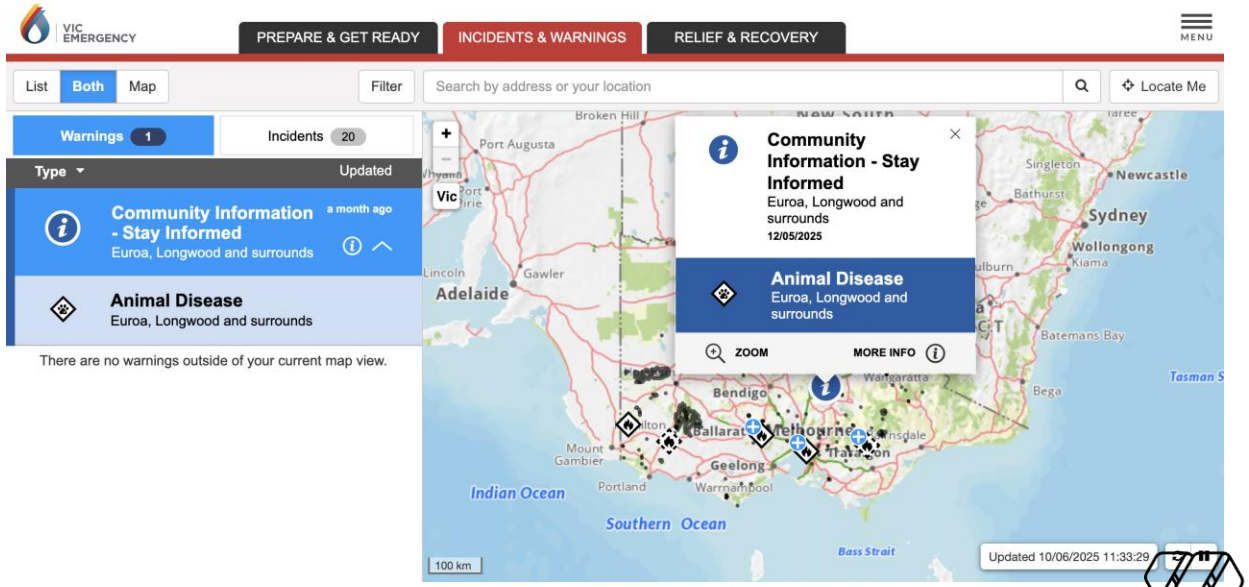




Australian Warning System



Project Aim

This research aims to understand how multi-hazard public information and warning **platforms** contribute to public safety within a broader risk communication framework, seeking to explore future communication innovations and capabilities.

Research Team

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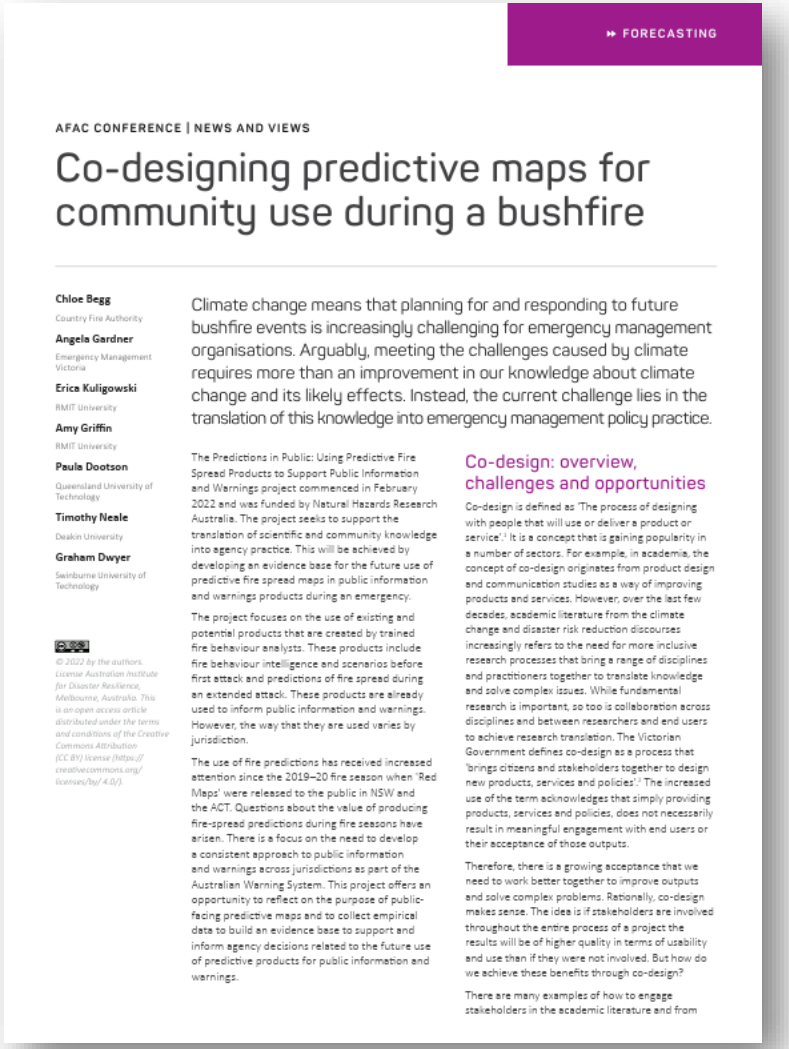
Chloe Begg

Steering Committee

- Katelyn Samson – AIDR
- Carla Mooney – BOM
- Rachel Guy – CFS, SA
- Reegan Key – EMV, VIC
- Anni Fordham – DFES, WA
- Blythe McLennan – NHRA
- Lara Wedding – NHRA

And we report into the AFAC Warning Groups and the AFAC Research Policy and Doctrine working group.



FORECASTING

AFAC CONFERENCE | NEWS AND VIEWS

Co-designing predictive maps for community use during a bushfire

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Climate change means that planning for and responding to future bushfire events is increasingly challenging for emergency management organisations. Arguably, meeting the challenges caused by climate requires more than an improvement in our knowledge about climate change and its likely effects. Instead, the current challenge lies in the translation of this knowledge into emergency management policy practice.

The Predictions in Public: Using Predictive Fire Spread Products to Support Public Information and Warnings project commenced in February 2022 and was funded by Natural Hazards Research Australia. The project seeks to support the translation of scientific and community knowledge into agency practice. This will be achieved by developing an evidence base for the future use of predictive fire spread maps in public information and warnings products during an emergency.

The project focuses on the use of existing and potential products that are created by trained fire behaviour analysts. These products include fire behaviour intelligence and scenarios before first attack and predictions of fire spread during an extended attack. These products are already used to inform public information and warnings. However, the way that they are used varies by jurisdiction.

The use of fire predictions has received increased attention since the 2019–20 fire season when 'Red Maps' were released to the public in NSW and the ACT. Questions about the value of producing fire-spread predictions during fire seasons have arisen. There is a focus on the need to develop a consistent approach to public information and warnings across jurisdictions as part of the Australian Warning System. This project offers an opportunity to reflect on the purpose of public-facing predictive maps and to collect empirical data to build an evidence base to support and inform agency decisions related to the future use of predictive products for public information and warnings.

Co-design: overview, challenges and opportunities

Co-design is defined as 'The process of designing with people that will use or deliver a product or service'.[1] It is a concept that is gaining popularity in a number of sectors. For example, in academia, the concept of co-design originates from product design and communication studies as a way of improving products and services. However, over the last few decades, academic literature from the climate change and disaster risk reduction discourses increasingly refers to the need for more inclusive research processes that bring a range of disciplines and practitioners together to translate knowledge and solve complex issues. While fundamental research is important, so too is collaboration across disciplines and between researchers and end users to achieve research translation. The Victorian Government defines co-design as a process that 'brings citizens and stakeholders together to design new products, services and policies'.[2] The increased use of the term acknowledges that simply providing products, services and policies, does not necessarily result in meaningful engagement with end users or their acceptance of those outputs.

Therefore, there is a growing acceptance that we need to work better together to improve outputs and solve complex problems. Rationally, co-design makes sense. The idea is if stakeholders are involved throughout the entire process of a project the results will be of higher quality in terms of usability and use than if they were not involved. But how do we achieve these benefits through co-design?

There are many examples of how to engage stakeholders in the academic literature and from

Approach

Phase	*Purpose*	*Output*	*Outcome*
Phase 1: Co-Designing the Research Program (2025)	The purpose of Phase 1 is to co-design the specifics of the research program outlined in this proposal with the project Steering Committee.	The output of this phase is an endorsed research program.	Initiation of the project itself.
Phase 2: Systematic Review (2025)	The purpose of the systematic review, led by QUT, is to analyse existing research on, and agency practice related to, multi-hazard public information and warning platforms and practice to inform the knowledge gaps outlined in the Call for EOI.	Insights from the audit, literature search, current practice review, and Knowledge Sharing Forum will be consolidated into a report.	The outcome of this phase will be the consolidation of insights on (a) existing standards and principles in Australia and internationally, (b) current platform implementation, (c) existing jurisdiction review, (d) review of the AFDRS and the AWS, (e) review of existing international and Australian research. + new knowledge gaps
Phase 3: Empirical Research (2026-2027)	This phase will collect primary research data that addresses the knowledge gaps identified in Phase 2 and aligns with agency needs provided in Phase 1 and throughout Phase 2.	Reports Data Hazard Notes Publications	The outcome of this phase is a suite of research insights that build knowledge beyond what was identified in Phase 2, to inform academic publications, and changes to organisational practice through Phase 4.
Phase 4: Utilisation (2027)	The specifics of the utilisation phase will depend on the needs of the agencies related to the platforms tested and diverse community groups engaged in the research.	Examples: • Workshop on how platforms must be designed for specific community groups • Updates or additional guidelines as part of the AIDR PI&W doctrine • 1:1 agency consultation to advise on existing platform design and or future projects for updating their platforms • A Living Research Database • Tools and checklists for future platform design for specific community groups.	Change in practice Evidence-based product development Training

In and out of scope (working draft)

Item	In-scope	Out-of-scope
Multi-hazard	Cyclone, bushfire, flood, extreme heat, storm (AWS hazards that align with NHRA funded hazards). Immediate secondary hazards that emerge from the above (e.g., storm asthma, smoke) / 'compounding hazards'.	Drought, chemical incidents/spills, technological failures/emergencies, climate - related events, road emergencies, war/conflict situations, health emergencies/ pandemics.
Platforms	Official agency platforms and third-party platforms will be considered in scope, for example, websites, portals, Apps, social media ('Pages'). Third-parties: e.g., Google Maps, Fires Near Me, bushfire.io, Windy, weather Apps.	Community groups (e.g., Facebook), Reddit, and other two-way conversational platforms where the Emergency Agency would need to join and contribute to.
Communities	• People with low digital literacy • Culturally and linguistically diverse (CALD) communities • People with disabilities • Mobility impaired individuals • Tourists and visitors • Older adults (65+) • Rural and remote communities • Non-English-speaking residents	First Nations communities are out of scope for primary data collection (secondary data collection and insights can be used).
Geography	• All States and Territories in Australia • Urban areas • Regional areas • Remote areas (* Tasmania)	

Objectives (working draft)

1. To explore how Australian communities, especially specific community cohorts (CALD backgrounds, people with disabilities, and those with accessibility and literacy challenges), **perceive and use** multi-hazard public information and warning platforms.

2. To understand how and why different community cohorts use both **official and unofficial** multi-hazard information platforms, examining their strengths and limitations across various scenarios.

3. To develop **evidence-based design principles** for future multi-hazard warning platforms that effectively reach diverse Australian communities, enhance public trust, and maximise protective actions.

4. To develop **recommendations for improving**, integrating, and adapting platforms to better meet diverse communities' informational needs.

5. To create **practical outcomes** for emergency management agencies for the design of a national multi-hazard public information and warnings platform, including technical and client facing recommendations.

Research Questions (working draft)

RQ1. How and why do different community cohorts use multi-hazard public information and warning platforms in Australia?

RQ2. How might multi-hazard public information and warnings platforms be improved, integrated, and adapted to better meet the informational needs of diverse communities into the future?

RQ3. What are the enablers and barriers to designing and utilising a national multi-hazard warnings platform, and why?

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Research gaps

COMPREHENSION: How AWS warnings, BoM weather warnings, and AFDRS information are received, understood, and used by communities in interaction with each other

CALLS TO ACTION: How AWS calls to action are received and understood by platform users, especially when multiple hazard calls to action are communicated concurrently for the same area

VISUALS: Whether platforms empower people through knowledge or overwhelm users with too much information (including text-based and visual/map-based information)

REPUBLISHING: How warnings can effectively be displayed in third-party platforms that communities already use (e.g., Google Crisis Alerts)

ECOSYSTEM: How platforms fit into and interact with pre-existing informal warnings sharing tools (e.g., phone trees, social media)

REACH: The extent of the community reach of warnings issued through these platforms during minor (e.g., tree over road) and major (flooding, bushfire) events.

EDUCATION: How community engagement and education before hazard events can support comprehension of hazard risk and warning information shared via these platforms

FUTURE: Investigation into projected future community communication preferences and how they might be implemented into these platforms (e.g., AI technology)

Empirical Research

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A mixed-methods approach will be undertaken, and it is anticipated that four studies will be conducted. Each university will lead a study, relevant to their expertise with specific diverse community groups.

Study 1, led by RMIT, could involve interviews in Victoria and South Australia, in regional (and where possible) remote areas, with CALD communities on their use of multi-hazard public information and warning platforms. Part A of the interviews will explore current use and comprehension of platforms, then Part B will explore a visualisation of a platform, in a specific scenario to explore comprehension, use, preferences, and future changes.

Study 2, led by University of Tasmania, could involve a case study in Tasmania and Western Australia on regional and remote communities, with low literacy, limited digital access, and low digital literacy, and to understand how these factors impact official and unofficial platform use.

Study 3, led by Monash, could involve a case study in Victoria and Queensland on the use and comprehension of platforms for visually impaired and mobility impaired communities, followed by co-design workshops to improve how future platforms must be designed (in Phase 4).

Study 4, led by QUT, could involve a national survey of the yet to be reached jurisdictions to examine current and future potential use of official and unofficial platforms in different scenarios.

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Next Steps

1. Natural Hazards Research Forum workshop ✅
2. Knowledge Sharing Forum (September 2025)
3. Systematic Review Report (December 2025)

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