

Predictions in public: understanding the design, communication and dissemination of predictive maps to the public

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Predictions in Public Research Project

NHRA Research Forum Workshop

May 2, 2023

Chloe Begg, Angela Gardner, Erica Kuligowski, Amy Griffin, Paula Dootson, Timothy Neale, Graham Dwyer and the Project Steering Committee



Project Aim

To define how future predictive products should be crafted to promote safe and effective public response during a bushfire emergency.



Project Stakeholders

Project team

- Chloe Begg (CFA)
- Angela Gardner (EMV)
- Paula Dootson & Deanna Grant-Smith (QUT)
- Amy Griffin & Erica Kuligowski (RMIT)
- Timothy Neale (Deakin University)
- Graham Dwyer (Swinburne)



Project Stakeholders

Project Steering Committee:

- Representatives from **AFAC PSG** and **AFAC WG** from each Australian jurisdiction.
 - **TAS** - Chris Collins (PSG) and Peter Middleton (WG)
 - **WA** - Jackson Parker (PSG) and Anni Fordham/Deana Pullella (WG)
 - **QLD** - Jack Emueleus (PSG) Anna Grohn (previously Alex Battye) (WG)
 - **NSW** - Laurence McCoy (PSG) and Anthony Clark/Ben Shepherd (WG)
 - **VIC** - Phillip Brien (PSG) and Reegan Key/Marc Unsworth (WG)
 - **ACT**- Ailish Milner (PSG) and Leighton Bush (previously James Morris) (WG)
 - **SA** - Simeon Telfer (previously Mike Wouters) (PSG) and Monique De Silva (WG)
 - **NT** - Don MacCorquodale and Angus Farlam (previously Akshy Athukorala)
 - **BOM** - Fiona Dunstan



Co-Design

Process Principles (Vincent et al. 2018):

- **Collaboration:**
 - Provide opportunities for different people with different needs to participate
 - Decision-driven
- **Inclusion:**
 - Ensure inclusion of everyone's contribution throughout the process
 - Process-based
- **Flexibility:**
 - Allowance for shifts in the process and directions to meet project objectives
 - Time-managed

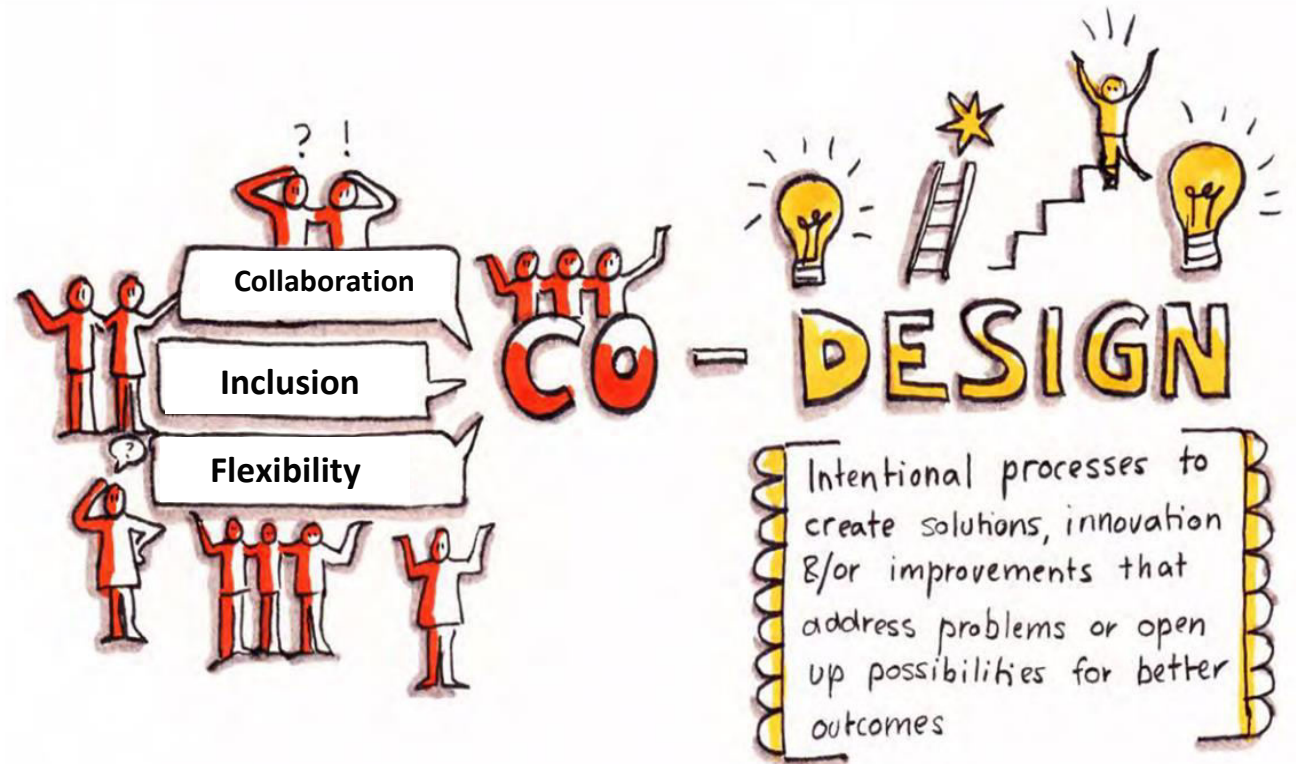


Image adapted from Burkett (2017)



Project Design

Phase 1:

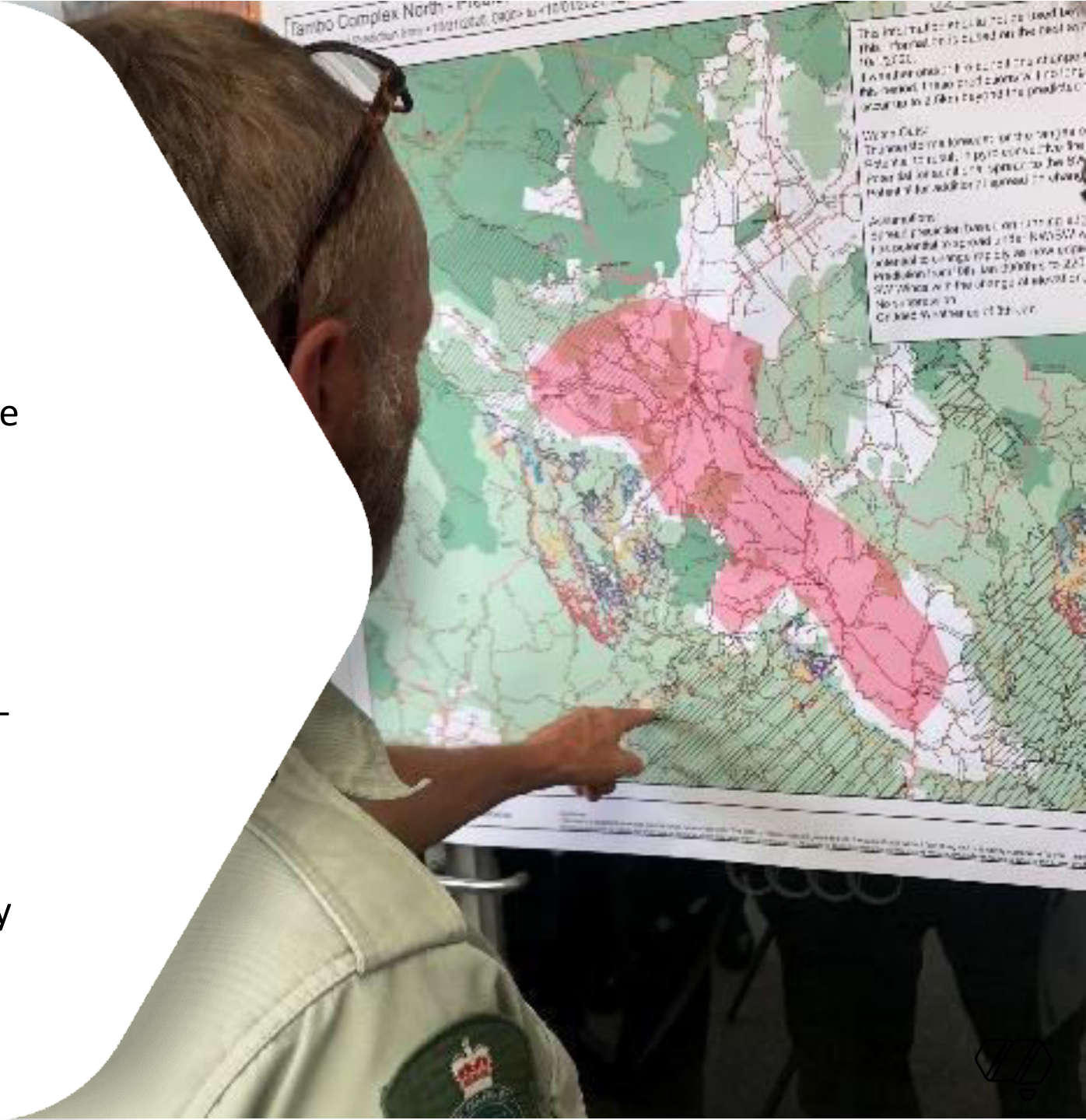
Understanding current agency practice and community comprehension and use of existing public-facing map-based products (i.e., incident warning maps and predictive fire spread maps).

Phase 2:

Developing and testing national, public-facing predictive map concepts.

Phase 3:

Developing practical outputs for agency use.



Phase 1 Results

A draft list of **evidence-based principles** for map design, risk communication, dissemination, and community education and engagement.

Example:

Using timestamps	Maps represent a situation at a specific point in time. It is critical to include information about when a map was produced (AIDR, 2021). During events that evolve over longer time periods, several maps may be published. The date of publication and the time period for which the map is expected to be valid should be communicated. The time when the next update can be expected should also be communicated. The Public Information and Warnings Handbook (p19) notes that best practice design includes stating “the issuer of the warning and date/time of issue” (AIDR 2021).	Leonard et al., 2014; Bean et al., 2015; Cao et al., 2016; Cao et al., 2017a; Thompson Clive et al., 2021; Australian Institute for Disaster Resilience, 2021
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Phase 1 Results

Interviews with 44 emergency sector representatives from across Australia to better understand the perceived benefits and risks of releasing predictive fire spread maps to the public.

Key findings:

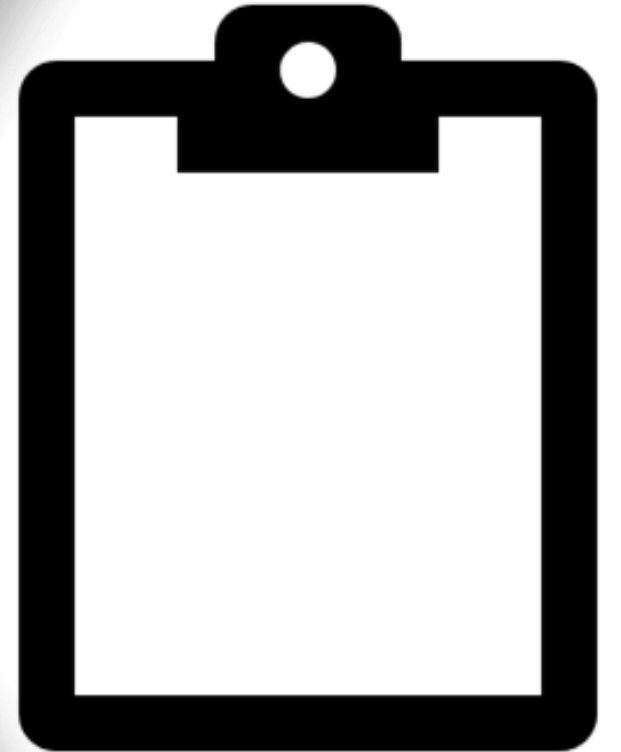
- There is broad consensus from emergency sector representatives that public-facing predictions would be best reserved for **impactful** fires during **extreme or catastrophic** fire weather conditions and should be produced and designed as a **specific product** distinct from the predictions currently generated for sector practitioners.



Phase 1 Results

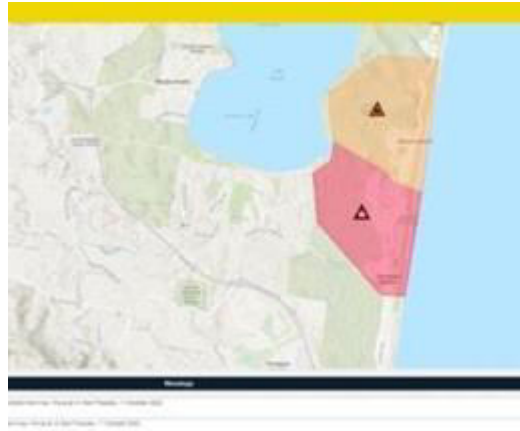
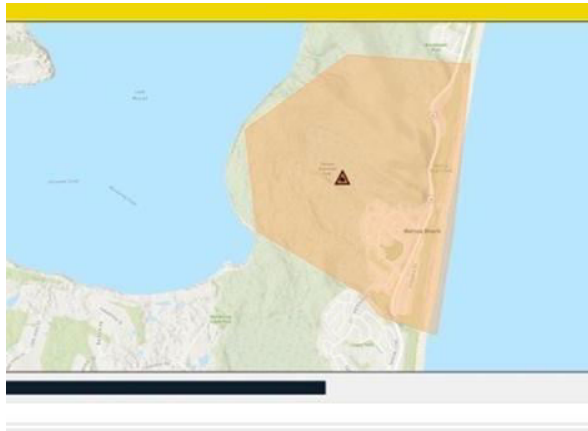
A national community survey (n=3007) to better understand how community members comprehend and use existing map-based products during an emergency.

A simple and a complex map were tested in each jurisdiction.

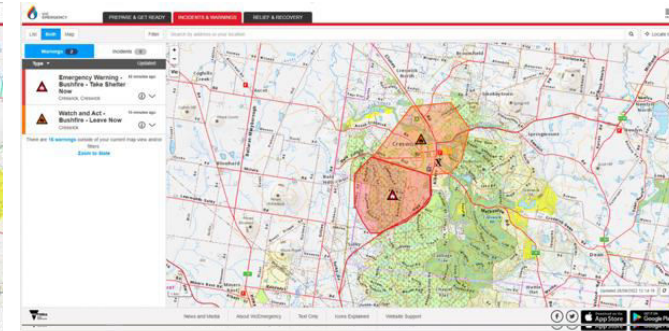
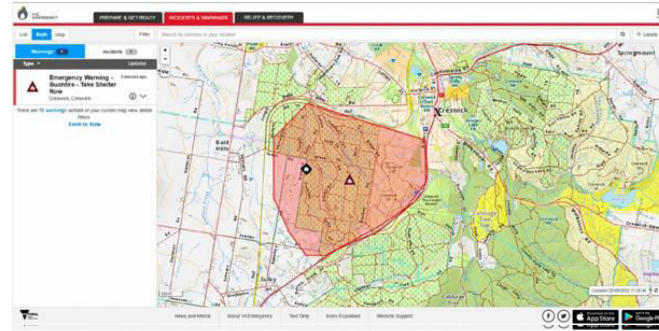


Maps Tested

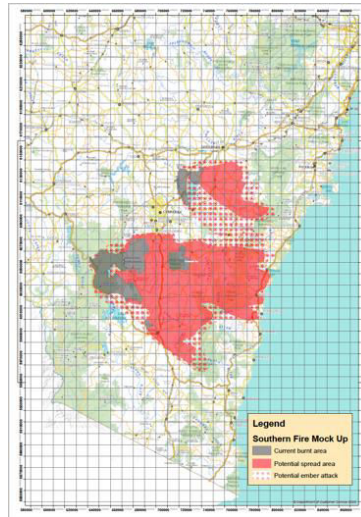
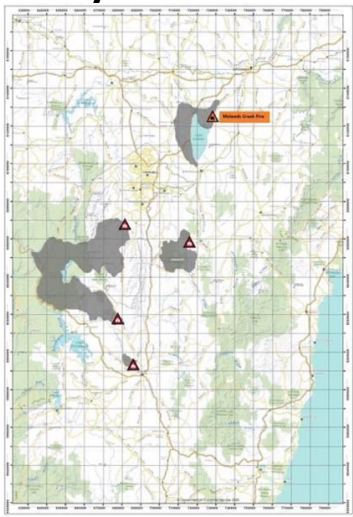
QLD



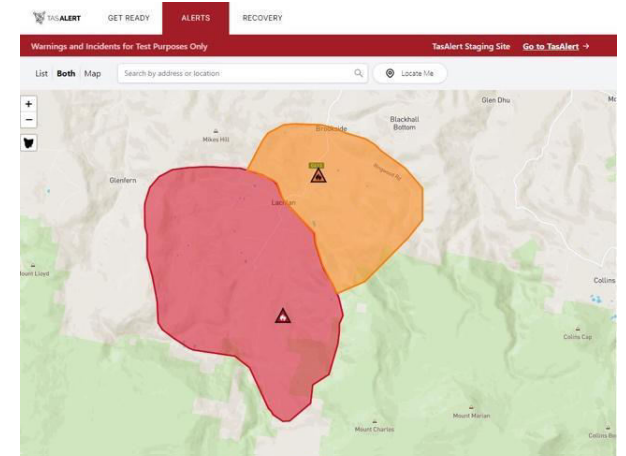
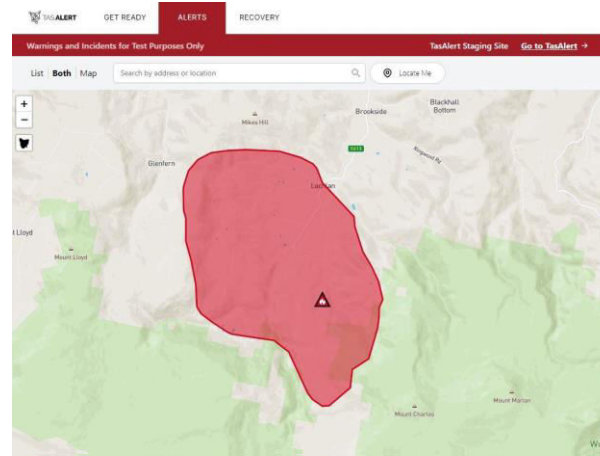
VIC



ACT/NS



TA



Examples of Maps Tested

SA



Message ID: 0007061
 Time Message Issued: 08:02
 Date Message Issued: 14/10/2022
Watch and Act Message - MELROSE, MT REMARKABLE RANGE TRACK Bushfire - Prepare to Leave Issued 14 Oct 2022 08:02

Issued for Mt Remarkable and Melrose near the Mt Remarkable National Park and Melrose Township in the Flinders Ranges.

Take action now as this bushfire may threaten your safety. If you are not prepared, leave now and if the path is clear, go to a safer place. Do not enter this area as conditions are dangerous.

The MELROSE, MT REMARKABLE RANGE TRACK fire is uncontrolled. This stubble fire is burning in a south easterly direction towards Dorrington Road, Stuart Street, Lambert Street, Brewery Street, Joes Road, Nutt Street, Horrocks Highway and the Melrose Township including the Melrose Caravan and Tourist Park. Conditions are continually changing.



Shapes on this map image indicate the Warning Area to which this message applies.
 YELLOW: Advice Message, ORANGE: Watch and Act Message, RED: Emergency Warning

For updates listen to your local ABC radio station on a battery powered radio, visit the CFS website www.cfs.sa.gov.au or phone the Information Hotline on 1800 362 361.

This message will be updated as the situation changes or before: 14/10/2022 15:59

Homes that have been built to withstand a bushfire, and are prepared to the highest level, may provide safety.

You may lose power, water, phone and data connections.

Fire crews are responding but you should not expect a firefighter at your door.

WHAT TO DO:

- Check and follow your Bushfire Survival Plan.
- Protect yourself from the fire's heat – put on protective clothing.
- Tell family and friends of your plans.

IF YOU ARE LEAVING:

- Leave now, don't delay.
- Roads may become blocked or access may change. Smoke will reduce visibility.
- Secure your pets for travel.
- If you become stuck in your car, park away from bushes, cover yourself, get onto the floor as the windows may break from the intense heat.

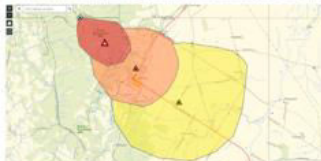


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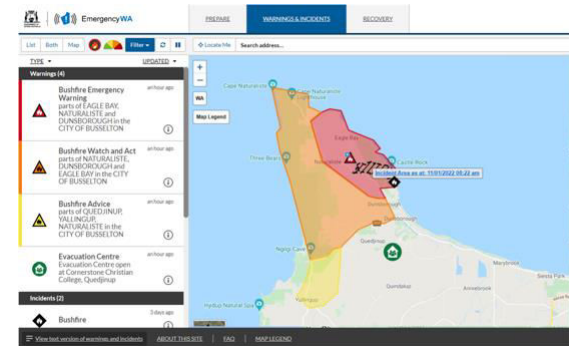
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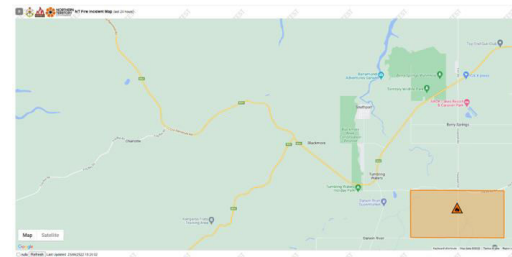
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W



NT



Phase 1 Results

A national community survey (n=3007)

Key findings:

- Communities are grateful for and value existing products.
- Respondents mostly comprehended the purpose of the maps. However, confusion increased as the complexity of the maps increased (i.e., multiple polygons, large number of roads, and lack of road names, etc.)
- Desired improvements included:
 - ***Legibility:*** making sure symbols and map labels are legible and understandable (e.g., including a legend)
 - ***Routes:*** show clear routes out to help people navigate their evacuation.
 - ***Landmarks:*** show on the map key landmarks to help people locate themselves and important features on the map, including evacuation centres.
 - ***Directionality of hazard:*** arrows showing directionality of the bushfire spread.
 - ***Timing:*** indicate when the map was developed and for how long it is valid; time estimates on how fast the fire is tracking



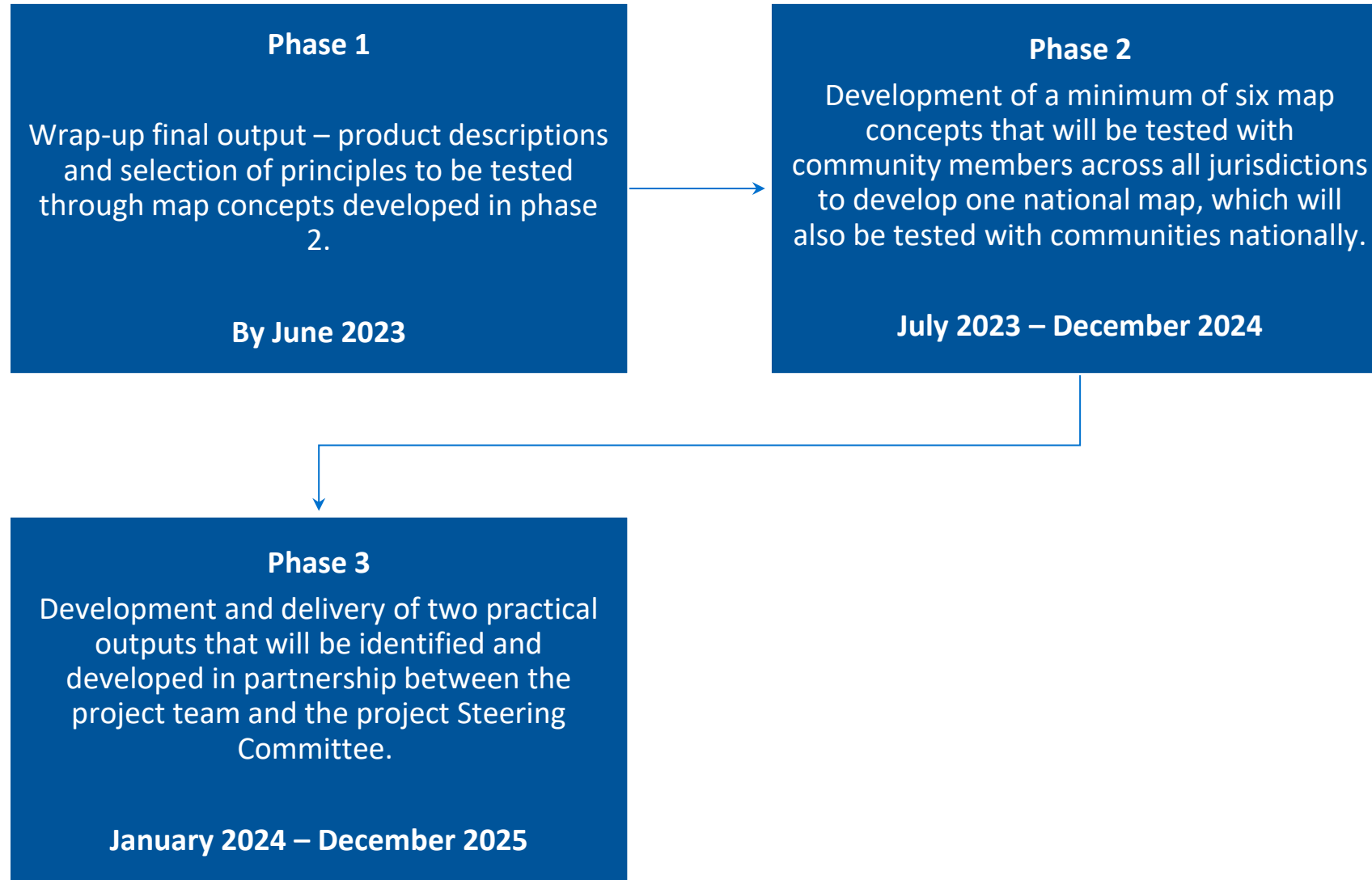
Phase 1 Progress

Community interviews in four locations (ACT, NSW, TAS, and VIC) to better understand how community members comprehend and use existing map-based products during an emergency

- ***Role of the steering committee:***
 - Guide the identification of a) the four locations; and b) affected communities within each state/territory
 - Provide maps to support Part 2 of the interview guide
 - Connect researchers with local champions in each community
- ***Progress updates:***
 - 94 interviews conducted across all four locations
 - Code list and definitions developed, coding underway
 - Results by end of June 2023



Next Steps



Questions for Discussion:

For the panel:

- Why were/are you interested in being involved in this project and what benefits has it/do you believe it will provide you personally/for your academic career?
- What have been some of the challenges that you have faced related to co-design during phase 1 of the project?
- What have you learnt from those challenges?

For the audience:

- How does the approach to co-design used in this project as well as the discussion of opportunities and challenges resonate with your experience of working in co-designed projects?

