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PREPARING EMERGENCY SERVICES FOR OPERATIONS IN A CLIMATE-CHALLENGED WORLD

Summary report

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ABOUT THIS PROJECT

Preparing emergency services for operations in a climate-challenged world was a 12-month research project beginning in 2020 that focused on a research question that the Bushfire and Natural Hazards CRC and member agencies were seeking to address:

"How can fire and emergency service agencies develop and use forward-looking (and linked) climate and social change scenarios to best prepare their businesses so that they can continue to provide effective services in a climate-challenged world?"

Reos Partners, in collaboration with RMIT University, lead the design and facilitation of this important project that brought together a select group of leaders and professionals from across the Australian and New Zealand emergency management services (EMS) to construct a series of plausible scenarios. The ultimate aim of this project is for organisations within the EMS, is to apply these scenarios, separately and perhaps collaboratively with others, to examine their current thinking, challenge existing assumptions, test and strengthen their strategic and operational planning in an uncertain and climate-challenged world.

END-USER STATEMENT

Bridget Tehan, *Victorian Council of Social Service, VIC*

We usually look at urgent and immediate needs. This process provides a chance to step back and look at the overall system, notice the trends and see leverage points for change.

Sarah Harris, *Country Fire Authority, VIC*

Our big challenges are around capacity and capability as we head into these uncertain futures. If we have reduced volunteers in the future, how do we adapt to this?

Matt Dyer, *Country Fire Authority, VIC*

What's most exciting is the *permission* that these scenarios provide for the sector to imagine bigger!

Peter Ashton, *Department of Environment, Land, Water and Planning, VIC*

As emergency planning moves toward systems scenario thinking response rather than the current single risk based planning. That these scenarios could form the basis of that thinking.

Darrin Woods, *Fire and Emergency New Zealand*

I am now seeing the wide-ranging implications of our business within the context of "community" - and how big the impacts on community will be within the big picture of climate change.

Valentino Luna Hernandez, *Fire and Emergency New Zealand*

The fact that we did this work on uncertainty at a time where we are still in the thick of a huge health/social/economic 'disaster' was mind-blowing! We were already out of our comfort zone to start with.

Peter Ashton, *Department of Environment, Land, Water and Planning, VIC*

Talking to others has helped expand my thinking beyond my narrow thoughts around the risks that I am familiar.

EXECUTIVE SUMMARY

EMS agencies are learning to adapt and be prepared for futures where the changing climate will influence the services they deliver, and how they deliver those services. This research project was designed to help the sector to better prepare for these futures and take action to more quickly adapt as it unfolds, and importantly take action to shape the future in ways that reduce the risks of the hazards ahead.

In 2020 and 2021 this research project, under the stewardship of Bushfire and Natural Hazards CRC and AFAC and led by Reos Partners and RMIT University, collaborated with a select group of leaders and professionals (a scenario team) from across the Australia and New Zealand EMS. The research project was completed in three integrated parts:

1. A synthesis of the literature conducted by RMIT on the implications of climate change for emergency services operation
2. A series of participatory workshops with the project scenario team to develop an explorative and adaptable methodology that is then used to create transformative scenarios (2021-2035)
3. Develop EMS guidance for using transformative scenarios in a climate-challenged world for planning and decision-making in EMS.

By involving key people from across the EMS in the construction and application of the scenarios (the scenario team), this project has helped to build the sector's understanding and capabilities in scenario development and in scenario use and application. The project has not only strengthened the scenario thinking capability of the participants across a range of agencies, but secured positive support and endorsement from the scenario team who can continue to share and apply the project methods across the EMS.

A range of documents and resources are available from www.bnhcrc.com.au/research/climatescenarios. These include a workbook, and a research and methodology pack:

Transformative Scenarios in a Climate-challenged World – workbook:

- *Transformative scenarios in a climate-challenged world: an introduction to alternative futures (2021-2035) for planning and decision making in the emergency management sector.*
- *Transformative scenarios in a climate-challenged world: a guide for using scenarios in the emergency management sector*
- *Transformative scenarios in a climate-challenged world: emergency management sector case studies as worked examples*

Transformative Scenarios in a Climate-challenged World – research and methodology:

- *Preparing emergency services for operations in a climate-challenged world – summary report*

- *Implications of climate change for emergency services operations: insights from the literature*
- *Research methodology for scenario development*

BACKGROUND

It is acknowledged by the emergency services sector that the world around us is unfolding in uncertain and unpredictable ways. The duration, scale and intensity of the 2019-2020 Black Summer bushfire season and the devastating impact of COVID-19 remind us we cannot predict the future, and what we expect will happen won't necessarily play out the way we expect it to. These events have provided an opportunity to question what we value, challenge our assumptions and help the EMS to not only adapt to, but also transform the future as it emerges in order to reduce the risks of future hazards and disasters. This highlighted the need to test a different approach to scenario building and scenario application to address the key research question:

'How can fire and emergency service agencies develop and use forward-looking (and linked) climate and social change scenarios to best prepare their businesses so that they can continue to provide effective services in a climate-challenged world?

One way to help make sense of the complex and uncertain world around us is by creating scenarios that engage with, and open the minds of, leaders and decision-makers. These plausible stories about alternate futures can help the EMS re-think what might happen in future, thereby strengthening corporate, strategic and operational plans in a more agile and resilient manner.

Whilst the EMS have used climate projections and scenarios extensively in the past, the scenario development approach in this project was explorative rather than predictive and challenged scenario team members to use their imagination and creativity more than what they were used to.

"Using a creative approach alongside science, results in a more useful outcome."
Scenario Team member

"I like the idea of bringing the science and imagination together."
Scenario Team member

By applying these scenarios, together with the scientific rigour and insights from the literature, EMS end-users will be challenged to question whether waiting for the future to arrive and then responding is good enough, or whether there are proactive steps and transformative actions that can be taken to influence the future. This distinction makes a critical difference from traditional scenario planning and enables more proactive strategies to be actioned to see if we can influence the future as well as adapt to it.

RESEARCH APPROACH

This project involved collaborating with a key team of people in and related to the EMS in Australia and New Zealand.

The research was completed in three stages which are described below.

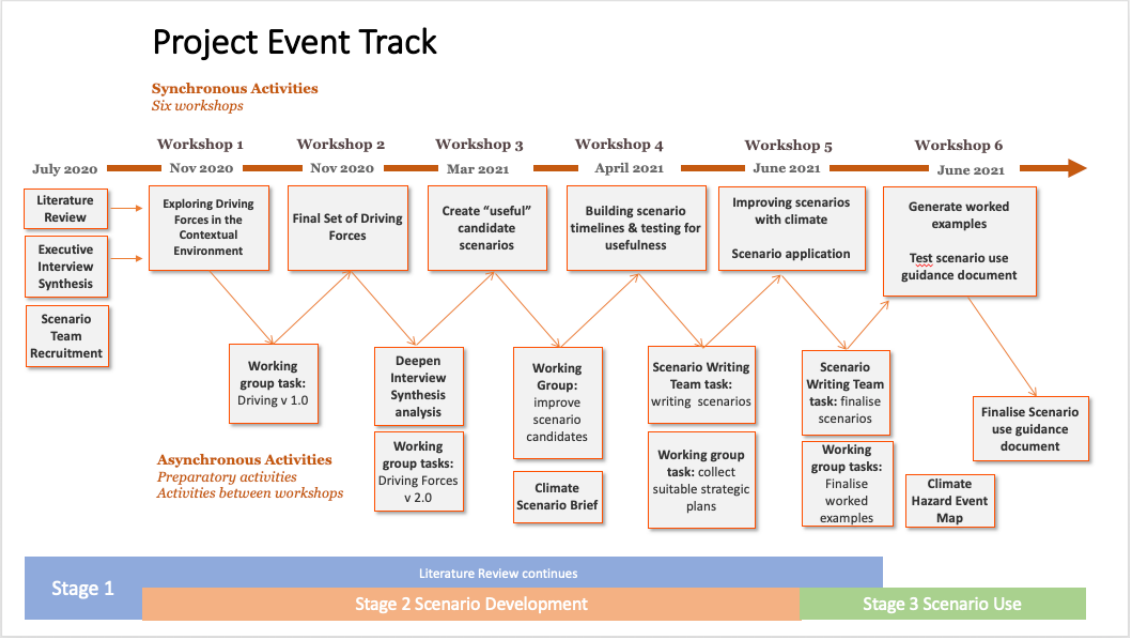

FIGURE 1: PROJECT TIMELINE SHOWING THE THREE STAGES, HIGHLIGHTING THE SYNCHRONOUS WORKSHOPS AND THE IMPORTANT WORK UNDERTAKEN BY THE PROJECT AND SCENARIO TEAMS BETWEEN WORKSHOPS (ASYNCHRONOUS ACTIVITIES).

STAGE 1: LITERATURE REVIEW

July 2020 to June 2021

RMIT University researchers undertook a desk-based review of both peer reviewed and grey literature to produce a synthesis of research on the implications of climate change for emergency services operations. The review draws on a wide literature relevant to the challenges for the sector, including cutting edge insights about climate change and adaptation.

The literature review outlines the projected impacts of climate change in Australia and New Zealand, particularly as they pertain to natural hazards. It then goes beyond this to provide the sector with a comprehensive overview of key issues in the literature, including: interactions between uncertainty, modelling, and risk management; what good adaptation might look like; limits to adaptation, transformation, and a systems-thinking approach to understanding the challenge. Finally, it considers potential interactions between climate change and social, technological, environmental, economic, legal, and policy/political drivers, leading to implications for the sector.

The literature review was an evolving document throughout the scenario development process and was periodically reviewed in response to suggestions from the interviewees and the emerging needs of the scenario team. A draft version of the literature review was provided early in the project to provide the project its guiding parameters with further development and tailoring so that

emerging issues identified through the scenario development process could be incorporated. While not in the original research plan, RMIT researchers provided several briefs on pertinent aspects of the literature to the Scenario Team at key points in the process.

A final peer review and copy-edited review will be completed by July 31, 2021. The literature review was conducted and overseen by Professor Lauren Rickards and Dr Adriana Keating peer-reviewed by Professor John Handmer and copyedited by Dr Haydie Gooder. Title: *Implications of climate change for emergency services operations: Insights from the literature. Lauren Rickards and Adriana Keating, RMIT*.

STAGE 2: DEVELOP A SCENARIO BUILDING METHOD AND DEVELOP TRANSFORMATIVE SCENARIOS FOR A CLIMATE-CHALLENGED WORLD

November 2020 to June 2021

Complementing the literature review, the research team (lead by Reos Partners) conducted ten interviews with senior emergency services personnel. These interviews provided the initial 'guide-rails' for the literature review to ensure that it is relevant to the issues with which the sector is currently considering. The interviews also helped to increase the credibility and salience of the scenario development process.

The Reos Partners team in this stage used an explorative and adaptable scenario planning method called Transformative Scenario Planning (TSP) that is a robust and well-tested approach designed to enable teams of people to work together to develop scenarios that are:

- relevant (they attend to strategic imperatives of decision makers in EMS across Australia and New Zealand);
- plausible (they believably "could" happen – because they are based in seeds of the present);
- challenging (they stretch and challenge thinking and mental models); and
- clear (they are understandable and provide a way to make sense of much complexity).

The project scenario team started by better understanding the driving forces in the world that interact to shape the future in unpredictable and volatile ways; ways that humans cannot reliably forecast or predict. The team then prioritised these driving forces to construct a series of plausible futures that explore what might happen over 2021-2035 in a climate-challenged world, incorporating social and community impacts and how these futures might plausibly come about.

STAGE 3: DEVELOP EMS GUIDANCE ON USING TRANSFORMATIVE SCENARIOS IN A CLIMATE-CHALLENGED WORLD

This later stage of the project involved testing and developing an approach for applying scenarios in EMS organisations to strengthen strategic and operational planning.

The development of this guidance drew on the experience of Reos Partners globally and the climate change research undertaken by RMIT University. During the final two workshops (June 2021), the approach to scenario use also drew on the wisdom and experience of the project Scenario Team in testing the application of the project scenarios against a sample of urban, rural, land management and emergency services strategies. These scenario use workshops also helped to strengthen the scenario thinking capability of Scenario Team members and has built support for application and use in practice beyond the project.

The case studies and scenario use guidance developed in this project will now be used by emergency service agencies across Australia and New Zealand to aid their strategic planning and associated preparedness activities. The ultimate aim is to allow those agencies to test the effectiveness of strategies and plans within the alternate futures that may emerge, thereby helping to strengthen their thinking, planning, adaptability, foresight and resilience.

RESEARCH FINDINGS

EXECUTIVE INTERVIEW FINDINGS

"What we learned about the strategic agenda from ES leaders and decision-makers"

Prior to the Scenario Team workshops, the Reos Partners team interviewed a select group of twelve key leaders and thinkers connected to the Emergency Services Sector

The Reos team then distilled this interview data source by highlighting many different and varied verbatim quotes and perspectives relevant to the work of the scenario team. These quotes were then collated into the categories in the Word Art below. The quotes (and the categories) formed the strategic agenda for the work of Scenario Team and helped to guide the direction of the Literature Review.

FIGURE 2: WORD CLOUD SHOWING THE STRATEGIC AGENDA SET BY KEY LEADERS ACROSS EMS.

STAGE 1: LITERATURE REVIEW FINDINGS

Climate change is altering the base climate and the magnitude and frequencies of extremes in temperature and precipitation. Australia will face increasing average temperatures and heatwaves, shifts in precipitation and water availability, changes in storms and cyclones, and effects on fire weather. Multiple uncertainties mean that climate change adaptation is poorly suited to conventional risk management. Further modelling has only limited capacity to reduce uncertainties and project exactly how change will manifest in any one place. In the modelling that exists for Australia-New Zealand climate, there are no discernible differences between models for 2035.

Enhanced disaster preparation and responses to cope with more frequent and worse hazards is a crucial adaptation, already being pursued by the EMS. Furthermore, adaptation also involves: continuous improvement in disaster prevention and recovery; concurrently addressing slow and chronic changes;

reducing existing vulnerabilities, not just hazards and exposure; addressing root causes of vulnerability, hazards and exposure; increasing resilience and adaptive capacity; and generating positive co-benefits.

Criteria of successful adaptation include effectiveness, efficiency, equity, externalities, and extended time horizon. Often the most significant barriers to adaptation action are institutional ones. Maladaptive actions are an important concern. A systems-thinking approach to adaptation has much potential for the challenges faced by the EMS. Systems-thinking helps decision-makers tease out complex interactions and interdependencies, understand driving forces, and thereby potentially identify more effective adaptation actions.

The academic literature provides some valuable insights into the drivers at work in the EMS system. However, very little research is focused on the EMS context per se. We therefore need to bring together different insights to piece together what the future may entail for the EMS. One useful way to begin this process is to consider the 'STEEP drivers' (Social, Technological, Environmental, Economic and Policy/Political drivers) and to then start thinking through how they may affect vulnerability/adaptive capacity and interact with climate change in the EMS system to generate impacts or positive outcomes. In response to input from the scenarios team, we have included a sixth category – legal – into the framework.

Climate Hazard Event Map

The hazard events on this map is presented as a heuristic tool. They broadly reflect the projections outlined in the literature review, but should not be considered predictive. Instead, they are one plausible example of how future hazards may manifest. They:

1. Extend across the geographies of Australia and New Zealand
2. Apply to different aspects of the EMS: urban operations, rural operations, land management and SES
3. Represent a range of hazard types that vary in volatility, frequency and magnitude.

It is proposed that the hazard event map is an "overlay" to all scenarios. In this way it is possible to explore the same hazard events in different scenarios, where each scenario represents different situations in terms of level and character of adaptive capacity/vulnerability. This approach highlights that not only do climatic hazards generate impacts, but so too do the non-climatic situations that we often have more control over. That is, the same hazard events present different risks in different scenarios because of differences in vulnerability and adaptive capacity.

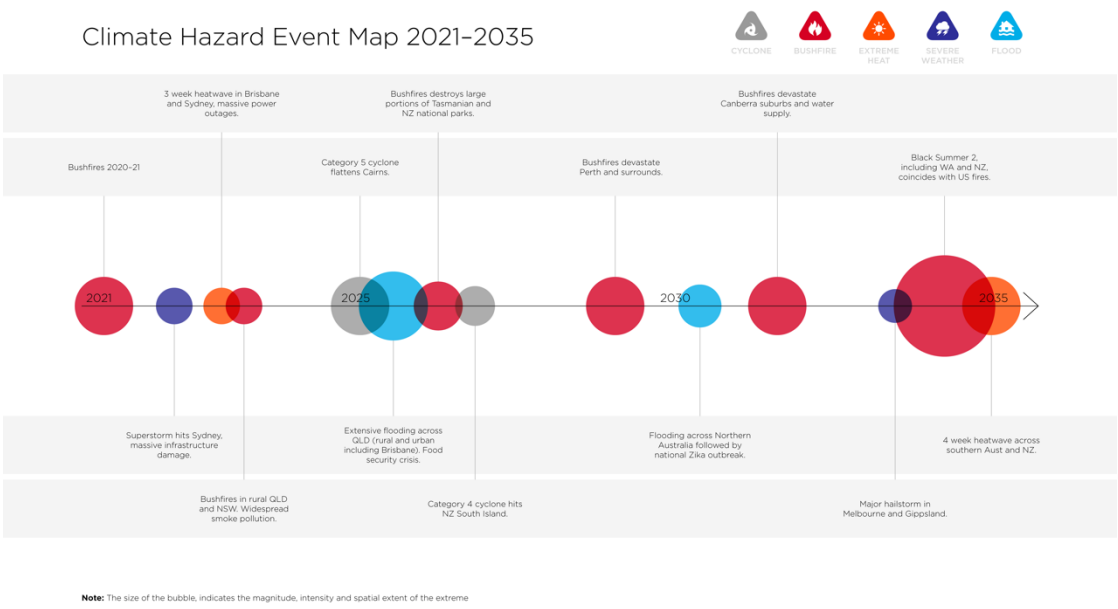

FIGURE 3: CLIMATE HAZARD EVENT MAP.

This approach is the inverse to most climate scenario planning approaches. It has the double advantage of (1) drawing attention to both the certainties (consistency among climate projections) and uncertainties (in exact manifestations of climatic extremes) associated with climate futures in the medium term (in this case, between now and 2035); (2) emphasising that how impactful this climate future will be for different social groups and professions, including the EMS, depends in large part on non-climatic factors, namely the sort of social, political and economic scenario that emerges, as illustrated by the four scenarios presented in this project.

STAGE 2: SCENARIO DEVELOPMENT FINDINGS

Stretching the thinking of those involved

Because transformative scenarios are not about the EMS sector or the organisations within it, the scenario team was first invited to think about the world outside of EMS. This type of thinking was unfamiliar terrain for the scenario team, but it helped them to stretch and extend their thinking outside the EMS to the forces impacting the EMS itself.

"We usually look at urgent and immediate needs. This process provides a chance to step back and look at the overall system, notice the trends and see leverage points for change"
Bridget Tehan (VCOSS).

"For me this project has been about stepping out of my comfort zone to consider the broader driving forces and imagining what these future worlds could look like when these forces come together in different ways.
Katelyn Samson

"The fact that we did this work on uncertainty at a time where we are still in the thick of a huge health/social/economic 'disaster' was mind blowing. We were

already out of our comfort zone to start with."
Valentino Luna

Key uncertainties

Scenarios exist outside the sector in the contextual environment - that is, the domain consisting of driving forces (social, technological, economic, environmental and political trends) that influence what happens to the sector itself.

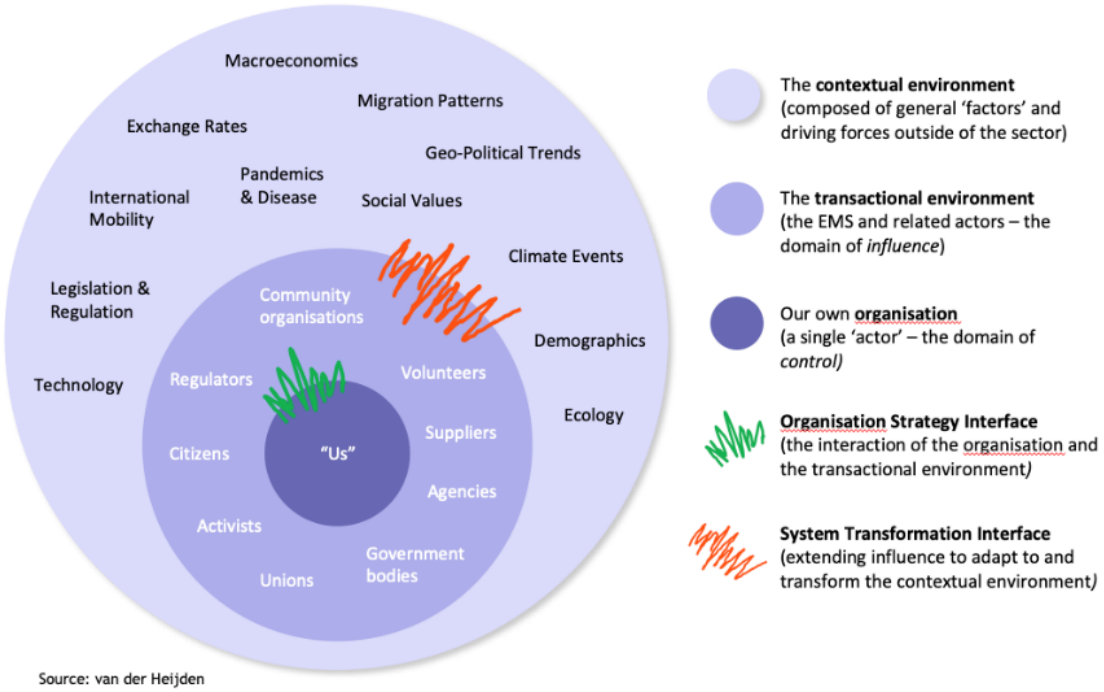

FIGURE 4: THE 3 DOMAINS OF STRATEGY - SOURCE: VAN DER HEIJDEN.

The first scenario development finding was a set of external driving forces in the world, outside the EMS, that could have the most substantive impact on the sector itself. While many driving forces were identified by the team the most uncertain and most impactful included:

- The degree to which governance regimes are long-term, proactive and strategic versus short-term, less active and responsive;
- The extent to which social cohesiveness is present in society - whether society bonds together in collective support for one another versus operating in an individualistic, "me first" approach;
- The extent of economic prosperity and access to capital;
- The degree to which societal functioning is reliant upon technology;
- The extent of population spread and movement between rural and urban landscapes;
- The extent of global geo-political tension; and
- The impact of epidemics/pandemics. It is these key uncertainties that lay out the structural framework for the possible future scenarios.

Climate change as a certainty

The two factors that the team agreed are certain, no matter what we as a human race now do to avert climate impacts, we are already on a fixed trajectory of changing weather and climate. This constituted another finding from the scenario development process. Over the next fifteen years:

2021 2025 2030 2035

Continuation of **existing climate trends**:

- Increasing average temperatures and heat;
- Increasing drought/decreasing rainfall (overall); and
- Increasing sea level rises and ocean acidification.

Continuation of **increasing volatility, frequency and magnitude of weather extremes**:

- Longer fire seasons and more severe fire weather;
- More frequent and intense heatwaves; and
- More intense storms and flash floods.

The scenarios themselves

The scenario team agreed that the two most uncertain and important driving forces were:

1. The degree to which governance regimes are long-term, proactive and strategic versus short-term, less active and responsive;
2. The extent to which social cohesiveness is present in society - whether society bonds together in collective support for one another versus operating in an individualistic, "me first" approach;

By combining these two uncertainties, four distinct, plausible scenarios emerged. Each scenario unfolds in different ways that lead to different futures. Each scenario has distinct and profound implications for the EMS.

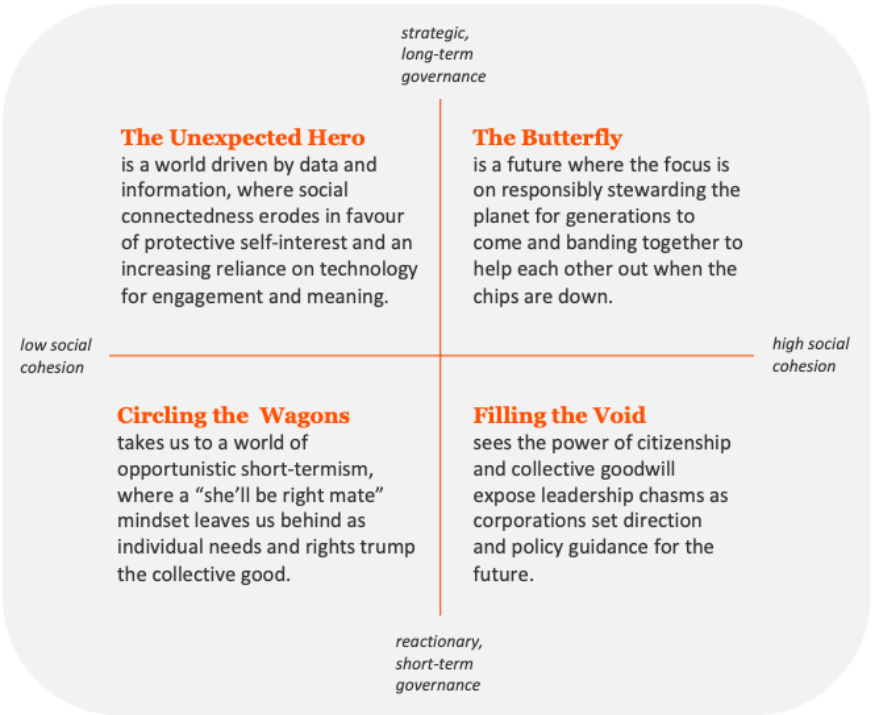

FIGURE 5: THE SCENARIOS.

In the week after workshop #4, scenario working groups (1 group per scenario) formed and met twice each before workshop #5 to improve the plausibility and challenge of each emerging story. One member from each working group then formed a dedicated scenario writing team. The writing team (supported by Reos Partners and RMIT over a multiple series of Write-shops) continued the task of writing scenario narratives on behalf of the broader scenario team. This team of four worked tirelessly and progressed the scenarios to a final draft.

STAGE 3: SCENARIO USE FINDINGS

What we learned about our scenarios in practice

Another key output from the research and the work of the scenario team in workshops #5 and #6, was the development of a Guide for using the scenarios in practice - *Transformative scenarios in a climate-challenged world: a guide for using scenarios in the emergency management sector.* The Guide enables EMS agencies individually, or collectively, to explore the implications of these scenarios, together with the overlay of climate change in their own strategic and operational planning activities: how these alternate worlds impact on the planning and operations of agencies and what might need to be done to mitigate risks, and improve the resilience and adaptability needed to meet their emergency services obligations.

The Guide contains an overview of what scenarios are and how they can be used in practice. It is highly practical, providing direction on how to use scenarios for planning and decision-making in EMS organisations. It provides steps on how to fully explore the scenarios and on how to overlay the climate hazard events identified in the Literature Review process. It provides step by step instructions on how to use the scenarios to 'wind-tunnel' an existing strategy, to make the strategy more robust and responsive to alternate worlds that might emerge.

Worked examples

The scenario team also selected a set of strategies to 'wind tunnel' against the four scenarios. These case studies (or worked examples) cover the following EMS agency types:

1. Urban firefighting services "urban operations"
2. Rural firefighting services "rural operation"
3. Land management agencies "land management"
4. State emergency services "emergency services"

Three 'case strategies' were selected for the purposes of illustrating how the scenarios can be used:

- Case 1 – Urban Operations: State Emergency Response Plan Extreme Heat Sub-Plan (2017)
- Case 2 – Rural Operations: Barwon South West Bushfire Management Strategy (2020)
- Case 3 – Emergency Services: NZ Risk Reduction Strategy (2019-29)

HOW COULD THIS RESEARCH BE USED?

The project has successfully engaged a diverse team of people from across the emergency services sector and exposed them to a *different* way of thinking and perceiving the world around them. The feedback from the Scenario Team members demonstrates a high level of enthusiasm and interest in the application of scenarios back in their own organisations and networks.

Whilst this Bushfire and Natural Hazards CRC research project has concluded, the potential uses and application for project outputs have only just begun. To have the desired impact on EMS agencies and leaders and decision-makers across the sector, ongoing engagement and activities will be required.

How the scenarios are now used by leaders and decision makers in the emergency services sector is the crux of scenario planning and the outcomes of application are yet to be realised in practice across both the Australian and New Zealand EMS.

The Scenario Use Guide from this project provides leaders and decision-makers from across EMS with an initial set of strategic analysis and wind tunneling tools to help assess the robustness and strength of emergency management strategies and plans against the different scenarios and then work to improve their adaptability and effectiveness in these contexts. However, there is many further ways the value of scenarios can be realized.

The application of scenarios can make an enormous difference to our current effectiveness and future success as we translate new learnings about possible futures into our planning, decision making, learning and operational priorities. The applications can extend from building capacity of individual leaders through to whole-industry and even country or region-wide initiatives. Scenario applications generally fall into three broad categories:

1. **Teams or Organisations** – Applications can involve a range of programs, workshops and exercises that can be integrated into day-to-day operations and standard ways of operating for improving decisions and outcomes. For example:
    - **Strategic planning processes** – processes and workshops for opening teams to the outside world and integrating scenarios into strategic processes for strengthening existing plans or priorities.
    - **Building leadership and team capability** – in-house development programs to build leadership agility, foresight capacity, strategic thinking for future risk mitigation for improving planning and operations.
    - **Innovation programs** – "safe spaces" for bringing different leaders or teams together to examine and explore what could be done to improve operations and adapt to alternative futures.
    - **Implementation and BAU alignment** – aligning scenarios, strategy and operations as business-as-usual – providing a clear line of sight between planning and action.
2. **Individual Leaders or Decision Makers** – programs provide safe and confidential learning spaces for leaders, individually or with peers, to build

confidence and capacity and explore what works in practice. For example:

- **Leadership development programs** – sector-wide open programs to build networks, strengths and capacities for leading teams and organisations effectively in complex and uncertain contexts.
- **Executive leadership coaching** – tailored, confidential one:one coaching to support leaders adapt to leading in complex contexts where there are no easy solutions and no precedent answers.
- **Action learning journeys** – a robust methodology for small groups of industry peers to share, explore and resolve key challenges together in a confidential manner.

3. **Sectors, Countries or Regions** – Events, processes or ongoing platforms for driving system-wide transformation across a sector, jurisdiction, country or region. These involve proven processes for making progress when stakeholders face common challenges but have neither the resource, capacity or authority to solve them alone. For example:
    - **Transformative Scenario Processes** – wider scenario engagement to connect with broader stakeholder groups and encourage immersion and insight. These processes building shared understandings and create new system-wide relationships, new insights, new capacities, new commitments and new experimental initiatives.
    - **Innovation Labs** – Strategic and collaborative innovation processes that bring together key stakeholders from across a given system to work on specific systemic challenges together – to collaborate and experiment on what can and must be done to best adapt to and transform our current situation.

FUTURE DIRECTIONS

The AFAC Climate Change Group (CCG), together with the Bushfire and Natural Hazards CRC could be ideal stewards for carrying this work forward and promoting and supporting its dissemination and application. Consistent institutional support and backing over the medium term is a crucial future direction for this work to realise its potential benefits.

Developing strategy and plan for this future direction is recommended to ensure the full value of the work from this project is realized in a way that genuinely makes a difference to not only the agencies and organisations in and around the sector, but to the sector itself.

Reos Partners and RMIT University would welcome the opportunity of supporting Bushfire and Natural Hazards CRC and AFAC in the next steps.

RESOURCES

The resources from this project are divided into a workbook, and a research and methodology pack. All documents are available at www.bnhcrc.com.au/research/climatescenarios.

Transformative scenarios in a climate-challenged world: workbook

- *Transformative scenarios in a climate-challenged world: an introduction to alternative futures (2021-2035) for planning and decision making in the emergency management sector*
- *Transformative scenarios in a climate-challenged world: a guide for using scenarios in the emergency management sector*
- *Transformative scenarios in a climate-challenged world: emergency management sector case studies as worked examples*

Transformative scenarios in a climate-challenged world: research and methodology

- *Preparing emergency services for operations in a climate-challenged world – summary report*
- *Implications of climate change for emergency services operations: insights from the literature*
- *Research methodology for scenario development*

Further reading

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