



BUSHFIRE AND NATURAL HAZARDS COOPERATIVE RESEARCH CENTRE

Submission to the Productivity Commission Inquiry on
Natural Disaster Funding Arrangements

“An ounce of prevention is worth a pound of cure.” - Benjamin Franklin

JUNE 2014





INTRODUCTION

The Bushfire and Natural Hazards CRC (Cooperative Research Centre) welcomes the current Productivity Commission Inquiry into 'the effectiveness and sustainability of Australia's natural disaster funding arrangements' and is pleased to have the opportunity to provide input and comment.

Given that the national arrangements for natural disaster funding have not been reviewed since 2002, and the recent trends in the costs of natural disasters in Australia, the review clearly has the potential to make a valuable and timely contribution to this important area of public policy.

The Bushfire and Natural Hazards CRC was established in July 2013. Its creation was a joint initiative of the Commonwealth Government and jurisdictional fire, emergency service, land-management agencies and non-government organisations across Australia and New Zealand. It builds on ten years of successful research and utilisation of the Bushfire CRC.

This submission has the following attachments:

- 1) An overview of the Bushfire and Natural Hazards CRC
- 2) An overview of the research conducted by the Bushfire and Natural Hazards CRC
- 3) An overview of the needs of the Emergency Management sector assessed following an multi-jurisdictional workshop in March 2013

It should be stressed that this submission is made entirely by the Bushfire and Natural Hazards CRC and does not reflect the views of its members or individual Board Directors. Most of the Bushfire and Natural Hazards CRC's members will be submitting separate submissions through their own jurisdictions.

The Bushfire and Natural Hazards CRC works closely with the Australasian Fire and Emergency Service Authorities Council (AFAC) and supports the initiatives proposed in its separate submission the Productivity Commission's Inquiry.

The Bushfire and Natural Hazards CRC is ready to provide appropriate assistance to your Inquiry in its important task. Please do not hesitate to contact me should you require more information regarding the material below or in relation to other matters.



SUMMARY OF RECOMMENDATIONS

Recommendation

It is recommended that a national data management infrastructure be established, to enable access to consistently interpreted, long-term data that will support research, policy and analysis.

The development of this infrastructure will require exploration and development of data models and information management systems, development of meta-data, definition of supporting practices, capture, storage, processing and delivery mechanisms, as well as a need to build capacity across the sector.

Recommendation

It is recommended that the emergency management system be viewed as a complete interconnected system and that the Commission does not neglect the role that response can play in mitigating future events.

In support of this recommendation the Bushfire and Natural Hazards CRC notes the need for research that identifies the role that incident response can play in long-term mitigation efforts and the potential for decreased future recovery expense.

Recommendation

It is recommended that, consistent with the call by AFAC, the use of the term 'risk reduction' rather than 'prevention' be adopted.

The Bushfire and Natural Hazards CRC notes the critical need to continue the research work on adaptation to the impacts of locked-in climate change and demographic changes. This will ensure that Australia is mitigating, not only against today's threat, but also those of the future.

Recommendation

It is recommended that detailed consideration be given to a more focused research effort in the area of relative costs and benefits of mitigation versus recovery, over and above the vital research work already under way.

Recommendation

It is recommended that a national strategy be developed for research investment in the natural hazards space, covering the various requirements of the different levels of government, the non-government organisations and the private sector.



THE BUSHFIRE AND NATURAL HAZARDS CRC

The Bushfire and Natural Hazards CRC is funded for eight years with \$47 million from the Australian Government's Cooperative Research Centres Program. The remaining funds – approximately \$80m cash and in-kind – come from partner agencies, non-government organisations, government organisations and research institutions from all States and Territories and New Zealand. The Bushfire and Natural Hazards CRC has an annual cash research spend of approximately \$7 million per year; this is augmented by in-kind resources from the partners.

The work of the Bushfire and Natural Hazards CRC is intrinsically linked to a number of national policies and strategies, including:

- the National Disasters Resilience Strategy (NSDR) (COAG endorsed);
- the Strategic Research Priorities (Australian Research Committee endorsed); and
- the National Bushfire Policy Statement (COAG endorsed);

The Bushfire and Natural Hazards CRC is an incorporated, not-for-profit public company limited by guarantee. It is managed through a small central office in East Melbourne. It has a skills-based Board of Directors elected by its Members. The Board is chaired by an independent Director, Dr Laurie Hammond.

The Bushfire and Natural Hazards CRC has the following strategic goals:

- Create a sustainable emergency management research capability
- Generate knowledge through high-quality research
- Build enduring partnerships for effective conduct and use of research
- Translate the research to adoption and use
- Contribute to the delivery of a disaster-resilient Australasia

A more complete overview of the Bushfire and Natural Hazards CRC can be found in **Attachment 1**.

TARGETED RESEARCH

A full list of the research being conducted by the Bushfire and Natural Hazards CRC can be found in **Attachment 2**.

The Bushfire and Natural Hazards CRC's research program is just beginning and has been informed by the broader sector and the jurisdictions. In developing the research program, the CRC held a multi-jurisdictional workshop to scope out the issues and problem statements



that need to be addressed. This broad set of statements and discussion is appended in **Attachment 3**. This was used as the background document for a public call for research projects. Owing to the level of funding available, the final research agenda addresses only a portion of these issues.

The Bushfire and Natural Hazards CRC research programs that have commenced in the last few months, and that have relevance to the Inquiry's Terms of Reference, include the following.

Theme: Economics, Policy and Decision-Making

This research theme deals with the economics and the interface between risk-based priorities and the practice of decisions to allocate resources where the potential for some of the greatest tangible benefits can be realised. Projects in this research theme are:

Economics and Strategic Decisions

Better understanding of the economic costs of disasters and their risks, and the risk-reducing benefits of treatments, can build a more compelling case that improves the likelihood of risk treatments being resourced and implemented.

Furthermore, a better understanding of the economic and policy environment within which decisions are made, and an improved understanding of how risk information is perceived and understood by decision-making bodies, can allow risk-reduction proposals to be presented in a more effective way that increases the likelihood of resourcing and implementation.

This cluster of research projects focuses on developing the tools required to undertake sound economic analysis of the costs and benefits of different emergency management decisions. Projects in this cluster are:

- The development of a decision-support system for assessment of policy and planning investment options for optimal natural hazard mitigation;
- Economics of natural hazards;
- Mapping and understanding bushfire and natural hazard vulnerability and risks at the institutional scale; and
- Pre-disaster multi-hazard damage and economic loss estimation modelling.

Governance and Institutional Knowledge

Learning from past disasters is difficult. At a national level, the relatively long periods between major disasters result in few decision-makers having prior disaster management experience. At an international level, the frequent turnover of relief workers means that many of the actors are



relatively inexperienced and susceptible to adopting myths and clichés that are rarely challenged by the media and the academic world. It is time for an international initiative to identify the best practices, and it is time for affected countries and scientists to point out the inadequacies of responses. Projects in this cluster are:

- Policies, institutions and governance of natural hazards; and
- Scientific diversity, scientific uncertainty and risk-mitigation policy and planning.

Scenarios and Loss Analysis

This cluster of research projects focuses on understanding the historical costs and losses to Australia from natural disasters and how to develop scenarios for future planning. The understanding of historical losses and human fatalities is a fundamental first step to enabling efficient and strategic risk reduction.

In turn, the development of a series of natural disaster scenarios allows a quantification of their impacts on society, critical infrastructure, lifelines and buildings, and where possible, the natural environment. This enables us to understand the possible implications of these events and thereby support the emergency management sector to better prepare for or mitigate impacts of events beyond their experience. Projects in this cluster are:

- An analysis of building losses and human fatalities from natural disasters; and
- Using realistic disaster scenario analysis to understand natural hazard impacts and emergency management requirements.

Theme: Resilient People, Infrastructure and Institutions

The focus of this research theme is to improve the conceptualisation of resilience and the factors that both promote and inhibit its development. Improved understanding of these factors will contribute to and optimise the development of a capability to identify vulnerability, manage the risk and enable resilience. Projects that are part of this research theme include:

Hardening Buildings and Infrastructure

The research objectives here are the establishment of an understanding of the vulnerability of buildings and key infrastructure that is consistent and comparable across a range of natural hazards (earthquake, flood and wind, initially). The projects will focus on existing high-risk components of the built environment but will include information on how new construction can be more appropriately undertaken for some hazards (flood and bushfire) as a risk-reduction strategy.



The research is designed not only to quantify the contributions of existing assets to community risk but also to provide information on how this risk can be mitigated through cost-effective interventions that will reduce damage, injury, community disruption and the future cost of natural disasters, from the present baseline of minimal intervention. It is an objective that these quantitative measures will be in a form that the insurance industry can also use in assessing potential reductions to portfolio risk and possible premium reduction incentives to the policy owner.

Significantly, the research cluster will consider more broadly the cost of disruption to economic activity by considering business activity at an interdependent district level, where disruption directly caused by damage to some businesses has a broader impact on other businesses in the locality (e.g. the Christchurch earthquake). Projects in this cluster are:

- Cost-effective mitigation strategy development for building-related earthquake risk;
- Cost-effective mitigation strategy development for flood-prone buildings;
- Enhancing resilience of critical road infrastructure: bridges, culverts and flood-ways;
- Improving the resilience of existing housing to severe wind events; and
- Natural hazard exposure information modelling framework.

Understanding and Measuring Social Resilience

The relationship between natural hazards and communities has traditionally been viewed from a vulnerability perspective, where communities are at varying levels of vulnerability and helplessness. Australia's recently adopted National Strategy for Disaster Resilience takes an internationally leading approach in the application of a disaster resilience paradigm.

This method gives communities greater options and diversity in managing natural hazards, and places the preparation, prevention, response and recovery in the context of societies learning from and adapting to change. The NSDR recognises four characteristics of disaster resilient communities: 1) they function well while under stress; 2) they adapt successfully; 3) they are self-reliant, and 4) they have strong social capacity. However, important questions are raised. How would progress towards the development of these characteristics be assessed and how should investments to develop disaster resilience be prioritised, evaluated and reported?

This cluster of research projects are:

- The development of an Australian Natural Disaster Resilience Index for assessing, evaluating, reporting and planning for resilience to natural hazards under the NSDR; and



- Development of a framework for understanding the ownership of risks from bushfires and natural hazards at the institutional level in order to improve risk governance through a range of measures, including investment strategies, resilience and risk mitigation.

Additional work

In addition to the work currently getting under way, research previously undertaken by the Bushfire CRC now underpins a number of the new research directions outlined above. This earlier work included projects undertaken as part of the *Economics and Future Scenarios* theme that was designed to improve the understanding of bushfire impact on human communities, the environment and the economy.

The Bushfire CRC also undertook significant studies into the effectiveness of mitigation approaches to bushfire, in particular the role played by prescribed burning. Further details of the Bushfire CRC work can be found at www.bushfirecrc.com

Insurance coverage

In the Productivity Commission's *Issues Paper*, a question is asked around the level of household insurance. The Bushfire and Natural Hazards CRC and Bushfire CRC have conducted post-incident interviews and surveys following major fire events in Victoria, New South Wales, and Western Australia. These surveys involved residents from houses that were destroyed and those which were threatened by the fires and survived.

A summary of these surveys is that 87% households indicated that they were insured (2758 of the 3392 responses). It is not known the degree to which they were fully covered or underinsured. Across the data sets the lowest level of insurance was 73% and the highest 92%.

The Bushfire and Natural Hazards CRC is willing to work with the Productivity Commission to examine these data in more detail.

GAPS AND OPPORTUNITIES

The extensive consultation undertaken late last year across the emergency management sector and across academia by the Bushfire and Natural Hazards CRC in developing its research program revealed a range of future challenges for public policy and institutional design, workforce capability and capacity, risk communication, land-use policy and planning, settlement and asset development. There is general agreement among responders and researchers that the current arrangements may become unsustainable and lose their efficacy in terms of building resilience.



Data

The research consultation frequently confronted data-related issues. While there are many existing and potential sources of data that are relevant to the emergency management sector and other stakeholders, there are critical gaps.

Data often were not accessible, or not in a format or on a platform that facilitated data exchange, use and analysis in a policy and practice context. For many cases, data did not exist at all.

Mechanisms and capabilities are needed to assist policy-makers and practitioners to collect and make use of complex data to produce the information and evidence to underpin strategic and operational decisions.

Recommendation

It is recommended that a national data management infrastructure be established, to enable access to consistently interpreted, long-term data that will support research, policy and analysis.

The development of this infrastructure will require exploration and development of data models and information management systems, development of meta-data, definition of supporting practices, capture, storage, processing and delivery mechanisms, as well as a need to build capacity across the sector.

Incident Response

The scope of the present Inquiry does not include *incident response*. The focus is on 'mitigation, resilience and recovery'. The experience of the Bushfire CRC in relation to wildfire, and indeed the experience internationally, is that a failure by governments to adequately fund and resource year-round management of natural areas in fire-prone jurisdictions is contributing considerably to escalating fire response costs (the reference in the Inquiry's *Issues Paper* to the work of Healy and Malhorta (2009) is noted). It is critical that the total end-to-end costs be understood otherwise there is a risk of unintended consequences of isolated changes, particularly when there are different levels of government responsible for different aspects of the system.

It is important to recognise that the response aspect can also act as a mitigating factor for future events. For example, a wildfire allowed to burn longer (when safe to do so) may reduce fuels more effectively and more cheaply than a prescribed burn later.



Recommendation

It is recommended that the emergency management system be viewed as a complete interconnected system and that the Commission does not neglect the role that response can play in mitigating future events.

In support of this recommendation the Bushfire and Natural Hazards CRC notes the need for research that identifies the role that incident response can play in long-term mitigation efforts and the potential for decreased future recovery expense.

The Inevitability of Future Events


Australia's natural hazard researchers and its emergency management agencies clearly have much work to do if they are to sufficiently understand the influence of climate change on the nation's level of bushfire, flood and other hazard risks. The scientific issues associated with climate change are obviously complex. Indeed, the Deloitte Access Economics 2013 report concluded:

'In 2012 alone, the total economic cost of natural disasters in Australia is estimated to have exceeded \$6 billion. Further, these costs are expected to double by 2030 and to rise to an average of \$23 billion per year by 2050, even without any consideration of the potential impact of climate change...'

In this context, the findings of the Productivity Commission's report *Barriers to Effective Climate Change Adaptation*, suggesting that features of the current Natural Disaster Relief and Recovery Arrangements (NDRRA) may be inconsistent with effective risk management, made sobering reading (Productivity Commission 2013). The role that betterment options following a disaster play in mitigating future impacts needs further consideration, and making such initiatives more easily achievable will have significant benefits.

In August 2010, a national Inquiry by the Australian Senate described itself in its final report as the nineteenth major bushfire-related inquiry to be conducted in Australia since 1939 and the third to be conducted federally since 2003. In evidence to that Inquiry, Professor Peter Kanowski (an author of a 2004 COAG Inquiry report, the first such national Inquiry in the nation's history) said that his Inquiry had identified:

'...a repeated cycle of response by governments and the community to major fire events: first, suppression and recovery processes are always accompanied by assertions, accusations and allocations of blame, even while the fires are still burning; second, inquiries are established and report; third, recommendations are acted upon, to varying degrees; fourth, the passage of time sees



growing complacency and reduced levels of preparedness... and the cycle begins again with the next major bushfire event...'
(COAG, 2004)

The critical aspect of the above discussion is that such events cannot be prevented entirely; what can be done is to reduce the consequence of the events and hence reduce the impact and cost to the community. The impacts of climate change may change the nature or frequency of events, and demographic change will change the exposure and vulnerability. It is these factors that are driving the increasing cost of recovery; only mitigation stands between an event and a disaster.

Recommendation

It is recommended that, consistent with the call by AFAC, the use of the term 'risk reduction' rather than 'prevention' be adopted.

The Bushfire and Natural Hazards CRC notes the critical need to continue the research work on adaptation to the impacts of locked-in climate change¹ and demographic changes. This will ensure that Australia is mitigating, not only against today's threat, but also those of the future.

The Balance between Mitigation and Recovery

The Bushfire and Natural Hazards CRC strongly supports the notion that mitigation is by far the preferred option over post-disaster clean-up, for many reasons. However, as has been noted in the *issues paper* and the paper by Healy and Malhotra, the incentives for doing so are stacked against its achievement.

Although the arguments for doing so intuitively appear correct, it appears that there is little hard evidence to support the validity of switching money from recovery to mitigation. There are isolated case studies, and generalised statements, but little rigorous research. The work to be undertaken by the Bushfire and Natural Hazards CRC in its Economics, Policy and Decision-Making Theme will help to fill some of these gaps in the longer term.

It would be a mistake to assume that transferring all the funds to mitigation will prevent the impacts of events like Black Saturday, Cyclone Yasi or the Newcastle Earthquake for example. There is, therefore, a need to understand the scale of the transfer from one to the other, as some funds will need to be kept as contingent liabilities to cover the extreme events, by some level of government. However, what is the right

¹ Locked-in climate change means changes resulting from past greenhouse gas emissions and the inertia in the climate system (Productivity Commission, 2012)



mix is the outstanding question. It clearly is dependent on the nature of the event, its location, and the relative payoff of the mitigation, or leverage factor (Healy and Malhotra estimate a 1:15 payoff and Deloitte Access Economics demonstrate Benefit/Cost Ratios of between 1 and 9 depending on the case study and assumptions made). A further challenge is to understand how the choice is made to prioritise which mitigation action, against which hazard(s) will result in the highest likely payoff.

Recommendation

It is recommended that detailed consideration be given to a more focused research effort in the area of relative costs and benefits of mitigation versus recovery, over and above the vital research work already under way.


Research Funding and Capability

Box 3 of the Inquiry's *Issues Paper* provides a timely reminder of one element of the costs of natural disasters, namely the insured value of damage to property. While the material presented shows that the costs of natural disasters are highly variable from year to year, it also shows that in recent years, Australia has experienced several natural disaster events that have imposed significant costs on the Australian community. This illustration does not include the real economic costs of the disasters, merely those born by the insurers. Further research is needed to fully understand the full costs of disasters on Australia in order to better understand where mitigation can have the biggest impact.

Viewed in such contexts, the funds invested nationally in related research are arguably nominal. Indeed, in negotiations with the jurisdictions associated with the formation of the Bushfire and Natural Hazards CRC, the natural hazard problems raised were many, had complex interdependencies and were considered by some to be seemingly impossible to solve. Clearly the establishment of the Bushfire and Natural Hazards CRC presents an exceptional opportunity to make a difference. But the size of the task should not be underestimated.

As Mr Jim Gould, a Principal Research Scientist at CSIRO, told the Royal Commission that followed Victoria's Black Saturday fires:

'Because bushfire cuts across many management and scientific disciplines, because fire affects so much of the country, and because the risks to life and property are public and political issues, the breadth of opportunities for relevant, needed research is nearly unlimited. The great challenge is perhaps not so much what to do next as it is what to leave out in a limited budget climate...' (Victorian Bushfires Royal Commission 2010 p. 394).



A relatively small proportion of the research work of the Bushfire and Natural Hazards CRC, and across other bodies in Australia, is focused on the issues central to the Commission's focus, that is, on the balance between mitigation and recovery. This is an issue that is not simply a matter of reprioritising existing research resources, but one requiring increased resources to address the issue effectively.

There are significant benefits to be gained from an ongoing commitment of funding to natural hazards research, combined with a strong engagement of policy, strategy and operational personnel from the jurisdictions, not-for-profit and private sectors to ensure there is swift uptake of the findings. In some ways, an ongoing commitment is more important than the quantum of funding, as it enables longer-term investment, and less time spent sourcing funding and retraining experts, which reduces efficiencies.

Recommendation

It is recommended that a national strategy be developed for research investment in the natural hazards space, covering the various requirements of the different levels of government, the non-government organisations and the private sector.

The Bushfire and Natural Hazards CRC considers that such a strategy must embrace the multi-disciplinary nature of the problems and the many factors impacting on the emergency management sector, and must drive the commitment of new resources. It must recognise that shifting of resources from currently vital research to address the gaps will not result in an adequate national capability to address the balance between mitigation and recovery.

CONCLUSION

Faced with climate and demographic change, Australia has reached a critical stage in the evolution of its approach to the management of the natural hazards it must continue to confront.

In an award-winning essay, written within days of Victoria's Black Saturday fires, the Australian National University historian Professor Tom Griffiths sought to remind his readers of how Judge Leonard Stretton's seminal Inquiry in Victoria in 1939 had sought to find words adequately to describe how: '*...rampant flame had scourged a country that considered itself civilised*', and how Stretton went on to define '*an active, half-conscious denial of the danger of fire, and a kind of community complicity in the deferral of responsibility....*'

Griffiths observed that:



'In the seventy years since 1939, we have lived through a revolution in scientific research and environmental understanding and we have come to a clearer understanding of the peculiar history and fire ecology of these forests. We have fewer excuses for innocence. We knew this terrible day would come. Why, then, was there such an appalling loss of life?'

The comments above relate to major fire events but have equal validity for other natural hazards, be they cyclone, flood or earthquake. The need to continually reassess and monitor Australia's approach to managing its natural hazards has never been more pressing. Effective, cooperative, national and international initiatives that seek a greater understanding of the natural, social and political impacts of natural hazards have a critical role to play in this process.

There is poor coordination of international research collaboration and exploitation in Australia. It is critical that Australia draws on international research and lessons to support Australian needs. The Bushfire and Natural Hazards CRC is willing take a lead role in this through its links to national and international research groups and organizations.

SOURCES

Australian Senate. 2010. *The Incidence and Severity of Bushfires across Australia*. Report of the Agricultural and Related Industries Select Committee. Commonwealth of Australia. 255 pp.

Council of Australian Governments. 2004. *Report of the National Inquiry on Bushfire Mitigation and Management*. Australian Government. Canberra. 415 pp.

Deloitte Access Economics. 2013. *Building Our Nation's Resilience to Natural Disasters; Report for the Australian Business Roundtable for Disaster Resilience and Safer Communities*. Canberra. 93 pp.

Griffiths, T. 2009. *We have still not lived long enough*. Inside Story website (16 February 2009). <http://inside.org.au/we-have-still-not-lived-long-enough/>

Healy, A. and Malhotra, N. 2009. *Myopic voters and natural disaster policy*, *American Political Science Review*, **103**, pp. 387-406

Victorian Bushfires Royal Commission. 2010. *Report of the 2009 Victorian Bushfires Royal Commission*. Volumes 1–3. Parliament of Victoria. 1141 pp.



Productivity Commission. 2013. *Barriers to Effective Climate Change Adaptation*, Report No. 59, Australian Government. Canberra. 385 pp.



ATTACHMENT 1

THE BUSHFIRE AND NATURAL HAZARDS CRC (bnhcrc.com.au)

Launched at Parliament House, Canberra, by the Minister for Justice, the Hon Michael Keenan, on 10 December 2013, the \$130 million Bushfire and Natural Hazards CRC draws together all of Australia and New Zealand's fire and emergency service authorities with the leading experts across a range of scientific fields to explore the causes, consequences and mitigation of natural disasters.

At the launch, the Minister said the establishment of the Bushfire and Natural Hazards CRC acknowledged the ongoing impacts of natural hazards upon communities, emergency service providers, governments, agriculture and other industries.

The Bushfire and Natural Hazards CRC's establishment followed several years of discussion regarding a successor to the Bushfire CRC, which, under the CRC program, is due to largely complete its work in June 2014. In announcing the Australian Government's commitment to the Bushfire and Natural Hazards CRC in February 2013, then Prime Minister Julia Gillard said the new centre would build on the work of the Bushfire CRC and expand the research into other natural hazards.

The Bushfire and Natural Hazards CRC is funded for eight years with \$47 million from the Australian Government's Cooperative Research Centres Program. The remaining funds – cash and in-kind – come from partner agencies, government organisations and research institutions from all States and Territories and from New Zealand.

The work of the Bushfire and Natural Hazards CRC is intrinsically linked to a number of national policies and strategies, including:

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As the Inquiry's *Issues Paper* makes clear, over the last decade natural disasters have caused more damage and destruction across Australasia than ever before. Disasters such as flood, fire, cyclone, earthquake and tsunami expose human, infrastructure and institutional vulnerabilities and



subject the Australian community to considerable impact and loss. Such events make headlines when they cause injury, death and widespread damage. However, their full impacts often remain poorly quantified, while being felt through long-term consequences for individuals, communities, infrastructure, the landscape, and the economy.

The purpose of the Bushfire and Natural Hazards CRC is to conduct end-user-inspired applied research to:

- Create a sustainable emergency management research capability
- Generate knowledge through high-quality research
- Build enduring partnerships for effective conduct and use of research
- Translate the research to adoption and use
- Contribute to the delivery of a disaster-resilient Australasia

A NATIONAL APPROACH TO NATURAL HAZARD-RELATED RESEARCH

Both the Bushfire CRC and the Bushfire and Natural Hazards CRC are part of the national Cooperative Research Centre program that has operated since 1991, under successive federal governments. The CRC program was designed to facilitate *'end user-driven research collaborations [that would] address major challenges facing Australia. CRCs pursue solutions to these challenges that are innovative, of high impact and capable of being effectively deployed by the end users.'*

The Bushfire CRC was established in July 2003, with the strong support of the industry's peak body, the Australasian Fire and Emergency Service Authorities Council (AFAC). The Bushfire CRC's formation followed devastating fires around Sydney in December–January 2001–02. It became one of the larger CRCs, with over 40 partners – including 18 research institutions spread across Australia and New Zealand.

All the fire and land-management agencies of Australia and New Zealand are members of both the Bushfire CRC and the Bushfire and Natural Hazards CRCs as are many universities and research organisations. In addition, several international organisations are involved either through a formal Memorandum of Understanding (MOU) or through less formal arrangements or research links.

Relevant Inquiries by COAG (2004), the Senate (2010) and the Victorian Bushfires Royal Commission (2010) have all recommended the continuation of a nationally focused bushfire and natural hazard research program.



MEMBERSHIP OF BUSHFIRE AND NATURAL HAZARDS CRC

The following are the formal participants in the Bushfire and Natural Hazards CRC:

ACT Emergency Services Agency
ACT Territory and Municipal Services
Attorney General's Department
Australasian Fire and Emergency Service Authorities Council
Australian National University
Australian Red Cross
Bureau of Meteorology
Central Queensland University
Charles Darwin University
Country Fire Authority, Victoria
Deakin University
Department of Environment and Primary Industries, Victoria
Department of Fire and Emergency Services, WA
Department of Parks and Wildlife, WA
Fire & Rescue NSW
Fire Protection Association Australia
Fire Services Commissioner, Victoria
Flinders University
Geoscience Australia
James Cook University
Macquarie University
Metropolitan Fire & Emergency Services Board, Victoria
Monash University
Northern Territory Government
NSW Rural Fire Service
NSW State Emergency Service
NZ Fire Service Commission
Office of Environment and Heritage, NSW
Queensland Fire and Emergency Services
Queensland University of Technology
Royal Melbourne Institute of Technology



RSPCA Qld

South Australian Fire and Emergency Service Commission on behalf of the Government of South Australia

Tasmanian Fire Service on behalf of the Tasmanian Government

The University of Adelaide

University of Canberra

The University of Melbourne

The University of New England

University of Southern Queensland

The University of Sydney

University of Tasmania

The University of Western Australia

The University of Western Sydney

The University of Wollongong

Victoria State Emergency Service

Victoria University

Volunteering Queensland



Attachment 2

THE BUSHFIRE AND NATURAL HAZARDS RESEARCH PROGRAM



Attachment 3

SECTOR NEEDS

The outcome of a multi-jurisdictional workshop in March 2013 held to define the possible scope of works for the Bushfire and Natural Hazards CRC was used as the basis of a public call for expression of interest from research providers.