

FIRE NOTE 100

ISSUE 100 NOVEMBER 2012

FIRE NOTE – A SHARED RESOURCE OF FIRE KNOWLEDGE



AUTHOR

Dr Richard Thornton, Bushfire CRC Deputy CEO and Research Director.

BACKGROUND

Fire Notes are a critical resource produced by the Bushfire CRC in conjunction with the Australasian Fire and Emergency Service Authorities Council, outlining progress on a research question in a brief and accessible way. Each *Fire Note* aims to summarise a piece of research in plain language that can be read and understood by the majority of interested readers. Importantly, a *Fire Note* can act as a springboard for further investigation; no single *Fire Note* is intended as a complete reference on the topic.

First published in late 2005 and now at Issue 100, *Fire Notes* remain a central tenet of both the

research utilisation and communications strategies of the Bushfire CRC. They spell out the broad outline of a research area, which for many readers is sufficient. For a more complete understanding of the research, the *Fire Note* points to the published scientific literature and further reading.

Each *Fire Note* is distributed across Australasia and internationally to more than 400 individuals by email; these people are leaders in fire, land and emergency service agencies, research organisations, government and bureaucracy and members of the public. Each *Fire Note* is also placed on the Bushfire CRC website and the AFAC Knowledge Web for public access.

FIRE NOTES – AN EVOLUTION

Fire Notes first concentrated mainly on industry topics (chemicals, prescribed fire, smoke) that included a section on how the research would help address the topic. They soon evolved so that a *Fire Note* is now equally about the research underway and how it can be used by the sector.

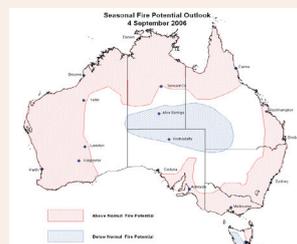
This evolution has mirrored the influence of the Bushfire CRC within the broader industry. For example, the first *Fire Note* in late 2005 addressed the use of chemicals in firefighting operations – a topic still relevant today. It discussed the broad issues with only a passing reference to research that was underway. By Issue three the topic of bushfire smoke was addressed: a topic that would be touched on a further seven times in *Fire Notes* through various ongoing research projects, illustrating the importance of this issue from an environmental, public health and firefighter health and safety perspective.

FIRE NOTES WITH IMPACT

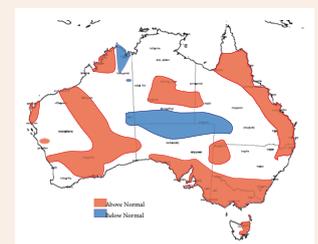
Bushfire outlook

Every year, before the northern and southern Australian fire seasons, the Bushfire CRC has brought together fire managers from all jurisdictions with Bureau of Meteorology scientists. The final agreed national seasonal outlook is communicated in a *Fire Note* (see panel, right) and used by governments and fire managers to harness resources and decide on community awareness campaigns for the upcoming season.

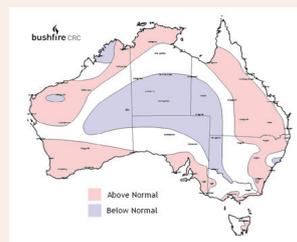
SEASONAL OUTLOOKS



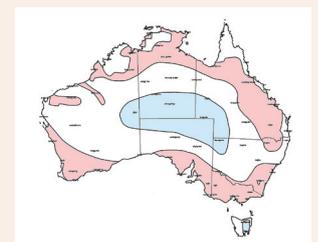
Summer 2006-2007



Summer 2007-2008



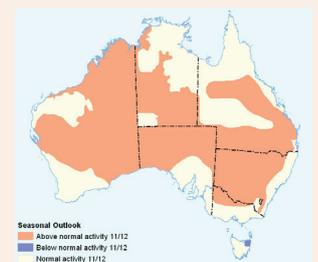
Summer 2008-2009



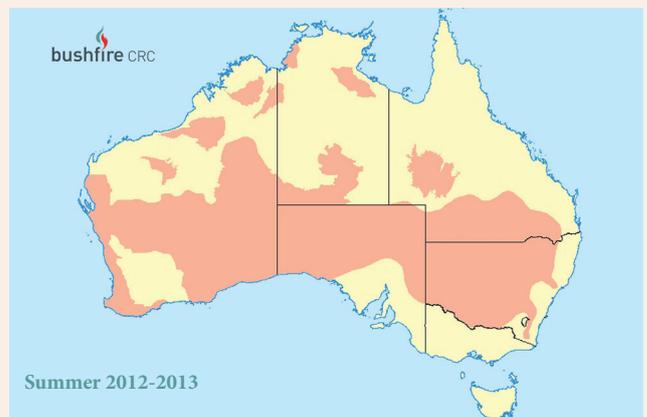
Summer 2009-2010



Summer 2010-11



Summer 2011-12



Summer 2012-2013

The national seasonal bushfire outlook is communicated widely through a *Fire Note*. An analysis of past outlooks shows the changes in bushfire potential over the years across Australia.

► *Fire Notes* have provided research briefings across a range of topics.

“A CRITICAL REASON FOR THE ESTABLISHMENT OF THE BUSHFIRE CRC WAS THE DWINDLING NUMBER OF SPECIALISED RESEARCHERS IN THIS AREA OF NATIONAL IMPORTANCE.”

Fire Note five in September 2006 saw the first seasonal bushfire outlook for Australia; it was a time well into the growing drought in Australia and illustrated that most of the coastal areas around Australia had above average fire potential for the upcoming fire season. Since then, there has been much discussion about the interpretation of these bushfire outlooks: are the same areas always ‘above normal’, what does ‘normal activity’ actually mean, why does rainfall have a varying effect on fire potential, what does it mean for regions bordering above and normal activity areas?

An examination of the combined national outlooks (see page 1) covering the period from the first in 2006 to the one produced a few months ago is revealing.

A close analysis of these *Fire Note* maps highlights many interesting trends in bushfires across Australia, most of which are linked to the broader climatic drivers of moisture, and hence fuel type and fuel availability. For example, during the period between 2006 to around 2010, the areas declared above average for fire potential were mainly in the forested regions around the coast of Australia. But from around 2010 onwards, there was a marked shift to the central areas of Australia recording above average conditions, driven by the high grass fuel loads following extensive rainfall and floods across the inland country. This also highlights the importance of related research in changing climate, vegetation classification and fuel moisture – as summarised in other *Fire Notes*.

By 2010, New Zealand had joined in with the development of a seasonal outlook examining

the likely scenarios for the upcoming fire season, based on the now well understood methodology developed in Australia through the Bushfire CRC *Fire Note*.

Shared responsibility

Another interesting trend started with what in hindsight is an iconic topic. *Fire Note* six in October 2006 highlighted the importance of sharing responsibility with the community regarding bushfire safety, in particular the legal aspects associated with delivering advice to the public. This *Fire Note* came from a joint meeting between researchers, lawyers and members of land management and emergency response agencies just prior to the 2006 AFAC and Bushfire CRC conference in Melbourne. It is interesting to see how prophetic some of these discussions were given the importance that policy and legal research carries now and that the resonance of shared responsibility has following the Victorian Bushfires Royal Commission.

Fire weather

Fire Notes have summarised research addressing some of the drivers of extreme fire behaviour including an examination of the passage of cold fronts over a fire ground (*Fire Note* 54 and 15 others covering different aspects). Some of this work is now embedded into the Bureau of Meteorology’s severe forecaster knowledge base.

Community safety

More than 25 *Fire Notes* cover aspects of community safety. The most recent returned



SHIFTING RISKS AND RESPONSIBILITIES - THE BALANCING EXERCISE

THE OUTCOMES OF A WORKSHOP ON THE LEGAL ISSUES OF ‘STAY OR GO’ AND COMMUNITY WARNINGS IN RELATION TO COMMUNITY SAFETY PROGRAMS.

Prepared by Elise Loh, Centre for Risk and Community Safety, RMIT University, on behalf of Catherine Dunlop and Rebecca Monson of Maddocks Lawyers, and John Handmer of RMIT

A joint workshop between the Bushfire CRC and Maddocks Lawyers was held on 10 August just prior to the 2006 AFAC/Bushfire CRC/HFCAA Annual Conference. The workshop attracted 30 participants from fire, land management and emergency service agencies.

This paper highlights the key points made at the workshop by the presenters, Catherine Dunlop and Rebecca Monson from Maddocks Lawyers and John Handmer from Bushfire CRC, and also by the participants who were at the workshop.

The two and a half hour workshop involved short presentations as well as two interactive exercises which covered the legal aspects of the ‘stay or defend or leave early’ (‘Stay or Go’) policy and community information and warnings (Community Warnings).

ABOUT THE LEGAL PROJECT

The legal project focuses on examining the legal risks faced by emergency workers and looks specifically on the legal issues connected with the ‘Stay or Go’ approach.

The complexity and confusion surrounding law in this area is partly due to the different jurisdictions that exist in Australia, which includes eight separate state/territory jurisdictions and federal law. A comprehensive paper has been completed as part of the project outlining the powers, liabilities and immunities of emergency workers in the context of the ‘Stay or Go’ policy.



Photo: Fire and Emergency Services Victoria

1. LEGAL RESEARCH VS LEGAL ADVICE

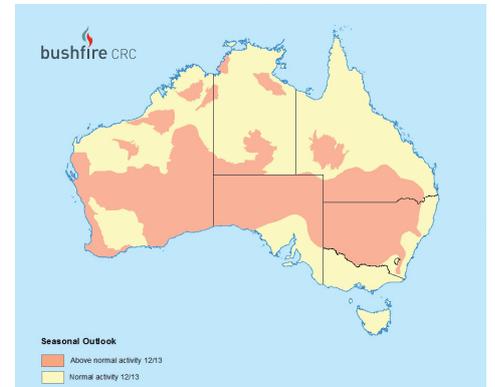
An important point made at the outset was the complementary and equally important roles that legal research and legal practice play in the area of emergency law. To clarify the difference, the two roles were described as follows:

• **Legal research** is often more focused on the broader themes in law (such as on the social and policy issues related to law) and on critiquing the current state of the law. As well as outlining and critically analysing the current state of law, legal research is also important in that it is able to trace the historical development of the law as well as suggesting recommendations for change.

• **Legal advice** involves providing legal opinions that are available to a particular client in relation to a specific situation. The important thing to remember in seeking legal advice is to ask broad questions in order to receive a more comprehensive answer from your solicitor. Asking a narrow question, such as one that requires a ‘yes’ or ‘no’ answer (e.g. ‘Can I do that?’) may provide you with an answer (usually a ‘no’), but will not give your legal counsel an opportunity to explain the reasons behind their answer. These reasons equip you to come to an alternative course of action, that may be equally possible for you as well as involving less legal risk. This point will be illustrated later in this paper.



SOUTHERN AUSTRALIA SEASONAL BUSHFIRE OUTLOOK 2012-13



SUMMARY
Large areas of southern Australia, from the east coast to the west coast, face above average fire potential for the 2012-13 fire season, despite the extensive fires in some parts of the country over the last 12 months. However, the area most at risk does not extend as far north as was seen in 2011-12. The above average forecast is due to the abundant grass growth from the high amount of rain from two strong La Niña events over the past two years across the eastern seaboard and South Australia. Fuel moisture content within forests is still high, but this rainfall has continued to provide widespread vegetation growth in the grasslands, which remains a threat. Elsewhere across southern Australia, the fire potential is considered to be average for 2012-13, but average fire conditions can still produce fast running fires. The above map combines the southern bushfire outlook with the northern bushfire outlook, which was released as *Fire Note* 83 in early August.

Photo: Fire and Emergency Services Victoria



EFFECTIVENESS AND EFFICIENCY OF AERIAL FIRE FIGHTING IN AUSTRALIA

SUMMARY

In recent years, considerable attention has been given to suppressing bushfires with aerial fire bombing. While the public has strongly identified aerial programs with successful bushfire suppression and called for greater investment in technologies that support this approach, public policy makers and fire agencies have been keen to more fully understand the costs and the effectiveness of using aircraft for firefighting operations. Bushfire CRC research examined the practical effectiveness and economic efficiency of aerial firefighting in Australia.

This research aims to help fire agencies identify the most effective combination of suppression resources for minimising the impact of bushfires.

The effectiveness of aerial fire suppression is complex, depending on many factors, including:

- Aerial travel time
- Distance from fire
- Aircraft characteristics
- Drop characteristics
- Ambient conditions
- Availability of ground-support resources
- Fire intensity
- Fuel size
- Fuel type
- Pilot skill
- Suppression agent used
- Organisational and infrastructure arrangements.

In addition, maximising use of limited capital and operational resources is one of the major challenges for all fire and land management agencies, which are often faced with the need to rapidly evaluate a range of fire suppression options under highly pressured situations.

BUSHFIRE CRC RESEARCH

Various methods were employed by Bushfire CRC researchers to explore the effectiveness



Photo: Fire and Emergency Services Victoria

and efficiency of aerial suppression techniques, including the following approaches:

- Suppression operational research data was collected during recent fire seasons from state and territory rural fire and land management agencies in Australia and New Zealand, and also the current best practice from relevant literature. Data were collected from more than 200 fires where aerial suppression were used. There were 76 and 32 fire reports from forest and grass fires respectively that were suitable for detailed analysis.

A series of aerial suppression experiments on stubble fires were conducted near Cambridge, Tasmania, to determine the effects of suppression drops on fire behaviour in stubble fuels. The experimental results were also used to develop test methods for evaluating the effectiveness of aerial suppression. The suppression experiments were conducted in

ABOUT THIS PROJECT

The effectiveness and efficiency of aerial firefighting in Australia was investigated under two Bushfire Cooperative Research Centre projects, including Project A.1.3: Evaluation of Aerial Suppression Techniques and Guidelines (within Program A: Safe Prevention, Preparation and Suppression), and Project C.1: Bushfire Economics (within Program C: Community Self-Sufficiency for Fire Safety). Bushfire CRC researchers involved include Matt Placinski of CSIRO Sustainable Ecosystems, Jim Gosnell of Emis, CSIRO Bushfire Research Group, John Handmer, Director of the Centre for Risk and Community Safety, RMIT University, and Gaminda Ganewatta, a former research fellow at the Centre for Risk and Community Safety, now at Deakin University.

to the issues discussed in that very early *Fire Note* (above), with Issue 82 looking at the research behind fire law and Issue 97 discussing mainstreaming fire and emergency management into broader policy areas.

Prescribed fire

Prescribed fire was one of the original focus areas of the Bushfire CRC and much has been written and delivered, each piece adding to the complex jigsaw involved in managing the Australian landscape. This touched on matters of ecology and biodiversity, fire behaviour, fire and fuel management, and risk management.

Background briefings on emerging issues for fire managers from AFAC and Bushfire CRC.



FIRE NOTE

ISSUE 82 | 11 FEBRUARY 2018

UNDERSTANDING FIRE LAW

SUMMARY

Conflicting legal requirements, and fear of litigation, may impede decision making at all stages of the 'prevent, prepare, respond and recover' cycle of hazard management. This *Fire Note* reports on the preliminary outcomes of research to identify the true impact of law upon fire management and community resilience and identifies the next stage of the research. It discusses how fire agencies may assist in identifying legal impediments to effective fire and emergency management.



ABOUT THIS FIRE NOTE

This is a preliminary report on understanding fire management into law and policy, a research project conducted as part of the Bushfire CRC Extension (Understanding Risk Research Program).

The authors: Dr Michael Eburn (pictured), Senior Research Fellow with the Fenner School of Environment and Society at the Australian National University and the ANU College of Law, and Professor Stephen Downes, Director of the Fenner School. For more information on this project contact Michael Eburn at michael.eburn@anu.edu.au.

END USER STATEMENT

'Emergency services agencies will gain by this research, through developing a sound understanding of the liabilities they face in conducting their activities, and the benefits that derive from a clear understanding of community expectations and concerns in respect to their obligations.'

— Mick Ayle, Acting Director, Northern Territory Fire and Rescue Service

CLAIMS FOR COMPENSATION AGAINST THE NSW RURAL FIRE SERVICE

In the period 1989 to 2010 the NSW Rural Fire Service attended 184,888 fire calls and received 263 claims for compensation.

- Between 21 and 31 per cent of claims related to firefighting operations.
- Between 25 and 35 per cent related to hazardous debris burns.
- 27 per cent related to motor vehicle accidents involving fire appliances.
- Five per cent related to claims arising from other activities.
- 13 per cent were for personal injury.
- 84 per cent were for damage to property.
- 11 per cent were made by members of the Rural Fire Service.
- Only six per cent were taken to Court. That means there was one court case for every 100,075 fire calls.

CONTEXT

Fire agencies and the community need to understand the limits of the law as it applies to fire planning and emergencies and to advocate for reforms to ensure that the legal system does not impose undue burdens on communities that must live with the risk of fire.

The research has reviewed the findings of post-event inquiries, judicial decisions and insurance claims to identify how law is applied to the fire ground and to determine if legal principles are an impediment to effective fire management.

BACKGROUND

Laws that restrict the ability to clear vegetation, prima facie, conflict with legal obligations to reduce fire risk, statutory obligations to respond to fire events are restricted by other obligations to ensure health and safety. Fear of legal liability may hinder decision makers and individuals. This research is identifying how these competing interests can be balanced in the most effective way, to ensure that the law and processes do not unduly hinder the community's ability to live with the risk of fire. The research seeks to separate fact, fear and fiction regarding law and its impact on fire management.

BUSHFIRE CRC RESEARCH

Preliminary research published in the *Environmental and Planning Law Journal* (Eburn, M and Jackson, B, 2013) suggests that the area of law and emergency management is surrounded more with urban myth and confusion rather than actual, clear evidence of a problem. Claims of inconsistency or legal impediments to preparation or response appear, more often than not, to be examples of misunderstanding of the process, or of a legal law is too loosely-type consuming or complex.

As the next step to identify how the law may impact effective emergency management, this research looked at the extent of litigation and claims for compensation arising out of bushfires. Publicly available court judgments were reviewed to identify cases that deal with liability for starting, or failing to contain, bushfires. The research identified that, in the 79 years between 1931 and 2010, five subject to litigation that resulted in a judgment by a court occurred in just 14 of those years.

A review was also undertaken of the claims file maintained by the New South Wales Treasury

Background briefings on emerging issues for fire managers from AFAC and Bushfire CRC.



FIRE NOTE

ISSUE 47 | NOVEMBER 2008

PLANTS AND FIRE: SURVIVAL IN THE BUSH

Management of fire for ecological and fuel reduction objectives requires knowledge of how plants are likely to respond to fire. This research investigates the composition of plants with different fire response traits across a mountainous region of south-eastern Australia, and the role fire plays in determining these patterns.

BACKGROUND

Fire management is underpinned by our understanding of the interaction between plants and fire. Plants have a variety of traits that allow them to survive in fire-prone landscapes.

Fire ecologists have developed a range of classification schemes to categorise plants according to their fire response traits (see 'Classifying plants' box). Two key traits are post-fire seedling and resprouting. However, the probability that a plant population will persist is dependent on a range of other factors, such as fire severity and the length of the intervals between fires. For instance, obligate seeders, which are killed by fire but regenerate from seed, can become locally extinct if a fire occurs before they have sufficient time to establish a large enough seed bank.

In 2003, bushfires burned across south-eastern Australia. This project analyses a large body of data on seedling and resprouting responses to these fires, with the aim of developing a detailed understanding of where particular fire-response traits occur across the landscape.

BUSHFIRE CRC RESEARCH

The extensive bushfires of January 2003 provided a unique opportunity to study the effects of fire on vegetation at a landscape level. These fires burned over 4 million hectares in Victoria, New South Wales and the Australian Capital Territory. A year after these fires, teams from five different organisations surveyed the resprouting and seedling response of 81 plant species at 284 sites across a steep elevation gradient in the Australian mountainous region from Burriem (NSW) to the Brindabella (ACT), Kooberoo and Merambong (NSW/VIC border).



A tank on fire in Brindabella National Park, near the border of New South Wales and the Australian Capital Territory. Tank on fire on the ground to support high response of obligate seeders.

SUMMARY

Resprouting and seedling are traits that enable plants to survive in fire-prone landscapes. This research brings together a large body of data to investigate how the proportion of resprouters and seeders varies in response to historic fire regimes and other environmental factors.

The survey data, as well as data on fire history and environmental characteristics for each site, were made available for this research and were compiled into a large database for analysis. At every site, the proportion of each fire-response trait was calculated. The key issues studied were: (1) What are the spatial patterns in fire-response traits across the study area? (2) What are the relationships of these patterns to fire regimes, habitat type and resource gradients in the study area?

ABOUT THIS PROJECT

This research is from B.L. Fire Regimes and Sustainable Landscape Risk Analysis, and part of Program B: Managing Perceived Fire in the Landscape.

THE AUTHOR: Lyndsey Vivian (pictured) is a PhD candidate at the Australian National University and the recipient of a Bushfire CRC scholarship. For more information about this research, visit the Education page at www.bushfirecrc.com or contact the author at lyndsey.vivian@anu.edu.au.

Background briefings on emerging issues for fire managers from AFAC and Bushfire CRC.



FIRE NOTE

ISSUE 74 | FEBRUARY 2017

THE RELEVANCE OF THE PACK HIKE TEST FOR AUSTRALIAN BUSHFIRE FIREFIGHTERS

CONTEXT

Fire agencies should become aware of the relevance of the Pack Hike Test (PHT) to Australian bushfire fighting in addition to the human factors associated with successful performance of the test. This research reviews the history, development and validation of the internationally recognised wildfire firefighter work capacity test, the PHT, with emphasis on its relevance for Australian fire agencies.

BACKGROUND

The annual threat of bushfires to communities across Australia and the world exposes thousands of firefighters to the physically demanding and often dangerous work of suppressing bushfires. The Occupational Health and Safety Act (OSHSA) in Victoria, and similar legislation across Australia, require that employers (including fire agencies) reduce risks to their employees as far as is reasonably practicable. One way of achieving this is by implementing physical competency tests to ensure that firefighters are fit for their required duty and able to work safely and competently. One such test widely used is the Pack Hike Test (PHT), also known as the Pack Test or Work Capacity Test. The test involves a 4.83 km hike over level terrain carrying a 20.4 kg pack within 45 minutes (Sharkey, 1999). The test is designed to challenge an individual's muscular endurance, strength and cardio-respiratory fitness, and was devised to mimic the physiological strain encountered during wildfire suppression using handtools and to replicate a common USA wildfire firefighter task, i.e. hiking with a pack (De Lorenzo, Green and Sharkey, 1995). The PHT is also currently used as a fit for duty test in Australia. However, the validity of the PHT for Australian firefighters is currently unknown.

BUSHFIRE CRC RESEARCH

The PHT is a physical competency selection test used to determine if firefighters have the required fitness to perform the necessary tasks for bushfire suppression. As a selection

SUMMARY

Fighting bushfires is a physically demanding occupation and therefore firefighters need to be physically fit to work safely and productively. Many firefighting agencies employ physical competency tests such as the Pack Hike Test (PHT) to determine whether personnel are fit for duty. The PHT involves a 4.83 km hike over level terrain carrying a 20.4 kg pack within 45 minutes. The PHT was devised to test the job readiness of American wildfire firefighters and is currently used by some fire agencies in Australia, including the Victorian Department of Sustainability and Environment and Australian Capital Territory Rural Fire Service. This *Fire Note* highlights key points from a recent review (Peterson et al., 2010) of the history and development of the PHT. The review addresses the relevance and validity of the PHT, the current research on the PHT, and the validity of these modified terms addressed. Finally, the risks associated with undertaking the PHT are discussed.

ABOUT THIS FIRE NOTE

This research is from the Firefighter Health and Safety Project within Bushfire CRC Program D: Protection of People and Property.

Co-authors included Aaron Peterson, of the School of Sport and Exercise Science, Victoria University, Bushfire CRC academic scholarship student Cara Lord, School of Exercise and Nutrition Sciences, Deakin University, Bushfire CRC Project Leader David Nicholls, of the Country Fire Authority (V.C.), and Bushfire CRC researcher Brad Aisbett (right), also of School of Exercise and Nutrition Sciences, Deakin University.

For more information, contact Dr Brad Aisbett at brad.aisbett@deakin.edu.au.

test, it is vital that the PHT can discriminate between firefighters who possess the essential fitness for the required work from those individuals who do not. The aims of the current research were to:

1. Review the literature on the history and development of the PHT with emphasis



2. Review the validity and suitability of the PHT for Australian bushfire firefighters.
3. Report on the modified version of the PHT, the human factors associated with successful PHT performance, and risks associated with PHT testing.

Notes 38 and 50). For example, through the evaluation of the DC-10 air tanker, the Victorian Government decided to not construct the plane in the following fire season, potentially saving the state \$10 million per year.

Firefighters

The volunteer-based fire agencies have changed their management of volunteers to take into account the work of the Bushfire CRC to ensure that Australians will be protected by volunteers in the coming years (*Fire Notes* 11, 22, 23 and 35). In addition, the health and safety of volunteers and paid firefighters has been improved through the extensive work conducted by the Bushfire CRC (*Fire Notes* 12, 30, 43, 44, 74, 77, 80 and 81).

A DECADE OF ACHIEVEMENTS AT THE BUSHFIRE CRC

The Bushfire CRC was established in 2003 following the bushfires that burned in and around Sydney in the 2001-2002 fire season. It was established to build capacity in research in Australia and New Zealand, to better understand aerial suppression of bushfires and to examine issues around prescribed fire. The Bushfire CRC also established the first national approach to social science research in the fire sector.

It was recognised then, as much as today, that there was a critical need to better understand the multi-factorial elements of fire management. If this is not done, then people will die unnecessarily, infrastructure and assets will be lost, and the environment

will be damaged irreparably; this is not a point of debate. The Bushfire CRC is the only nationally coordinated research organisation that is drawing together the best researchers across Australia, New Zealand and from around the world to the complex and fundamental issues around fire. Furthermore, most of the research of the Bushfire CRC is having a profound impact on the broader management of all natural hazards.

A critical reason for the establishment of the Bushfire CRC was the dwindling number of specialised researchers in this area of national importance. Many of Australia's pioneering researchers had or were shortly going to retire and there were few researchers following up. This was a national crisis, in one of the most fire-prone regions in the world. The Bushfire CRC set about rectifying this problem and, during the first seven years, the Bushfire CRC funded to completion around 43 PhD students. In the current extension research program, the Bushfire CRC is funding a further 45 PhD students. Many completed PhDs are complemented by a *Fire Note* based on the research thesis.

During this time, more than 100 research fellows and researchers were funded for periods of three years or more, greatly boosting the capability for research in Australia and New Zealand.

Although much of this output is captured in *Fire Notes*, this ongoing capacity is brittle and reliant upon further funding to maintain the momentum. Many of the skills developed by the Bushfire CRC to address the issues of national importance around disaster

The Bushfire CRC has had inputs in books on this topic including *Burning Issues; Flammable Australia; and Culture, Ecology and Economy of Fire Management in North Australian Savannas*. Also, 27 *Fire Notes* have been published in this area (2, 3, 4, 10, 13, 18, 19, 21, 25, 26, 28, 31, 32, 36, 37, 46, 47, 49, 56, 57, 64, 66, 76, 78, 79, 92, and 96).

Aircraft

The work of the Bushfire CRC has enabled fire and land management agencies to make more informed decisions regarding the use and purchase of aerial firefighting resources, (*Fire*



▲ Postgraduate students at the AFAC and Bushfire CRC annual conference in Perth, August 2012.

management are also in high demand in other related sectors. The researchers will be quickly absorbed into other fields if no further funding is available, representing a loss to the critical resource of fire research.

FUTURE RESEARCH

As this *Fire Note* 100 is published, there are already a further 60 *Fire Notes* scheduled for production over the next 12 months. These will cover the current research program and highlight the key findings and potential uses of the research.

It is critically important for all fire, land management and emergency services to realise that, although the *Fire Notes* have bushfire as a focus, many are equally relevant to other hazards and disasters. This is particularly true of those focusing on community preparedness, warnings, insurance, law, and occupational health and safety. In fact in many cases, the work being conducted through the Bushfire CRC on many of these broader topics will be the only academic work that has been conducted on which to inform policy and practice.

There are still many areas where the Bushfire

CRC has only just touched the surface and more work is needed. In particular, there are many areas that share common ground, particularly in the links between fire and flood where community issues are similar, response issues and incident management are similar and recovery issues have commonality.

Australian Government funding for the current Bushfire CRC research program was shaped exclusively around issues related to the Black Saturday bushfires. At the time, it made perfect sense to target short-term funding directly at the issues most pertinent to those fires. This funding wraps up at the end of June 2013.

But now, nearly four years on, far more knowledge is needed to deal with bushfires across the country, amid fast-moving changes in community values, demographics, climate and technology. The connections between emergency management of bushfires, cyclones, floods and other natural hazards are now more obvious.

Both the Victorian Bushfires Royal Commission and the Senate recommended the establishment of a national centre for ongoing bushfire research. While many

of the other recommendations have been publically discussed and acted upon, this recommendation is still outstanding.

Just prior to Black Saturday, an extensive research agendum was submitted to the Australian Government's CRC Committee for a CRC with an eight-year research program. Much of the research agendum, which was defined as "critical" by Bushfire CRC partners, remains untouched. Australasia's chiefs with fire and emergency responsibilities warned in 2008 that existing fire management practices, at all levels, are not sustainable in today's changing world.

Although agencies continue to adapt to the pressures as they arise, they fear that these pressures could combine unpredictably to make their current strategies ineffective under extreme circumstances. It is likely that this would occur at a time when the community is most vulnerable – during a major emergency – resulting in catastrophic societal, environmental and economic loss.

There is still more to know, more to do, more questions to ask, and more *Fire Notes* to inform.

Fire Note is published jointly by the Bushfire Cooperative Research Centre (Bushfire CRC) and the Australasian Fire and Emergency Service Authorities Council (AFAC). This Fire Note is prepared from available research at the time of publication to encourage discussion and debate. The contents of the Fire Note do not necessarily represent the views, policies, practices or positions of any of the individual agencies or organisations who are stakeholders of the Bushfire CRC.

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Bushfire CRC is a national research centre in the Cooperative Research Centre (CRC) program, formed in partnership with fire and land management agencies in 2003 to undertake end-user focused research.
Bushfire CRC Limited ABN: 71 103 943 755

Australasian Fire and Emergency Service Authorities Council
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Telephone: 03 9419 2388
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AFAC is the peak representative body for fire, emergency services and land management agencies in the Australasia region. It was established in 1993 and has 35 full and 10 affiliate member organisations.