



BUSHFIRE CRC ANNUAL REPORT 2012 -13



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October 2013

Front cover:

Bushfire CRC researcher Dr Carmen Lawrence at the Annual Conference in Perth.

Research Taskforce at Siding Spring Observatory, near Coonabarabran NSW.

CEO CERTIFICATION

I hereby certify that the information provided to the Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education by the Bushfire CRC in:

- the written annual report for the 2012-13 financial year;
- the CRC's online milestone tables for the 2012-13 financial year;
- the CRC's online financial tables for the 2012-13 financial year;
- the CRC's online MDQ for the 2012-13 financial year; and
- the four quarterly reports provided online for the 2012-13 financial year

is accurate and provides a true and fair view of the matters reported on therein.

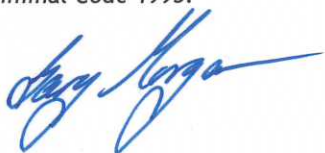
I certify that the Commonwealth funding and participant contributions were applied for the activities of the CRC as specified in the Commonwealth Agreement and that Commonwealth funding has been expended only for the activities and otherwise in accordance with this agreement.

I certify that the CRC has met its obligations in relation to the treatment of intellectual property.

I certify that the chair of the board meets the requirements of independence set out in the Commonwealth Agreement and that the majority of board members are independent of the CRC's research providers.

I certify that the CRC has adhered to the requirements for proper use of the CRC Program indicia, publicity and support as specified in the Commonwealth Agreement.

I am aware that giving false or misleading information is a serious offence and could lead to prosecution under the Criminal Code 1995.



Gary Morgan

CEO, Bushfire CRC

DATE

29/10/13

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EXECUTIVE SUMMARY

ACHIEVEMENTS AND ACTIVITIES FOR THE REPORTING PERIOD

After three years of Extension funding the Bushfire CRC has seen a range of outputs produced across all of its activities - research, research utilisation, education and communications. Bushfire CRC governance, financial and management operations are sound and effective. The details of the reporting period 2012-13 are contained in this publication.

High level achievements for 2012-13 include:

RESEARCH

Publications

The formal publication output of the Bushfire CRC increased by 201 and included three books, five book chapters, 43 Bushfire CRC Reports, 121 articles in scholarly refereed journals and 18 written conference papers. Details are in **Appendix A**.

These formal 201 publications, together with a further 192 research outputs over the year, lifted the total research output over the life of the Bushfire CRC to 1555 items. These publications - reports, journal articles, presentations, posters - are online at www.bushfirecrc.com and most also appear on the AFAC Knowledge Web, a product of the Bushfire CRC now managed by the industry.

Publications for industry

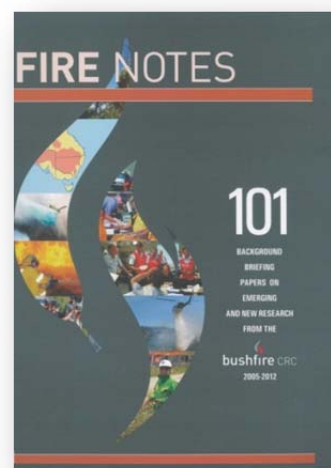
To assist fire agencies, volunteers and the community understand the new fire knowledge and how best to apply this knowledge, the Bushfire CRC continued to turn scientific reports into easy to read publications. This accounted for further publications that were produced with the aim of transferring know-how and practical information to end-users.

This year the 100th *Fire Note* was distributed. This was a milestone for bushfire research in Australia with so many succinct briefing papers, totalling 111 by the end of the financial year, on the major research issues in fire. A special limited edition compilation of 101 *Fire Notes* was published in a book format and distributed to all partners. *Fire Notes* were distributed to the industry on subjects including fire weather, risk planning, smoke impacts and community bushfire preparedness.

A record 84 posters were on display at the joint Bushfire CRC and Australasian Fire and Emergency Service Authorities Council (AFAC) annual conference in Perth. In addition, four editions of the Bushfire CRC's *Fire Australia* magazine were produced and sent to 6000 research and industry readers to widen the reach of research outputs from the Bushfire CRC.

Fire forecast

The Bushfire CRC again coordinated the southern and northern Australian and the New Zealand seasonal bushfire assessment workshops in collaboration with its partners. The outputs of these workshops provided information to assist fire managers from around Australasia in making strategic decisions such as resource planning and prescribed fire management.

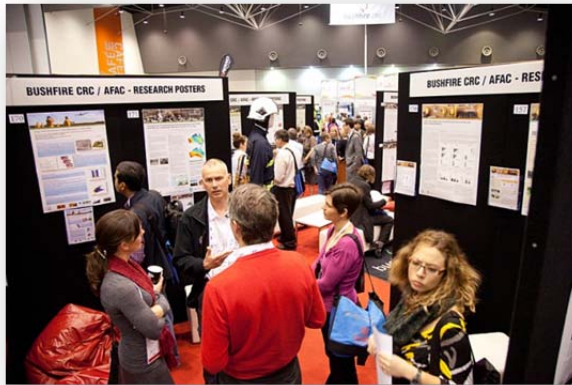


The annual workshops allowed fire and weather specialists from each of the jurisdictions to collectively consider the latest climate data from the Bureau of Meteorology, alongside the input from their regional managers, to distil consistent regional outlooks for the coming fire seasons. The workshops attempt to predict the areas likely to experience above or below normal fire potential. The outputs from these workshops were consolidated into reports as Bushfire CRC *Fire Notes*, together with a media release, to coincide with various state and national announcements on bushfire awareness. Significant media coverage followed each announcement.

Annual Conference

The Research Forum and Student Showcase were proud moments for the Bushfire CRC at our joint annual conference with AFAC at the Perth Convention and Exhibition Centre in late August.

Around 1300 delegates from around Australia attended over the conference week, with 130 trade expo displays, furthering its reputation as the biggest fire, land management and emergency services event of the year, linking research, policy and industry.



The conference, the workshops and the posters ensure the research of the Bushfire CRC is transferred into agency partners. The presence of so many people from across the industry – from the many CEOs to those in day-to-day operations as volunteers or paid staff, and Small to Medium Enterprises (SMEs) – is an acknowledgement that the industry is seizing the opportunity to be informed of the latest developments in its field.

Research Forum

A twice yearly Research Advisory Forum where half of the research projects alternately present on their progress has proven to be an effective way for the end-users and researchers to get a broad understanding on the progress and directions of the research projects, as well as providing feedback on quality and relevance. Participants at the Sydney and Perth forums had the opportunity to challenge the research and to increase the opportunities for collaboration and assistance.

FINANCIAL MANAGEMENT

The Bushfire CRC ended the financial year in a strong position with funds to carry out its operations for a further twelve months through to July 2014. This enhances the objectives of the Bushfire CRC for its final year.

EXTERNAL REVIEWS

The Bushfire CRC was reviewed by the Commonwealth Department of Innovation, Industry, Science, Research and Tertiary Education (DIISRTE) in the previous reporting period (Three Month Visit, First Year Visit and a Performance Review).

The final report from the Performance Review Panel found the Bushfire CRC to be “sound and robust”, with supportive and engaged stakeholders, a high quality research program, a cohort of leading international researchers and a clear vision for its future.

In its final report the Panel recommended the Bushfire CRC better measure its research impacts and enhance its presence in social media.

The Panel's main concern centred on measuring impact from the outcomes of the research. It believed the Bushfire CRC understated these actual and potential benefits.

The Bushfire CRC has acted on all these recommendations and provided full responses to the CRC Program. The significant improvements in social media presence are reported in the Communications section.

Research Utilisation

The roll out of the research utilisation strategy and the implementation plan remained on track during the year. Collaboration between research and end user partners has been strong as evidenced by the routine inclusion of project updates into the business group meetings of AFAC, the fire industry's peak body, widespread participation in the Research Advisory Forums, and the active role of Lead End-Users with researchers and project developments.

Engagement in professional development events has been strong, with 25 events and more than 2000 participants over the past year, including the major annual conference in Perth.

Research related to Human Factors has now been incorporated into the updated Australasian Inter-Service Incident Management System (AIIMS) manual and training resource kit; the key resources for ongoing training and development for the broader industry. This system details the national approach to operational work in emergencies in all states and territories, and New Zealand. Numerous research project outputs have been incorporated into the roles appropriate for people in emergency responses.

Over 250 people participated in the national series of Human Factors Professional Development workshops. Each workshop was evaluated and feedback was provided to the participant agency, providing them with a sense of what the relevant issues were for their context. The feedback was overwhelmingly positive, and assisted agencies in identifying issues to address.

Education

The Bushfire CRC has moved beyond its target number of PhD scholarship recipients. During this reporting period the Bushfire CRC had committed to supporting 61 students, up from 54 in the previous period. This figure includes nine PhD students who are in the final stages of their doctorate from the original funding period and four Masters students.

Four of the current program students submitted their thesis during the reporting period, plus another two students from the original funding period also submitted. More than half of the scholarship recipients are due to submit by the end of the current financial year (to mid 2014).

All students attended the Bushfire CR annual conference in Perth, submitted a poster and participated in the poster discussion session at the conference. To further support their professional development, select students were given the opportunity participate in a student showcase held in conjunction with the conference.

A number of students have also had the opportunity to present at the Research Advisory Forums or AFAC group meetings, while others have been supported to present their work at international conferences.



Communications

The Bushfire CRC was in high demand for media comment from late October when the northern fire season moved into southern Queensland and New South Wales and across Central Australia.

In December, the Bushfire CRC partnered with the Australian Science Media Centre for a national online briefing on bushfire science, generating 83 coverage items. Further online commentary continued into the hot weather of January. Comments were used by the media in Australia and internationally.

The Bushfire CRC and its researchers were in steady demand for media comment over summer on the science behind the current research program, the work of the research taskforces following bushfires in Tasmania and in NSW, the impacts of an active bushfire season and community responses to the bushfire threat. Individual researchers commented on their area of expertise across a range of media.

The annual conference in Perth in August attracted widespread national media coverage with several media organisations allocating a representative for most of the week at the venue.



The 100th *Fire Note* was distributed. This was a milestone for bushfire research in Australia with so many succinct briefing papers on the major research issues in fire. A special limited edition compilation of all the *Fire Notes* was published in a book format and distributed to all partners.

A growing community of people interested in Bushfire CRC research is developing through our active online social media channels, namely Facebook, LinkedIn and Twitter. Regular concise updates on Bushfire CRC activities are attracting comments and discussion and many new members to our sites.

Appointments

The membership of the Board changed with the resignations of Naomi Brown, Prof Mark Adams and Ewan Waller, and the additions of Stuart Ellis and Craig Lapsley.

Awards

The Bushfire CRC was honoured to be recognised by a Highly Commended award in the national Resilient Australia Awards, for the impact of its collective research program over the last decade. The Resilient Australia Awards are coordinated by the Federal Attorney-General's Department, with a presentation in Canberra in December.

The program of research projects by the Bushfire CRC was in the Nationally Significant and Cross Jurisdictional Category of the awards.

The award citation acknowledged that the Bushfire CRC work had led to many community benefits across Australia and New Zealand, including:

- the more efficient use of water-bombing aircraft
- increased house and vehicle safety
- greater understanding of fire behaviour and better smoke management
- effective use of firefighting volunteers
- creating bushfire arson reduction tools
- improved firefighter health and safety



The Bushfire CRC introduced a new award at its annual conference in Perth, the Excellence in Utilisation of Bushfire CRC Research award, which acknowledges agencies demonstrating effective uptake of Bushfire CRC research into their business.

The inaugural award was won by the Tasmania Parks and Wildlife Service for its utilisation of Bushfire CRC expertise in working toward changing workplace culture to become a high reliability organisation. Adrian Pyrke accepted the award from Bushfire CRC CEO Gary Morgan (*pictured left*).



The Bushfire CRC was also pleased to commend the efforts in research utilisation at the Western Australian Fire and Emergency Services Authority, the New South Wales Rural Fire Service and the ACT Parks and Conservation Service.

Bushfire CRC PhD student Rachel Carter, from La Trobe University, was awarded a prestigious International Association of Wildland Fire (IAWF) scholarship by IAWF board member Ron Steffens (*pictured left*).

RISKS AND IMPEDIMENTS

A general risk highlighted in previous Annual Reports was the potential impact on the retention of key researchers as the funding uncertainty continued. This risk continued for most of this reporting period. With most projects due to finish by mid-2013, retention beyond this date was unlikely. This impediment was addressed somewhat by the commitment of all Bushfire CRC partner agencies to maintain their own funding to an ongoing research program, and by the allocation of research funds to specific contract research projects.

However, the mid-February announcement by the Australian Government to create an expanded national centre for research into bushfires and natural hazards substantially addressed the risk, even though the funds were not provided directly to the current group of researchers. The Prime Minister Julia Gillard committed \$47 million over eight years for a new Bushfire and Natural Hazards Cooperative Research Centre from 1 July 2013.

The Bushfire CRC released a public statement supporting the announcement to the media and to all Bushfire CRC partners, researchers and students. Letters of acknowledgement were also sent to the Prime Minister and other Ministers of the joint announcement: the Minister for Industry, Innovation, Science, Research and Tertiary Education; the Minister for Emergency Management; and the Minister for Human Services.

END-USER ENVIRONMENT

The uncertainty of ongoing funding for the Bushfire CRC also attracted much public debate during this period. Coupled with an active fire season, this presented an opportunity for key messages to be reinforced in public messages through the media, online and social media channels, and via end users.

Fires over the 2012/13 summer provided an opportunity for Bushfire CRC end users to promote to the community that the agencies valued the Bushfire CRC and had a continuing need for ongoing research across our fire prone environment. Bushfire CRC Director Shane Fitzsimmons and Commissioner of the NSW Rural Fire Service, and Tasmania Fire Service Chief Officer Mike Brown both took the opportunity to brief the Prime Minister on the importance of ongoing fire research as she toured regions impacted upon by fires.

Several high profile media articles and radio interviews highlighted the fact that Australian Government funding for national bushfire research was to end on 30 June 2013. The Bushfire CRC endeavoured to outline the facts of the situation as clearly as possible, including the fact that, although no new funding was scheduled and the long term future was unclear, the Bushfire CRC would continue to operate well into 2014 on funding set aside for the utilisation of the outputs from the current research program.

The end user environment was also influenced by major news coverage on the Bushfire CRC funding included comments from several Federal MPs and Senators, the NSW Premier and the ACT and Victorian state governments.

IMPACTS

The anticipated impacts detailed at the beginning of the Bushfire CRC, as outlined in the Impact Tool, have been exceeded. The changed culture across the industry towards knowledge and research has led to an increased utilisation of the research outputs.



GOVERNANCE AND MANAGEMENT

The Bushfire CRC is an incorporated not for profit public company (Bushfire CRC Ltd) limited by guarantee.

The Company, Bushfire CRC Ltd was registered in March 2003 and began formal CRC operations in July 2003. The Bushfire CRC is endorsed by the Australian Taxation Office as a charitable institution, which provides income tax exemption and Fringe Benefits Tax rebatable status.

The Bushfire CRC's Stakeholders Council consists of representatives of each of the participating agencies.

The Stakeholders Council met in November 2012 to review and receive updates on the progress of research, finance, education, communication and other activities. The Governing Board met five times throughout the year.

Changes to the membership of the Board in the reporting period were:

- Naomi Brown (resigned 23 November 2012)
- Ewan Waller (resigned 19 October 2012)
- Mark Adams (resigned 19 October 2012)
- Craig Lapsley (appointed 22 October 2012)
- Stuart Ellis (appointed 22 November 2012)

The Governing Board has five committees that meet at least twice a year:

- A **Risk Management and Audit Committee** that oversees corporate governance, audit responsibilities, finance, compliance and risk management.
- A **Research and Education Committee** that ensures the research conducted meets the strategic aims of the Bushfire CRC and the needs of the users and is responsible for providing strategic advice on the overall development of the Bushfire CRC's postgraduate program and new educational initiatives.
- A **Human Resources Committee** to advise on and oversee the Bushfire CRC's personnel matters including selection, remuneration, performance management and Board nominations.
- A **Research Utilisation Committee** to advise on the strategy for research adoption.
- A **Strategic Directions Committee** to advise on strategic planning initiatives.

FINANCIAL MANAGEMENT

The Bushfire CRC ended the financial year in a strong position. The CRC managed to accumulate enough funds to carry out its operations for a further twelve months through to July 2014.

The independent auditors confirmed that no issues had been identified during the audit in relation to the financial management of the Bushfire CRC and have issued an unqualified audit report.

Governing Board Members

Name	Role	Key skills	Independent/ Organisation	Attendance (out of 5)
Len Foster AO	Chairman	Governance and strategy	Independent	5/5
Professor Mark Adams	Director	Researcher and academic	University of Sydney	1/1 Resigned 19 October 2012
Naomi Brown	Director	Industry based skills	Australasian Fire and Emergency Service Authorities Council	2/2 Resigned 23 November 2012
Murray Dudfield MNZN, MNZIF	Director	Industry based skills	New Zealand National Rural Fire Authority	4/5
Commissioner Shane Fitzsimmons AFSM	Director	Industry based skills	New South Wales Rural Fire Service	5/5
Professor Alistar Robertson	Director	Researcher and academic	University of Western Australia	5/5
Mike Taylor AO	Director	Governance and strategy	Independent	4/5
Ewan Waller AFSM	Director	Industry based skills	Department of Environment and Primary Industries	1/1 Resigned 19 October 2012
Yvonne Sneddon FAICD, FCA	Director	Finance and governance	Independent	5/5
Stuart Ellis AM	Director	Industry based skills	AFAC	3/4 Appointed 22 November 2012
Craig Lapsley PSM	Director	Industry based skills	Fire Services Commissioner, Victoria	2/4 Appointed 22 October 2012

COMMITTEE MEMBERS

Committee Name	Risk Management and Audit	
Name	Role	Independent/ Organisation
Yvonne Sneddon	Chair	Independent
Stuart Ellis	Member	AFAC
Shane Fitzsimmons	Member	NSW RFS

Committee Name	Research and Education Committee	
Name	Role	Independent/ Organisation
Murray Dudfield	Chair	NRFA
Craig Lapsley	Member	FSC - Victoria
Alistar Robertson	Member	UWA

Committee Name	Human Resources Committee	
Name	Role	Independent/ Organisation
Mike Taylor	Chair	Independent
Len Foster	Member	Independent
Shane Fitzsimmons	Member	NSW RFS

Committee Name	Research Utilisation Committee	
Name	Role	Independent/ Organisation
Stuart Ellis	Chair	AFAC
Murray Dudfield	Member	NRFA
Alistar Robertson	Member	UWA

Committee Name	Strategic Directions Committee	
Name	Role	Independent/ Organisation
Len Foster	Chair	Independent
Mike Taylor	Member	Independent
Stuart Ellis	Member	AFAC
Yvonne Sneddon	Member	Independent

KEY STAFF

Name	Organisation	CRC Position / Role	Time
Gary Morgan	Bushfire CRC	CEO	100%
Richard Thornton	Bushfire CRC	Deputy CEO/Research Director	100%
Noreen Krusel	Bushfire CRC	Research Utilisation Manager	100%
Lyndsey Wright	Bushfire CRC	Research Manager	100%
David Bruce	Bushfire CRC	Communications Manager	100%
Trevor Essex	Bushfire CRC	Business Manager	40%

PRINCIPAL SCIENTIFIC ADVISERS

Name	Organisation
Prof Rod Keenan	University of Melbourne
Prof Drew Dawson	Central Queensland University
Prof John Handmer	RMIT University
Prof Douglas Paton	University of Tasmania
Prof Mike Taylor	University of South Australia

PARTICIPANTS

Name	Organisation Type	ABN	Role
Essential			
ACT Emergency Services Agency	State	77 972 506 632	End-user
ACT Parks & Conservation Service	State	37 307 569 373	End-user
Attorney-General's Department	Australian Government	71 103 943 755	End-User
Bureau of Meteorology	Australian Government	92 637 533 532	End-user
Central Queensland University	University	39 181 103 288	Research provider
Country Fire Authority, Vic.	State	39 255 319 010	End-user
CSIRO	Australian Government	41 687 119 230	Research provider
Deakin University	University	56 721 584 203	Research provider
Department of Parks and Wildlife, WA	State	38 052 249 024	End-user
Department of Environment and Primary Industries, Vic.	State	90 719 052 204	End-user
Department of Fire & Emergency Services, WA	State	39 563 851 304	End-user
HQ Plantations Pty Ltd	State	25 142 448 977	End-user
Forestry Corporation of NSW	State	43 141 857 613	End-user
Geoscience Australia	Australian Government	80 091 799 039	Research provider
South Australian Country Fire Service on behalf of the Government of South Australia	State	97 677 077 835	End-user
La Trobe University	University	64 804 735 113	Research Provider
Metropolitan Fire & Emergency Services Board	State	28 598 558 561	End-user
Municipal Association of Victoria	Local Government	24 326 561 315	End-user
Office of Environment and Heritage NSW	State	30 841 387 271	End-user
Fire and Rescue NSW	State	12 593 473 110	End-user

Name	Organisation Type	ABN	Role
Essential			
NSW Rural Fire Service	State	25 003 129 221	End-user
NSW State Emergency Service	State	88 712 649 015	End-user
NT Fire & Rescue Service	State	84 085 734 992	End-user
NZ National Rural Fire Authority	New Zealand Government	Not Required	End-user
Queensland Fire & Rescue Service	State	93 035 163 778	End-user
RMIT University	University	49 781 030 034	Research provider
Rural Fire Brigades Association of Qld	State	37 417 474 709	End-user
Tasmania Fire Service on behalf of the Tasmanian Government	State	68 039 681 690	End-user
The Australian National University	University	52 234 063 906	Research provider
The University of Melbourne	University	84 002 705 224	Research provider
The University of Sydney	University	15 211 513 464	Research provider
The University of Western Australia	University	37 882 817 280	Research provider
University of Canberra	University	81 633 873 422	Research Provider
University of South Australia	University	37 191 313 308	Research provider
University of Tasmania	University	30 764374782	Research provider
Department of Justice Victoria, Fire Services Commissioner	State	32 790 228 959	End-user

Name	Organisation Type	ABN	Role
Other			
Australasian Fire and Emergency Service Authorities Council	Industry	52 060 049 327	End-user
Fire Protection Association of Australia	Industry	30 005 366 576	End-user

Name	Organisation Type	ABN	Role
Other			
National Aerial Firefighting Centre	Industry	96 105 736 392	End-user
Terramatrix Pty Ltd	Industry	44 129 163 373	End-user
University of Wollongong	University	61 060567686	Research partner

INTELLECTUAL PROPERTY MANAGEMENT

As a public-good CRC, it is expected that the work of the Bushfire CRC will ultimately be publicly available, informing public policy and debate. A broad range of mechanisms for dissemination of information are used.

There is a requirement to ensure that information is not immediately available in the public domain for a number of strategic reasons; this includes in the area of incomplete policy and public safety guidance, or where premature release may result in adverse community outcomes, for example unsafe practices or policies. Also, there is a need to ensure exposure drafts can be circulated to partners contributing to the Bushfire CRC.

The Bushfire CRC owns all intellectual property (IP) created under its auspices and manages its IP to ensure the objectives of the centre are met. Where a clear opportunity arises and where the expense can be justified, formal protection can be sought. It is considered that this will be rare.

The Bushfire CRC has a corporate website that features the latest research and other activities. This is linked with the AFAC website (which incorporates the AFAC Knowledge Web initially developed by the Bushfire CRC). This online forum provides an opportunity to debate and develop policy amongst all fire, land management and emergency service agencies in Australia and New Zealand.

The Bushfire CRC engages in contract research where such work is consistent with the Bushfire CRC mission. All contract research is conducted on a commercial basis, that is, without subsidisation from partners. However, the Bushfire CRC will remain a not-for-profit, incorporated body, and any funds raised through commercial activities will be reinvested into further research for the community good.

Key pieces of IP held by the CRC

The Bushfire CRC does not hold any commercially valuable pieces of intellectual property. Most of the IP generated in the first seven years of the Bushfire CRC was placed in the public domain. Under the current work of the Bushfire CRC the IP is either in development or in the process of being published. The CRC holds substantial copyrighted material in photos, videos, and other products.

Ensuring the maximum benefits of IP arrangements

Maximum benefits are derived from the work of the Bushfire CRC through the widespread use of the outputs by the end-user partners on behalf of the communities they serve. Licensing is completed for agencies that are not part of the Bushfire CRC and have not signed the participant's agreement; this is, however, rare, as most relevant organisations are partners of the Bushfire CRC. Arrangements have been put in place to enable the ongoing use of centre IP for research and teaching purposes by the participants.

RESEARCH PROGRAMS

THE KEY CHALLENGE

On 7 February 2009, Australia suffered its worst-ever loss of life and property in a series of bushfires driven by severe weather in Victoria. In these fires, 173 people lost their lives, many more were injured and lost their homes and livelihood. There was also extensive loss of community infrastructure. This event was a latest in a line of bushfire disasters stretching back to early European settlement of Australia. The series of fires which took place at this time are known collectively as the 'Black Saturday' fires and join the many iconic events in recent times such as Ash Wednesday (SA and Vic) in 1983; Canberra (ACT) in 2003; Sydney (2001-2); Wangary (SA) in 2005; Boorabin (WA) in 2008 and Toodyay (WA) in late 2009 which have challenged our fire services and communities. Significant fires (including Toodyay, Roleystone, Lake Clifton and Margaret River in WA 2009 to 2011, Tasmania and NSW in 2013) have occurred in the intervening period.

The scale and the consequence of the February 2009 fires in Victoria resulted in the establishment of the 2009 Victorian Bushfires Royal Commission.

The key issues highlighted in the Royal Commission Reports include:

- The fires
- Engaging communities
- Warnings
- Information
- Relocation (Evacuation)
- Stay or go
- Risk and refuge
- Incident management
- Emergency management
- Commonwealth response
- Emergency calls
- Building in bushfire-prone areas

In the immediate aftermath of the Black Saturday fires the Bushfire CRC embarked on the biggest data-collection and research study of any fires ever undertaken. Covering more than 2000 staff-days of effort, the aim of the study was to get a better understanding of the key issues and the intrinsic problems in dealing with extreme events of this nature. This data collection is an important snapshot of understanding at that point in time and provides a base line for future studies. Some analysis has been undertaken, but much remains to be explored.

It is clear in the analysis undertaken so far that the community did not understand the risk that it faced. The Bushfire CRC's challenge is to build on its previous work towards a better understanding of these tragic events to help the sector and the community address the key issues identified by the Royal Commission.

The response

In responding to this key challenge, the Bushfire CRC developed a research plan for 2010-2013 that sets the agenda for longer-term studies. This drew on extensive data collection following the 2009 fires, discussions with leaders in the fire, land-management, local government, academic and policy arenas, and the Counsel Assisting the Royal Commission.

KEY RESEARCH ACHIEVEMENTS

The Bushfire CRC has now been operating under its extension contract for three years and the outputs are in the final stages of completion. Outputs have been presented to the end user community through reports, *Fire Notes* and other publications, workshops, conferences and seminars. Much of the work has also been submitted for publication in peer review journals. The Bushfire CRC has seen a lift in the quality of its research outputs as demonstrated to the DIISRTE Review Panel in 2012. Some of key highlights have been the presentation of the combined work on understanding community expectations, in particular the way in which this is shaping community engagement policy and practice, along with a major fire weather workshop at Busselton in Western Australia that brought together researchers and practitioners to discuss and review the current state of the science and its application.

As part of the management of the research program, the Bushfire CRC initiated a twice yearly Research Advisory Forum where half of the research projects alternately present on their progress. This continues to be a highly effective way for the end-users and other researchers to get a broad understanding on the progress and directions of the work as well as providing feedback on quality and relevance.



Two Research Advisory Forums were held over the year - the first at the NSW Rural Fire Service headquarters in October 2012 (*panel session pictured above*) and the second at the Department of Parks and Wildlife in Perth in May 2013.

In New Zealand in July, Bushfire CRC researchers were prominent at the Forest and Rural Fire Associations annual conference, which included participation by senior fire service staff and volunteers and the forestry industry.

Forum presentations are made up of comments from the Lead End-User, a presentation by the researcher, and time for questions facilitated by the Lead End-User. Groups of like projects respond to questions in a panel format. Both events involved more than 60 researchers and end-user staff from around Australia and New Zealand discussing the progress of a range of projects. Research forums in the past 12 months have

also included presentations from students. Student projects make an important contribution to the research program and to building the ongoing research capacity and capability of the sector.

All projects have been assigned a Lead End-User who has ensured that the detailed research directions include input from the end-user cohort. This person also helps to provide access into agencies and ensure that the research utilisation is considered at a very early stage. An evaluation of the Lead End User experience is scheduled for late 2013.

Throughout the year many of the projects have presented to the various AFAC Group meetings (including Community Safety, Rural and Land Management, State Emergency Service, and Urban Operations) and also at the Perth annual conference, which was held jointly with the broader industry.

The research program is split into three inter-related themes of work around the topics of Understanding Risk, Communicating Risk and Managing the Threat.

A list of Publications is at **Appendix A**.

RESEARCH PROGRAMS

Understanding Risk

The work in this program seeks to understand the underlying risk exposure of the community and the things it values. It is exploring and making sense of these conflicts, examining the complexity of legislation, regulation and policy relating to fire management and building a risk evaluation model that can help residents, policymakers, asset owners and fire managers simulate the impact of decisions made and examine the trade-offs.

In this theme there are four substantive parts, all of which are moving towards utilisation and application.

The first elements surrounding community expectations have already started to have significant impact in the industry, particularly at senior management level in fire agencies. The foundation work conducted on the theme of shared responsibility, a key issue in the 2009 Victorian Bushfires Royal Commission, has continued to inform industry debate and is having an influence on community engagement approaches. Following the success of the 2012 workshop, which brought together policy leaders and members of the community in a wide-ranging discussion on the concept of shared responsibility, the project team conducted similar discussions in other states. Researchers studying the range of impacts arising from several of pieces of legislation and from inquiries have been in high demand to speak to agencies throughout the year. Work from this project has now been incorporated into updated material in educational programs.

Case studies of the relationship between fire management and land use planning have been completed in New South Wales, ACT, Northern Territory and Victoria.

Publications were featured in the fields of fire weather (report, conference paper), fire behaviour modelling (journal, conference papers) mapping of interface fuels (reports), legal aspects of emergency management (journals, reports, conference papers), sharing responsibility (journal, report), and the social construct mapping of bushfire areas (conference papers).

Communicating Risk

This program of work focuses on the communication of risk and threat: how warnings and information are best communicated. Research is focusing on what people actually did, why they did it and what tools, methods and techniques can be used by public safety authorities to better ensure the safest behaviour under the types of conditions that occur in major event scenarios.

The work in this theme is based around two main project areas: effective communication and understanding how people behave under stress, a particular focus of this work has been on understanding the way in which communities, social capital and community interactions can influence bushfire safety outcomes. Extensive surveying, including testing the impact of particular known scenarios (for example, the potential for the loss of power or communications during a bushfire) has been completed and research outcomes presented to community safety practitioners.

The results of this work have quantified that rather than making a decision to 'stay and defend' or 'leave early' some people consciously make a decision to 'wait and see' and these people are likely to be the least prepared to either defend or to leave. Knowledge from the range of studies in this program are directly influencing policy and practice.

Publications were featured in the areas of understanding communities and social cohesion; (reports, conference papers), gender aspects of bushfire research (reports conference papers), householder preparations for bushfire (reports), community engagement and wildfire preparedness (book), and bushfire survival related decision making (journals, reports, conference papers).

Managing the risk

This program addresses scenarios where the risk of fire has translated into a direct threat. It is considering extreme events such as the Black Saturday fires of 7 February 2009; these events are irregular and not as well understood as more routine occurrences of fire.

The program includes understanding the role of incident coordination at the levels above the incident management team, and the ability to obtain timely situational awareness consistent with appropriate fire prediction and warnings, together with the ability to resource these effectively and sustainably. This program also considers the impact of events on important infrastructure and resources, including environmental resources such as carbon and water.



This theme has four broad areas of work - incident management, fire in the landscape, extreme fire behaviour and suppression, and health and safety. All teams have completed a range of experimental activities both in the field and in the laboratory to better understand issues as diverse as the movement of fire brands through the air leading to the creation of spot fires, and the influence of plant regrowth after fire on water use. Projects in this program also consider the way in which communications can be enhanced and better outcomes achieved during complex events.

A continuing focus of the projects across this program has been the regular and intensive engagement with the end-users, particularly through the relevant AFAC Groups and their state, territory and New Zealand managers. Examples of such involvement include the participation of operational staff (firefighters) in physical and cognitive testing to understand the impact of heat and fatigue on decision making.

Publications were featured in the areas of incident management (book chapters, reports, conference papers), environmental impacts of prescribed and wildfire (reports, conference papers), operational readiness of firefighters (journal articles, conference papers) and smoke impacts at the rural-urban interface (reports, conference papers).

RESEARCH UTILISATION

Background

The Research Utilisation Strategy 2013-2014 is the product of extensive consultation with end user stakeholders, including a survey of end user organisations that was conducted in late 2010 and another to review the strategy in December 2012.

A 2012 Review by the Department of Industry, Innovation, Science, Research and Tertiary Education reported the relationships and partnership within the Bushfire CRC were exemplary. A survey of end user partners conducted in November 2012 suggests high satisfaction with collaboration and engagement opportunities. However, respondents were still having difficulty dealing with understanding the research and what it might mean to industry practice. At a strategic level, alignment between the Bushfire CRC outputs and the agencies' strategic plans has declined. The reduced alignment between Bushfire CRC and Agency Strategic Plans is entirely expected as the Bushfire CRC moves towards its wind down phase and that the last three years of funding was to address issues arising from the 2009 Victorian Bushfires rather than those issues that the agencies believed needed addressing to assist them in protecting their communities into the future.

The most important barrier to research utilisation found in the survey, was the perceived shortcomings in internal agency processes, with limited capacity to cope with the change research might bring, and the need for industry wide approaches. The focus of the Bushfire CRC in the next period will be to assist agencies in improving their research utilisation.

The December 2012 Review revealed improved customer satisfaction with our key information products and engagement processes. Since 2010 there were strong improvements in reported levels of satisfaction with utilising Bushfire CRC information resources (website; *Fire Notes*, and research publications). None of these information services offer the skills to bring about change on their own (nor are they intended to).

Since 2010, there is also general satisfaction with collaboration and engagement opportunities including participation in the Bushfire CRC Stakeholder Council; Research Advisory Forum; Bushfire CRC/AFAC Conference; and AFAC group membership. Events (workshops and project team involvement) that provide more intensive and active engagement were associated with the highest levels of satisfaction.



The strategy continues to:

- use a multitude of information transfer mechanisms (website, *Fire Notes*, conference posters and presentations);
- facilitate interactive engagement mechanisms (professional development events such as forums, workshops, and seminars);
- support end user/research collaboration mechanisms (AFAC working groups and meetings) and;
- embed new knowledge into agency training, professional development and other education.

However, the December 2012 Review also identified the need to place additional emphasis on some of the following as key areas for success (emphasis is bolded);

- Relationships and partnerships beyond AFAC to individual agencies and new partners

- Increased engagement and active involvement in addition to passive approaches
- Nurturing of a responsive and learning culture within individual end-users, by agencies
- Building of research utilisation capacity and capability within end-user agencies
- Creation of high quality products to support utilisation in a collaborative way
- Supporting agencies to make the research meaningful for their context.

The implementation plan that delivers the intent of Strategy has been adjusted accordingly.

PROGRESS

Comprehensive reports on the progress of the implementation of the Strategy and Plan were presented to the Research Utilisation Committee of the Board in August 2012, February 2013 and March 2013. The implementation of the Strategy and Plan is tracking largely as planned.

Collaboration with industry operational partners has continued through ongoing and active participation of Lead End Users in research project teams, and researchers or Bushfire CRC staff, at all relevant AFAC business meetings. These AFAC meetings represent end user agency national communities of practice for the research projects. Most meet two times each calendar year. In addition:

- 18 *Fire Notes* were released during the reporting period – a list is attached at **Appendix B**.
- 25 events were conducted over the year for 2085 participants, including the annual conference with 1385 registrants for a four-day program.
- An e-learning resource has been developed and is distributed to practitioners who purchase the latest AIIMS training Resource Kits. The e-learning resource provides support to industry trainers who are delivering the new Human Factors elements of the AIIMS training. Additional advisory support is being provided to industry through a 'help line' which offers access to Bushfire CRC research experts.
- An e-book based on the research of a PhD graduate from the first Bushfire CRC Program was developed into a product for parents and those who work with children. The e-book provides basic information about how children can be included appropriately into bushfire preparedness planning. This has had national distribution and significant interest.

ISSUES

While the April 2012 Performance Review noted the strong support and enthusiasm of all end-user agencies, there was also commentary about the need for the industry to measure impacts.

The mid-term review of the Research Utilisation Implementation Plan has revealed that the industry's capability and capacity to utilise research could be a limiting factor to achieving impact. The Bushfire CRC is working with the AFAC Information and Capability managers to develop a comprehensive approach to support industry, including professional development and the creation of learning and sharing opportunities.

HIGHLIGHTS

Human Factors Professional Development

The final of a series of Introductory Human Factors Professional Development workshops were held in the ACT in November and December 2012.

Over 250 people participated in the national series of Human Factors Professional Development workshops. Each workshop was evaluated and feedback was provided to the participant agency, providing them with a

sense of what the relevant issues were for their context. The feedback was overwhelmingly positive, and assisted agencies in identifying issues to address.

The workshops were a consolidation of various early research projects conducted by Bushfire CRC research. Extension research is continuing in this field and gradually a strong interest is building in industry of both the need to understand and appreciate the role of 'people' in emergency operations. Examples of 'spin off' activities have included the development of a resource and the supporting of two agencies in the conduct of a Staff Ride; the development of a network of researchers and practitioners between the US and Australia; the employment of research graduates by agencies so they can continue to apply their expertise in industry; and, the embedding of human factors concepts into vocational training.

Conference Support Scheme

A conference support scheme has been established for end-users to support conference attendance for two people each year. A budget of \$10,000 for the first calendar year has been allocated to support two international conference attendances.

The scheme supported Sandy Whight, from the Tasmania Parks and Wildlife Service, to present at the International Safety Summit in Sydney in October 2012, (pictured right).



Publications

All 1555 research publications - reports, journal articles, presentations, posters, etc - are online at www.bushfirecrc.com and most also appear on the AFAC Knowledge Web, a product of the Bushfire CRC now managed by the industry. See **Appendix A**.

To assist fire agencies, volunteers and the community to understand the new fire knowledge and how best to apply this knowledge, the Bushfire CRC continued to turn scientific reports into easy to read publications. This included 111 *Fire Note* briefing papers accessible to the industry on subjects including aerial firefighting, the organisation of incident management teams, firefighter health and safety, forest flammability, assessment of grasslands by satellite, community fire safety for people with special needs, and climate change and fire management.



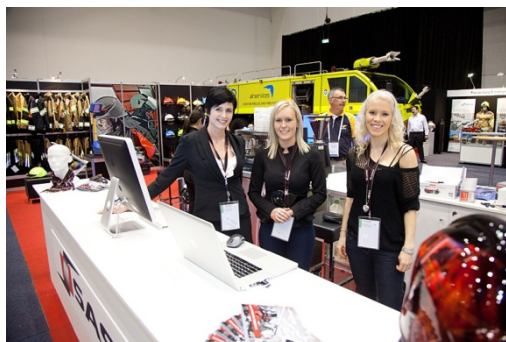
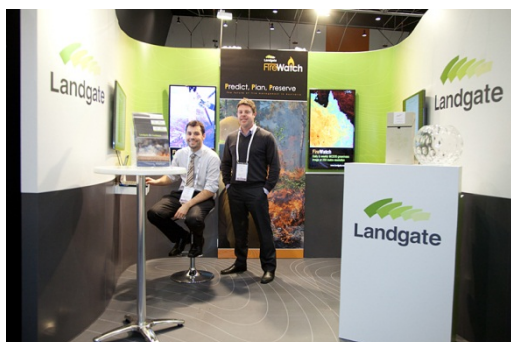
In addition, four editions of the Bushfire CRC's *Fire Australia* journal were produced and sent to more than 6000 research and industry readers to widen the reach of research outputs from the Bushfire CRC. These editions contained a total of 22 articles on Bushfire CRC research and activities. This publication is a collaborative effort in partnership with the peak industry body for Australia and New Zealand, AFAC, and the Fire Protection Association of Australia, which has more than 5000 SMEs from across Australia as its members.

SME ENGAGEMENT

Engagement with small to medium enterprises and large corporations has been ongoing since the Bushfire CRC began in 2003. The overall planning strategy for the Bushfire CRC, the *Strategic Directions of the Bushfire CRC 2010-2013*, as well as the specific strategies for Research Utilisation and for Communications, includes SME engagement as a prime objective.

SME engagement highlights include:

- The Bushfire CRC held an international conference in Perth in August with 130 trade exhibitors from the broader industry, the majority of which were small to medium enterprises. The conference, held jointly with the peak industry body AFAC, also attracted significant corporate sponsorship, including a long-term principal sponsor relationship with global vehicle manufacturer Scania and sponsorship of the Knowledge Lounge by international fire protection equipment maker Dräger.
- The Fire Protection Association of Australia, which represents more than 6000 SMEs, is a contributing member of the Bushfire CRC and actively promotes the research to its members. FPA Australia and the Bushfire CRC attended and promoted their activities at each other's annual conference in this reporting period.
- *Fire Australia* is a joint Bushfire CRC, AFAC, and FPAA quarterly journal that is distributed to 6000 members of the broad fire industry.



RESEARCH COLLABORATIONS

During the year the Bushfire CRC continued to build on formal and informal research collaborations both nationally and internationally.

During the reporting period the following collaborations were undertaken.

- The Bushfire CRC entered into a number of consultancies, mainly with its existing end-user partners. The primary aim is to help to customise and build upon the core research of the Bushfire CRC. This is particularly true with the Victorian agency partners, in particular the DEPI (formerly DSE) which further extended its contract research program managed by the Bushfire CRC. This work complements the work of the Bushfire CRC under the Commonwealth Agreement.
- Following the fires on the Tasman Peninsula in January 2013 the Bushfire CRC was engaged by the Tasmania Fire Service to conduct community surveys to understand the level of preparedness for such events, to consider the characteristics of fuels and fire behaviour of fires in that period and to conduct a 'staff ride' (a field examination of the factors influencing decision making) to educate operational staff involved in the event. This work built on the knowledge developed in the response to Black Saturday and the subsequent research. The outcomes from this work are now being considered by the Tasmania Fire Service and will also be incorporated in other broader knowledge bases across the sector.



- Similarly, in response to the January 2013 fires in NSW, the Bushfire CRC was engaged by the NSW Rural Fire Service to undertake a series of community surveys focused in understanding the community responses to warnings. Fieldwork was undertaken using teams made up of Bushfire CRC researchers and NSW RFS staff enabling a sharing of local knowledge and research expertise. Outcomes from this work have been presented at several NSW RFS forums and are being built into the communications policy and practice.



- The Bushfire CRC has continued to take a leading role in the development of the science behind a new Fire Danger Rating System. The Bushfire CRC is providing project management under contract to the Federal Attorney-General's Department for this national project. The Bushfire CRC was awarded a \$300,000 contract for a research management and brokering role in the 2012-13 financial year.

- Research using a 3D fire suppression simulator was undertaken when representatives from the Bushfire CRC travelled to France in July as part of a study tour to exchange best practices in fire response. Bushfire CRC research leader Dr Christine Owen (University of Tasmania) and Dr Claire Johnson (a former Bushfire CRC postgraduate student now employed at CFA) were in the team that collected data for analysis and a report for the AFAC AIIMS committee. The research will also assist in identifying additional areas of mutual interest for ongoing collaboration between the Bushfire CRC and the Bouches-du-Rhône Fire Brigade.
- Bilateral bushfire research and development was strengthened with the signing of a Memorandum of Understanding between the Bushfire CRC and Pôle Risques, a French risk management organisation. Hosted in Australia by the Bushfire CRC, the Director of Pôle Risques Richard Biagioni signed the MOU with Gary Morgan, Bushfire CRC CEO, in the presence of the French Ambassador to Australia Stéphane Romalet in Canberra on 22 October. (*pictured right*)
- The CEO is a member of the International Liaison Committee for the International Wildland Fire Conferences. He is also a member of the United Nations International Strategy for Disaster Reduction - Wildland Fire Advisory Group, and the United Nations Food and Agricultural Organisation's Fire Management Action Alliance Advisory Group.
- The Deputy CEO and Research Director is a Board member on the International Association of Wildland Fire. He is the Chair of the Editorial Advisory Committee for the *International Journal of Wildland Fire*. The Deputy CEO also co-edited a special edition of the Ecological Society of America's journal *Frontiers in Ecology and the Environment* on *Prescribed Burning in Fire Prone Landscapes*.
- During 2013 the Deputy CEO was seconded to the implementation team for the Bushfire and Natural Hazards CRC as interim CEO.



COMMUNICATIONS

The Communications Strategy of the Bushfire CRC prioritises a range of communication tools to enhance the profile and credibility of the Bushfire CRC to target audiences. These support the overall strategic objectives of:

1. delivering quality outputs in the current research program
2. enabling the transition of the Bushfire CRC to an ongoing bushfire research centre

The communications outputs of the Bushfire CRC during this reporting period were aligned with this overall strategy. The communications strategy promotes the research and activities of the Bushfire CRC amongst stakeholders and to the broader community. The strategy complements the communications objectives of all the stakeholder fire, land management and emergency service agencies, and research and education organisations.

Elevated public profile

The uncertainty of ongoing funding for the Bushfire CRC attracted much public debate during this period. Coupled with an active fire season, this presented an opportunity for key messages from research outputs to be reinforced in public messages through the media and our own online channels, including social media.

Several high profile media articles and radio interviews highlighted the fact that Australian Government funding for national bushfire research was to end on 30 June 2013. The Bushfire CRC endeavoured to outline the facts of the situation as clearly as possible, including the fact that, although no new funding was scheduled and the long term future was unclear, the Bushfire CRC would continue to operate well into 2014 on funding set aside for the utilisation of the outputs from current research program.

Major news coverage on the Bushfire CRC funding included comments from several Federal MPs and Senators, the NSW Premier and the ACT and Victorian state governments.



Prime Minister announces funding

In mid-February, the Bushfire CRC publically welcomed the Australian Government announcement to create an expanded national centre for research into bushfires and natural hazards.

The Prime Minister Julia Gillard committed \$47 million over eight years for a new Bushfire and Natural Hazards Cooperative Research Centre from 1 July 2013.

The Bushfire CRC released a public statement supporting the announcement to the media and to all Bushfire CRC partners, researchers and students. Letters of acknowledgement were also sent to the Prime Minister and other Ministers of the joint announcement: the Minister for Industry, Innovation, Science, Research and Tertiary Education; the Minister for Emergency Management; and the Minister for Human Services.

COMMUNICATING WITH OUR INDUSTRY AND RESEARCHERS

Perth conference full of highlights



In a week of highlights, the Research Forum and Student Showcase were proud moments for the Bushfire CRC at our joint annual conference with AFAC at the Perth Convention and Exhibition Centre in late August.

Around 1300 delegates from around Australia attended over the conference week, with 130 trade expo displays, furthering its reputation as the biggest fire, land management and emergency services event of the year, linking research, policy and industry.

The conference, the workshops and the posters are prime communications vehicles for ensuring the research of the Bushfire CRC is transferred into our agency partners. The presence of so many people from across the industry - from the many CEOs to those in day-to-day operations as volunteers or paid staff, and SMEs - is an acknowledgement that the industry is seizing the opportunity to be informed of the latest developments in its field.

This was a prime communications event for researchers. Bushfire CRC postgraduate students are required to attend the annual conference - many get the opportunity to present their work at the conference or

workshop program, and all get to present their work on a poster. The research poster display dominated the middle of the Trade Expo hall.

The high number of participants at the annual conference indicates that the industry clearly sees the value in gathering to participate in the research process.

The Research Forum featured 37 presentations that covered the full range of fire and natural hazards. The forum opened the conference week, and provided a great opportunity for the research community and emergency management personnel to engage in focused discussions. Bushfire CRC PhD student, Mika Peace from the Bureau of Meteorology, was voted best presentation by attendees.

On the last day, Bushfire CRC PhD students were given the opportunity to feature their projects during the Student Showcase. Held in a more relaxed “interview-style” environment, the showcase gave 16 students the chance to discuss what their research had uncovered to date, and what the next steps would be.



This conference saw a record amount of posters displayed, including 84 from Bushfire CRC researchers and students. All the Research Forum presentations and posters are online as an ongoing resource for the community, industry and researchers together with photographs, audio and video.

The broader fire industry (SMEs and large corporations) was well represented with 130 exhibitors on the Trade Expo floor. Again this proved to be successful in allowing the researchers and partners to interact with representatives of the various enterprises. Business representatives expressed their gratitude for the opportunity to hear about the latest Bushfire CRC research outputs and the industry’s anticipated technical needs based on this new knowledge to address the future.

Summit on fire safety

Fire safety was the main point of discussion at the Bushfire CRC sponsored 12th International Wildland Fire Safety Summit held in Sydney at the end of October. The summit attracted more than 100 delegates from around Australia, New Zealand, North America and Europe.

The International Association of Wildland Fire event had two days of presentations and discussion on many aspects of wildland and urban fire safety, both for firefighters and for communities. Five of the key presentations related to Bushfire CRC research, two Bushfire CRC PhD students also presented on their work - Cara Lord and Grahame Douglas - while Douglas Brown had a poster presentation.

The Bushfire CRC had a small but popular display of research reports, pocket field guides and other publications on show.

Fire Australia

The *Fire Australia* magazine continues to provide a vehicle for the promotion of Bushfire CRC research and activities to the broader fire industry. The journal is a joint publication of



the Bushfire CRC, AFAC and the Fire Protection Association of Australia.

Fire Australia is published quarterly with a distribution list of 6000 that includes all Bushfire CRC researchers and end-users, AFAC members, the fire protection industry, academic libraries, and selected local, state and federal members of parliament.

Bushfire CRC activities highlighted include research into extreme fire behaviour, a project using a smartphone application to help those at risk of bushfire engage more actively in bushfire preparedness, mapping fire severity in northern Australia, a new tertiary course on bushfire planning and management and key presentations from the Perth conference.

Research Briefs

Four-page *Fire Notes* on research projects were emailed to end-users and researchers on a regular basis throughout the year. *Fire Notes* serve as a brief four-page summary of the project designed to keep all Bushfire CRC members abreast of current developments and outputs. These publications are also available online for general access.

This year the 100th *Fire Note* was distributed. This was a milestone for bushfire research in Australia with so many succinct briefing papers on the major research issues in fire. A special limited edition compilation of all the *Fire Notes* was published in a book format and distributed to all partners. In total, 111 *Fire Notes* were distributed up to the end of the financial year.

Newsletter

This year 11 (monthly) *Fire Update* newsletters were distributed to Bushfire CRC end-users, researchers, and students by email. These are also available online and by subscription. In addition, regular full reports on Bushfire CRC activities were provided to Board and Stakeholder Council members.

International Wildfire

The Bushfire CRC joined the editorial advisory board of the International Association of Wildland Fire's *Wildfire* magazine, with Communications Manager David Bruce taking up this post. The January/February edition had a cover story by Bushfire CRC lead end user John Schauble, complemented with Bushfire CRC photography. Research on architecture in bushfire-prone areas by our PhD student Douglas Brown, University of Sydney, was also showcased.

Publications

A growing amount of research content produced by the Bushfire CRC is available for Bushfire CRC members and the broader industry and community. The publications output now totals 1555 and includes research reports, journal articles, field guides, presentations and posters. The 2012 Bushfire CRC and AFAC annual conference in Perth produced a significant amount of new material on key research issues. All this content is online at www.bushfirecrc.com.

Camera action

Video content continues as a complement to other types of information available on research project pages. For most projects, the online visitor can view a poster, read a research report, access a journal article and then watch a brief video of the researcher describing the purpose of the research.

Other plain language video statements by researchers that were uploaded over the past year include:

- Awake, Smoky and Hot - a series of videos on simulated bushfire fighting testing hydration, stress, fitness and other physical and mental strains.
- Familiarity, teamwork and decision making - research into incident control teams.
- Fire and fuels at the interface - research into what people value at the urban-rural interface.

Science and fire danger

Australian fire experts discussed the science behind fire danger ratings at a Bushfire CRC seminar in June. In this seminar Dr Marty Alexander provided a broad overview of the fundamental principles of fire danger ratings. The seminar was part of the Bushfire CRC Professional Development event series - it was co-hosted with the New South Wales Rural Fire Service and the University of Sydney.

A video of the seminar is on the Bushfire CRC website:

www.bushfirecrc.com/research/event/2012-marty_seminar

COMMUNICATING TO A BROADER AUDIENCE

Online Communications

The website remains a prime communications hub for both internal and external audiences. It received a steady increase in hits over the year with demand particularly strong around major bushfire events, both in Australia and internationally, our conference and other events, and with the launch of new research. The website drew many enquiries from the interested general community in fire zones around Australia as well as industry and academic enquiries, including school and tertiary students.

Visits to the site remains consistently high over the year with papers from the 2012 Perth annual conference and past conferences continuing to be popular along with major research reports, briefing papers and news reports.

Social media

- A newly created *Linked In* group has more than doubled over the past 12 months to reach 450 individual contacts, all of who are or have been closely connected or are seeking a closer connection with the activities and research of the Bushfire CRC.
- Followers across *Facebook* and *Twitter* have grown strongly - see detailed report on page 30.
- Blogs are written each month by all senior management to provide a more personal account of varying activities and interests of the Bushfire CRC. Each blog is posted online, on social media and in the printed edition of the *Fire Update* newsletter.
- A PhD project by RMIT University's Dr Briony Towers - Educating children about bushfire risk and mitigation - has been presented in many industry forums in recent years. This year it was adapted into an interactive ebook - a first for the Bushfire CRC. This online resource is aimed at parents wanting guidance on how to educate their children on bushfire risk.

Media

The Bushfire CRC was in high demand for media comment from late October when the northern fire season moved into southern Queensland and New South Wales and across Central Australia.

On 13 December, the Bushfire CRC partnered with the Australian Science Media Centre for a national online briefing on bushfire science. A total of 26 journalists from around the country tuned in to the briefing and 43 others subsequently downloaded it from the website. The briefing generated 83 pieces of coverage.

Further online commentary was provided by the Bushfire CRC through the Australian Science Media Centre during the hot weather of January. Comments were used by the media in Australia and internationally.

The Bushfire CRC and its researchers were in steady demand for media comment over the December-January period. CEO Gary Morgan and Research Director Dr Richard Thornton commented on the science behind the current research program, the work of the research taskforces in Tasmania and in NSW, the impacts of an active bushfire season and community responses to the bushfire threat. Individual researchers commented on their area of expertise across a range of media.

The annual conference in Perth in August attracted widespread national media coverage with several media organisations allocating a representative for most of the week at the venue.

The release of the *Bushfire Seasonal Outlook* during the conference threw a national media focus upon our event in Perth. The CEO of the Bushfire CRC and the Commissioners and Chief Officers of each state fire agency did joint and separate media conferences over the week, including Commissioner Lee Johnson, Queensland Fire and Rescue (*pictured right*).

The national *Bushfire Seasonal Outlook* was released as an outcome of the Bushfire CRC organised Southern Seasonal Outlook Assessment Workshop held in Sydney. This workshop brought fire managers, severe weather meteorologists and climatologists together to evaluate the fire potential for the upcoming season for the southern part of Australia. The Outlook was covered by the national media in a coordinated release with all Bushfire CRC partners, with each local fire agency supplementing the release with its own local fire warnings. A Bushfire CRC *Fire Note* on the Outlook was distributed nationally.



As the bushfire season moved into central and southern Australia, the Bushfire CRC was called to make public comment on the potential for fires. Our *Seasonal Bushfire Outlook*, which predicted the high potential for fires in this region, was used as a basis for most of the media reports. Many of these reports are on the Bushfire CRC website, including an in studio live interview with CEO Gary Morgan on the Channel 10 news program *The Project*:

Other significant media appearances of the Bushfire CRC included:

National research task forces

Bushfire researchers were deployed to fire-affected areas in Tasmania and New South Wales, following destructive fires over the summer. Each deployment was accompanied by a media release to local media, which attracted good local coverage of the deployments.

Live on the wireless

The Bushfire CRC took to the airwaves of Melbourne radio station Triple R throughout June, with Deputy CEO and Research Director Dr Richard Thornton, Professor Jim McLennan (La Trobe University) and Dr Brad Aisbett (Deakin University) guests on the Einstein A Go-Go science show.

Over three successive Sunday's Richard gave an overview of the Bushfire CRC, Jim talked about how people make decisions under the stress of a bushfire and Brad discussed research into the effects of heat, smoke and sleep deprivation on firefighters. Podcasts are available of each show on the Triple R website. www.rrr.org.au/program/einstein-a-go-go/

Shaping the way forward

The first in a series of Bushfire CRC Public Benefit Conversations took place in October, aiming to generate new ideas and new thinking about communities and emergency management.

With the support of Maddocks Lawyers, the first public benefit conversation featured 19 invited diverse thinkers contributing to an open discussion on shaping a way forward for emergency managers, community leaders and researchers under the Bushfire CRC.

The group specifically discussed “What does success look like for emergency service organisations in 2030?”

Lunch science

Victorian parliamentarians were given a lunchtime update on Bushfire CRC projects late in 2012 by Dr Brad Aisbett, Deakin University, and Dr Blythe McLennan, RMIT University. The two researchers were invited to the regular Lunchtime Parliamentary Science and Technology Briefing to speak on their current Bushfire CRC work and take questions from the MPs and their staff.

Weather inquiry

The Bushfire CRC made a submission to the Senate Standing Committee on Environment and Communications inquiry into “Recent trends in and preparedness for extreme weather events”, along with several other Bushfire CRC partners and individual researchers. CEO Gary Morgan followed this up with an appearance before the Committee when it sat in Melbourne.

SOCIAL MEDIA STRATEGY REVIEW

The CRC Program 2012 Performance Review of the Bushfire CRC recommended an increase in activity on social media. The Bushfire CRC has long been a pioneer in this field, being the first CRC to have an active *You Tube* channel in 2008 and an early adopter of other social media formats, as per the Communications Strategy.

Prior to the Review, the Bushfire CRC had hired a new Communications Officer to further build the social media presence.

In the 12 month period from end of June 2012 through to June 2013, the Bushfire CRC communications team has revamped its use of social media, resulting in significantly more community engagement through social media channels.

With this foundation there is now clear scope to continue to grow the reach and impact of our social media channels, thereby increasing two-way engagement, driving traffic to the website, and opening up access to our research outputs.

Website - www.bushfirecrc.com

During 2012-2013 the Bushfire CRC website has experienced 127,008 visits (to June 2013). This is more than double the average number of visits than the previous two financial years.

There was a large spike in visits during January, particularly following the bushfires in Tasmania and New South Wales.

While January was significantly busier than most months, even taking out the January spike and allowing for it to be the average of all other months from the reporting period, the 2012-13 year is up over 39,500 visits from the same time period from the previous year.

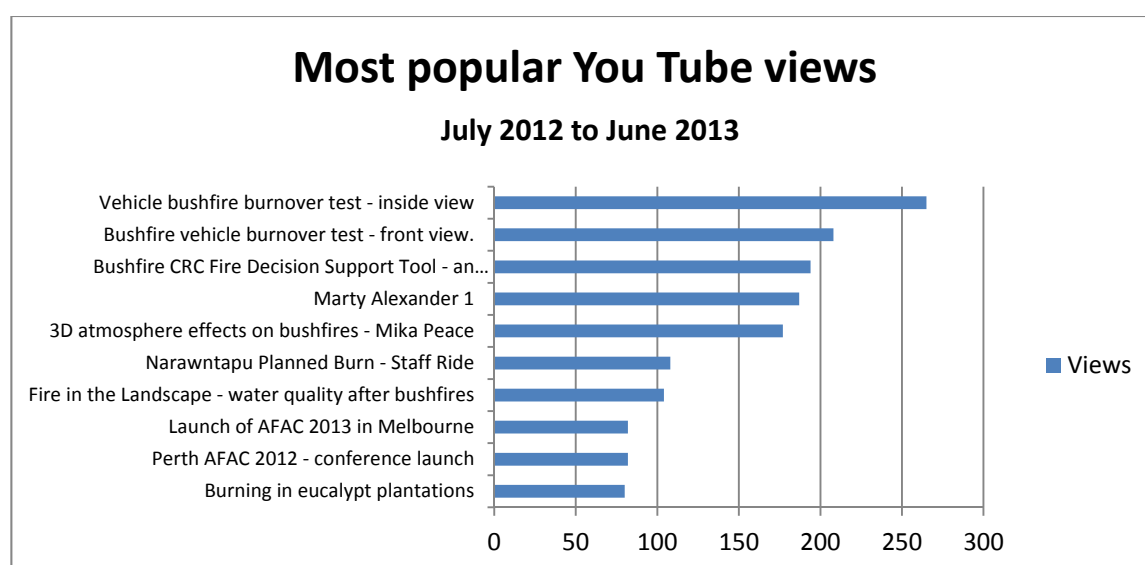
There are two explanations for this rise. Firstly, the most recent fire season was more active than the two prior seasons in south-eastern Australia and hence, interest in all matters bushfire was high.

Secondly, and perhaps more significantly, the rise in website visits is directly related to the increase in activity and visitation on our social media channels, which always direct users to our website. For example, the publication of each *Fire Note* is announced on both Twitter and Facebook with a direct link to the publication on the Bushfire CRC website.

You Tube

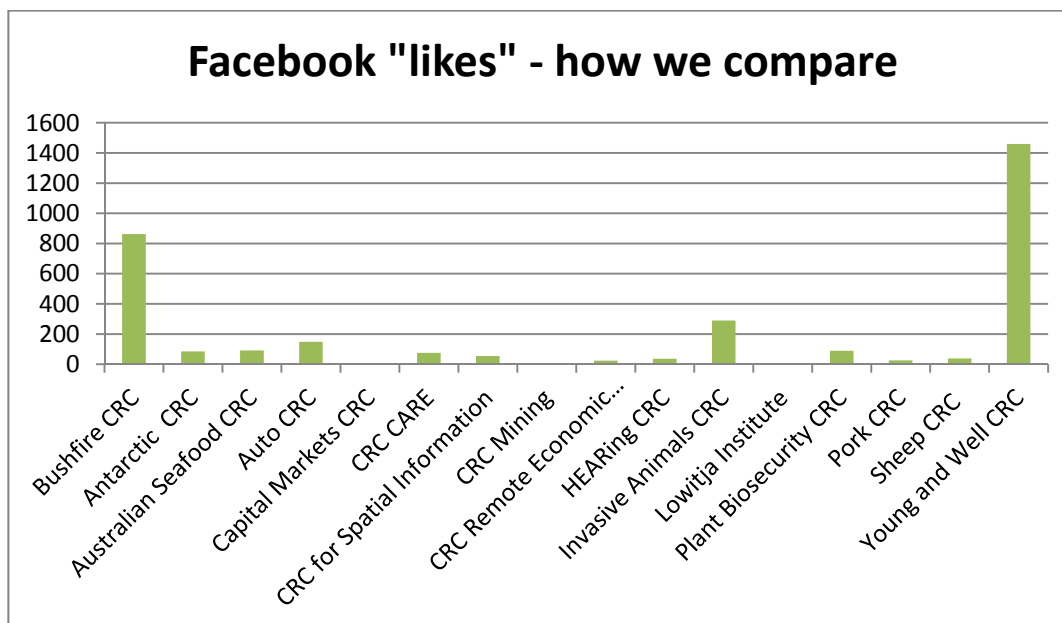
An analysis of our You Tube channel shows a steady rise in the number of people watching our research videos over the last 12 months, but particularly since the start of this year.

Peaks of viewing coincide with times of posting and promoting new content. The most popular content is consistently footage of the vehicle burning research, and videos linked to research utilisation activities such as seminars, field trips and conferences.



Facebook

Since June 2012 the Bushfire CRC communications team has increased the number of likes of the Bushfire CRC Facebook page from 212 to 862 (to 30 June 2013). This represents an increase well in excess of 300 per cent. The number of likes is significantly more than most CRC's, apart from one.



This has been achieved through the sustained effort across a range of measures. Content is posted to the page on a more regular basis, the subject matter is varied and engaging, and there are links to partner pages. This has resulted in a steady upward trend in likes during the reporting period, with peaks around the annual conference and a busy bushfire season.

The average number of people who have seen a Bushfire CRC post per day on the Facebook page has increased from 12 in June 2012 to 220 in June 2013. This statistic can be quite volatile with some months significantly lower or higher than average, depending upon our own activity as well as external factors. We are continually refining our processes to determine the optimum activity. Higher views can be achieved by posting the right number of times per day and at the right times of day when people are more likely to be using Facebook.

Twitter

The Bushfire CRC commenced using Twitter to communicate, interact and engage at the end of August 2012. Since then, the Bushfire CRC has averaged 1.33 tweets per day. Twitter is a great medium for one-to-one interaction, and we see a steady number of interactions and retweets.

Although the number of followers at end of June 2013 (287) was similar to many other CRCs, there is significant growth underway (585 at end of October 2013).

EDUCATION AND TRAINING

EDUCATION AND POSTGRADUATE SCHOLARSHIPS



Scholarships are awarded to students in a range of disciplines, project areas are designed to extend the breadth or depth of the work being undertaken across the CRC research program. Students are relatively evenly distributed across the Bushfire CRC research themes with 30 per cent in Understanding Risk; 30 per cent in Communicating Risk; and 40 per cent in Managing the Threat. There is an even distribution between those students in the social sciences and those working in the physical sciences.

The support for higher degree students is an important part of the Bushfire CRC strategy for building capacity and capability in the industry. A successful Bushfire CRC student will have a range of competencies including high level research skills, communication and presentation skills, an ability to write grant applications, an understanding of intellectual property issues, and an exposure to cross-disciplinary research. Students are provided with networking opportunities throughout the industry and related research disciplines.

The Commonwealth Agreement requires the Bushfire CRC to engage and support 41 PhD students and 12 Masters students across the program.

After a slow start the Bushfire CRC has moved beyond the target number of PhD scholarship recipients.

During this reporting period the Bushfire CRC had committed to supporting 61 students, up from 54 in the previous reporting period. This figure includes nine PhD students who are in the final stages of their doctorate from the original funding period and four Masters students.

Four of the current program students submitted their thesis during the reporting period, plus another two students from the original funding period also submitted. More than half of the scholarship recipients are due to submit by the end of the current financial year (to mid 2014).

Student involvement

All student projects are designed to extend the breadth or depth of the work being undertaken across the main CRC research program.

They work as part of the research teams undertaking these projects and have a Bushfire CRC researcher as a lead or co-supervisor.



Each student has an industry sponsor who meets with them on a regular basis. These meetings provide the industry with insights into the research work being undertaken by these students, and provide opportunities for students to access additional industry personnel and/or data.

All students attended the Bushfire CRC annual conference in Perth, submitted a poster and participated in the poster discussion session at the conference. To further support their professional development,

all students were given the opportunity participate in communications training and to present at a student showcase held in conjunction with the conference. This showcase encouraged students to present their research in response to scenarios they are likely to encounter throughout their careers. Follow up questions and feedback was provided.

A number of students have also had the opportunity to present at the Research Advisory Forums or AFAC group meetings, while others have been supported to present their work at international conferences.

HIGHER EDUCATION

The Bushfire CRC's research member agencies are mostly universities, who have the internal capacity to embed research into their teaching and learning.

Some key courses that currently utilise Bushfire CRC research are:

- National Forestry Masters Program, a partnership between Australian National University, Southern Cross University, University of Tasmania, University of Melbourne, University of Queensland.
- *Fire in the Environment* course, Australian National University.
- Masters of Applied Science, (also Graduate Certificate and Bachelor levels), James Cook University

Many Bushfire CRC funded researchers currently teach in a range of courses. Their materials lie within the domain of the individual institutions and are generally for fee-paying students. However, as a public-good research centre, the Bushfire CRC makes freely available the teaching and learning resources it develops. The following resources are on the Bushfire CRC website:

- Human factors concepts: "Designing a staff ride - learning from wildfire and prescribed burning operations". This learning resource manual and video is suitable for fire and land management agencies and operational improvement personnel.

- Fire and the environment: resources covering fire regimes, prescribed fire and biodiversity, living with fire, fire ecology and adaptive management. These are suitable for undergraduate ecologists, geographers and environmental scientists.
- Strategic Planning and Management for Bushfire on the peri-urban fringe: currently taught in the Planning and Managing for Climate Change post-graduate unit, University of Tasmania, School of Geography. This is suitable for post-graduate planners and land managers
- Professional Development Course - Bushfire Community Safety: currently taught at Masters level. This is suitable for agency community safety personnel.

TRAINING

Research related to Human Factors has now been incorporated into the updated Australasian Inter-Service Incident Management System (AIIMS) manual and training resource kit; the key resources for ongoing training and development for the broader industry. This system details the national approach to operational work in emergencies in all states and territories, and New Zealand. Numerous research project outputs have been incorporated into the roles appropriate for people in emergency responses.

More than 250 people participated in the national series of Human Factors Professional Development training workshops. Each workshop was evaluated and feedback was provided to the participant agency, providing them with a sense of what the relevant issues were for their context. The feedback was overwhelmingly positive, and assisted agencies in identifying issues to address.

The Bushfire CRC is not a registered training organisation (RTO), although most member agencies are.

The land management and the fire and emergency management partners (our 'end-users') generally deliver training to their personnel and are RTOs in their own right. The inclusion of bushfire related matters for land management agencies is particularly strong in the area of planning and conducting prescribed burning operations and fire behaviour.

The key training qualifications are in the public safety area, and Bushfire CRC research outputs have been cross-linked at unit level to these qualifications:

- Advanced Diploma of Public Safety (Firefighting Management)
- Advanced Diploma of Public Safety (Fire Investigation)
- Diploma of Public Safety (Firefighting Management)
- Diploma of Public Safety (Community Safety)
- Certificate IV in Public Safety (Firefighting Supervision)
- Certificate VI in Public Safety (Community Safety)
- Certificate III in Public Safety (Firefighting and Emergency Operations)
- Certificate III in Public Safety (Firefighting Operations)
- Certificate III in Public Safety (Community Safety)
- Certificate II in Public Safety (Firefighting Operations)

A number of training units that underpin these qualifications have been reviewed and updated to include relevant Bushfire CRC research. These units include:

- PUAFIR203B Respond to wildfire
- PUAFIR303B Suppress wildfire
- PUAOPE0015 Conduct briefings and debriefings
- PUAFIR208B Participate in Community Safety Activities
- PUAFIR213 Assist with prescribed burning
- PUAFIR413 Plan prescribed burning
- PUAFIR412 Conduct prescribed burning
- PUAFIR406C Develop prescribed burning plans
- PUATEA001B Work in a team
- PUATEA002B Work autonomously
- PUATEA003B Lead, manage and develop teams

OTHER ACTIVITIES

Other work, not already noted, outside of the Commonwealth Agreement ongoing over the year included:

- A \$6.4 million research contract with the Victorian Department of Sustainability and Environment (now Victorian Department of Environment and Primary Industries) to undertake a number of distinct projects over the next 3-4 years
- The national fire danger rating project for the Commonwealth Attorney-General's Department on behalf of the Council of Australian Governments (COAG).



GLOSSARY OF TERMS

AFAC	Australasian Fire and Emergency Service Authorities Council
AIIMS	Australasian Inter-Service Incident Management System
BOM	Bureau of Meteorology
CFA	Country Fire Authority Victoria
CFS	Country Fire Service South Australia
CSIRO	Commonwealth Scientific Industrial Research Organisation
DEC	Department of Environment and Conservation WA
DEPI	Department of Environment and Primary Industries
DSE	Department of Sustainability and Environment Victoria
EMA	Emergency Management Australia
ESA	ACT Emergency Services Agency
FESA	Fire and Emergency Services Authority WA
FPAA	Fire Protection Association Australia
IMT	Incident Management Team
MFB	Metropolitan Fire Brigades
NAFC	National Aerial Firefighting Centre
NAFMC	North Australia Fire Management Council
NPWS	National Parks and Wildlife Service NSW
NRFA	New Zealand National Rural Fire Authority
QFRS	Queensland Fire and Rescue Service
RFS	Rural Fire Service NSW
TFS	Tasmania Fire Service

Appendix A Bushfire CRC Publications - 2012-13

Publication Title	Type	Journal / Event	Authors
Handbook of Disaster Policies and Institutions (2nd Edition)	Book	n/a	Dovers, S. & Handmer J.
Emergency Law	Book	n/a	Eburn, M
Making a Bushfire Plan? Involve your kids!	Book	n/a	Towers, B
Book Count	3		
Landscape Fires: Social Disasters? Ecological Necessities?	Book Chapter/s	10 Commitments	Cary, G.; Gill, M.
Bushfires and Australian emergency management law and policy: Adapting to climate change and the new fire and emergency management environment	Book Chapter/s	Studies in Law, Politics and Society	Eburn, M
Chapter 3 - Sharing responsibility and community resilience: The role of law in converting policy to action	Book Chapter/s	Next Generation Disaster Management	Eburn, M
Firefighter decision making at the local incident and regional/state control levels	Book Chapter/s	Enhancing Individual and Team Performance in Fire and Emergency Services	Lawson, A.; Bearman, C.; Bremner, P.
Cognitive Bias Modification: A New Frontier in Cognition and Emotion Research	Book Chapter/s	MacLeod, C., & Clarke, P. J. F. (2013). Cognitive Bias Modification: A New Frontier in Cognition and Emotion Research. In E. Watkins (Ed.), Handbook of Cognition and Emotion: Guilford.	MacLeod, C.; Clarke, P.
Book Chapter/s Count	5		
Social networks and disaster preparedness A social network indicator study	Bushfire CRC Reports	Bushfire CRC Report	Akama, Y.; Chaplin, S.; Fairbrother, P.
On the need for a bushfire threat scale that represents the potential damage from bushfires	Bushfire CRC Reports	Technical Report	Anderson, D.; Anderson, W.; Kilinc, M.; Price, B.
The applicability of bushfire behaviour models in Australia	Bushfire CRC Reports	Internal Report	Anderson, W.; Kilinc, M.; Price, B.

Sharing responsibility for implementing the National Strategy for Disaster Resilience - workshop report	Bushfire CRC Reports	Bushfire CRC Workshop	Austin, E.; Hearne, J.; Henry, S.; Rance, A.; McLennan, B. J.; Travers, A.
Human Factors Issues in Secondary Sources	Bushfire CRC Reports	Bushfire CRC Report	Bearman, C.; Brooks, B.; Grunwald, J.; Owen, C.
Amenity and Risk annual report 2012	Bushfire CRC Reports	Annual Report	Beilin, R.
Putting 'it' together: mapping the narratives of bushfire and place in two Australian landscapes	Bushfire CRC Reports	Bushfire CRC Report	Beilin, R.; Reid, K.
Maintenance of High Fire Research Sites Report	Bushfire CRC Reports	Internal Report	Bell, T.; Ingram, L.
Case study vulnerability parameters defined and documented for UL review	Bushfire CRC Reports	Case Study	Blanchi, R.; Culvenor, D.; Lipkin, F.; Leonard, J.; Newnham, G.; Opie, K.; Siggins, A.
Case Study 1 - Final	Bushfire CRC Reports	Internal Bushfire CRC Report	Blanchi, R.; Leonard, J.; Lipkin, F.; Newnham, G.; Siggins, A.
Vulnerability Parameterisation and Interface fuels Characterisation Project â€™ Work Program Objectives and Approach	Bushfire CRC Reports	Bushfire CRC Report	Blanchi, R.; Leonard, J.; Newnham, G.; Opie, K.; Siggins, A.
Vulnerability Parameterisation and Interface fuels Characterisation Project	Bushfire CRC Reports	Bushfire CRC Technical Report	Blanchi, R.; Leonard, J.; Newnham, G.; Opie, K.; Siggins, A.
Training Pathways for Effective Emergency Management Coordination above the IMT	Bushfire CRC Reports	Bushfire CRC Report	Brooks, B.; Owen, C.
PHOENIX: Under the hood. A technical guide to the Phoenix bushfire characterisation model, Version 3.9	Bushfire CRC Reports	Internal Report	Chong, D.; Tolhurst, K.
Incorporating vertical winds into PHOENIX RapidFire's Ember Dispersal Model	Bushfire CRC Reports	Technical Report	Chong, D.; Tolhurst, K.; Duff, T.
PHOENIX RapidFire 4.0's Convection and Ember Dispersal Model	Bushfire CRC Reports	Technical Report	Chong, D.; Tolhurst, K.; Duff, T.
Sensitivity Analysis of PHOENIX RapidFire	Bushfire CRC Reports	Internal report	Cirulis, B.; Chong, D.; Duff, T.; Tolhurst, K.
Annual Report 2012 Effective Communication: communities and bushfire	Bushfire CRC Reports	Annual Report	Fairbrother, P.

2012 Annual report bushfire crc study Effective Communication: communities and bushfire	Bushfire CRC Reports	Annual Report	Fairbrother, P.
Education Guidelines	Bushfire CRC Reports	Bushfire CRC Report	Fairbrother, P.; Phillips, R.
The meteorology of Black Saturday: a high-resolution ACCESS modelling study	Bushfire CRC Reports	Inteneral Report	Fawcett, R.; Kepert, J.; Thurston, W.; Tory, K.
Blue Mountains Case Study December 2001	Bushfire CRC Reports	Internal Report	Fawcett, R.; Thurston, W.; Kepert, J.; Tory, K.
Modelling the Eyre Penninsula fire weather January 2005	Bushfire CRC Reports	Internal Report	Fawcett, R.; Thurston, W.; Kepert, J.; Tory, K.
Case Studies Sensitivity Analysis Specification	Bushfire CRC Reports	Internal Progress Report	French, I.A.; Tolhurst, K.
Case Study One Beta Test Results	Bushfire CRC Reports	Internal Progress Report	French, I.A.;Tolhurst, K.
Windows on responsibility-sharing challenges	Bushfire CRC Reports	Report	Handmer, J.; McLennan, B.
Annual Report: Year 2 of the Sharing Responsibility project	Bushfire CRC Reports	Annual Report	Handmer, J.; McLennan, B.
A Summary of the Key Meteorological Processes Influencing	Bushfire CRC Reports	Bushfire CRC Workshop	Harris, S.; Lam, C.; Lynch, K.; White, E.
Visions of Sharing Responsibility for Disaster Resilience - Account of a multi-stakeholder workshop	Bushfire CRC Reports	Bushfire CRC Workshop	Keating, A.; Towers, B.; Bosomworth, K.; McLennan, B.; Kruger, T.
A note on the meteorological interpretation of Case Study 1 (Black Saturday) model fields	Bushfire CRC Reports	Internal Report	Kepert, J.; Fawcett, R.; Thurston, W.; Tory, K.
Education and training priorities and opportunities for better integration of bushfire risk management into strategic and statutory planning	Bushfire CRC Reports	Internal Report	Lavis, J.
Report on the French Australian/New Zealand Collaborative Research Exchange	Bushfire CRC Reports	Bushfire CRC Technical Report	Lawson, A.; McCarthy, B.; Johnson, C.; Owen, C.; Turner, P.; Yorke, S.
Relating vertical wind profiles to vegetation structure for fire behaviour prediction	Bushfire CRC Reports	Internal Report	Moon, K.
2013 Bushfire Unit Bushfire Planning University of Canberra	Bushfire CRC Reports	Internal Report	Norman, B.
Volatile organic compounds in smoke	Bushfire CRC Reports	Technical Report	Possell, M.; Bell, T. L.
Integrating spatial planning with bushfire risk and emergency management in the context of climate change: critical literature review - stage 1	Bushfire CRC Reports	Technical Report	Sullivan, K.; Norman, B.

PHOENIX RapidFire 4.0's Convective Plume Model	Bushfire CRC Reports	Bushfire CRC Technical Report	Tolhurst, K.
Sensitivity Analysis to be conducted on FireDST case studies	Bushfire CRC Reports	Briefing note	Tolhurst, K.
Interface fuels for PHOENIX	Bushfire CRC Reports	Internal Report	Tolhurst, K.; Chong, D.; Duff, T.; Ackland, A.; Gretton, T.
Briefing note: model configuration for investigating updraft phenomenon number two	Bushfire CRC Reports	Briefing note	Tory, K.
Briefing note: model configuration for investigating updraft phenomenon number one	Bushfire CRC Reports	Briefing note	Unknown (or Not Specified Yet)
Review of Smoke Emissions and Transport Modelling Systems	Bushfire CRC Reports	Briefing note	Unknown (or Not Specified Yet)
Bushfires and Planning: Commonalities and Inconsistencies across Jurisdictions, and Barriers to Better Practice	Bushfire CRC Reports	Internal Report	Weir, J. K.; Norman, B.
Busfire CRC Reports	43		
Evaluation of uncertainty visualisation techniques for decision-making in a bushfire scenario	Conference Abstract	International Cartographic Conference, Dresden	Cheong, L.
A methodology for evaluating the impact of visualisation on decision making under uncertainty for PHOENIX Rapidfire	Conference Abstract	MODSIM Conference 2013	Cheong, L.
Post wildfire soil erodibility	Conference Abstract	AGU Chapman conference	Christoph L.; Lane, P.; Nyman, P.; Noske, P.; Sheridan, G.
A 40-year mesoscale gridded fire weather climatology for Victoria - an overview	Conference Abstract	20th International Congress on Modelling and Simulation (MODSIM2013)	Domagoj P.; Mills, G.; Harris, S.; Reinbold, H.; Brown, T.
'Wait and See': The Elephant in the Community Bushfire Safety Room?	Conference Abstract	AFAC/BCRC Research Forum	Elliott, G.; McLennan, J.
When residents come under imminent wildfire threat, what aspects of decision making distinguish those who stay and defend from those who leave?	Conference Abstract	IAWF 3rd Human Dimensions of Wildland Fire Conference: 16-18 April 2012	Elliott, G.; McLennan, J.; Omodei, M.
The Melbourne dust storm revisited: an ACCESS case study	Conference Abstract	Modsim conference 2013	Fawcett, R.; Kepert, J.; Thurston, W.; Tory, K.

Forecasting fire activity in Victoria, Australia, using antecedent climate variables and ENSO indices	Conference Abstract	Science for Services Workshop - Improving forecasts of fire weather and deep convection	Harris, S.; Neville N.; Nigel T.
Modelling fuel moisture across the landscape for fire management	Conference Abstract	4th Fire Behavior and Fuels Conference	Matthews, S.
Synthesis of knowledge related to modelling post fire hydrologic risks associated with fire affected soils	Conference Abstract	American Geophysics Union Chapman Conference	Nyman, P.; Van der Sant, R.; Sheridan, G.
Large Eddy Simulation (LES) of Backward Facing Step using Fire Dynamics Simulator (FDS)	Conference Abstract	14th Asian Congress of Fluid Mechanics, Vietnam (15-19 Oct 2013)	Sarwar, M.
Conference Abstract Count	11		
Role of social networks in community preparedness for bushfire	Conference Paper	9th Annual International Conference of the International Institute for Infrastructure Renewal and Reconstruction at QUT	Akama, Y.; Chaplin, S.; Fairbrother, P.
The Problems of Maintaining Effective Teamwork During Out-of-Scale Events	Conference Paper	Australasian Fire and Emergency Service Authorities Council/Bushfire CRC Conference 2013. Melbourne, Australia	Bearman, C.; Brooks, B.; Grunwald, J.; Owen, C.
A 3 Dimensional Ray Tracing Approach to Modelling Bushfire Radiant Heat Flux for Houses Using Lidar Derived Vegetaion Voxel Data and Quadratic Polygonal Fire Fronts	Conference Paper	International Geosceince and Remote Sensing Symposium (IGRSS)	Blanchi, R.; Leonard, J.; Newnham, G.; Siggins, A.
FireDST: Fire Impact and Risk Evaluation Decision Support Tool model description	Conference Paper	MODSIM 2013	Cechet, B.
Building Fire Impact Model	Conference Paper	MODSIM 2013	Cechet, B.
Wildland urban interface (WUI) fire modelling using PHOENIX Rapidfire: A case study in Cavaillon, France	Conference Paper	MODSIM 2013	Chong, D.; Duff, T.; Pugnet, L.; Tolhurst, K.
Assessing potential house losses	Conference Paper	Proceedings of Bushfire CRC & AFAC 2011 Conference Science Day, 1 September 2011, Sydney Australia	Chong, D.; Tolhurst, K.
Combining satellite measurements and topographic downscaling to model net radiation and aridity in mountainous terrain	Conference Paper	20th International Congress on Modelling and Simulation (MODSIM2013)	Christoph L.; Christopher S.; Nyman, P.; Sheridan, G.
Enforcing safety with law - implications for incident controllers and fire agencies	Conference Paper	IAWF Safety Summitt	Eburn, M.

Meteorological aspects of the Margaret River fires of November 2011	Conference Paper	MODSIM 2013	Fawcett, R.; Kepert, J.
Modelling the fire weather of Black Saturday	Conference Paper	AFAC proceedings	Fawcett, R.; Kepert, J.; Thurston, W.; Tory, K.
Large-eddy simulations of bushfire plumes in the turbulent atmospheric boundary layer	Conference Paper	MODSIM 2013	Fawcett, R.; Kepert, J.; Thurston, W.; Tory, K.
Modelling the fire weather of the Dunalley, Tasmania fire of January 2013: an ACCESS case study	Conference Paper	Science for Services	Fawcett, R.; Kepert, J.; Webb, M.; Thurston, W.; Tory, K.
Wildfire safety-related decisions and actions: lessons from stress and performance research	Conference Paper	IAWF Safety Summit	McLennan, J.; Omodei, M.; Strickland, R.; Suss, J.
Enhancing forest fires preparedness in Portugal: The relevance of integrating risk communication with community engagement and development	Conference Paper	Modelling Fire Behavior and Risk	Paton, D.; Tedim, F.
Mapping of Australian Fire Weather Potential: Observational and modelling studies	Conference Paper	Proceedings of the Modelling and Simulation Society of Australia and New Zealand (MSSANZ)	Sanabria L.A.; Cechet R.P.; Li, J.
Modelling Fire Behavior and Risk	Conference Paper	Modelling Fire Behavior and Risk	Tedim, F.
Measuring forest carbon and fire emission from southern Eucalyptus forests: key findings and some lessons learnt	Conference Paper	AFAC	Volkova, L.; Weston, C.
Conference Paper Count	18		
The effect of water stress on leaf senescence rate in three pasture grasses and wheat	Journal Abstract	Crop and Pasture Science Journal	Anderson, S. A. J.; Bridle, Kerry L.; Corkrey, R.; Daily, H. G.; Lane, P. A.; Lisson, S. N.
How well do bushfire rate of spread models perform in Australia?	Journal Abstract	Australian Journal of Forestry	Anderson, W.; Kilinc, M.; Price, B.
Post-wildfire recovery of water yield in the Sydney Basin water supply catchments: an assessment of the 2001/2002 wildfires	Journal Abstract	Journal of Hydrology	Bishop, T. F. A.; Chafer, C. J.; Heath, J. T.; van Ogtrop, F. F.
Contrasting fire responses to climate and management: insights from two Australian ecosystems	Journal Abstract	Global Change Biology Journal	Bradstock, R.; Cary, G.; Marsden-Smedley, J. B.; King, K. B.
Impact of Bushfires on Air Quality in an Australian urban centre	Journal Abstract	Atmospheric Environment	Cope, M.; Emerson, K.; Keywood, M.; Linuma, Y.; Meyer, M.
From risk to resilience? Reframing shared responsibility in Australian disaster policy	Journal Abstract	Proceedings of 3rd Human Dimensions of Wildland Fire	Handmer, J.; McLennan, B.

Journal Abstract Count	6		
Social connectedness and adaptive team coordination during fire events	Journal Paper	Fire Safety Journal	Abbasi, A.; Hamra, J.; Hossain, L.; Owen, C.
Effects of networks on learning during emergency events	Journal Paper	Disaster Prevention and Management	Abbasi, A.; Hamra, J.; Hossain, L.; Owen, C.
The effect of patch area on birds in central Australian mulga (Acacia aneura) woodland of different times-since-fire.	Journal Paper	Pacific Conservation Biology Vol 19, No. 1	Adam L.; Cary, G.
Stand water use status in relation to fire in a mixed species eucalypt forest	Journal Paper	Forest Ecology and Management	Adams, M. A.; Gharun, M.; Turnbull, T. L.
A critical review of the science underpinning fire management in the high altitude ecosystems of south-eastern Australia	Journal Paper	Forest Ecology and Management	Adams, M.A.; Cunningham, S.C.; Taranto, M.T.
"Awake, smoky, and hot": providing an evidence-base for managing the risks associated with occupational stressors encountered by wildland firefighters	Journal Paper	Applied Ergonomics	Aisbett, B.; Ferguson, S.A.; Sprajcer, M.; Wolkow, A.
A survey to identify physically demanding tasks performed during storm damage operations by Australian State Emergency Services personnel	Journal Paper	Applied Ergonomics	Aisbett, B.; Graham, T.; Larsen, B.
Identification of physically demanding tasks performed during bushfire suppression by Australian rural firefighters	Journal Paper	Applied Ergonomics	Aisbett, B.; Lord, C.; Netto, K.; Nichols, D.; Payne, W.; Phillips, M.
The effect of prescribed fluid consumption on physiology and work behavior of wildfire fighters	Journal Paper	Applied Ergonomics	Aisbett, B.; Nichols, D.; Harvey, J.; Petersen, A.; Raines, J.; Snow, R.
Comparison of the fire weather characteristics of the Melbourne dust storm (1983) and Black Saturday (2009): a high-resolution ACCESS case study	Journal Paper	MODSIM 2013	Alan W.; Fawcett, R.; Kepert, J.; Thurston, W.; Tory, K.
Testing existing models for predicting hourly variation in fine fuel moisture in eucalypt forests	Journal Paper	Forest Ecology and Management	Alen S.; Matthews, S.; Anderson, W.
Uncertainty associated with model predictions of surface and crown fire rates of spread	Journal Paper	Environmental Modelling and Software	Alexander, M. E.; Cruz, M.
Fire behaviour modelling in semi-arid mallee-heath shrublands of southern Australia	Journal Paper	Environmental Modelling and Software	Anderson, W.R.; Cruz, M.; Gould, J.S.; McCaw, W.L.
Anatomy of a catastrophic wildfire: The Black Saturday Kilmore East fire in Victoria, Australia	Journal Paper	Forest Ecology and Management	Bannister, A. J.; Cruz, M.; Gould, J. S.; Hollis, J. J.; Hurley, R. J.; Sims, N. C.; Sullivan, A.

Modelling the potential for prescribed burning to mitigate emissions from fire-prone Australian ecosystems	Journal Paper	International Journal of Wildland Fire	Barrett, D.; Cook, G.; Boerr, M.M.; Bradstock, R.A.; Cary, Geoff; Gill, M.; Price, O.F.; Williams, R.J.
A day in the life of a volunteer incident commander: Errors, pressures and mitigating strategies	Journal Paper	Applied Ergonomics	Bearman, C.; Bremner, P. A.
Developing a research framework of complex multi-team coordination in emergency management	Journal Paper	International Journal of Emergency Management	Bearman, C.; Brooks, B.; Chapman, J; Owen, C.
A KM Model to improve the development of Bushfire communication products	Journal Paper	IT Journal	Beekhuyzen, J.; Corbitt, B.; Toh, K.
Making the landscape 'home': narratives of bushfire and place in two Australian communities	Journal Paper	Geoforum	Beilin, R.; Reid, K.
Managing multiple species or communities? Considering variation in plant species abundances in response to fire interval, frequency and time since fire in a heathy Eucalyptus woodland	Journal Paper	Forest Ecology and Management	Bell, T. L.; Duff, T. J.; York, A.
Ground and satellite-based assessments of wet eucalypt forest survival and regeneration for predicting long-term hydrological responses to a large wildfire	Journal Paper	Forest Ecology and Management	Benyon, R. G.; Lane, P.
Estimating the economic, social and environmental impacts of wildfires in Australia	Journal Paper	Environmental Hazards	Betts, R.; Handmer, J.; Stephenson, C.
Environmental circumstances surrounding bushfire fatalities in Australia	Journal Paper	Journal of Environmental Science and Policy	Blanchi, R.; Haynes, K.; James, M.; Leonard, J.; Oliveira, F. D.; Opie, K.
Wildfires, fuel treatment and risk mitigation in Australian eucalypt forests: Insights from landscape-scale simulation	Journal Paper	Journal of Environmental Management	Bradstock, R. A.; Cary, G. J.; Davis, I.; Lindenmayer, D. B.; Price, O. F.; Williams, R. J.
Exploring the role of fire, succession, climate, and weather on landscape dynamics using comparative modeling	Journal Paper	Ecological Modelling	Bradstock, R.; Cary, G.; Chao Li; Gill, M.; Flannigan, M. D.; Keane, R. E.; Parsons, R. A.
Environmental assessment of erosion following prescribed burning in the Mount Lofty Ranges, Australia	Journal Paper	International Journal of Wildland Fire	Bradstock, R.; Dragovich, D.; Henderson, M.; Morris, R.; Penman, Trent & Ostendorf, Bertram
Divergent Fire responses to climate and management: Insights from contrasting Australian ecosystems	Journal Paper	Global Change Biology	Bradstock, R.A.; Cary, Geoff; King, K.J.; Marsden-Smedley, J.
Simple models for stomatal conductance derived from a process model: cross-validation against sap flux data	Journal Paper	Plant Cell and Environment 35	Buckley T. N.; Turnbull, T. L.; Adams, M. A.

Attentional biases underlying trait anxiety in younger and older adults	Journal Paper	Cognition and Emotion	Burgess, M.; Cabeleira, C.; Cabrera, I.; Bucks, R. S.; Macleod, C.
Evaluating benefits and costs of wildland fires: critical review and future applications	Journal Paper	Environmental Hazards	Cary, G.; Clayton, H.; Dovers, S.; Milne, M.
Exploring the use of economic evaluation in Australian wildland fire management decision-making	Journal Paper	International Journal of Wildland Fire	Cary, G.; Clayton, H.; Dovers, S.; Shirmer, J.; Mylek, M.
Implications of changing climate and atmospheric CO2 for grassland fire in south east Australia: Insights using the GRAZPLAN grassland simulation model	Journal Paper	International Journal of Wildland Fire	Cary, G.; Gill, M.; King, K.J.; Moore, A.D.
Estimating Bushfire Hazard in SE Australia using Climate Simulated Data	Journal Paper		Cechet, B.; Li, J.; Qin, X.; Sanabria, L.A.
Estimating Fire Weather Danger in SE Australia using Climate Simulated Data	Journal Paper	International Journal of Climatology	Cechet, B.; Li, J.; Qin, X.; Sanabria, L.A.
Bushfires are Mens Business: The importance of gender and rural hegemonic masculinity in Australian understandings of bushfire	Journal Paper	Journal of Rural Studies	Chaplin, S.; Fairbrother, P.; Phillips, R.; Toh, K.; Tyler, M.
Quantifying spatio-temporal differences between fire shapes: Estimating fire travel paths for the improvement of dynamic spread models	Journal Paper	Environmental Modelling and Software	Chong, D. M.; Duff, T. J.; Tolhurst, K. G.
3.3.2 MODSIM paper Wildfire Interface Zone	Journal Paper	MODSIM 2013	Chong, D.; Duff, T.; Tolhurst, K.
The Area Difference Index (ADI), an improved index for the comparison of patterns of fire spread	Journal Paper	Journal of Environmental Informatics	Chong, D.; Duff, T.; Tolhurst, K.
Using Discrete Event Simulation Cellular Automata models to determine multi-mode travel times and routes of terrestrial suppression resources to wildland fires	Journal Paper	Environmental Modelling & Software	Chong, D.; Duff, T.; Tolhurst, K.
The Area Difference Index (ADI), an improved index for the comparison of patterns of fire spread.	Journal Paper	Journal of Environmental Informatics	Chong, D.; Duff, T.; Tolhurst, K.
Is selective attention in anxiety characterised by biased attentional engagement with or disengagement from threat: Evidence from a colour naming paradigm	Journal Paper	Journal of Experimental Psychopathology	Clarke, P. J. F.; Hart, S.; Macleod, C.
Simply imagining sunshine, lollipops and rainbows will not budge the bias: The role of ambiguity in interpretive bias modification	Journal Paper	Cognitive Therapy and Research	Clarke, P. J. F.; Nanthakumar, S.; Notebaert, L.; Holmes, E.; Blackwell, S.; Macleod, C.
Absence of evidence or evidence of absence: Reflecting on therapeutic implementations of attention bias modification	Journal Paper	BMC Psychiatry	Clarke, P. J. F.; Notebaert, L.; Macleod, C.

The Impact of Anxiety on Cognitive Task Performance	Journal Paper	Secondary Influences on Neuropsychological Test Performance	Clarke, P.; Macleoad, C.
Temperate eucalypt forest decline is linked to altered ectomycorrhizal communities mediated by soil chemistry	Journal Paper	Forest Ecology and Management	Close, D. C.; Horton, B. M.; Mohammed, C.; Morag, G.; Ratkowsky, D.; Wardlaw, T. J.; Davidson, N. J.
Smoke Impacts from Prescribed Burning in Victoria: Developing a Risk Climatology	Journal Paper	MODSIM	Cope, M.; Lee, S.; Meyer, M.
Leaf growth and senescence rates of three pasture grasses and wheat	Journal Paper	Crop and Pasture Science	Daily, H.; Bridle, K.; Lane, P.; Lisson, S.; Anderson, S.; Corkrey, R.
The sleep, fatigue and performance implications of sustained operations rosters: A review	Journal Paper	Sleep Medicine Reviews	Dorrian, J.; Lushington, K.; Short, M.
Measuring the success of emergency management policy	Journal Paper	International Journal of Wildland Fire	Dovers, S.; Eburn, M.
Learning the lessons from the past alternatives Royal Commissions and other quasi-judicial post disaster inquiries.	Journal Paper	Australian Journal of Public Affairs	Dovers, S.; Eburn, M.
Procrustes based metrics for spatial validation and calibration of two-dimensional perimeter spread models: A case study	Journal Paper	Agricultural and Forest Meteorology	Duff, T. J.; Chong, D. M.; Taylor, P.; Tolhurst, K. G.
A review of approaches to modelling fire wildfire suppression for landscape management	Journal Paper	International Journal of Wildland Fire	Duff, T.; Tolhurst, K.
A review of approaches to the modelling of wildfire suppression for landscape management	Journal Paper	Critical Reviews in Environmental Science and Technology	Duff, T.; Tolhurst, K.
Risk? What Risk? Risk sharing and risk assessment in fire management	Journal Paper	PLoS Disasters	Eburn, M.
Suing the Australian fire brigades: a question of duty	Journal Paper	Dictum	Eburn, M.
Exposing hidden value trade-offs; sharing wildfire management responsibility between government and citizens	Journal Paper	International Journal of Wildland Fire	Eburn, M.; McLennan, B.
Spectral analysis of fire severity in north Australian tropical savannas	Journal Paper	Remote Sensing of Environment	Edwards, A. C.; Maier, S. W.; Hutley, L. B.; Williams, R. J.; Russell-Smith, J.
Householders safety related decisions, plans, actions and outcomes during the 7 Feb 2009 Victorian (Australia) wildfires	Journal Paper	Fire Safety Journal	Elliott, G.; Josh W.; McLennan, J.; Omodei, M.

Potential determinants of Australian householders' intentions to self-evacuate if a wildfire threatens: two theoretical models	Journal Paper	International Journal of Wildland Fire	Elliott, G.; McLennan, J.; Paton, D.; Beatson, R.; Cowlishaw, S.
Gender, masculinity and bushfire: Australia in an international context	Journal Paper	Australian Journal of Emergency Management 28 (2): 2227	Fairbrother, P.; Tyler, M.
Modelling the fire weather of the Dunalley, Tasmania fire of January 2013: an ACCESS case study	Journal Paper	2013 MODSIM conference	Fawcett, R.; Kepert, J.; Thurston, W.; Tory, K.
Simulating boundary-layer rolls with a numerical weather prediction model	Journal Paper	Quarterly Journal of the Royal Meteorological Society	Fawcett, R.; Kepert, J.; Thurston, W.; Tory, K.
Design of a valid simulation for researching physical, physiological and cognitive performance in volunteer firefighters during bushfire deployment	Journal Paper		Ferguson, S. A.; Aisbett, B.; Jay, S. M.; Onus, K.; Lord, C.; Sprajcer, M.; Thomas, M. J. W.
FireDST: Fire Impact and Risk Evaluation Decision Support Tool	Journal Paper	Proceedings of the Modelling and Simulation Society of Australia and New Zealand (MSSANZ)	French, I.A.; Cechet, R.P.; Yang, T.; Sanabria, L.A.
Validation of canopy transpiration in a mixed-species foothill eucalypt forest using a soil–plant–atmosphere model	Journal Paper	Journal of Hydrology 492	Gharun, M.; Turnbull T. L.; Adams, M. A.
Stand water use status in relation to fire in a mixed-species eucalypt forest	Journal Paper	Forest Ecology and Management 304	Gharun, M.; Turnbull T. L.; Adams, M. A.
When ignorance is bliss: Explicit instruction and the efficacy of CBM-A for anxiety	Journal Paper	Cognitive Therapy and Research	Grafton, B.; Mackintosh, B.; Vujic, T.; Macleod, C.
Cognitive bias modification in anxiety disorders	Journal Paper	International Handbook of Anxiety Disorders	Grafton, B.; Macleod, C.
Identifying and Resolving Coordinated Decision Making Breakdowns at the Regional Level	Journal Paper		Grunwald, J. A.; Bearman, C.
Network effects on learning during emergency events	Journal Paper	Knowledge Management Research and Practice	Hamra, J.; Hossain, L.; Owen, C.; Wigand, R.
An integrated optimization model for fuel management and fire suppression preparedness planning	Journal Paper	Annals of Operations Research	Hearne, J.; Martell, D.; Minas, J.
A contractionless, low-turbulence wind tunnel for the study of free-burning fires	Journal Paper	Experimental Thermal and Fluid Science	Hurley, R.; Knight, I.; Sullivan, A.; Webber, C.
Modelling the effects of fire and rainfall regimes on extreme erosion events in forested landscapes	Journal Paper	Stochastic Environmental Research and Risk Assessment	Jones, O.; Nyman, P.; Sheridan, G.
Impact of biomass burning sources on seasonal aerosol air quality	Journal Paper	Atmospheric Environment	Keywood, M.; Meyer, M.; Reisen, F.
Post-fire response models and their applications in hazard prediction and land management	Journal Paper	Progress in Physical Geography	Lane, P.; Nyman, P.; Sheridan, G.

Assessing the Exposure Risk of Regional Populations to Smoke from Fires	Journal Paper	MODSIM 2013	Lee, S.; Meyer, M.
Particle and volatile organic emissions from the combustion of a range of building and furnishing materials using a cone calorimeter	Journal Paper		Leonard, J.; Mahendra B.; Reisen, F.
Validating 'fit for duty' tests for Australian volunteer fire fighters suppressing bushfires	Journal Paper	Applied Ergonomics	Lord, C.; Netto, K.; Petersen, A.; Nichols, D.; Drain, J.; Phillips, M.; Aisbett, B.
Muscle activation during the Pack Hike test and a critical wildfire fighting task	Journal Paper	Applied Ergonomics	Lord, C.; Nichols, D.; Aisbett, Brad; Netto., K.; Petersen, A.; Jorgensen, J.
Regulation of emotion through modification of attention	Journal Paper	Handbook of Emotion Regulation	Macleod, C.; Grafton, B.
Fire development in focus	Journal Paper	The Australian Journal of Emergency Management	Maddock, N.
Fire and weather: understanding the extremes	Journal Paper	Fire Australia	Maddock, N.
A spatial optimization model for multi-period landscape level fuel management to mitigate wildfire impacts	Journal Paper	European Journal of Operational Research Volume 232, Issue 2	Martell, D.; Minas, J.; Hearne, J.
Dead fuel moisture research: 1991-2012	Journal Paper	IJWF	Matthews, S.
Determining landscape fine fuel moisture content of the Kilmore East 'Black Saturday' wildfire using spatially-extended point-based models	Journal Paper	Environmental Modelling & Software	Matthews, S.; Sullivan, A.
P6. Predicting Delay in Residents' Decision on Defending versus Evacuating through Antecedents of Decision Avoidance.	Journal Paper	International Journal of Wildland Fire	McNeill, I. ; Dunlop, P.; Skinner, T.; Morrison, D.
Expecting the unexpected: predicting physiological and psychological wildfire preparedness from perceived risk, responsibility, and obstacles.	Journal Paper	Risk Analysis	McNeill, I.; Dunlop, P. D.; Heath, J. B.; Skinner, T. C.; Morrison, D.L.
Meteorological dynamics in a fire environment; a case study of the Layman prescribed burn in Western Australia	Journal Paper	Australian Meteorological and Oceanographic Journal	Mills, G.; McCaw, L.; Peace, M.
Sediment availability on burned hillslopes	Journal Paper	Journal of Geophysical Research	Moody, J.; Lane, P.; Nyman, P.; Noske, P.; Sheridan, G.
Environmental assessment of erosion following prescribed burning in the Mount Lofty Ranges, Australia	Journal Paper	International Journal of Wildland Fire	Morris, R. H.; Bradstock, R. A.; Dragovich, D.; Henderson, M. K.; Penman, T. D.; Ostendorf,
Bushfire Risk and Planning in Southeast Australia and the Northern Territory: Review and Comparison	Journal Paper	Urban Policy and Research	Norman, B.; Weir, J.

When we should worry more: A first investigation into increasing worry through CBM to drive adaptive health behaviour	Journal Paper	Cognitive Therapy and Research	Notebaert, L.; Clarke, P. J. F.; Holmes, E.; Macleod, C.
Attentional prioritization of threatening information: examining the role of the size of the attentional window	Journal Paper	Cognition and Emotion	Notebaert, L.; Crombez, G.; Van Damme, S.; Durnez, W.; Theeuwes, J.
Bushfire CRC research with France	Journal Paper	Fire Australia	Owen, C.
Gendered communication and public safety: Women, men and incident management	Journal Paper	Australian Journal of Emergency Management	Owen, C.
Spanning organizational boundaries in emergency management	Journal Paper	International Journal of Public Administration	Owen, C.; Curnin, S.
Obtaining information in emergency management: A case study from an Australian emergency operations centre	Journal Paper	International Journal of Human Factors and Ergonomics	Owen, C.; Curnin, S.
The challenges of multi-agency coordination	Journal Paper	Disaster Prevention and Management	Owen, C.; Curnin, S.
Cognitive artefacts supporting distributed situation awareness in an emergency operations centre	Journal Paper	International Journal of Human Factors and Ergonomics	Owen, C.; Curnin, S.
Frequency, intensity and duration of physical tasks performed by Australian rural firefighters during bushfire deployment	Journal Paper		Phillips, M.; Netto, K.; Payne, W.; Nichols, D.; Lord, C.; Brooksbank, N.; Onus, K.; Jefferies, S.; Aisbett, B.
The influence of fuel moisture content on the combustion of <i>Eucalyptus</i> foliage	Journal Paper	International Journal of Wildland Fire 22	Possell, M.; Bell, T. L.
Short-term physiological effects of smoke on wine grapevine leaves	Journal Paper	International Journal of Wildland Fire	Possell, M.; Bell, T. L.
The influence of whole plant water availability on combustion of <i>Eucalyptus</i> foliage	Journal Paper	Journal of Fire Sciences	Possell, M.; Bell, T. L.
Pre-shift fluid intake: effect on physiology, work and drinking during emergency wildfire fighting	Journal Paper	Applied Ergonomics	Raines, J.; Snow, R.; Petersen, A.; Harvey, J.; Nichols, D.; Aisbett, B.
Building Fire Impact Model	Journal Paper	Proceedings of the Modelling and Simulation Society of Australia and New Zealand (MSSANZ) MODSIM 2013	Sanabria, L.A.; French, I.A.; Cechet, R.P.
Combining long term satellite measurements and topographic downscaling to characterize net radiation and aridity in complex terrain	Journal Paper	Australian Meteorological and Oceanographic Journal	Sherwin, C.; Langhans, C.; Nyman, P.; Sheridan, G.

Modelling the effects of surface storage, macropore flow and water repellency on infiltration after wildfire	Journal Paper	Journal of Hydrology	Smith, H.; Lane, P.; Nyman, P.; Sheridan, G.
Expectancy bias in anxious samples	Journal Paper	Emotion	Steinman, S. A.; Cabeleira, C.; Burgess, M.; Bucks, R. S.; Macleod, C.; Melo, W.; Teachman, B. A.
Large-eddy simulations of bushfire plumes in the turbulent atmospheric boundary layer	Journal Paper		Thurston, W.; Tory, K.; Fawcett, R.; Kepert, J.
Incident Management Approaches above the Incident Management Team level in Australia	Journal Paper	Journal of Homeland Security and Emergency Management	Trist, C.; Owen, C.
3.4.3 "Using wind multipliers to determine local wind speed from modeled regional data for fire spread applications	Journal Paper		Unknown (or Not Specified Yet)
Redistribution and emission of forest carbon by planned burning in Eucalyptus obliqua (L. Hrit.) forest of south-eastern Australia	Journal Paper	Forest Ecology and Management	Volkova, L.; Weston, C.
Wildfire Aware Planning: Integrating knowledge to support leading practice	Journal Paper	International Journal of Wildland Fire	Weir, J.
Community safety during the 2009 Australian 'Black Saturday' bushfires: an analysis of household preparedness and response	Journal Paper	International Journal of Wildland Fire	Whittaker, J.; Haynes, K.
The effectiveness of health interventions in cardiovascular risk reduction among emergency service personnel	Journal Paper	International Archives of Occupational and Environmental Health	Wolkow, A.; Netto, K.; Aisbett, B.
Journal Paper Count	121		

Grand Count

201

APPENDIX B

FIRE NOTES – RESEARCH BRIEFS FOR INDUSTRY

Awake, Smoky and Hot – Fighting Fire Without Fire	Issue 111 - June 2013
Smoke Composition and Flammability of Forests and Grasslands	Issue 110 - June 2013
Fire Impact and Risk Evaluation	Issue 109 - May 2013
Predicting Bushfire Preparedness From Bushfire Expectations	Issue 108 - May 2013
Promoting Community Bushfire Preparedness	Issue 107 - April 2013
The Influence of Familiarity on Teamwork and Decision Making	Issue 106 - April 2013
Economic Contributions to Bushfire Management Policy	Issue 105 - February 2013
Understanding Social Networks For Bushfire Preparation	Issue 104 - February 2013
Urban and Regional Planning For Risk and Uncertainty in a Changing Climate	Issue 103 - January 2013
Making Knowledge Visible Collecting and Collating Bushfire Communication Products	Issue 102 - January 2013
Gender and Bushfire	Issue 101 - December 2012
A Shared Resource of Fire Knowledge	Issue 100 - November 2012
Firebrand Behaviour and the Probability of Fuel Bed Ignition	Issue 99 - October 2012
Community Bushfire Safety Issues: Residents Affected by the 2009 Victorian Bushfires	Issue 98 - October 2012
Mainstreaming Fire and Emergency Management - What is Possible? What is Feasible?	Issue 97 - September 2012
Environmental Impacts of Prescribed and Wildfire - Emissions Management	Issue 96 - September 2012
Southern Australia Seasonal Bushfire Outlook 2012 - 13	Issue 95 - August 2012
Fire Development, Transitions and Suppression: An Overview	Issue 94 - August 2012
Northern Australia Seasonal Bushfire Assessment 2012	Issue 93 - August 2012

