



BUSHFIRE CRC ANNUAL REPORT 2011 -12



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October 2012

Front cover:

Bushfire CRC partners viewing a demonstration of the CSIRO pyrotron in action at the Canberra Research Advisory Forum.

Fire in the Landscape project researchers explaining the science of water quality in bushfire affected north-east Victoria.

CEO CERTIFICATION

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

- *the written annual report for the 2011-12 financial year;*
- *the CRC's online milestone tables for the 2011-12 financial year;*
- *the CRC's online financial tables for the 2011-12 financial year;*
- *the CRC's online MDQ for the 2011-12 financial year; and*
- *the four quarterly reports provided online for the 2011-12 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

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EXECUTIVE SUMMARY

ACHIEVEMENTS AND ACTIVITIES FOR THE REPORTING PERIOD

Two years into the Extension funding period, 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 2011-12 are contained in this publication.

High level achievements for 2011-12 include:

RESEARCH

Publications

The formal publication output of the Bushfire CRC included five books, 21 book chapters, 43 articles in scholarly refereed journals and 33 written conference papers.

Research output after 10 years now totals 1162 publications. All 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.

Burning Issues, a book on the role of prescribed burning in the sustainability and management of Australia's southern forests and based on Bushfire CRC research, was launched at the November Stakeholder Council meeting by the Hon Bernard Teague AO, Chair of the 2009 Victorian Bushfires Royal Commission.

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 a further 120 publications produced with the aim of transferring know-how and practical information to end-users.

This included 10 *Fire Notes* distributed to the industry on subjects including fire severity mapping, householder survival decisions, dry lightning and smoke impacts. A record 85 posters were on display at the joint Bushfire CRC and Australasian Fire and Emergency Service Authorities Council (AFAC) annual conference. 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.

Community safety

An analysis of the research on the Black Saturday fires with a focus on interviews of those that survived has been completed. This analysis has been used in the framing of the new Community Safety position of the industry through AFAC.

Annual Conference

The Bushfire CRC held an international conference in Sydney in August 2011 with the peak industry organisation AFAC. The conference was seen as a major international event attracting 1430 delegates, including many international speakers and delegates, and 110 trade exhibitors from the broader industry, the majority of which were small to medium enterprises. The three day conference heard from international and Australian speakers from research organisations and from the fire and related industries. In addition, workshops were provided to assist in the transition of research into agencies responsible for community safety. A three day post-conference workshop on Fire Weather and Risk catered for specialist researchers and fire managers in this field.



THE SYDNEY CONVENTION CENTRE AT DARLING HARBOUR WAS THE VENUE FOR THE ANNUAL CONFERENCE IN AUGUST 2011.

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 Canberra and Hobart (pictured right) forums had the opportunity to challenge the research and to increase the opportunities for collaboration and assistance.



International wildfire conference

Researchers and end user partner agencies were supported by the Bushfire CRC to attend the International Conference on the Human Dimensions of Wildland Fire in Seattle, Washington. This profiled Bushfire CRC research and its application in the international area. Of the 99 presentations, 21 were from Australians relating to Bushfire CRC research. A quarter of these were end-user agency staff talking about how the research had informed their operational practices.

Financial management

The Bushfire CRC's prudent financial management ended the financial year in a strong position with all participant contributions paid in full. The CRC is well placed financially to fund all of its research activities through to 2013 and research utilisation into 2014.

EXTERNAL REVIEWS

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

The First Year Review (December 2011) visit was led by the Chairman of the CRC Committee, Neville Stevens AO.

This review panel called on management, researchers, and partner staff in looking at all aspects of the Bushfire CRC performance to judge whether the research was in a position to deliver on its aims. The First Year Review found that the Bushfire CRC was substantially on-track, and established a more thorough Performance Review in the New Year to ensure that this remained the case.

The Performance Review was a major exercise that is normally conducted after four years of operation for a CRC. For the Bushfire CRC this was completed after only 18 months with terms of reference that only looked back to the preceding July 2011, that is, only twelve months of operations.

The Bushfire CRC, partners, Board, and management committed extensive resources to the Performance Review to meet the expectations of the Panel. This review was also led by the Chairman of the CRC Committee, Neville Stevens AO.



OVER THREE DAYS IN APRIL 2012 THE PERFORMANCE REVIEW PANEL REVIEWED A BROAD RANGE OF ACTIVITIES AND STRUCTURES WITHIN THE BUSHFIRE CRC.

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 noted the strong support of stakeholders and end users, at very senior levels, to the CRC and the extent to which evidence based research from the CRC was supporting cultural change within the participant organisations.

It recommended the Bushfire CRC better measure its research impacts, enhance its presence in social media and increase and diversify its partner base beyond its current 45 partners to include others such as utilities and insurance industries, to better match its future research aims.

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 Panel wrote: “It was clear to the Panel that the research was being taken up with enthusiasm by participants, even where the results may not be the most palatable to those organisations. The Panel has made a number of recommendations for the CRC to measure these impacts more realistically.”

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 AFAC business group meetings, 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 32 events and more than 2500 participants over the past year, including the major Annual Conference in Sydney.

The 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 is being promoted through a rolling series of professional development workshops around the country.

Education

The support for higher degree students continues to play an important part of the Bushfire CRC strategy for building capacity and capability in the industry. The Bushfire CRC has now moved beyond its target number of PhD scholarship recipients. At the end of this reporting period the Bushfire CRC had committed to supporting 45 students, up from 37 in the previous reporting period. In addition, the Bushfire CRC has two Masters students and a further seven PhD students in the final stages of their doctorate from the original funding period.

The first student from the Extension program submitted their thesis during the reporting period. A further four students from the original research program submitted during the year.



BUSHFIRE CRC RESEARCH SCHOLARSHIPS STUDENTS AT THE ANNUAL CONFERENCE IN SYDNEY

In higher education, six university partners and 10 vocational and education training organisations are utilising Bushfire CRC research for course content. Furthermore, *The Age* newspaper published a bushfire poster for upper primary to middle secondary school students drawing on Bushfire CRC input: this was distributed to schools as part of a poster series on natural hazards.

Communications

The promotion of the research outputs into the industry and the broader community continued through the development of print and online publications, including the quarterly magazine *Fire Australia*, research briefing papers and a regular monthly newsletter.

The Bushfire CRC sustained its media profile throughout the year despite the relative absence of major fires across the country. The Bushfire CRC and AFAC annual conference in Sydney attracted solid media coverage, including national media, such as the Weather Channel (pictured right) based at the conference for the duration of the event.



The Communications Strategy emphasises the central role for all Stakeholder partners in promoting and supporting the Bushfire CRC within their own agencies and externally. It positions the Bushfire CRC to transform into an ongoing Institute and aligns with the *Strategic Directions of the Bushfire CRC 2010-2013* document.

Appointments

There was a change to the membership of the Board in the reporting period. Director Joanne Bloch (ceased as director 1 February 2012) was replaced by Yvonne Sneddon (appointed 11 April 2012). Professor Mike Taylor of the University of South Australia was engaged as a Principal Scientific Advisor at the beginning 2012.

There were no major changes to Bushfire CRC staff in the central office.

AWARDS

Bushfire CRC research was associated with winning projects in the 2011 Australian Safer Communities Awards presented by the Commonwealth Attorney-General in Canberra in December.

One of the two *Nationally Significant* awards went to the SES Agencies and Australasian Fire and Emergency Service Authorities Council for the *SES Children's National Hazards Awareness and Education Program*.

That program featured a series of fire safety television commercials aimed at children, with its *Li'l Larikkins* storylines based on the work of Bushfire CRC PhD student Briony Towers (University of Tasmania and RMIT University), whose work looks at how children and young people perceive bushfire risk.

In the *State and Territory* category, the South Australia Country Fire Service's *Firey Women Program* was Highly Commended. Research underpinning *Firey Women* was led by Helen Goodman and Catherine Rowe of RMIT University as part of Bushfire CRC program *Evaluating Bushfire Community Education*. It sought to help rural women prepare for fires so they would be able to stay and defend their properties while the local men were away on the fire trucks.

At the Bushfire CRC annual conference in Sydney, Bushfire CRC CEO Gary Morgan presented project leader Professor Jim McLennan of La Trobe University with the Bushfire CRC Special Recognition Award (*pictured right*) for the high quality of his research leadership and his mentoring of new researchers.

Jim McLennan is Adjunct Professor in the university's School of Psychological Sciences and has specialised in bushfire decision-making and community survival. He was a key researcher in the post-fire research taskforces after the 2009 Black Saturday fires in Victoria and the Perth Hills fires in early 2011.



RISKS AND IMPEDIMENTS

A general risk that was highlighted in the previous Annual Report is the potential impact on the retention of key researchers if the funding uncertainty continues for the overall bushfire research program. With most projects due to finish by mid-2013, retention beyond this date may be difficult. This impediment is

being 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. Steps are underway to identify Commonwealth Government funding beyond the Extension term of the Bushfire CRC; however, while there has been much political support, no financial commitment has been made to date. A more recent extension to allow operations to the end of June in 2014 will assist some projects.

As highlighted at the Three Month Visit, First Year Visit and Performance Review, the Bushfire CRC had early difficulties in getting suitable PhD students to fill the number of proposed positions in the Commonwealth Agreement. The Bushfire CRC embarked on a broad recruitment campaign that included national advertising. This proved successful in attracting suitable candidates. The Bushfire CRC has now moved beyond the target number of PhD scholarship recipients.

END-USER ENVIRONMENT

The 2009 Victorian Bushfires Royal Commission released its final report at the end of July 2010 containing much discussion on the nature of Bushfire CRC research, past, present and future. This continues to have a major impact upon this end-user environment, not only in bushfire but across all natural hazards including floods, cyclones and earthquakes.

Furthermore, when the original seven year research program drew to a close in early 2010 it was clear that the priorities for the emergency services industry had changed in ways unforeseen by the industry at the start of that decade.

Much of the initial research program was shaped by the priorities of 2002 and has served Australia well. By 2010 the focus had evolved to centre on changes of climate and drought, human behaviour, demographic shifts, new demands with workplace health and safety, and emerging technology.

In addition a range of issues has arisen out of formal inquiries into the tragic Black Saturday bushfires in Victoria during February 2009, the east coast floods of January 2010, Cyclone Yasi in 2011 and the Perth fires of early 2011.

It is with these new priorities that the Bushfire CRC partners are looking ahead and planning a broad strategic research agenda beyond the current Extension Program, which ends on 30 June 2013. This is being done in a climate of restricting finances at the federal level and across most states.

However, national leaders in the industry realise that even during tough financial times, it is critical to conduct research for new knowledge to ensure the industry can meet the challenges ahead. States and Territories have provided strong support for the continuation of fire, land and emergency management research. The Commonwealth agencies partners have expressed the same desire. As a result, the Bushfire CRC is working to secure ongoing Commonwealth funding for this important research that benefits the community.

The Bushfire CRC partners are now seeking to ensure that long term strategic thinking and forward planning are not abandoned. More innovative and efficient communications methods, including online and videoconferencing, are being used to maintain the momentum towards securing an ongoing national body for fire and emergency management research.

IMPACTS

The expected impacts of the Bushfire CRC, as outlined in the Impact Tool, remain unchanged.

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 2011 and June 2012 to review and receive updates on the progress of research, finance, education, communication and other activities. The Adelaide meeting was hosted by our South Australian partners the University of South Australia and the Country Fire Service. The Governing Board met five times throughout the year. There was a change to the membership of the Board in the reporting period. Director Joanne Bloch (ceased 1 February 2012) was replaced by Yvonne Sneddon (appointed 11 April 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 with all participant contributions paid in full. The CRC is well placed financially to fund all of its research activities through to 2013.

The auditors have met with the Audit and Compliance Committee since conducting the 2011-12 audit. The 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.



THE STAKEHOLDER COUNCIL MET IN MELBOURNE (LEFT) FOR THE AGM, AND IN ADELAIDE.

GOVERNING BOARD MEMBERS

Name	Role	Key skills	Independent/ Organisation	Attendance (out of 5)
Len Foster AO	Chairman	Governance and strategy	Independent	4/5
Professor Mark Adams	Director	Researcher and academic	University of Sydney	4/5
Joanne Bloch	Director	Finance and governance	Independent	3/3 Ceased 1 February 2012.
Naomi Brown	Director	Industry based skills	Australasian Fire and Emergency Service Authorities Council	5/5
Murray Dudfield	Director	Industry based skills	New Zealand National Rural Fire Authority	5/5
Commissioner Shane Fitzsimmons AFSM	Director	Industry based skills	New South Wales Rural Fire Service	4/5
Professor Alistar Robertson	Director	Researcher and academic	University of Western Australia	4/5
Mike Taylor AO	Director	Governance and strategy	Independent	4/5
Ewan Waller AFSM	Director	Industry based skills	Department of Sustainability and Environment	5/5
Yvonne Sneddon	Director	Finance and governance	Independent	1/1 Appointed 11 April 2012

COMMITTEE MEMBERS

Committee Name	Risk Management and Audit	
Name	Role	Independent/ Organisation
Yvonne Sneddon	Chair	Independent
Naomi Brown	Member	AFAC
Mike Taylor	Member	Independent

Committee Name	Research and Education Committee	
Name	Role	Independent/ Organisation
Ewan Waller	Chair	DSE
Murray Dudfield	Member	NRFA
Alistar Robertson	Member	UWA

Committee Name	Human Resources Committee	
Name	Role	Independent/ Organisation
Naomi Brown	Chair	AFAC
Len Foster	Member	Independent
Shane Fitzsimmons	Member	NSW RFS

Committee Name	Research Utilisation Committee	
Name	Role	Independent/ Organisation
Murray Dudfield	Chair	NRFA
Mark Adams	Member	University of Sydney
Shane Fitzsimmons	Member	NSW RFS
Naomi Brown	Member	AFAC

Committee Name	Strategic Directions Committee	
Name	Role	Independent/ Organisation
Len Foster	Chair	Independent
Mike Taylor	Member	Independent
Naomi Brown	Member	AFAC
Ewan Waller	Member	DSE

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	University of South Australia/ Central Queensland University
Prof John Handmer	RMIT University
Prof Douglas Paton	University of Tasmania
Prof Mike Taylor	University of South Australia (from January 2012)

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

Name	Organisation Type	ABN	Role
Essential			
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 Environment & Conservation, WA	State	38 052 249 024	End-user
Department of Sustainability & Environment, Vic.	State	90 719 052 204	End-user
Fire & Emergency Services Authority, WA	State	39 563 851 304	End-user
Forestry Plantations Queensland	State	86 076 628 981	End-user
Industry and Investment NSW	State	72 189 919 072	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
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	State	37 417 474 709	End-user

Name	Organisation Type	ABN	Role
Essential			
Association of Qld			
Tasmanian 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
Victorian Office of Emergency Services Commissioner (OESC)	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
National Aerial Firefighting Centre	Industry	96 105 736 392	End-user
Terramatrix Pty Ltd	Industry	15 323 406 259	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 number 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 in a way that ensures that 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 Knowledge Web (initially developed by the Bushfire CRC). This 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 on an opportunistic basis where such work is consistent with the Bushfire CRC mission and 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.

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 along with extensive community infrastructure. This was a latest in a line of bushfire disasters stretching back to early European settlement of Australia, including 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.

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

The Bushfire CRC also 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. Some analysis has been undertaken, but much remains to be explored.



It is clear in the some analysis of the Bushfire CRC research 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 two years and the outputs are beginning to flow in earnest. The Bushfire CRC has seen a lift in the quality of its research outputs as demonstrated to the DIISRTE Review Panel during the year. Some of key highlights have been the completion of the analysis of the research of the Black Saturday fires with a focus on interviews from those that survived. This analysis has been used in the framing of the new Community Safety position of the industry through AFAC.

As part of the management of the research program, the Bushfire CRC has initiated a twice yearly Research Advisory Forum where half of the research projects alternately present on their progress. This has proven 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 Australian National University in November 2011 (pictured right) and the second in Hobart in May 2012.



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. 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. The Hobart forum also included a presentation from a visiting fire scientist from Botswana.

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.

Many of the projects have also presented to the various AFAC Group meetings (including Community Safety, Rural and Land Management, SES, and Urban Operations) and also at the Sydney annual conference, which was held jointly with the 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 made solid early progress this year.

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 also sparked much debate within the industry. This project also conducted a wide-ranging discussion on the concept of shared responsibility at a workshop that included policy leaders and members of the community.

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. This included addressing a key meeting of the Chief Officers of the fire, land management and emergency services during the year.

The other areas in this theme have all continued to make substantial progress in developing case study sites, undertaking data collection, and completing literature reviews.

Publications 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).



DR MICHAEL EBURN SPOKE REGULARLY ON THE LEGAL ASPECTS OF EMERGENCY MANAGEMENT

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, both of which continued to make good progress this year. The teams have already collected substantial data through the work undertaken as part of the post-fire analysis of the Perth Hills fire in during the previous year and now this has been supplemented with further data collection during this year. Substantial case study sites have also been established in other states.

Publications featured in the areas of community influence on individual behaviour (reports, conference papers), gender aspects of bushfire research (reports), 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 is focussing on 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.

This theme has four broad areas of work - incident management, fire in the landscape, extreme fire behaviour and suppression, and health and safety. All areas achieved the expected progress on their work plans over this period. All teams have built on their foundation work, some with the addition of world class researchers. It is a notable achievement of this group that there has been regular and intensive engagement with the end-users, particularly through the relevant AFAC Groups and their state, territory and New Zealand managers.

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



BUSHFIRE CRC RESEARCHER DR ANDREW SULLIVAN DEMONSTRATES THE CSIRO PYROTRON TO PARTICIPANTS AT THE CANBERRA RESEARCH ADVISORY FORUM.

RESEARCH UTILISATION

Background

The Research Utilisation Strategy 2011-2014 is the product of extensive consultation with end user stakeholders, including a survey of end user organisations that was conducted in late 2010.

The research and consultation revealed a need to build on the successful approaches to research adoption in the previous strategy. Thus the new 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.

The review of the research adoption approach also identified the need to emphasise the following as key areas for success:

- 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.

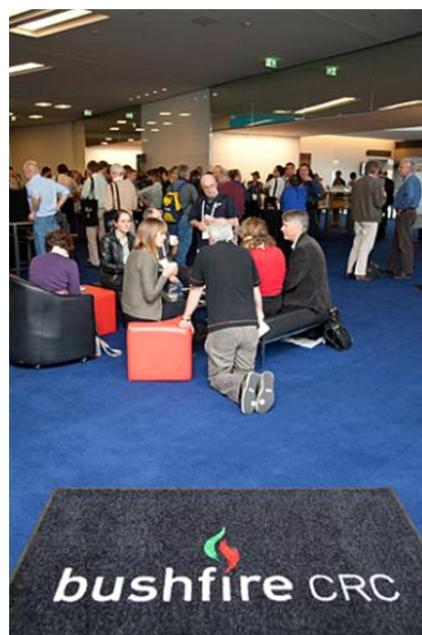
PROGRESS

Comprehensive reports on the progress of the implementation of the Strategy and Plan were presented to the Research Utilisation Committee of the Board in February 2012 and at the Stakeholders Council meeting in June 2012.

The April 2012 Performance Review of the Bushfire CRC was glowing in its report on the commitment and support of end-users and comment was made about the robust process that had been used to formulate the Strategy and Plan. The implementation of the Strategy 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:

- 10 *Fire Notes* were released during the reporting period - a list is attached at **Appendix B**.
- 32 events were conducted over the year for more than 2500 participants. A summary is attached in **Appendix C**.
- Bushfire CRC research outputs in the Human Factors area have been integrated into the updated AIIMS training manuals. Research findings have been relevant to the following VET training resource kits:
 1. Respond to wildfire



2. Suppress wildfire
3. Respond to remote and isolated structure fire.
4. Conduct complex prescribed burn
5. Plan complex prescribed burn
6. Assist with prescribed burn
7. Plan Simple prescribed burn
8. Conduct simplex prescribed burn
9. Conduct briefings and debriefings
10. Lead a crew
11. Take local weather observations
12. Interpret and analyse fire weather information

ISSUES

The only ongoing issue and risk, which was highlighted by the Performance Review, is the need to assess usage of key products.

Extensive action was taken to seek information from end-user partners, including the CEO requesting this information from end user partner agencies and follow-up requests to all end-user agencies. Most partner agencies responded.

In summary there is evidence of:

- **Strategic alignment** - At the highest level agencies have strategies and policies that are aligned to the Bushfire CRC research and the Bushfire CRC outputs inform agency needs.
- **Awareness and access** - agencies are aware of Bushfire CRC research and make it widely accessible throughout their organisations.
- **Engagement** - agencies participate in workshops, seminars and conferences. Publications are widely circulated and read both online and in print.
- **Use** - many examples were provided to show agency use of the research to modify their business.

While the 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.

A mid-term review has been built-in to the Research Utilisation Implementation Plan. This review is scheduled for completion early in 2013 and will include actions to focus on measuring the impact of research. The current initiative by the Group of Eight and ATN Universities to measure impact is being monitored and the planned release of the findings of a pilot project in December 2012 is eagerly anticipated and will be considered in the measurement of Bushfire CRC impacts.

HIGHLIGHTS

Human Factors Professional Development workshops

Introductory Human Factors Professional Development workshops have been held in Victoria, New Zealand, Queensland, Tasmania, South Australia and Western Australia.

The overall feedback on these workshops has been very positive. Workshops appear to work best when the agency sees a need and when there are complementary development initiatives occurring or planned with the agency/jurisdiction. The most suitable group of participants have been operational and with IMT or at least crew leader experience. The addition of senior agency training, operational and operational performance personnel has demonstrated commitment and also allowed the agency to assess what their needs might be based on the level of interaction and engagement at the workshops.

To date 235 people have participated in the Human Factors Professional Development workshops.

Conference Support Scheme Awarded

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 Claire Johnson, from the Country Fire Authority, Victoria, to attend the Human Dimensions of Wildland Fire in Seattle, Washington, from April 17-19 2012. In addition to organising a session, Claire gave a presentation titled 'From Academia to Action: The Application of Decision Research Exploring Worst Case Scenario Thinking into Fire Agency Practice'.

Sponsorship and Support

Human Dimensions of Wildland Fire Conference - Seattle April 17-19

The International Association of Wildland Fire (IAWF) held its third Human Dimension in Wildland Fire conference in April.

The Bushfire CRC provided support, of varying levels, to two end-users, and nine researchers to attend and present at the conference. The Bushfire CRC's Research Utilisation Manager was on the Steering Committee and Program Committee.

This conference enabled the Bushfire CRC to make an impact on the international stage:

- 175 people registered for the conference
- A virtual conference was set up online for those unable to attend and as a legacy archive.
- There were six special sessions with papers and a series of grouped presentations - three of these were by Australians connected with the Bushfire CRC-
 - *Public Safety and Bushfires: Recent Lessons Learned in Australia* - led by Damien Killalea, Bushfire CRC end user leader from the Tasmania Fire Service.
 - *Shared Responsibility for Community Wildfire Safety in Australia: What it is, how might we do it and how might we do it better* - led by Blythe McLennan, Bushfire CRC researcher at RMIT University.
 - *Sharing the responsibility of research application: How Victorian fire agencies are implementing research findings to improve incident management* - led by Claire Johnson, Bushfire CRC PhD graduate now employed by CFA, a partner agency.
- Of the 99 presentations, 21 were from Australians. Most of these were related to Bushfire CRC research. Of the 21, about one quarter were presented by people from end-user agencies talking about how the research has informed their practices.
- Feedback from attendees was positive, including:

"The research presented by the Australasian participants was of a high standard and generally some of the better quality material offered at the conference. The Australasian presenters pitched their research in a very accessible way that enabled a wide range of conference participants to engage with the key ideas and understand the potential implications for communities and fire agencies."

The strong representation by Australians at this conference reflects the impact of the Bushfire CRC funded social science and people-related research - both in the first seven year program and in the current research program. The timing of this conference made it the premier international conference for many Bushfire CRC recent and current researchers. It is the only human dimensions conference in the world that serves both researchers and managers in this field.

The theme of human factors in decision making and incident management (From the *Protection of People and Property Program* in the first seven-year Bushfire CRC program) was addressed in these presentations:

- *Getting the best bang for your buck: Ad hoc or pre-formed Incident Management Teams?* - P. Hayes

- *From Academia to Action: The Application of Decision Research Exploring Worst Case Scenario Thinking into Fire Agency Practice* - C. Johnson
- *Learning from Case Studies: Applying Human Factors Principles to Investigations of Near-Miss Events* - S. Ryan
- *Improving the Leadership Skills of Incident Controllers: The Development of a Multi-Agency Incident Leadership Framework* - L. Frye
- *War fighting to fire fighting: Adoption of mission command philosophy and networked information systems within the Fire Service* - D. Harris

Communities and Bushfire Safety (From the *Community Self Sufficiency for Fire Safety* Program in the original Bushfire CRC) was covered in these presentations:

- *Bushfires and community safety in Australia: a revised national approach following the 2009 Victorian "Black Saturday" fires* - D. Killalea
- *Finding a way forward: The Victorian State Policy response to Bushfires in Australia* - A. Rhodes
- *The consequences of a "Primacy of Life" priority for managing bushfires - A Case Study from Western Australia* - D. Caporn (Presented by P. Dunlop)
- *Shelter in a Firestorm: Public refuges and shelter options during bushfire - a public policy dilemma* - J. Schauble
- *"Stay or go" after the fire: community wildfire safety policy in Australia* - J. Handmer
- *Firey Women - Why engage women in bushfire safety?* - F. Dunstan
- *Educating children about wildfire hazards* - B. Towers

The research from the current Bushfire CRC themes of *Understanding Risk* and *Communicating Risk* was also well represented:

- *Preparing for what? Exploring the dimensionality of wildfire preparedness* - P. Dunlop
- *Expect and Act: Predicting Physiological and Psychological Wildfire Preparedness from Perceived Risk, Responsibility and Obstacles* - I. McNeill
- *Living with Wildfire at the Wildland-Urban Interface in California and New South Wales* - C. Eriksen
- *From risk to resilience? Reframing shared responsibility in Australian disaster policy* - B. McLennan
- *Sharing responsibility with governments and their agencies* - M. Eburn
- *Spatial planning, wildfire risk and climate change: shared responsibility and adaptive capacity to build resilience* - J. Handmer
- *Community adaptation to wildfire in a changing climate: developing a toolkit for local government* - S. Chaplin
- *When residents come under imminent wildfire threat, what aspects of decision making distinguish those who stay and defend their home from those who leave?* - J. McLennan

Publications

Research output after 10 years now totals 1162 publications. All 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. 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 more than 90 *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 6000 research and industry readers to widen the reach of research outputs from the Bushfire CRC. These editions contained a total of 25 articles on Bushfire CRC research and activities. This publication is a collaborative effort in partnership with AFAC and the Fire Protection Association of Australia.

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 Sydney in August with 110 trade exhibitors from the broader industry, the majority of which were small to medium enterprises. The conference, held jointly with the peak industry body the Australasian Fire and Emergency Service Authorities Council, also attracted significant corporate sponsorship, including a long-term principal sponsor relationship with global vehicle manufacturer Scania and sponsorship of the Knowledge Lounge by 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.

The Bushfire CRC has built upon established links with other CRCs, including the Memorandum of Understanding with the Spatial Information CRC signed in 2005, with continued joint works examining the role of satellites in fire management.

During the reporting period a number of 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 DSE with a substantial block of contract research being awarded to the Bushfire CRC. This work complements the work of the Bushfire CRC under the Commonwealth Agreement.
- Following the November 2011 bushfire in Margaret River Western Australia, which resulted from an escaped prescribed burn, the Bushfire CRC was engaged by the Western Australian Department of Environment and Conservation to evaluate its risk management processes and align them to the ISO 31000 standard for risk management. This is an ongoing piece of work that continues into the 2012-13 financial year.
- The Bushfire CRC has also taken on 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 is now taking on the research management and brokering role in the 2012-13 financial year under a new contract for \$300,000 that was awarded to the Bushfire CRC.
- 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*. He also co-authored a case study for the Intergovernmental Panel on Climate Change special report on Extremes.

COMMUNICATIONS

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.

Progress continues on a range of communications activities that are aligned to the strategic directions of the Bushfire CRC to enable the CRC to better communicate with its target audiences:

- Bushfire CRC partners
- The fire industry (Small to Medium Enterprises and large enterprises)
- The research and education community
- The general public

Activities are focussed on priority areas including:

- online communications
- publications
- media
- events

Communications strategy

The communications activities of the Bushfire CRC work within a strategy for the period to 2013 and beyond towards the establishment of an ongoing fire and natural hazards research institute.

This strategy emphasises the central role for all Stakeholder partners in promoting and supporting the Bushfire CRC within their own agencies and externally. It positions the Bushfire CRC to transform into an ongoing Institute and aligns with the *Strategic Directions of the Bushfire CRC 2010-2013* document.

COMMUNICATING WITH OUR INDUSTRY AND RESEARCHERS



Sydney Conference and workshops for industry

The Bushfire CRC and AFAC annual conference - held at the Sydney Convention and Exhibition Centre, Darling Harbour, at the end of August - was our biggest and busiest yet. More than 1430 people participated in the event, while 110 industry exhibitors filled the trade hall.

THE COMMUNICATIONS AND MEDIA SKILLS WORKSHOP FOR RESEARCHERS AT THE ANNUAL CONFERENCE



THE POSTER DISPLAY WAS POPULAR IN THE ANNUAL CONFERENCE TRADE EXPO.

All delegates satchels included a Bushfire CRC USB stick that contained key research outputs of the Bushfire CRC, all *Fire Notes* and conference posters, and a selection of research interviews.

Delegates from around Australia and overseas attended the event over the week, furthering its reputation as the biggest fire, land management and emergency services event of the year, linking research, policy and industry.

Importantly, 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. All Bushfire CRC postgraduate students are required to attend each annual conference - many get the opportunity to

present their work on 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, with more than 80 percent of delegates saying they viewed them.

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 busy week began with professional development workshops on the Monday, including a media and communications skills class for new researchers. Tuesday and Wednesday were packed with panels and presentations across four venues within the large centre. Thursday's focus was the inaugural Bushfire CRC Science Day, where more than 250 participants heard from 30 researchers on the latest in fire science - including (below) Bushfire CRC researcher Dr Brad Aisbett and PhD student Sondra Dickinson.



Many conference delegates and researchers then went to Bowral, in the NSW Southern Highlands, for a post-conference workshop on Fire Weather and Risk (*pictured below*). This was a specialised gathering of researchers, meteorologists and fire managers keen to understand more about the dynamics of fire and weather.



The full conference proceedings are now on the Bushfire CRC website and the AFAC Knowledge Web as an ongoing resource for the community, industry and researchers. This includes the presentations of most speakers, as well as photographs and video.

The broader fire industry (SMEs and large corporations) was well represented with 110 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.



A RECORD 110 EXHIBITORS FROM THE SME SECTOR WERE ON DISPLAY AT THE ANNUAL CONFERENCE

Direct stakeholder engagement

The Stakeholder Council Annual General Meeting was held in Melbourne, in November (*pictured below*). Stakeholder representatives were informed of the actions being undertaken to secure long term ongoing funding for fire research. A lengthy discussion followed on how each partner could best provide support. Representatives of Bushfire CRC partners from around Australia and New Zealand were also provided updates on a selection of key research projects.



The South Australia Minister for Emergency Services, the Hon Jennifer Rankine MP, opened the Bushfire CRC Stakeholder Council in Adelaide in June 2012. The Minister noted that South Australia was active in the Bushfire CRC through six separate agencies - the Country Fire Service, Metropolitan Fire Service, Department of Environment and Natural Resources, Forestry SA, University of South Australia and Central Queensland University.

Ms Rankine said the Bushfire CRC has produced tangible results for her state including how to better manage emergency incidents, advice on how best to use aircraft for firefighting and the effect of extreme weather on fires.

An individual Stakeholder Report has been provided to each end-user partner. This report details the contribution of the partners towards the 2003 to 2010 research program, involvement in the 2010 to 2013 program, outputs relevant to that partner, and suggests future opportunities for collaborative research within the Bushfire CRC.

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 a Fire Decision Support Tool Box, carbon and water impacts in sub-alpine regions, fire weather and risk management.



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 10 new *Fire Notes* were published bringing the total to 92.

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.

Wildfire

The Bushfire CRC had the cover story in the September/October 2011 issue of *Wildfire*, the official journal of the International Association of Wildland Fire. The article looked at issues related to controlled or prescribed burning.



Fire in the landscape tour

A group of fire managers and scientists went deep into the forests of north east Victoria in April to view research sites in landscapes that were severely damaged in the 2009 bushfires. (See photo on cover).

Touring research sites at Stanley and Mudgegonga the participants learnt about a series of projects attempting to determine the effects of fire on the landscape. These studies are helping to predict future fire behaviour—both prescribed fire and bushfire—and the potential adverse impacts on water and carbon.

The Bushfire CRC has commissioned the research through the University of Sydney and the University of Melbourne to measure fire impacts on water resources, erosion and carbon emissions.

Fire and land management agencies across south-eastern Australia are supporting this research including ACT Parks, Conservation and Lands, whose Fire Management Unit Manager, Neil Cooper, is the lead end-user of the projects. The Project Leader is Dr Tina Bell, from the University of Sydney.

Publications

A growing amount of research content produced by the Bushfire CRC is now available for Bushfire CRC members and the broader industry and community. The publications output now totals 1162 items including research reports, journal articles, field guides, presentations and posters. The 2011 Bushfire CRC and AFAC annual conference in Sydney produced a significant amount of new material on key research issues. All this content is online at www.bushfirecrc.com and the AFAC Knowledge Web.

Burning Issues



LAUNCHING BURNING ISSUES: FROM LEFT THE HON BERNARD TEAGUE AO, PROF MARK ADAMS AND GARY MORGAN.

Burning Issues, a book on the role of prescribed burning in the sustainability and management of Australia's southern forests, was launched at the November Stakeholder Council meeting by the Hon Bernard Teague AO, Chair of the 2009 Victorian Bushfires Royal Commission.

Burning Issues provides a scientific discussion on the current state of knowledge on prescribed burning. It draws on some of the research in the broad area of prescribed burning over many years, including a significant contribution by Bushfire CRC researchers.

The Bushfire CRC funded the book and much of this research. CSIRO Publishing is the publisher and distributor.

The book is by Professor Mark Adams, a Bushfire CRC Director and former project leader and Dean of the Faculty of Agriculture, Food and Natural Resources at the University of Sydney, and Dr Peter Attiwill, Principal Fellow in Botany and Senior Fellow in Historical Studies at the University of Melbourne and editor-in-chief of the international journal *Forest Ecology and Management*.

Fire industry promotion

The research program of the Bushfire CRC was strongly promoted to a new audience at the annual Fire Protection Association of Australia (FPA Australia) conference in Adelaide in November (pictured below). FPA Australia represents thousands of SMEs in the fire protection industry across Australia.

As a partner of the Bushfire CRC FPA Australia supported the Bushfire CRC/AFAC annual conference with a booth at the Trade Expo in Sydney in September

The Bushfire CRC is keen to support its partner organisations on appropriate occasions in the interests of promoting the research outputs to broader and newer audiences. The Bushfire CRC booth attracted much interest from conference participants wishing to discuss the research program and keen to keep informed through *Fire Notes*, *Fire Australia* and the website on future work.



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:

- Water quality after bushfires in sub-alpine areas, by University of Melbourne researchers.
- A Tasmania Parks and Wildlife Service video examining the lessons from an escaped planned burn in Narawntapu National Park.
- An introductory video on the Fire Decision Support Toolbox project, explaining how the various elements from a range of scientific disciplines are drawn together – this video was produced with the assistance of the Metropolitan Fire and Emergency Services Board in Melbourne, a lead partner in the project.

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, 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 2011 Sydney annual conference and past conferences continuing to be popular along with major research reports, briefing papers and news reports.

New media

- The Bushfire CRC *YouTube* channel features videos of Bushfire CRC research in action. *YouTube* provides a simple mechanism of promoting Bushfire CRC work to Australian and international audiences with short (less than two minutes) videos. Importantly, these videos are linked to the main Bushfire CRC website. New content is being progressively uploaded as it becomes available. See <http://www.youtube.com/bushfirecrc>
- A Bushfire CRC *Facebook* page fosters communication between those interested in bushfire science but who are not normally recipients of the specific communications coming out of the Bushfire CRC. A base of 1000-plus followers is developing; many from regional Australia and overseas, including research groups, fire industry media, and numerous local fire brigades - all who share the postings with their own members.
- A newly created *Linked-In* group has now passed 200 individual contacts, all of who are or have been closely connected with the activities and research of the Bushfire CRC.
- 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.

Fire comes to Canberra

Bushfire research featured as part of a display of all Cooperative Research Centre research at Parliament



House in August. The then Minister for Innovation, Industry, Science and Research, Senator Kim Carr, hosted a science meets the Parliament function to coincide with National Science Week.

The Bushfire CRC arranged for Neil Cooper, ACT-based land manager and Bushfire CRC Lead End-User, to attend to provide a first-hand account of research into practice. Also in attendance were AFAC CEO, Naomi Brown, and ACT Emergency Services Agency Commissioner Mark Crossweller. Neil caught the attention of all attendees in his Bushfire CRC protective fire

clothing (pictured above with MP Adam Bandt and Naomi Brown).

Bushfire CRC research into arson, prescribed burning, aerial suppression and community understanding was on display along with all our Pocket Guides for fire and land managers, which are available for industry from across Australasia and internationally.

Media

The annual conference in Sydney attracted widespread national media coverage with several media organisations allocating a representative for most of the week at the venue. The Weather Channel set up a portable studio, ABC Radio set up a mobile booth, the *Sydney Morning Herald* and the ABC sent news reporters and WIN TV filed a story on regional fire dangers.



The release of the *Bushfire Seasonal Outlook* during the conference threw a national media focus upon our event in Sydney. The CEO of the Bushfire CRC and the Commissioner of the New South Wales Rural Fire Service Shane Fitzsimmons did several joint media conferences during the week, including live breakfast television on Channel Seven's *Sunrise*.

The national *Bushfire Seasonal Outlook* was released as an outcome of the Bushfire CRC organised Southern Seasonal Outlook Assessment Workshop held in Adelaide. 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.

Other significant media appearances of the Bushfire CRC included:

- The national ABC TV *7.30 Report* interviewed Bushfire CRC CEO Gary Morgan in January 2012 on the potential for bushfires across Australia over the summer. At that time, many fires had occurred across Central Australia due to the large amount of dry grass that followed the heavy rains of the previous year, as predicted by our *Bushfire Seasonal Outlook*.
- Research based on the 2003 alpine fires as part of the Bushfire CRC HighFire Project gained broad radio and press coverage in January. This University of New South Wales component of the project provided new insights on the effects of wind channelling on a bushfire.
- ABC Radio National *Background Briefing* dedicated a program in early February to a discussion on pros and cons of prescribed burning over different landscapes. The Bushfire CRC was approached early by the program researchers to recommend experts and to define the issues. The *Burning Issues* book was the catalyst for the program, which is still on the ABC website.
- In February, *The Australian* reported Bushfire CRC research from the University of Melbourne and RMIT University that analysed the fatalities of the 2009 Black Saturday bushfires in Victoria to assess how people may need to adapt to future bushfires. The researchers concluded that Victoria was ill-adapted to large scale complex bushfire risk events.

Age education poster

The Age newspaper published a series of wall posters on natural disasters in March 2012.

The Bushfire CRC was contacted to contribute much of the content and editorial advice for the bushfire poster - this contribution was appropriately acknowledged on the poster.

The final poster series was distributed to schools around Australia.



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.

This commitment is reflected in the Commonwealth Agreement. 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. At the end of this reporting period the CRC had committed to supporting 45 students, up from 37 in the previous reporting period. In addition, the Bushfire CRC has a further seven PhD students in the final stages of their doctorate from the original funding period and two Masters students. Although there were other applications for Masters scholarships, these applications did not meet our requirements.

The first of the current program students submitted their thesis during the reporting period, with more than half of scholarship recipients due to submit at the end of the current financial year (to mid 2013). A further four students from the original research program submitted during the year.



BUSHFIRE CRC GRADUATING STUDENTS: ANDREW EDWARDS OF CHARLES DARWIN UNIVERSITY, AND PHIL ZYLSTRA, UNIVERSITY OF NSW (ADFA) WITH DEPUTY CEO DR RICHARD THORNTON AND RESEARCH MANAGER LYNDSEY WRIGHT.

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 Sydney, 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 to attend an induction workshop that provided an overview of the industry, an all-day communications skills workshop or a workshop on intellectual property considerations for researchers.

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.
- Master of Planning, University of Tasmania
- 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

The Bushfire CRC is not a registered training organisation (RTO), although most of its 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.

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)

Research findings are being progressively incorporated into existing units and training resource kits. There is also a strategic commitment, based on an expressed desire from the 37 AFAC member agencies, to embed research findings into organisation learning and resources. This includes the National Fire Behaviour Analysts course, which has substantial Bushfire CRC research content.



OTHER ACTIVITIES

New work outside of the Commonwealth Agreement during the year included:

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



PERFORMANCE REVIEW APRIL 2012

REVIEW PANEL RECOMMENDATIONS AND BUSHFIRE CRC PROGRESS ON IMPLEMENTATION

Recommendation 1: The panel recommends the Bushfire CRC widen its stakeholder base to reflect its future plans and proposed scope and to assist in the diffusion and take up of outputs to the broader community (including; insurance groups, local government, other emergency services, and utilities)

Implemented - Part

Reason why not implemented/Strategies to implement

The Bushfire CRC agrees with the Panel that many other organisations have an interest in the work of the CRC. In the period since the review the management has made efforts to attract new partners such as water utilities, park agencies and local government associations. Further explorations will be an integral part of the development of the proposed institute.

Timelines for implementation

The Bushfire CRC has broadened its community consultation through the introduction of the Public Benefit Conservation Series, where community leaders contribute to an open discussion on the community's expectations. This series, which begins in October 2012, will help to shape the future research agenda.

As the proposal for an institute develops, the Bushfire CRC is approaching a number of interested parties from broad spectrum including local government, insurance and utilities. Appropriate parties will be included in the consortium as essential partners. It is not anticipated that any new partners will be signed up during the remaining life of the Bushfire CRC but will start to be involved in a more informal manner or through contract research.

Expected completion - December 2013.

Recommendation 2: The panel recommends the Bushfire CRC explore and implement additional metrics to track research quality and use at a program level using both leading and lagging indicators.

Implemented - Part

Reason why not implemented/Strategies to implement

The Bushfire CRC agrees that measuring its research quality is vital as it transitions to an institute. The question of quality indicators is a debated topic amongst many research organisations. The Bushfire CRC management has begun discussions at the Board Committee level with its Principal Scientific Advisors to determine which are the most appropriate. The Bushfire CRC will continue this engagement with research organisations.

Timelines for implementation

The current initiative by the Group of Eight and ATN Universities to measure impact is being monitored and the release of the findings of a pilot project in December 2012 is eagerly anticipated and will be considered in the measurement of Bushfire CRC impacts. This issue will be a standard item on the agenda of the Research and Education Committee of the Board. These Board committee meetings are held six monthly. Lagging indicators are widely used in the form of tracking publications in quality journals. The exploration of leading indicators has started through discussion with various partner universities. The Bushfire CRC particularly notes the recent publication in Nature entitled 'Predicting Scientific Success' and is watching the developments carefully.

Expected completion - October 2013.

Recommendation 3: The panel recommends the Bushfire CRC improve its research data management systems to facilitate secondary analysis of data collected by CRC participants.

Implemented - Part

Reason why not implemented/Strategies to implement

The Bushfire CRC desires to see improved research data capture and management for future analysis and agrees with the Panel. In this regard the Bushfire CRC has held discussions with the various research partners and has attempted to capture as much of the research data as it can during its life to date. The use of much of the social science data is restricted in the ability to freely share, owing to the ethics requirements. The Bushfire CRC has managed to work with a number of university ethics committees to arrange for limited sharing of data.

It is clear that additional funding is required if the data management is to be properly addressed over the long term. Conscious of the funding need, the Bushfire CRC has had preliminary discussions with Australian National Data Service and has also put in an application in conjunction with AFAC to the Attorney General's Department to undertake the planning for a national research database program.

Timelines for implementation

It was unfortunate that the proposal submitted by the Bushfire CRC to the Commonwealth's Attorney General's Department for funding to help implement this recommendation was not successful. The Bushfire CRC will now explore other avenues. The Bushfire CRC is in the process of developing data sharing agreements with its partners.

Expected completion - June 2013

Recommendation 4: The panel recommends the Bushfire CRC evaluate the impact and outcomes of the research and to try and identify appropriate metrics to track and measure usage (for all potential impacts).

Implemented - Part

Reason why not implemented/Strategies to implement

The Bushfire CRC Agrees with the need to properly measure the usage and impact of its work and will continue to work with its industry partners to better define the contributions attributable to our work.

Timelines for implementation

The Bushfire CRC has begun a process with AFAC to determine the impact of its research in the industry. This is being monitored by the Research Utilisation Committee of the Board. This will be an ongoing agenda item for this committee which meets immediately after the Research and Education Committee.

Expected completion - July 2013

Recommendation 5: The panel recommends the Bushfire CRC explore metrics to track and measure impact to evaluate success / uptake of research outputs (including web based tools) to evidence change - fire policy, operation processes, industry standards, and social awareness.

Implemented - Part

Reason why not implemented/Strategies to implement

The Bushfire CRC agrees with the need to properly measure the usage and impact of its work and will continue to work with its industry partners to better define the contributions attributable to our work.

Timelines for implementation

The Bushfire CRC has begun a process with AFAC to determine the impact of its research in the industry. This is being monitored by the Research Utilisation Committee of the Board. This will be an ongoing agenda item for this committee which meets immediately after the Research and Education Committee.

Expected completion - October 2013.

Recommendation 6: The panel recommends the CRC revise the impact tool in consultation with stakeholders (end users) and the department to reflect more realistic estimates of impact and for the benefit of the CRC post CRC program funding.

Implemented - Part

Reason why not implemented/Strategies to implement

The Bushfire CRC will revise its economic modelling in the development of the business plan for the proposed institute and work further with the department and its industry and research partners.

Timelines for implementation

The Bushfire CRC is in the process of re-evaluating the impact tool. However, this will be influenced by the outputs from recommendation four and five.

Expected completion - June 2013.

Recommendation 7: The panel recommends the CRC explore and implement a formal system to evaluate the quality of its Research Education program.

Implemented - Part

Reason why not implemented/Strategies to implement

The Bushfire CRC notes the comments in the report regarding the evaluation of the quality of postgraduate students and that some universities have implemented steps in this direction. The Bushfire CRC is exploring these options with university partners.

Timelines for implementation

Following the responses from the universities the Bushfire CRC will provide an updated draft framework on how to achieve this to the next Research and Education Committee of the Board to implement in 2013.

Expected completion - June 2013.

Recommendation 8: The panel recommends the Bushfire CRC introduce more regular professional development courses (not just annual training workshops via the annual conference).

Implemented - Part

Reason why not implemented/Strategies to implement

This process has begun to have more regular professional development courses for the Bushfire CRC students. This will continue to be improved and incorporated into planning for the proposed institute.

Timelines for implementation

The Bushfire CRC has changed its professional development approach in recent months to a focus on targeted professional development opportunities. For the students, this has included sessions on presentation and media skills and the inclusion in industry professional development activities. The CRC will develop a more complete professional development program under its institute model.

Expected completion - June 2014

Recommendation 9: The panel recommends the Bushfire CRC explore options to track and survey the impacts of the CRC through alumni both inside and outside the existing set of end user agencies, industries, and SMEs, to explore the impact of its education program, research activity and its knowledge diffusion into the community.

Implemented - Part

Reason why not implemented/Strategies to implement

The Bushfire CRC agrees with the Panel and is proceeding to establish a formal Alumni program; however prioritisation of work has meant this has only just begun. The CRC has established a presence on both Facebook and LinkedIn which is facilitating connection of past researchers. This work will continue.

Timelines for implementation

The Bushfire CRC has become much more active in the use of LinkedIn and Facebook to keep in touch with its alumni. This will continue. And a more formal scheme for past students and researchers will be developed during this financial year.
Expected completion - June 2013.

Recommendation 10: The panel recommends the CRC expand its work on web material and social media to improve diffusion of information, knowledge, and research (web engines / social media, web content).

Implemented - Part

Reason why not implemented/Strategies to implement

The Bushfire CRC has sought external expert advice from industry leaders in the not-for-profit sector on social media tools to enhance the diffusion of research outputs to the wider community. The Bushfire CRC engaged an additional communications officer with high level skills in social media in early 2012.

Timelines for implementation

This expansion is ongoing. The Bushfire CRC will continue its efforts to increase its diffusion through media that is appropriate to the messages being considered and the audience that is being targeted. This is helping in the continued development of such online strategies. As the communications industry develops new media tools the Bushfire CRC will assess and implement those expected to increase the research impact.
Expected completion - October 2013.

GLOSSARY OF TERMS

AFAC	Australasian Fire and Emergency Service Authorities Council
AIIMS	Australasian Inter-Service Incident Management System
ANU	Australian National University
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
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
RMIT	RMIT University
TFS	Tasmania Fire Service
UWA	University of Western Australia

Appendix A - Publications

Publication Title	Type	Journal / Event	Authors
Bushfires and Biodiversity in southern Australian forests	Book	Flammable Australia (Eds. Bradstock RA, Gill AM, Williams RJ)	A.M. Gill
Socially Disastrous Landscape Fires in South-eastern Australia: Impacts, Responses, Implications	Book	Wildfire and Community: Facilitating preparedness and resilience' Springfield	A.M. Gill, Geoff Cary
Burning Issues	Book	CSIRO Publishing / Bushfire CRC	Adams, M; Attiwill, P.
The Social Dimensions of Forest Fire: Identifying contributors to sustainable, integrated management	Book	A Dimensao Humana dos Incendios Florestais. Estrategias Criativas: Porto, Portugal	Douglas Paton, F. Tedim
Community engagement and wildfire preparedness: The influence of community diversity	Book	Book: Wildfire and community: Facilitating preparedness and resilience	Douglas Paton, Petra Buergelt
Socially Disastrous Landscape Fires in South-eastern Australia: Impacts, Responses, Implications	Book Chapter	Wildfire and Community: Facilitating preparedness and resilience' Springfield	A.M. Gill, Geoff Cary
Socially Disastrous Landscape fires in south-eastern Australia: Impacts, Responses, Implications	Book Chapter	Book chapter	Geoff Cary, Malcolm Gill
Bushfires and Biodiversity in southern Australian forests	Book Chapter	Book Chapter (Chpt 11)	Gill, M.
Near-misses and mistakes in risky work: An exploration of work practices in high-3 environments	Book Chapter	Risky Work Environments: Reappraising Human Work within Fallible Systems (Chpt 8)	Christine Owen

Conclusion: Towards developmental work within complex and fallible systems	Book Chapter	Risky Work Environments: Reappraising Human Work within Fallible Systems (Chpt 9)	Christine Owen
Accomplishing Reliability within Fallible Systems	Book Chapter	Risky Work Environments: Reappraising Human Work within Fallible Systems (Part 2: Intro)	Christine Owen
Risky Work Environments: Reappraising Human Work within Fallible Systems	Book Chapter	Risky Work Environments: Reappraising Human Work within Fallible Systems (Edited Book)	Christine Owen, Ger Wackers, Pascal Beguin
Shifting the focus to human work within complex socio-technical systems	Book Chapter	Risky work environments: Reappraising human work within fallible systems (Intro)	Christine Owen, Ger Wackers, Pascal Beguin
Flammable Australia	Book Chapter	Global Change and fire regimes in Australia	Cary, G.J.; Bradstock, R.A.; Gill, A.M.; Williams, R.J.
Flammable Australia	Book Chapter	Fuel, fire weather and fire behaviour in Australian ecosystems	Sullivan, A.L.; McCaw, W.L.; Cruz, M.G.; Matthews, S.; Ellis, P.F.
Flammable Australia	Book Chapter	Fire Regimes and soil-based ecological processes: implications for biodiversity	York, A.; Bell, T.L.; Weston, C.J.
Nurturing Community Wildfire Preparedness from the ground up: Evaluating a community engagement initiative	Book Chapter	Wildfire and Community: Facilitating preparedness and resilience	Damien Killalea, Douglas Paton, Frandsen, M., Sakariassen, K.
Burning Issues	Book Chapters x 9	CSIRO Publishing / Bushfire CRC	Adams, M; Attiwill, P.
The February 2011 fires in Roleystone, Kelmscott and Redhill	Bushfire CRC Report	Report	Claire Nulson, Jon Heath, Patrick Clark, Patrick Dunlop, Petra Buergelt
Discussion Paper 1 - The Question of "Community": International debates and implications for bushfire research and policy in Australia	Bushfire CRC Report	Discussion Paper	Bernard Mees, Keith Toh, Meagan Tyler, Peter Fairbrother, Richard Phillips, Susan Chaplin

Discussion Paper 2 - Gender Matters: Applying a gendered analysis to bushfire research in Australia	Bushfire CRC Report	Discussion Paper	Bernard Mees, Meagan Tyler, Peter Fairbrother, Richard Phillips, Susan Chaplin, Toh, Keith
2011: Lake Clifton Fire 10 January 2011: Field Interview Task Force Report - Community Bushfire Safety	Bushfire CRC Report	Field Interview Task Force Report - Community Bushfire Safety	Dunlop, P., Glenn Elliott, Jim McLennan, Kelly, L.
Checklist items for researchers: Householder preparations for bushfires	Bushfire CRC Report	Report No 1	Glenn Elliott, Jim McLennan
2009 Victorian Bushfires Research Response Taskforce Interviews: Analyses of the complete set of transcripts - Preliminary Report	Bushfire CRC Report	Report	Glenn Elliott, Jim McLennan
Breakdowns in Team Decision Making in the Coordination of large-scale Bushfires in Australia (Final Report)	Bushfire CRC Report	Final Report prepared for the Bushfire CRC	Chris Bearman, Grunwald, J.
Breakdown in coordinated decision making in teams fighting large-scale bushfires in Australia	Bushfire CRC Report	Bushfire CRC Project: Organizing for Effective Incident Management	Chris Bearman, Grunwald, J.
Breakdown in Coordinated Decision Making in teams fighting large-scale Bushfires in Australia	Bushfire CRC Report	(Preliminary Report Prepared for the Bushfire CRC)	Chris Bearman, Grunwald, J.
Establishment Report	Bushfire CRC Report		Chris Weston
Discussion paper on carbon losses from forests	Bushfire CRC Report		Chris Weston, Liubov Volkova
Literature Review	Bushfire CRC Report	Literature Review	Alexandra Barlow, Tarryn Turnbull
Development of set of Social and Community Indicators of Bushfire Resilience and Vulnerability that can be used to assist community assessment and planning for the design and delivery of community.	Bushfire CRC Report		Douglas Paton

Characterising Interface Fuels - Literature Review	Bushfire CRC Report	Bushfire CRC	Anders Siggins, Darius Culvenor, Glenn Newnham, Justin Leonard, Raphaele Blanchi
Methods to Characterise and Map Interface Fuels using RSD	Bushfire CRC Report	Bushfire CRC document	Anders Siggins, Glenn Newnham, Justin Leonard, Kimberly Opie, Raphaele Blanchi
Vulnerability Model Parameters - Literature Review	Bushfire CRC Report	Bushfire CRC document	Darius Culvenor, Glenn Newnham, Kimberly Opie, Raphaele Blanchi
A case study on the 2007 Kangaroo Island bushfires	Bushfire CRC Report	CAWCR Technical Report	Marika Peace, Graham Mills
Governments and Emergency response	Bushfire CRC Report	Draft review of research theme 3 circulated to nominated researchers and delivered to Bushfire CRC	Michael Eburn, Stephen Dovers
What's Possible? What's Feasible?	Bushfire CRC Report	Discussion paper	Michael Eburn, Stephen Dovers
Curriculum development activities	Bushfire CRC Report	Not applicable	Michael Eburn, Stephen Dovers
Stage 3 - Policy Review Draft report of the Sharing Responsibility Project	Bushfire CRC Report	Report	Blythe McLennan, John Handmer
Community level influence on individual behaviours: Bushfire Readiness & decision making	Full papers for Conference	AFAC 2011	Carmen Lawrence, David Morrison, Petra Buergelt
Against the Commodification of Method: Fighting Fire with the Details of Design	Full papers for Conference	Conference on Human Factors in Computing Systems (CHI)	Yoko Akama
Bushfire survival-related decision making: What the stress and performance research literature tells us (published)	Full papers for Conference	Bushfire CRC / AFAC 2011 Conference Science Day	McLennan, J., Elliott, G., Omodei, M., McNeill, I., Dunlop, P.D., Suss, J.,
Capturing community members' bushfire experiences: The Lake Clifton (WA) fire.	Full papers for Conference	In Proceedings of the AFAC/Bushfire CRC Conference Science Day - R. Thornton (Ed)	Fairbrother, P., Glenn Elliott, Jim McLennan, Kelly, L., Patrick Dunlop, Riseborough, K., Tyler, M.

Bushfire survival-related decision making: What the stress and performance research literature tells us	Full papers for Conference	AFAC / Bushfire CRC Conference Science Day	Glenn Elliott, Illy McNeill, Jim McLennan, Mary Omodei, Patrick Dunlop, Suss, J
What does economics have to offer bushfire management & policy decision-makers?	Full papers for Conference	56th Australian Agricultural and Resource Economics Society Conference	Geoff Cary, Helena Clayton, Stephen Dovers
Organizing for effective incident management.	Full papers for Conference	Bushfire CRC / AFAC Conference 2011 Sydney	Ben Brooks, Chris Bearman, Christine Owen
Team decision making breakdowns in the Wangary and Kilmore East fires.	Full papers for Conference	Bushfire CRC / AFAC Conference 2011 Sydney	Chris Bearman, Grunwald, J.
Social Networks Perspective of Firefighters' Adaptive Behaviour and Coordination among them	Full papers for Conference	SocialNet 2010 : The IEEE International Symposium on Social Computing and Networking	Alireza Abbasi, Christine Owen, Jafar Hamra, Liaquat Hossain
The Influence of Social Networks on Learning in Disasters	Full papers for Conference	12th Annual Global Information Technology Management Association World Conference (GITMA 2011)	Alireza Abbasi, Christine Owen, Jafar Hamra, Liaquat Hossain
The changing nature of emergency services multi-agency coordination	Full papers for Conference	AFAC 2011	Christine Owen
Information flow and teamwork in incident control centers	Full papers for Conference	5th International ISCRAM conference, 4-7 May 2008, Washington	Christine Owen, Greg Hickey, Jan Douglas
Hillslope erosion and post-fire sediment trapping at Mount Bold, South Australia	Full papers for Conference	Wildfire and Water Quality: Processes, Impacts and Challenges Conference, Banff, Alberta, Canada 11-15 June 2012	Dragovich, D., Morris. R., Ostendorf, B.
A stochastic coverage model for erosion events caused by the intersection of burnt forest and convective thunderstorms	Full papers for Conference	MODISM11 Proceedings, Perth 2011	Gary Sheridan, Owen Jones, Petter Nyman
Frequency of post-fire debris flows under different fire regimes and changing rainfall patterns.	Full papers for Conference	Bushfire CRC / AFAC Conference	Gary Sheridan, Patrick Lane, Petter Nyman
Designing valid and relevant training and testing scenarios for industry	Full papers for Conference	AFAC / Bushfire CRC Conference Sydney	Brad Aisbett, C. Lord, K. Onus, M. Sprajcer, SM Jay, Sally Ferguson
Prescribed fluid consumption and its effects on the physiology and work behaviour of Australian bushfire fighters	Full papers for Conference	AFAC / Bushfire CRC Conference, Sydney 2011	J. Raines; R. Snow; A. Petersen, J. Harvey; K. Onus, S. Jefferies; D. Nichols; B. Aisbett

The frequency, intensity, speed and duration of tasks performed by Australian rural firefighters during bushfire suppression	Full papers for Conference	AFAC / Bushfire CRC Conference Sydney	M. Phillips; K. Netto; W. Payne; D. Nichols; C. Lord;; N. Brooksbank, K. Onus, S. Jefferies; B. Aisbett
Emissions from fires at the rural--urban interface	Full papers for Conference	AFAC / Bushfire CRC Conference Sydney	Fabienne Reisen, Michael Borgas
Facilitating community readiness for forest fire: Lessons from Portugal and Australia.	Full papers for Conference	Seminario Revisitar 25 Anos de Historia Na Serra Do Marao: Memorias e Desafios 7-8 Jan 2011 Portugal	Douglas Paton
Defining, Identifying and assessing the characteristics of a resilient community.	Full papers for Conference	Enhancing Sustained Resilience to Natural Risks: The imperative of changing the paradigm conference. Portugal	Douglas Paton
Effective Risk Management: The importance of community engagement, empowerment and community development.	Full papers for Conference	Enhancing Sustained Resilience to Natural Risks: The imperative of changing the paradigm conference	Douglas Paton
Assessing Potential House Loss Using Phoenix RapidFire	Full papers for Conference	AFAC/BCRC Annual Conference 2011	Derek Chong, Kevin Tolhurst
Volunteers and Litigation	Full papers for Conference	Bushfire CRC / AFAC Annual Conference	Michael Eburn
Sharing responsibility with governments and their agencies.	Full papers for Conference	3rd Human Dimensions of Wildland Fire	Michael Eburn, Stephen Dovers
Ecological and social 'place' mapping to assist bushfire management and research	Full papers for Conference	3rd Human Dimensions of Wildland Fire	Karen Reid, Ruth Beilin
The development of an automated algorithm to map fire severity from satellite imagery: tropical savannas northern Australia	Full papers for Conference	Bushfire CRC / AFAC 2011 Conference Science Day	Edwards, A.C.
The dirt on assessing post-fire erosion in the Mount Lofty Ranges: comparing methods	Full papers for Conference	Bushfire CRC / AFAC 2011 Conference Science Day	Morris, R, Buckman, S, Connellp, P. Dragovich, D, Ostendorf, B, Bradstock, R.A.
The effect of prescribed fire severity	Full papers for Conference	Bushfire CRC / AFAC 2011 Conference Science Day	Cawson, J.G., Sheridan, G.J., Smith, H.G., Lane, PNJ.
Integrated decision support model	Full papers for Conference	Bushfire CRC / AFAC 2011 Conference Science Day	Minas, JP, Hearne, JW.
Rethinking the fuel - fire relationship	Full papers for Conference	Bushfire CRC / AFAC 2011 Conference Science Day	Zylstra, P.
Warning Fatigue what is it and why does it matter	Full papers for	Bushfire CRC / AFAC 2011	Mackie, B.

	Conference	Conference Science Day	
The complex network within Bushfire Investigation Strategy	Full papers for Conference	Bushfire CRC / AFAC 2011 Conference Science Day	DeSisto, M.
What applied social psychology theories might contribute to community bushfire safety research after Victoria's Black Saturday.	Journal Paper	Australian Psychologist	Beatson, R., Jim McLennan
Relationship between leaf traits and fire-response strategies in shrub species of a mountainous region of south-eastern Australia	Journal Paper	Annals of Botany	Geoff Cary, L.M. Vivian
Fire behaviour modelling in semi-arid mallee-heath shrublands of southern Australia	Journal Paper	Forest Ecology and Management	Anderson, W.R., Cruz, M.G., Gould, J.S., McCaw, W.L.
Procustes based metrics for spatial validation and calibration of two dimensional perimeter spread models: a case study considering fire	Journal Paper	Journal of Geophysical Research	Derek Chong, Kevin Tolhurst, Peter Taylor, Thomas Duff
Changes to occupational health and safety laws and the impact on volunteers in the emergency services	Journal Paper	Australian Journal of Emergency Management	Michael Eburn
Re-framing shared responsibility for bushfire risk management in Australia after Black Saturday	Journal Paper		Blythe McLennan, John Handmer
Health and Safety Law	Journal Paper	Crisis Response Journal	Eburn, M.
Householder decision-making under imminent wildfire threat: stay and defend or leave?	Journal Paper	International Journal of Wildland Fire	McLennan, J., Elliott, G., Omodei, M.
Changing the rules of the game: mechanisms that shape responsibility sharing from beyond Australian fire and emergency management	Journal Paper	The Australian Journal of Emergency Management	McLennan, B.J., Handmer, J.
Flood risk, insurance and emergency management in Australia.	Journal Paper	The Australian Journal of Emergency Management	Carter, R.
Mainstreaming fire and emergency management across legal and policy sectors	Journal Paper	The Australian Journal of Emergency Management	Eburn, M., Dovers, S.
Muscle activation during the pack hike test and a critical wildfire fighting task	Journal Paper	Applied Ergonomics	Netto, K., Lord, C., Petersen, A., Spelt-Janssen, J., Nichols, D., Aisbett, B.
Predicting fire behaviour in dry eucalypt forest in southern Australia	Journal Paper	Forest Ecology and Management	Cheney, N.P., Gould, J.S., McCaw, L.W., Anderson, W.R.
Anatomy of a catastrophic wildfire: The Black Saturday Kilmore East fire in Victoria, Australia	Journal Paper	Fire Ecology and Management	Cruz, M.G., Sullivan, A., Gould, J.S., Sims, N.C., Bannister, A.J., Hollis, J.J., Hurley, R.J.
Exploiting three dimensional vegetation structure to map wildland extent	Journal Paper	Remote Sensing of Environment Journal	Newnham, G.J., Siggins, A.S., Bianchi, R., Culvenor, D.S., Leonard, J.E., Mashford, J.S.

Changes in behaviour of fire in dry eucalypt forests as fuel increases with age	Journal Paper	Forest Ecology and Management	McCaw, L.W., Gould, J.S., Cheney, P.N., Ellis, P., Anderson, W.R.
Differences in water use between mature and post-fire regrowth stands of subalpine Eucalyptus delegatensis R. Baker	Journal Paper	Forest Ecology and Management	Buckley, T.N., Turnbull, T.L., Pfautsch, S., Gharun, M., Adams, M.A.
Understanding the regeneration niche: Microsite attributes and recruitment of eucalypts in dry forests	Journal Paper	Forest Ecology and Management	Bailey, T.G., Davidson, N.J., Close, D.C.
Identification of physically demanding tasks performed during bushfire suppression by Australian rural firefighters	Journal Paper	Applied Ergonomics	Phillips, M., Payne, W., Lord, C., Netto, K., Nichols, D., Aisbett, B.
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., Wolkow, A., Sprajcer, M., Ferguson, S.A.
Field evaluation of two image-based wildland fire detection systems	Journal Paper	Fire Safety Journal	Matthews, S., Sullivan, A., Gould, J.S. Hurley, R.J., Ellis, P., Larmour, J.
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.
Vulnerability to bushfires in rural Australia: A case study from East Gippsland, Victoria	Journal Paper	Journal of Rural Studies	Whittaker, J., Handmer, J., Mercer, D.
Atmospheric and fuel moisture characteristics associated with lightning-attributed fires.	Journal Paper	Journal of Applied Meteorology and Climatology	Dowdy, A.J., Mills, G.A.
Simple models for stomatal conductance derived from a process model: cross-validation against sap flux data	Journal Paper	Plant, Cell & Environment	Buckley, T.N., Turnbull, T.L., Adams, M.A.
Responding to bushfire risk: the need for transormative adaptation	Journal Paper	Environmental Research Letters	O'Neill, S.J., Handmer, J.
Characteristics of lightning-attributed wildland fires in south-east Australia	Journal Paper	Journal of Wildland Fire	Dowdy, A.J., Mills, G.A.
The relationship between fire behaviour measures and community loss: an exploratory analysis for developing a bushfire severity scale	Journal Paper	Natural Scholar	Harris, S., Anderson, W.R., Kilinc, M., Fogarty, L.
Legal edition of the Australian Journal of Emergency Management in context	Journal Paper	Australian Journal of Emergency Management	Thornton, R.P.
Wildfires in Australia	Journal Paper	Crisis Response Journal	Thornton, R.P.
Behind the flaming zone: Predicting woody fuel consumption in eucalypt forest fires in southern Australia	Journal Paper	Forest Ecology and Management	Hollis, J.J., Matthews, S., Anderson, W.R., Cruz, M.G., Burrows N.D.
Relative greenness Index for assessing curing of grassland fuel	Journal Paper	Remote Sensing of Environment Journal	Newnham, G.J. Verbesselt, J., Grant, I.F., Anderson, S.A.J.

Preventing and reducing bushfire arson in Australia: A review of what is known	Journal Paper	Fire Technology	Beale, J., Jones, W.
Fungi and fire in Australian ecosystems: a review of current knowledge, management implications and future directions	Journal Paper	Australian Journal of Botany	McMullan-Fisher, S.J.M., May, T.W., Robinson, R., Bell, T., Lebel, T., Catcheside, P., York, A.
Prescribed burning: how can it work to conserve the things we value?	Journal Paper	International Journal of Wildland Fire	Penman, T.D., Christie, F.J., Andersen, A.N., Bradstock, R.A., Cary, G.J. Henderson, M.K., Price, O.F., Tran, C., Wardle, G.M., Williams, R.J.
A simple method for field-based grassland curing assessment	Journal Paper	International Journal of Wildland Fire	Anderson, S.A.J., Anderson, W.R., Hollis, J.J. Botha, E.J.
Neighbourhood rules make or break spatial scale invariance in a classic model of contagious disturbance	Journal Paper	Ecological Complexity	Boer, M.M. Johnston, P., Sadler, R.J.
Ecosystem respiration in a seasonally snow-covered subalpine Grassland	Journal Paper	Arctic, Antarctic and Alpine Research	Warren, C.R., Taranto, M.T.
Does low intensity surface fire increase water -and- nutrient-availability to overstorey Eucalyptus gomphocephala?	Journal Paper	Plant and Soil	Close, D.C., Davidson, N.J. Swanborough, P.W., Corkrey, R.
The effect of aerial suppression on the containment time of Australian wildfires estimated by fire management personnel	Journal Paper	International Journal of Wildland Fire	Plucinski, M.P. McCarthy, G.J., Hollis, J.J., Gould, J.S.
The effect of fireline intensity on woody fuel consumption in Southern Australian Eucalypt Forest Fires	Journal Paper	Australian Forestry	Hollis, J.J., Anderson, W.R., McCaw, L.W., Cruz, M.G., Burrows, N.D., Ward, B., Tolhurst, K.G., Gould, J.S.
A review of operations research methods applicable to wildfire management	Journal Paper	International Journal of Wildland Fire	Minas, J.P., Hearne, J.W., Handmer, J.
Wind-terrain effects on the propagation of wildfires in rugged terrain: fire channelling	Journal Paper	International Journal of Wildland Fire	Sharples, J.J., McRae, R.H.D., Wilkes, S.R.

APPENDIX B

RESEARCH UTILISATION PUBLICATIONS 2011-2012

Fire Notes - research briefs for industry

Fire Severity Mapping: Mapping the Effects of Fire on Savanna Vegetation in Northern Australia from Satellite Imagery	Issue 92 - May 2012
Householders' Survival Decisions Under Imminent Bushfire Threat - 2011 Lake Clifton (WA) Fire: A joint FESA-Bushfire CRC Field Research study	Issue 91 - May 2012
Erosion Risk to Water Resources in Fire and Rainfall Regimes	Issue 90 - February 2012
Children's Knowledge of Bushfire Hazards	Issue 89 - January 2012
Defining Community: Debates & Implications for Bushfire Policy	Issue 88 - October 2011
Checklist Items for researchers	Issue 87 - October 2011
Southern Australia Seasonal Bushfire Outlook 2011 - 12	Issue 86 - August 2011
Northern Australia Seasonal Bushfire Outlook 2011	Issue 85 - August 2011
Predicting Fire From Dry Lightning	Issue 84 - August 2011
Identifying Smoke Impacts from Bushfires Extending into the Rural -Urban Interface	Issue 83 - July 2011

Appendix C - Research Utilisation Events Summary

Knowledge/Professional Development Events 2011-12

Event Topic	Details	Event Type	Location	Presenter(s)	Partner(s)	Date	Participants
Seasonal Bushfire Outlooks	Development of regional fire season outlook annually	Workshops	Adelaide	Regional fire managers, AFAC RLM facilitator, BCRC Research Director	AFAC RLM	August	23
Human Factors	Introduction to Human Factors concepts - Individuals (part 1) and Teams (Part 2)	Workshop	Vic	Mary Omodei, Christine Owen	Vic agencies	September	18
Human Factors	Introduction to Human Factors concepts - Individuals (part 1) and Teams (Part 2)	Workshop	NZ	Mary Omodei, Christine Owen	New Zealand agencies	October	30
Human Factors	Introduction to Human Factors concepts - Individuals (part 1) and Teams (Part 2)	Workshop	Qld	Mary Omodei, Christine Owen	Qld agencies	December	10
Computer modelling fire simulation	Presentation and demonstration of application of BCRC research into an operation environment in WA	Forum	Melbourne	George Milne	AFAC RLM, FFMG	November	31
Children's Perception of Bushfire Risk	Implications for developing education programs for children	Seminar	Melbourne	Briony Towers	BCRC	November	15
Black Saturday Fires - Research	Extensive data collection conducted post fires. Need to review this and develop research questions.	Workshop	Melbourne	Alan Rhodes	BCRC	December	15
Extreme fire behaviour; suppression and Situational Awareness	Pyrotron and Wind Tunnel Demo	Demonstration	Canberra	Andrew Sullivan, Peter Ellis	BCRC/CSIRO	October	60
Emergency Management Exercising, Decision Making and Training Efficacy	Seminar and panel discussion attached to AFAC L&D Group, Research utilisation and L&D PD.	Seminar plus panel	Melbourne	Claire Johnson, Peter Hayes, David Guard	AFAC/BCRC	September	45
Economics and future scenarios	Future Scenarios	Workshop	Canberra	Various researchers	BCRC and ANU	December	18
Industry national conference	Annual Conference	Conference	Sydney	Various	AFAC and Bushfire CRC	August	1430

Induction	Introduction to the fire and emergency management industry for new CRC researchers	Forum	Sydney	Experienced industry personnel	AFAC	August	41
Intellectual Property	Exploring how IP considerations apply to the work of researchers	Workshop	Sydney	Various	AFAC	August	12
Media	Media training for new researchers	Clinic	Sydney	Econnect	AFAC	August	20
Visions of Sharing Responsibility for Disaster Resilience	One-day workshop to examine the idea and practice of sharing responsibility for disaster resilience.	Workshop	Melbourne	Various	BCRC, RMIT	March	90
Fire in the Landscape	Fuel reduction burning and forest carbon storage - Laboratory demonstration	Clinic	Sydney	Project researchers	BCRC/Uni Syd	February	15
Fire in the Landscape	Quantifying water quality risks following wildfire - End User demonstration	Clinic and field trip	Beechworth	Project researchers	BCRC	March	13
Occupational health and safety and surge capacity	Keeping cool is more than a mind game	Workshop	Darwin	Brad Aisbett	NT & BCRC	April	25
Human dimensions	Human Dimensions of Wildland Fire Conference	Conference	Seattle	Researchers and end users	Bushfire CRC and agencies	April	175
Bushfire Researchers Network	Community Adaption to Bushfire Risk & Community Engagement	Workshop / Seminar	Melbourne	Susan Chaplin & Damian Killalea	BCRC/RMIT	April	30
Bushfire Researchers Network	The 'Communication Grid' and its relevance for Bushfire Research	Workshop / Seminar	Melbourne	Keith Toh	BCRC/RMIT	February	20
Bushfire Researchers Network	Results of the La Trobe University Community Bushfire Intentions Survey	Workshop / Seminar	Melbourne	Glenn Elliot	BCRC/RMIT	May	10
The Science and Art of Fire Danger Rating	A historical perspective from an international leader in this field for over 40 years	Seminar	Sydney	Marty Alexander	BCRC, AFAC, NSW RFS, Uni Syd.	June	42
Northern Australian Fire Managers Group	Annual BCRC hosted gathering of fire managers in northern Australia - information sharing	Workshop/meeting	Townsville	Research Director	BCRC/agencies	June	33
Bushfire Researchers Network	Results of WA longitudinal field study	Workshop / Seminar	Melbourne	Illy McNeil; Patrick Dunlop	BCRC/RMIT	June	10
Community and Community Engagement in Public Policy	Public Policy	Workshop	Melbourne		BCRC/RMIT	June	30
Human Factors	Introduction to Human Factors concepts - Individuals (part 1) and Teams (Part 2)	Workshop	Hobart	Mary Omodei, Christine Owen	Relevant Agency	May	56
Human Factors	Introduction to Human Factors concepts - Individuals (part 1) and Teams (Part 2)	Workshop	Perth	Mary Omodei, Christine	Relevant Agency	June	81

				Owen			
Human Factors	Introduction to Human Factors concepts - Individuals (part 1) and Teams (Part 2)	Workshop	Adelaide	Mary Omodei, Christine Owen	SA agencies	June	44
Seasonal Outlook - Northern Aust	Nth Australia regional fire season outlook	Workshop	Townsville	Regional fire manager, AFAC RLM facilitator, Research Director	AFAC RLM, QFRS	June	31
Bushfires and Community Safety Position Workshop	Community safety	Workshop	Melbourne		BCRC	March	19
Developing Consistent Safety Messages for National Curriculum Adoption	Educators Forum	Forum	Perth	Briony Towers, Rick Cummings, Kevin Ronan	BCRC & FESA	April	22
TOTAL EVENTS							32
TOTAL PARTICIPANTS							2544