



# **BUSHFIRE CRC ANNUAL REPORT 2010-2011**

## **OUR MISSION**

**The Bushfire CRC's mission – to enhance the management of the bushfire risk to the community in an economically and ecologically sustainable manner.**

**It includes the following objectives:**

- **To develop an internationally renowned centre of excellence to lead bushfire research in Australia.**
- **To provide a research framework that will improve the effectiveness of bushfire management agencies.**
- **To increase the self-sufficiency of communities in managing the risks from bushfires.**

## INDEX

### INDEX

<b>EXECUTIVE SUMMARY</b>	<b>3</b>
ACHIEVEMENTS AND ACTIVITIES FOR THE REPORTING PERIOD	3
RISKS AND IMPEDIMENTS	7
END USER ENVIRONMENT	8
<b>GOVERNANCE AND MANAGEMENT</b>	<b>11</b>
FINANCIAL MANAGEMENT	11
GOVERNING BOARD MEMBERS, COMMITTEE MEMBERS	12
KEY STAFF	13
PRINCIPAL SCIENTIFIC ADVISERS	13
RESEARCH PROGRAMS	13
PARTICIPANTS	14
INTELLECTUAL PROPERTY MANAGEMENT	15
<b>RESEARCH PROGRAMS</b>	<b>16</b>
KEY RESEARCH ACHIEVEMENTS	16
THE RESEARCH PROGRAMS	18
<b>RESEARCH UTILISATION</b>	<b>19</b>
<b>RESEARCH COLLABORATIONS</b>	<b>24</b>
<b>COMMUNICATIONS STRATEGY</b>	<b>25</b>
<b>EDUCATION AND TRAINING</b>	<b>33</b>
<b>OTHER ACTIVITIES</b>	<b>35</b>
<b>APPENDIX A</b>	<b>36</b>
ACADEMIC PUBLICATIONS	36
<b>APPENDIX B</b>	<b>37</b>
RESEARCH UTILISATION PUBLICATIONS 2010-2011	37
<b>APPENDIX C</b>	<b>38</b>
EVENTS	38
<b>GLOSSARY OF TERMS</b>	<b>40</b>



## EXECUTIVE SUMMARY

### ACHIEVEMENTS AND ACTIVITIES FOR THE REPORTING PERIOD

#### RESEARCH EXTENSION BEGINS

The Bushfire CRC Governing Board set the following imperatives for the year in the *Bushfire CRC Extension Strategic Directions 2010-2013*. The excellent progress on these imperatives is outlined throughout this report.

2010-2011 IMPERATIVES	KEY MEASURE
Signing of all agreements and contracts.	100% of agreements signed.
Establishing the three year research program to deliver effectively.	Contracts established for all research projects. Process established to maintain all projects.
Continuing research utilisation of the research program outputs.	Implementation of Research Utilisation Plan addressing the research program.
Incorporating the expected outputs of the extension three-year program into research utilisation activities.	Research utilisation milestones included in all contracts.
Ensuring all new and existing stakeholders are committed to the research program and the implementation of its research outputs.	Representation of 100% of stakeholder partners at Research Advisory Forum, Stakeholder Council or Annual Conference.

The Bushfire CRC Extension commenced with the signature on the Commonwealth agreement on 14 July 2010. Subsequently, the Participants' Agreement was signed on the 27 September 2010. This then enabled the finalisation of the many individual project level researcher appointments and student contracts, although much preparatory work had already been done before this point.

Progress in the start-up phase has been impressive over the 2010-2011 reporting period, the first full year of the Extension program. A number of high quality research journal articles have already been submitted and many presentations on the work have been given, as outlined elsewhere in this report.

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 Bushfire CRC end-users and researchers to get a broad understanding on the progress and directions of the work as well as providing feedback on quality and relevance.

All projects have a Lead End User from a partner organisation. The person is tasked with ensuring that the detailed research directions include input from the end-user cohort. This person also assists in providing access to agencies and ensures that the research utilisation and community outreach is considered at an early stage.

Many of the projects have also presented to the various group meetings of the Australasian Fire and Emergency Service Authorities Council (AFAC) and also at our annual conference, which last year attracted almost 1000 people to Darwin.

Research output after seven years of the previous CRC now totals 925 publications. All reports, journal articles, presentations and posters are online at [www.bushfirecrc.com](http://www.bushfirecrc.com) and most also appear on the AFAC Knowledge Web, a product of the Bushfire CRC now managed by the industry.



Chairman Len Foster AO at the annual conference.

## EXECUTIVE SUMMARY

### High level achievements for 2010-2011 include:

#### Fire forecast

The Bushfire CRC again coordinated the southern and northern seasonal bushfire assessment workshops in collaboration with its partners. In a first, the Bushfire CRC in association with New Zealand agencies also organised a New Zealand Seasonal Wildfire Assessment Workshop, in Christchurch in December 2010. The outputs of these workshops provide 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.

#### Western Australia fires

Although it was a comparatively quiet fire season in the south-east, Western Australia had some severe fires. The Bushfire CRC was invited by one of its partners, FESA, to bring its expertise into assessing the impacts of these events. Teams of agency staff from the Tasmania Fire Service and the NSW Rural Fire Service assessed damage to properties, while researchers mostly from the University of Western Australia, but also from La Trobe and RMIT universities of Victoria, interviewed residents in the fire affected areas around Perth. The study builds on work already undertaken nationally after the 2009 Victorian Black Saturday fires to better understand community attitudes to bushfires; how warnings can be delivered more effectively; community understandings about living with bushfire risk; and how these are affected by the stress of imminent fire danger.

#### International wildfire conference

The Bushfire CRC was represented at the Fifth International Wildfire Conference in South Africa in May by a delegation that included several researchers. It was clear from the open discussions on the potential for collaborative research and from the multitude of Bushfire CRC presentations that Australian and New Zealand bushfire science has much to offer to international colleagues in this field.

#### International links – US

The US-Australia Science and Technology Joint Commission Steering Committee met in Washington in mid-February with the US Forest Service and Department of Homeland Security presenting on the issue of potential joint research projects with the Bushfire CRC. The intention is that this will eventually translate into funding for such projects. This effort is an outcome of both the US-Australasia Joint Research Symposium hosted by the Bushfire CRC in June 2010 and our Memorandum of Understanding with the US Forest Service.

#### Bushfire Detection Cameras

Bushfire detection cameras were trialled in Australia in 2010 by the Bushfire CRC. The cameras were placed in strategic positions in the Otway Ranges in Victoria and Tumut in New South Wales. They were evaluated on their performance in detecting fire starts, compared with current methods.

The trial was conducted by the Bushfire CRC, CSIRO, the Federal Attorney-General's Department and Victoria's Office of Emergency Services Commissioner (in conjunction with other Victorian agencies) and NSW Forests. A final report was published by the Attorney General's Department in October and presented at our annual conference in Darwin.







### Annual Conference

The Bushfire CRC held an international conference in Darwin in September. The conference was seen as a major international event attracting 980 delegates, including many international speakers and delegates, and 85 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, five hands-on workshops were provided to assist in the transition of research into agencies responsible for community safety. Researcher led field trips to experimental sites were also well attended.

### Aircraft Report

A Bushfire CRC evaluation of a DC-10 air tanker in Victoria for the 2009-2010 bushfire season was presented at the 2010 annual conference in Darwin in September. The presentation drew a large audience keen to assess the merits of large aircraft for fire suppression under Australian conditions. The day before, the then Victorian Minister for Environment and Climate Change, Mr Gavin Jennings, released the report and issued a media release.

The evaluation was used to consider the type of aircraft contracted for subsequent seasons. Based on our report, it was decided not to contract a DC-10 for the 2010-11 season, instead contracting two Conair Convair CV580s, which were also evaluated by the Bushfire CRC. A former Bushfire CRC Director, Tim Vercoe, was engaged to conduct the trial, which was finalised in the 2011-12 financial year.

### 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 included 20 *Fire Notes* distributed to the industry on subjects including firefighter health and safety, eucalypt decline, incident control systems, community bushfire safety, passenger vehicle burnovers, and fire intervals and biodiversity. In addition, four editions of the Bushfire CRCs *Fire Australia* journal were produced and sent to 6000 research and industry readers to widen the reach of research outputs from the Bushfire CRC.

### Event collaboration

The Bushfire CRC and AFAC formed a strategic knowledge management partnership to support the utilisation of research outputs through to the industry. An aspect of this partnership is the Professional Development Events Program for joint events. This year 29 events were held throughout Australia and New Zealand.



## EXECUTIVE SUMMARY



### RESEARCH ADOPTION

The former Research Adoption Strategy and Plan were revised and completely re-written during 2010 and are now known as the Research Utilisation Strategy 2011-2014 and Research Utilisation Plan 2011-2014.

This Research Utilisation Strategy is the product of extensive consultation with end user stakeholders. The Research Utilisation Plan documents the actions that will be conducted to implement the Research Utilisation Strategy 2011-2014. Implementation has continued to progress through well-developed pathways, ensuring a high level of research uptake.

### EDUCATION

The support for higher degree students is an important part of the Bushfire CRC aim of building capacity and capability in our industry. Although initial applications for scholarships were slow, initiatives such as advertising in national media and targeting of honours students working in the same departments as the Bushfire CRC research teams has proved to be successful in attracting interest from high quality applicants.

After a slow take-up the number of PhD scholarship recipients progressively increased. At the end of the reporting period the Bushfire CRC had committed to supporting 37 students. The first scholarship recipients are on target to completing their studies in mid 2012. More than 50 percent of scholarship recipients are due to submit their thesis by mid 2012.

### COMMUNICATIONS

A new Communications Strategy for the Bushfire CRC to cover the Extension funding period and beyond was developed and passed by the Bushfire CRC Board in April 2011.

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 and the draft *Business Plan for the Australasian Fire Research Institute*.

The Bushfire CRC website was overhauled to take into account the new research program, and include the new researchers and new partner organisations.

The Bushfire CRC maintained a media profile throughout the year across all levels – locally, nationally and internationally. While this was spread over the year, the Bushfire CRC was in particularly high demand when the 2009 Victorian Bushfires Royal Commission released its Final Report in July.

The international Bushfire CRC research conference in Darwin attracted solid media coverage, including national media based at the conference for the duration of the event.





### APPOINTMENTS

As this was the first year of this funding grant, many significant appointments were made across the research program. Key people were identified and approached to take leadership positions in the extension research program. This included key research leaders and key end-user participants. There were no major changes to Bushfire CRC staff in the central office.

### AWARDS

At our annual conference, an award to recognise outstanding endeavour in research was presented. The Bushfire CRC Special Recognition Award was given to Professor John Handmer (pictured top right holding the award, with Gary Morgan CEO of the Bushfire CRC).

Prof Handmer is a Principal Scientific Adviser at the Bushfire CRC and was the Program Leader of the Safe Prevention, Preparation and Suppression program from 2003. He is also the Director of Centre for Risk and Community Safety at RMIT University.

Prof Handmer was a leading researcher and adviser to the Bushfire CRC Research Taskforce immediately after the Black Saturday fires. He led the social science component of the Taskforce that looked into the human behaviour of the community – how people prepared, how they reacted, and how they were dealing with the recovery. During the subsequent Royal Commission, Prof Handmer was an expert witness and was requested by the Royal Commission to conduct several in-depth analyses that directly contributed to the final deliberations.

### RISKS AND IMPEDIMENTS

As highlighted in the First Year visit, the Bushfire CRC had difficulties early in the first year to get suitable PhD students to fill the proposed positions in the Commonwealth Agreement. Since then the Bushfire CRC has embarked on a broad recruitment campaign that included national advertising. This has seen an increase in the first quarter of 2011-12 and it is expected that Bushfire CRC will now come close to meeting the targets set out in the Commonwealth Agreement.

A more general risk is the potential impact of the Extension funding that is limited to three years. This may become a problem as we approach the end of the 2011-12 financial year if no further funding has been identified. If this uncertainty continues beyond the end of this financial year then it may be difficult to retain key researchers for the longer term resulting in a threat to the delivery of the outcomes. Steps are underway to identify 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.



## EXECUTIVE SUMMARY



### END USER ENVIRONMENT

The final report of the 2009 Victorian Bushfires Royal Commission, released at the end of July 2010, contained much discussion on the nature of our research, past, present and future. This continues to have a major impact upon our end-user environment, not only in bushfire but in all emergency management including floods, cyclones and earthquakes.

The Bushfire CRC Research Taskforce data and other Bushfire CRC research was heavily drawn upon for the Commissioners' deliberations – based on a formal Memorandum of Understanding signed early on between the Royal Commission and the Bushfire CRC.

Clearly, without the Bushfire CRC, the Royal Commission would not have had the number and quality of expert witnesses to help provide the background knowledge for the Commissioners to make their findings.

The Royal Commission released a list of future research priorities in fire and emergency management. Much of the original Bushfire CRC research program provides a solid evidence base for this research. The Bushfire CRC Research Taskforce, in particular, provides a wealth of data from Black Saturday on fire behaviour, why some houses burnt and others did not, and on the actions and decisions taken by residents.

The Commissioners commended the Bushfire CRC saying they had: "...benefited from extensive research conducted by the Bushfire Cooperative Research Centre, the Australasian Fire and Emergency Services Authority, and numerous other research bodies."

The Royal Commission recommended a permanent national centre for bushfire research with reasonable surety of long-term funding. (Recommendation 65)

A Bushfire CRC *Fire Update* was distributed to all Bushfire CRC stakeholders summarising the main research implications of the Report.

A Bushfire CRC media release announcing the intention to transition the Bushfire CRC to the Australasian Fire Research Institute was distributed on the day the Royal Commission Final Report was released. This media release was a direct acknowledgement of Recommendation 65.

All Bushfire CRC executive staff attended an AFAC-led forum run by Stuart Ellis, a consultant to the Office of the Royal Commission, on "Conduct, Reporting, Recommendations and Implications of the Victorian Bushfires Royal Commission."

The CEO of the Bushfire CRC Gary Morgan and Director Naomi Brown (as AFAC CEO) attended a roundtable at the former Victorian Emergency Services Minister Bob Cameron's office in August 2010 along with a broad range of representatives from the emergency management sector, to further discuss issues arising from the Final Report of the Royal Commission.



### A CHANGED INDUSTRY CONTEXT

When the original seven year research program drew to a close in early 2010 it was clear that the priorities for our industry had changed in ways unforeseen by the industry at the start of this 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 have arisen out of the tragic Black Saturday bushfires in Victoria during February 2009. It is with these new priorities that the Bushfire CRC is looking ahead and planning a strategic research agenda beyond the current Extension Program.

Through the Bushfire CRC, the sector partners are working closely together to better understand and prioritise the research issues arising from the 2009 Victorian bushfires on the management of extreme bushfire risk and to place these in the context of the broader research needs of the emergency management sector.

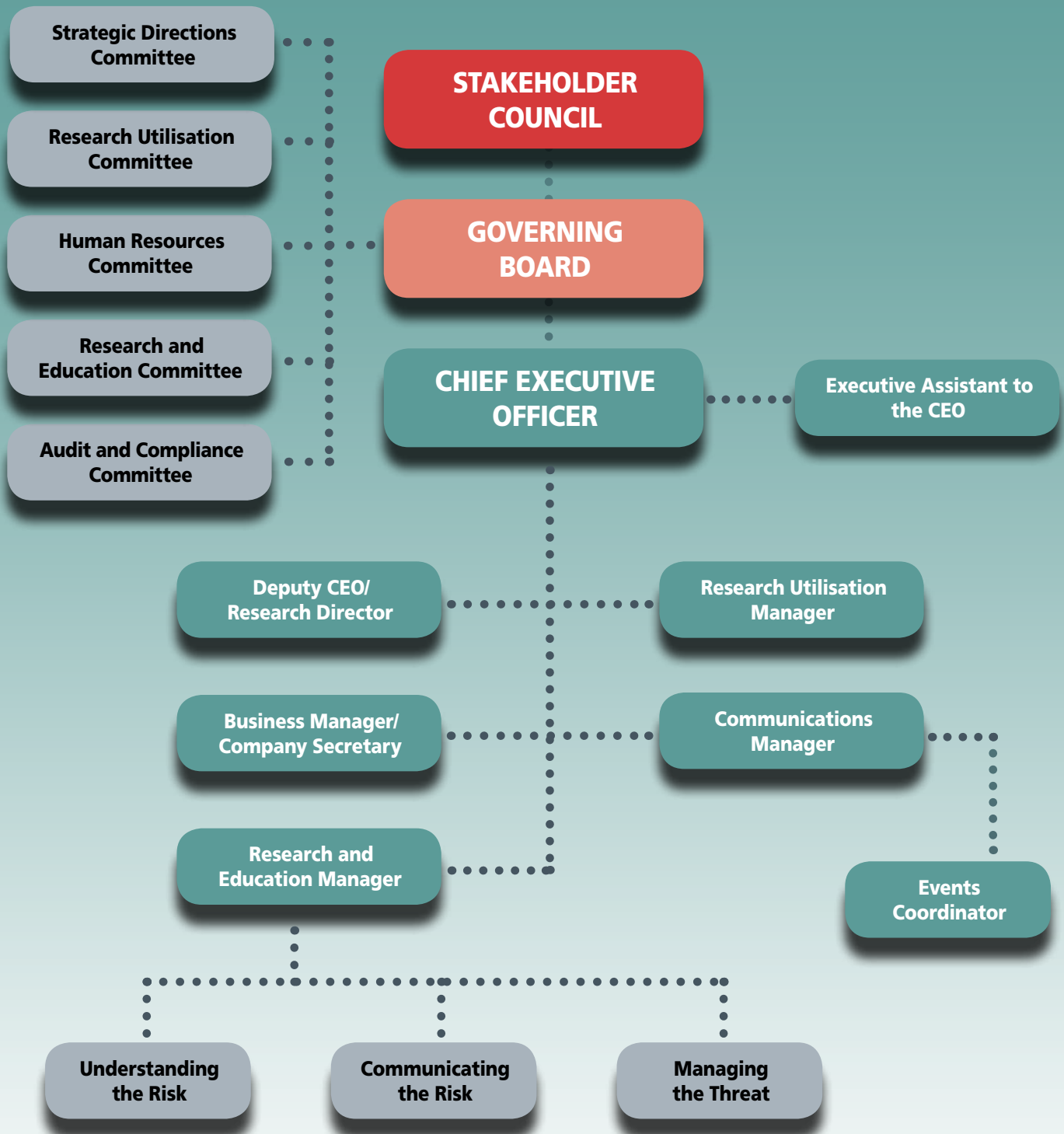
Further work is underway to identify an appropriate research vehicle and funding sources to secure the future of longer term fire and emergency management research in Australia.

This follows Recommendation 65 of the Royal Commission Final Report:

*The Commonwealth establish a national centre for bushfire research in collaboration with other Australian jurisdictions to support pure, applied and long-term research in the physical, biological and social sciences relevant to bushfires and to promote continuing research and scholarship in related disciplines.*



# Bushfire CRC Organisation Structure



### 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 to review and receive updates on the progress of research, finance, education, communication and other activities. The meeting was hosted by our partner the University of Sydney. The Governing Board met seven times throughout the year. There was no change to the membership of the Board in the reporting period.

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

- An **Audit and Compliance Committee** that oversees corporate governance, audit responsibilities, finance and compliance.
- 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 and performance management.
- 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.

A new auditor was appointed by the Stakeholder Council for 2010-11. This appointment is ongoing. The new auditors have met with the Audit and Compliance Committee since conducting the 2010-11 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 at the University of Sydney in November.*



## GOVERNANCE AND MANAGEMENT

### GOVERNING BOARD MEMBERS, COMMITTEE MEMBERS

Name	Role	Key skills	Independent/ Organisation	Attendance (out of 7)
<b>Len Foster AO</b>	Chairman	Governance and strategy	Independent	7
<b>Professor Mark Adams</b>	Director	Researcher and academic	University of Sydney	5
<b>Joanne Bloch</b>	Director	Finance and governance	Independent	6
<b>Naomi Brown</b>	Director	Industry based skills	Australasian Fire and Emergency Service Authorities Council	7
<b>Murray Dudfield</b>	Director	Industry based skills	New Zealand National Rural Fire Authority	7
<b>Commissioner Shane Fitzsimmons AFSM</b>	Director	Industry based skills	New South Wales Rural Fire Service	4
<b>Professor Alistar Robertson</b>	Director	Researcher and academic	University of Western Australia	4
<b>Mike Taylor AO</b>	Director	Governance and strategy	Independent	4
<b>Ewan Waller AFSM</b>	Director	Industry based skills	Department of Sustainability and Environment	7

#### AUDIT AND COMPLIANCE COMMITTEE

Name	Role	Independent/ Organisation
<b>Joanne Bloch</b>	Chair	Independent
<b>Naomi Brown</b>	Member	AFAC
<b>Mike Taylor</b>	Member	Independent

#### RESEARCH AND EDUCATION COMMITTEE

Name	Role	Independent/ Organisation
<b>Ewan Waller</b>	Chair	DSE
<b>Murray Dudfield</b>	Member	NRFA
<b>Alistar Robertson</b>	Member	UWA

#### HUMAN RESOURCES COMMITTEE

Name	Role	Independent/ Organisation
<b>Naomi Brown</b>	Chair	AFAC
<b>Len Foster</b>	Member	Independent
<b>Shane Fitzsimmons</b>	Member	NSW RFS

#### RESEARCH UTILISATION COMMITTEE

Name	Role	Independent/ Organisation
<b>Murray Dudfield</b>	Chair	NRFA
<b>Mark Adams</b>	Member	University of Sydney
<b>Shane Fitzsimmons</b>	Member	NSW RFS
<b>Naomi Brown</b>	Member	AFAC

## GOVERNANCE AND MANAGEMENT

### 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

Gary Morgan	CEO
Richard Thornton	Deputy CEO/Research Director
Noreen Krusel	Research Utilisation Manager
Lyndsey Wright	Research Manager
David Bruce	Communications Manager
Trevor Essex	Business Manager

### PRINCIPAL SCIENTIFIC ADVISERS

Prof Rod Keenan	University of Melbourne
Prof Drew Dawson	University of South Australia
Prof John Handmer	RMIT University
Prof Douglas Paton	University of Tasmania

### RESEARCH PROGRAMS

#### UNDERSTANDING RISK

##### Community expectations

**Lead End User:** Mick Ayre, NT Fire and Rescue Service

**Project Leader:** Professor Steve Dovers, Australian National University

##### Risk assessment and decision making

**Lead End Users:** David Youssef, MFB, and Ralph Smith, FESA

**Project Leader:** Dr Bob Cechet, Geoscience Australia

##### Fuels and risk planning in the interface

**Lead End User:** Mike Wouters SA DENR

**Project Leaders:** Dr Ruth Beilin, University of Melbourne, and Professor Ross Bradstock, University of Wollongong

##### National fire mapping

**Lead End User:** Dr Neil Burrows, DEC

**Project Leader:** Dr Mick Meyer, CSIRO

### COMMUNICATING RISK

#### Effective communication – communities and bushfire

**Lead End User:** John Schauble, OESC

**Project Leader:** Professor Peter Fairbrother and Professor John Fien, RMIT University

#### Human behaviour under stress – 1

**Lead End User:** Damien Killalea, TFS

**Project Leader:** Professor David Morrison, University of Western Australia

#### Human behaviour under stress – 2

**Lead End User:** Damien Killalea, TFS

**Project Leader:** Adjunct Professor Jim McLennan, La Trobe University

### MANAGING THE THREAT

#### Incident management systems

**Lead End User:** Liam Fogarty, DSE

**Project Leader:** Dr Christine Owen, University of Tasmania

#### Fire in the landscape

**Lead End User:** Neil Cooper, ACT Parks, Conservation and Lands

**Project Leader:** Dr Tina Bell, University of Sydney

#### Fire development transitions and suppression

**Lead End Users:** Steve Rothwell, QFRS, Dr Simon Heemstra, NSW RFS

**Project Leaders:** Dr Andrew Sullivan and Dr Kevin Tory, CSIRO

#### Occupational health and safety and surge capacity

**Lead End User:** Robyn Pearce, Tasmanian Fire Service

**Project Leader:** Dr Brad Aisbett, Deakin University

#### Economics and future scenarios

**Lead End Users:** Andrew Stark, ACT RFS, and Shane Wiseman, DENR

**Project Leader:** Dr Geoff Cary, Australian National University

#### Prescribed burning integrated assessment

**Project Leader:** Professor David Pannell, University of Western Australia

## GOVERNANCE AND MANAGEMENT

### PARTICIPANTS

Name	Organisation Type	Role
ACT Emergency Services Agency	State	End-user
ACT Parks Conservation & Lands	State	End-user
Attorney General's Department	Australian Government	End-User
Bureau of Meteorology	Australian Government	End-user
Country Fire Authority, Vic.	State	End-user
CSIRO	Australian Government	Research provider
Deakin University	University	Research provider
Department of Environment & Conservation, WA	State	End-user
Department of Sustainability & Environment, Vic.	State	End-user
Fire & Emergency Services Authority, WA	State	End-user
Forestry Plantations Queensland	State	End-user
Industry and Investment NSW	State	End-user
Geoscience Australia	Australian Government	Research provider
South Australian Country Fire Service on behalf of the Government of South Australia	State	End-user
La Trobe University	University	Research Provider
Metropolitan Fire & Emergency Services Board	State	End-user
Municipal Association of Victoria	Local Government	End-user
NSW Department of Environment & Climate Change	State	End-user
NSW Fire Brigades	State	End-user
NSW Rural Fire Service	State	End-user
NSW State Emergency Service	State	End-user
NT Fire & Rescue Service	State	End-user
NZ National Rural Fire Authority	New Zealand Government	End-user
Queensland Fire & Rescue Service	State	End-user
RMIT University	University	Research provider
Rural Fire Brigades Association of Qld	State	End-user
Tasmanian Fire Service on behalf of the Tasmanian Government	State	End-user



## GOVERNANCE AND MANAGEMENT

Name	Organisation Type	Role
<b>The Australian National University</b>	University	Research provider
<b>The University of Melbourne</b>	University	Research provider
<b>The University of Sydney</b>	University	Research provider
<b>The University of Western Australia</b>	University	Research provider
<b>University of Canberra</b>	University	Research Provider
<b>University of South Australia</b>	University	Research provider
<b>Victorian Office of Emergency Services Commissioner (OESC)</b>	State	End-user
<b>Australasian Fire and Emergency Service Authorities Council</b>	Industry	End-user
<b>Fire Protection Association of Australia</b>	Industry	End-user
<b>National Aerial Fire Fighting Centre</b>	Industry	End-user
<b>Terramatrix Pty Ltd</b>	Industry	End-user

## 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 occasionally engages in contract research on an opportunistic basis. 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.

## RESEARCH PROGRAMS

### 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. On this day, 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. Preliminary analysis has been undertaken, but much remains to be explored.

It is clear in the preliminary 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 has developed a research plan for 2010-2013 that will set the agenda for longer-term studies. This has drawn on an 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 extension was finally underway with the signature on the Commonwealth agreement on 14 July 2010. Subsequently, the Participants' Agreement was signed on the 27 September 2010. This then enabled the finalisation of the individual project level contracts. This slight delay was anticipated with the original planning and many projects and research providers began work on recruiting and conducting literature reviews in anticipation of the finalisation of the formal contracts.



In spite of these delays in finalising contract signatures, overall progress has been impressive. A number of high quality research journal articles have already been submitted and many presentations on the work have been given.

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 have been held in the last 12 months – the first at the University of South Australia in November 2010 and the second at the Queensland Fire and Rescue Service headquarters in Brisbane in May 2011.

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.

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 and also at our annual conference, which last year attracted almost 1000 people to Darwin.

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

At the end of the reporting period, the number of research students attracted was below target. As detailed in the Education section of this Annual Report, this has since been largely rectified.

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



## RESEARCH PROGRAMS

### THE RESEARCH PROGRAMS

#### UNDERSTANDING THE 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 done on the theme of shared responsibility, a key issue in the 2009 Victorian Bushfires Royal Commission, has also sparked much debate within the industry.

Researchers studying the range of impacts arising from various pieces of legislation and from inquiries have been in high demand to speak to agencies throughout the year.

The other areas in this theme have all made substantial progress in establishing case study sites, undertaking data collection, and completing literature reviews. No real delays are anticipated in these areas.

#### COMMUNICATING THE RISK

This program of work focuses on the communication of risk and threat: how are warnings and information best communicated and, for example, which media should be used? 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 made 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 February this year. Also substantial case study sites have been established in other states. It was also pleasing to see that one of the main teams involved in this work at the Bushfire CRC – from the University of Western Australia – was the only Psychology Department ranked as world leading in the recent Excellence in Research in Australia.

#### MANAGING THE THREAT

This program addresses scenarios where the risk of fire has translated into a direct threat. It is considering extreme events such as 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 main areas of work, all of which achieved the expected progress on their work plans. All teams have undertaken their foundation work and many have managed to attract world class researchers. It is a particular achievement of this group that there has been regular and intensive engagement with the end-users.



### RESEARCH UTILISATION

The former Research Adoption Strategy and Plan were revised and completely re-written during 2010 and are now known as the Research Utilisation Strategy 2011-2014 and Research Utilisation Plan 2011-2014.

This Research Utilisation Strategy is the product of extensive consultation with end user stakeholders. A survey of end user organisations was conducted during October and November 2010, 148 responses were received, representing a cross section of jurisdictions and of 'agency type' - rural, urban, fire and land management agencies. Analysis of the survey was conducted by the University of Tasmania, and further industry consultation, validation and contextual analysis was facilitated at a two day workshop in January 2011. The full consultation report and analysis are available on the Bushfire CRC web site.

The Research Utilisation Plan documents the actions that will be conducted to implement the Research Utilisation Strategy 2011 – 2014. It provides most detail to June 2012 and less for the following two years. It is a working document that will be subject to ongoing updates.

The Strategy outlines ways to address the factors important to enable utilisation. The factors are:

- Relationships and partnerships.
- Engagement and active involvement.
- Nurturing of a responsive and learning culture within end user agencies.
- Building of research utilisation capacity and capability within end user agencies.
- Creation of high quality products to support utilisation.
- Supporting agencies to make the research meaningful for their context.

The actions to support the approved Research Utilisation Strategy are detailed in the Plan. They are organised into the Goals identified in the overarching *Bushfire CRC Extension Strategic Directions 2010-2013* document.

Implementation has continued to progress through well-developed pathways, ensuring a high level of research uptake.





## RESEARCH UTILISATION

### WORKSHOPS AND PROFESSIONAL DEVELOPMENT EVENTS

The Bushfire CRC and AFAC have formed a strategic knowledge management partnership to support the utilisation of research outputs through to the industry. One mutual aspect of this partnership is the Professional Development Events Program for joint events. Upcoming events are listed on both the Bushfire CRC and AFAC websites for easy industry access.

In summary, this year 29 events were held throughout Australia and New Zealand, with a total of almost 1800 participants. See **Appendix C**.

### CONFERENCES

#### NATIONAL AFAC/BUSHFIRE CRC ANNUAL CONFERENCE

With the growth and development of Bushfire CRC research, the Australian fire and land management and emergency service sector's biggest event for the year, the annual conference, has been growing in size and scientific content. The annual conference is a prime example of collaboration initiated by the Bushfire CRC in conjunction with AFAC across researchers and students, fire and land agencies, emergency service personnel, volunteers and paid staff, all levels of government, small and large industries, professional associations, and the media and trade publishers.

The Bushfire CRC held its international conference in Darwin in September 2011. The conference was seen as a major international event attracting almost 1000 delegates, including many international speakers and delegates, and 85 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, a full day of hands-on workshops was provided to assist in the transition of research into agencies responsible for community safety.





### WILDLAND FIRE IN SOUTH AFRICA

The Bushfire CRC was represented at the Fifth International Wildfire Conference in South Africa in May by a delegation that included several researchers. Bushfire CRC researchers who presented included are detailed below. Presentations were also heard from Bushfire CRC Board members Murray Dudfield (NZ National Rural Fire Authority), Naomi Brown (AFAC) and Ewan Waller (DSE).

The Bushfire CRC coordinated a prominent poster display on the Australasian Wildland Fire Network, which showed the links between the Bushfire CRC, AFAC, the National Aerial Firefighting Centre, the Forest Fire Management Group and the Pacific Islands Fire Services Association. The display also promoted the proposal for the Bushfire CRC to transition to an Australasian Fire Research Institute.

Bushfire CRC research presentations included:

- Gary Morgan, Bushfire CRC, "Leadership Through Research"
- Raphaela Blanche et al, CSIRO Ecosystem Sciences, Australia, "Assessing vulnerability at the urban interface"
- Garry Cook & Mick Meyer, CSIRO, Ecosystem Sciences, Australia, "Fire management for greenhouse abatement in northern Australia"
- Roy Wittkuhn et al (presented by Neil Burrows), Dept of Environment and Conservation, Australia; "Resilience of open forests and shrublands to contrasting fire interval sequences in a Mediterranean environment of southwest Western Australia"
- Fabienne Reisen et al, CSIRO Marine and Atmospheric Research, Australia; "Smoke impacts on the fire ground: What are the exposure risks and how can potential health impacts be minimised?"
- Jim Gould et al, CSIRO, Australia; "How good are fire behaviour models? Validation of eucalypt forest fire spread models"

### OTHER KEY CONFERENCE PRESENTATIONS

CEO Gary Morgan delivered the opening keynote address to the Rural Fire Brigades Association of Queensland forum in Brisbane in May, on outputs from the Bushfire CRC research on the recruitment and retention of volunteers.

Gary Morgan delivered the opening keynote address at the NSW Rural Fire Brigades conference in Bathurst NSW in April.

At the VI International Conference on Forest Fire Research, Coimbra, Portugal, November 2010, David Nichols and Brad Aisbett presented on "Australian Firefighter Health and Safety: Improvements to Live With"

Assessing woody fuel consumption models for application in Australian forest fires, J.J. Hollis, S. Matthews, R.D. Ottmar, S.J. Prichard, A. Slijepcevic, N.D. Burrows, B. Ward, K.G. Tolhurst, W.R. Anderson, J.S. Gould, VI International Conference on Forest Fire Research, Coimbra, Portugal, November 2010.

Australia's most deadly wildfire disaster and its aftermath; Bushfire CRC Deputy CEO and Research Director Dr Richard Thornton delivered the keynote address at the VI International Conference on Forest Fire Research, Coimbra, Portugal in November.

Dr Michael Eburn, of the Australian National University, presented at the 5<sup>th</sup> Annual Wildland Fire Litigation conference in San Diego in May 2011. He shared insights into Australian law and learnt about the conduct of post-fire litigation in the US.

Dr Eburn spoke on litigation following fires at the Emergency Media and Public Affairs conference in Canberra, April 2011.

Dr Eburn also presented at the NSW Rural Fire Service Association annual conference in Coffs Harbour in June 2010, on "Bushfires and the litigation experience"

At the same conference in Coffs Harbour Dr Jason Sharples, Bushfire CRC researcher and lecturer in Applied Mathematics at the Australian Defence Force Academy presented on "Dynamic Bushfire Spread"

PhD researcher Rachel Carter presented on fire and insurance law at the 9<sup>th</sup> Conference on Catastrophe Insurance in Asia held in Beijing, China, in May 2011.

## RESEARCH UTILISATION

### VOLUNTEERS

The Volunteerism project – led by Latrobe University researchers – has provided fire services across Australia and New Zealand with information to help strategic planning and policy development concerning volunteer numbers, and suggested new ways of recruiting. Retaining and supporting volunteer workforces. The combined research of this project has led to agencies reviewing the way they manage volunteers, with enhanced training, support services for volunteers and families and recruitment campaigns that target younger and more diverse sections of the population.

As a final output to the 2003-2010 research project, the researchers produced a consolidated synopsis of all the findings.

This report was published in May 2011, distributed to members and placed on the Bushfire CRC website for public access.



### PUBLICATIONS

Research output after seven years now totals 925 publications. All these publications – reports, journal articles, presentations, posters – are online at [www.bushfirecrc.com](http://www.bushfirecrc.com) and most also appear on the AFAC Knowledge Web, a product of the Bushfire CRC now managed by the industry.

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 80 *Fire Note* briefing papers (20 since June 2010) distributed to the industry on subjects including aerial fire fighting, 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 CRCs *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, the Fire Protection Association of Australia, and the Institution of Fire Engineers Australia.

A list of these publications is available in **Appendix A and B**.

## 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 Darwin in September with 85 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 Dräger.
- The Fire Protection Association of Australia, which represents more than 6000 SMEs, is now 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.
- *Fire Australia* is a joint Bushfire CRC/AFAC/FPAA and Institution of Fire Engineers quarterly journal that is distributed to the broad fire industry.





## RESEARCH COLLABORATIONS

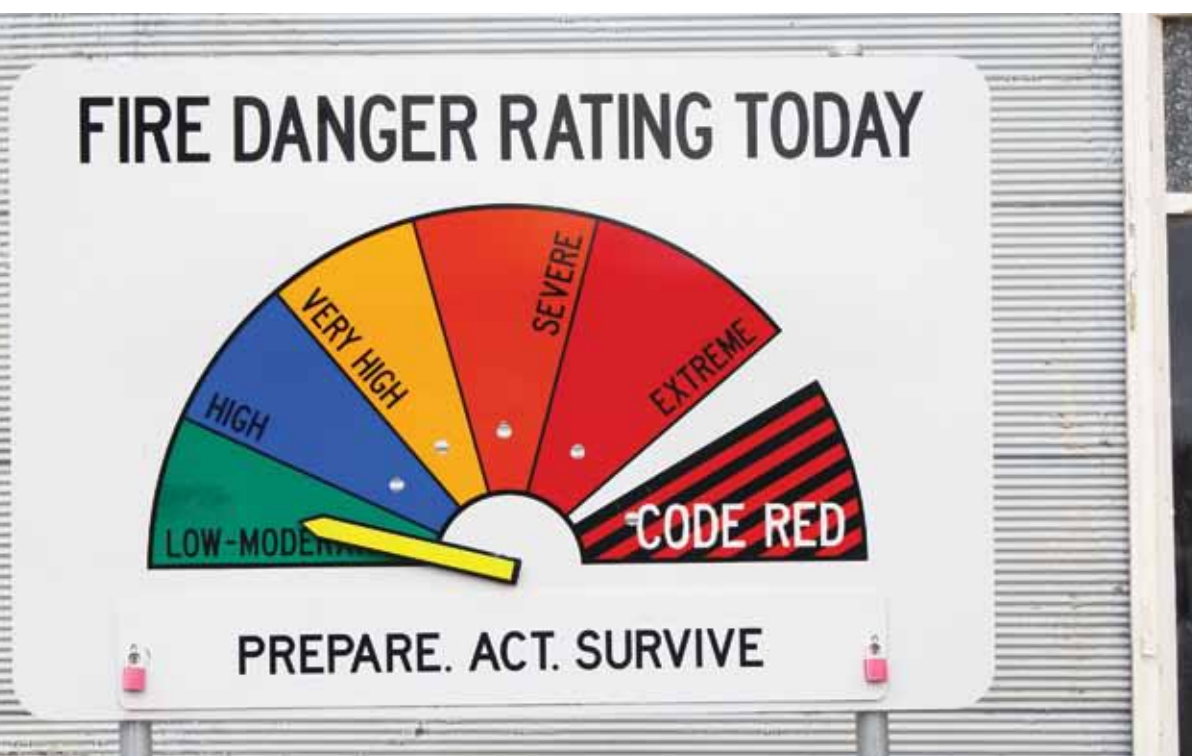
### RESEARCH COLLABORATIONS

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 has entered into a number of consultancies during the year, mainly with its existing end-user partners. The primary aim of these is to help to customise and build upon the core research of the Bushfire CRC. This is particularly true with the Victorian agencies, in particular the DSE and CFA, where the Bushfire CRC conducted evaluation of the Convair Air Tanker, and various other pieces of contract research.
- 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 Attorney General's Department for this national project. The Bushfire CRC will take on the research management and brokering role in the 2011-12 financial year.
- The Bushfire CRC also completed an assessment of fire detection cameras during the year, completing work begun during the 2009-10 financial year.
- The CEO is a member of the Editorial Advisory Board for the International Association of Wildland Fire *Wildfire* international magazine. The CEO is a member of the International Liaison Committee for the International Wildland Fire Conference. He is also a member of the United Nations International Strategy for Disaster Reduction – Wildland Fire Advisory Group.
- The Deputy CEO and Research Director is a Board member on the International Association of Wildland Fire. And he is the Chair of the Editorial Advisory committee for the *International Journal of Wildland Fire*.





### COMMUNICATIONS STRATEGY

The communications strategy promotes the research and activities of the Bushfire CRC amongst stakeholders and to the broader community. The strategy complements the communications objectives of all the stakeholder fire, land and emergency service management 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

Following Board discussion in early 2010 on the Communications activities of the Bushfire CRC a process was set in place to review the strategy for the period to 2013 and beyond towards the establishment of an ongoing fire research institute. A sample review of Stakeholder perceptions was conducted and a full day workshop explored the issues more fully. A new Communications Strategy for the Bushfire CRC to cover the Extension funding period and beyond was developed and passed by the Bushfire CRC Board in April 2011.

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.

### ONLINE UPDATE

The Bushfire CRC website was overhauled to take into account the new research program, and include the new researchers and new partner organisations. Given that some of the new research is an extension of the old, every effort has been made to maintain the prominence of the outputs of the 2003-2010 research program and provide opportunities for this research to continue to be adopted. This is in line with our Communications Strategy to promote the totality of Bushfire CRC research and activities as a resource for our partners and a broader audience.

### COMMUNICATING WITH OUR INDUSTRY AND RESEARCHERS

#### DARWIN CONFERENCE AND WORKSHOPS FOR INDUSTRY

Our annual conference, in conjunction with AFAC, was at the Darwin Convention Centre in September. Almost 1000 delegates from around Australia and internationally attended the event over the week, furthering its reputation as the biggest fire, emergency services and land management 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.

## COMMUNICATIONS STRATEGY

This was a prime communications event for researchers. All Bushfire CRC postgraduate students are invited 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. This year, the research poster display was shifted to 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 week began with delegates participating in one of five pre-conference workshops, including one specifically aimed to introduce new researchers, students and others to the workings of the Bushfire CRC and the broader emergency management sector.

Over the three days of the main conference there were three separate streams of presentations from researchers, management and operational personnel, both from Australia and elsewhere. These sessions allowed many of our researchers to present their research to the broader industry and to discuss ideas for better utilisation.

The 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, photographs and video.

The broader fire industry (SMEs and large corporations) was also well represented with 120 booths 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.

### DIRECT STAKEHOLDER ENGAGEMENT

The Stakeholder Council Annual General Meeting in Sydney, in November, heard a summation of the first seven years of Bushfire CRC research as well as a preview of the extension research. Around 40 representatives of Bushfire CRC partners from around Australia and New Zealand attended the meeting, hosted by the University of Sydney at the Australian Technology Park.

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

### FIRE AUSTRALIA

The *Fire Australia* journal 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, Australasian Fire and Emergency Service Authorities Council, Fire Protection Association Australia and the Institution of Fire Engineers 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 research and activities highlighted this year included implications from the 2009 Victorian Bushfires Royal Commission, flood management in northern NSW and Queensland, prescribed burning, a review of incident control management, and decision making on the fireground.



## MALLEE TALKS



Bushfire CRC researcher Dr Miguel Cruz (above left), a scientist with the CSIRO's Bushfire Dynamics and Applications group in Canberra, led seminars and field trips of fire managers to demonstrate his new quick guide for predicting fire behaviour in semi-arid Mallee country. Three seminars were held: in Adelaide and Berri in South Australia and Mildura in Victoria.

The plastic coated, fold-out guide is aimed at fire managers needing to plan controlled burns in the difficult Mallee lands. It has a four-step set of calculations that quickly predict the probability of a burn being successful under the conditions of any given day. During the Bushfire CRC-funded research that led to the guide's production, Dr Cruz, in conjunction with South Australia's Department of Environment and Natural Resources, conducted 67 separate test burns in Ngarkat Conservation Park at different times of the year, in many types of vegetation, from Mallee shrubs to pure heath.

Fire behaviour in the sparse Mallee lands is different to that in forests and grasslands, creating a problem in deciding the best conditions for controlled burns to be conducted to meet the specified land management objectives.

The guide addresses this difficulty of having conditions conducive to efficient burning without the fire escaping control; it is available on the Bushfire CRC website.

## 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 20 new *Fire Notes* were published bringing to the total to 82.

## 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.





## COMMUNICATIONS STRATEGY

### 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 (FPAA) Conference in Queensland in November. The FPAA represents thousands of SMEs in the fire protection industry across Australia.

As a new partner of the Bushfire CRC the FPAA supported the Bushfire CRC/AFAC annual conference with a booth at the Trade Expo in Darwin in September (pictured right).

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.

As a new exhibitor 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 our website on future work.



### 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 925 items including research reports, journal articles, field guides, presentations and posters – Stakeholders have also been provided with a printed list of publications. The 2010 Bushfire CRC and AFAC annual conference in Darwin produced a significant amount of new material on key research issues. All this content is online at [www.bushfirecrc.com](http://www.bushfirecrc.com) and the AFAC Knowledge Web.

### CONFERENCE LAUNCH

In April, the Sydney City historic fire station No 1 was a fitting venue to launch the AFAC and Bushfire CRC annual conference held in Sydney in late 2011, themed around 'New World, New Thinking'.

NSW and ACT fire and emergency service commissioners, senior land management personnel, and the Minister of Police and Emergency Services NSW, The Hon. Michael Gallacher MLC, were on hand to support the launch. The launch was hosted by the CEO of AFAC Naomi Brown, and CEO of Bushfire CRC Gary Morgan.





## CAUGHT ON CAMERA



Video content is being used to complement 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 statements by researchers on video that were updated over the last year include:

- The *Fire, Fuel and Weather* seminar at the 2009 annual conference including edited presentations and interviews with Bushfire CRC researchers. Go to the Events pages and see the 2009 conference.
- *In Their Own Words* – short introductions to PhD projects by Bushfire CRC students. Go to the Education/ Research Students pages.
- VicFiresTaskforce - videos of the researchers explaining how they examined properties after the Black Saturday fires. Go to the Taskforce page under Our Research.

## COMMUNICATING WITH THE PUBLIC

### ONLINE COMMUNICATIONS

The Bushfire CRC website underwent a major overhaul this year firstly, to cope with the growing amount of content being produced, and secondly, to better incorporate new technology and social media tools in a more vibrant and responsive website.

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 2010 Darwin annual conference and past conferences continuing to be popular along with major research reports, briefing papers and news reports.

### NEW MEDIA

- The Bushfire CRC *You Tube* site features videos of Bushfire CRC research in action. *You Tube* 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.

## COMMUNICATIONS STRATEGY

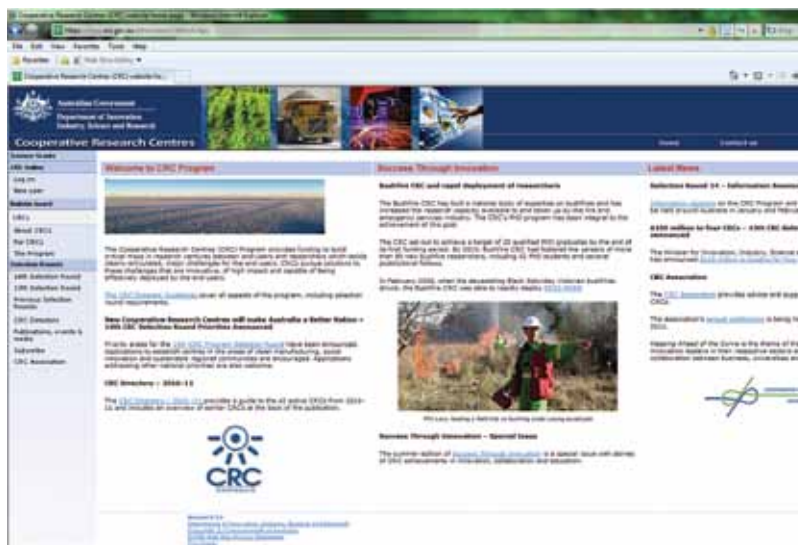
New content is being progressively uploaded as it becomes available.  
See <http://www.youtube.com/bushfirecrc>

- A Bushfire CRC *Facebook* site 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 500+ followers is developing; many from regional Australia and overseas, including research groups, fire industry media, and numerous local fire brigades – all who on-share the postings with their own members.

### CRC ONLINE

The Australian Government launched a new website for its CRC Program with improved access to information and news about its activities. A key element is the front page feature item on success stories from across the CRC Program.

The first story chosen was about the Bushfire CRC and the rapid deployment of researchers in the Taskforce for the Victorian bushfires in 2009, and two postgraduate student projects that led to our seminar and field trip to a eucalypt plantation and an animated television program on safety messages for children.



### MEDIA

It was a challenge to raise the interest of the national media for an event in Darwin, but the annual conference managed to attract media coverage on radio, print and television, both from regional and national media. Many sought comment on the just-released *Bushfire Seasonal Outlook* and how this would impact upon regional Australia.

Other highlights included:

- ABC Radio sent a Rural Affairs Reporter to attend for the entire three-day conference for both local and national content. The reporter interviewed conference presenters, including many Bushfire CRC researchers and students, international guests and visiting fire chiefs.
- Channel 9 Darwin and ABCTV Darwin ran a story with vision each day for the evening bulletin.
- *The Australian* covered the opening address of the Hon Michael Kirby AC.



## FINAL ROYAL COMMISSION REPORT

The release of the *2009 Victorian Bushfires Royal Commission Final Report* in July led to a high demand for comment from the Bushfire CRC across a range of issues. The Bushfire CRC, interviewed by a range of media outlets, stressed the important contribution of information collected and analysed by researchers, and publically backed the recommendation for a national bushfire research facility.

## OTHER MEDIA



During the floods in Queensland and Victoria in January 2011 some of our researchers were asked to make comments in the media including one of our new postgraduate students, Rachel Carter, of LaTrobe University, who spoke on issues of insurance for natural disasters.

The Bushfire CRC made media comments on the fires in Western Australia in early February regarding the learnings from Black Saturday and the links between warnings for fire and flood, as well as other more general comments on prescribed burning and building in bushfire areas. The Bushfire CRC CEO was interviewed for the national ABC 7.30 Report, ABC Radio National *Breakfast* (see above), *The Australian*, and Adelaide radio, while our comments were repeated in numerous news publications.

## EARLY WARNING SYSTEM

The Victorian State Government in August launched a fire prediction and early warning system based on Bushfire CRC research that will deliver detailed information on the spread of fires to help protect communities in the event of a bushfire.

The then Premier Mr John Brumby outlined details of the digital mapping system that will provide up to six hours warning of the direction, speed and intensity of a fire within minutes of it being discovered.

The system, which integrates the existing FireWeb system with the Bushfire CRC's computer mapping and fire simulation system called Phoenix RapidFire, is becoming a key tool in Victoria's firefighting efforts. The Phoenix RapidFire system was developed by Bushfire CRC researcher Dr Kevin Tolhurst from the University of Melbourne.

Meanwhile, in Western Australia, fire authorities are making routine use of the fire model developed by Bushfire CRC researcher Prof George Milne from the University of Western Australia. The simulation model is part of its state alerting system and was a main feature of a federal Digital Regions initiative grant.

## COMMUNICATIONS STRATEGY

### **COST OF ARSON**

A Bushfire CRC report out of the Australian Institute of Criminology, *Using crime prevention to reduce deliberate bushfires in Australia*, showed that arson costs the Australian community an estimated \$1.6 billion in damage each year. The report formed the basis of a national workshop on arson prevention organised by the Commonwealth Attorney General's Department, and attended by the CEOs of both the Bushfire CRC and AFAC.

### **BUSHFIRE OUTLOOK**

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

### **PUBLIC SCIENCE**

Three Bushfire CRC researchers featured at a public science forum in Adelaide in October. The forum, organised through RiAus (Royal Institute of Australia), attracted more than 120 people to hear about how science has attacked common myths about bushfires. The day following the public forum, the same three researchers addressed a lunchtime gathering of about 100 fire and land agency staff from the Country Fire Service and the Department of Environment and Natural Resources in South Australia.

In May, an expert panel of bushfire researchers discussed bushfire behaviour, risk, and how to best communicate information at the Stawell Entertainment Centre in western Victoria. The audience interacted with the speakers by voting on hand-held key pads to various questions raised during the presentations.

Again, the public event was put on by Free Range Science and hosted by RiAus as part of its Talking Science in Regional Victoria program. This Bushfire Science event was supported by the Bushfire CRC with several researchers contributing to the program.

### **SCIENCE RESEARCH PROMOTION**

The Bushfire CRC was represented in a publication given to delegates at the 7<sup>th</sup> World Conference of Science Journalists, held at Doha, Qatar in June 2011 and sent to Australian embassies and government offices around the world.

*Stories of Australian Science* was published in conjunction with the Congress. This 30-page feature included highlights of the Bushfire CRC research program.

### **INTERNATIONAL PROMOTION**

The Bushfire CRC was well represented at the Fifth International Wildfire Conference in South Africa in May and was on the international liaison committee that organised the event.

The Bushfire CRC was prominent throughout the conference in 20 sessions by people proudly acknowledging their involvement in the Bushfire CRC and its research. The Bushfire CRC coordinated a prominent poster display on the Australasian Wildland Fire Network, which showed the links between the Bushfire CRC, AFAC, the National Aerial Firefighting Centre, the Forest Fire Management Group and the Pacific Islands Fire Services Association.



### EDUCATION AND TRAINING

#### EDUCATION AND POSTGRADUATE SCHOLARSHIPS

The support for Higher Degree students is an important part of the Bushfire CRC strategy for building capacity and capability in the industry. Our commitment to this 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 our programs.

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 percent in Theme 1: Understanding the Risk; 30 percent in Theme 2 Communicating the Risk and 40 percent in Theme 3 Managing the Threat. There is an even distribution between those students in the social sciences and those working in the physical sciences.

Initiatives such as advertising in national media and targeting of honours students working in the same departments as the Bushfire CRC research teams have proved successful in attracting interest from high quality scholarship applicants, moving closer to the target number of PhD scholarship recipients after a slow start.

The Bushfire CRC is looking forward to the first of the scholarship recipients completing their studies in mid 2012. More than 50 percent of scholarship recipients are due to submit their theses by mid 2012.

At the end of the reporting period the Bushfire CRC had committed to supporting 37 students. Thirty six of these students are enrolled in a PhD program or have enrolled in a Masters program in preparation for PhD studies. The final scholarship was awarded to an Honours student undertaking work directly related to a Bushfire CRC project.



*Bushfire CRC postgraduate students at our annual conference.*

#### 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 Darwin, submitted a poster and participated in the poster discussion session at the conference. They were given the opportunity to attend an induction workshop that provided an overview of the industry. More than 90 percent of students took up this opportunity in Darwin, while the remainder attended other relevant workshops at the conference.

## EDUCATION AND TRAINING

### 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.
- 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 were developed over the reporting period:
- 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 '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.



## OTHER ACTIVITIES

During 2010-2011 the Bushfire CRC saw the continuation and conclusion of a number of major pieces of contract research including:

- The evaluation of the DC-10 Air Tanker.
- The evaluation of various fire detection cameras for the Commonwealth Attorney-General's Department.
- Fire reconstruction of the Black Saturday fires.
- An examination of the power of fire as the basis for fire danger ratings.
- Development of a framework for disaster cost evaluation.
- A climatology of fire in Victoria.

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

- The evaluation of the Convair CV580 medium air-tankers.
- The evaluation of the Perth Hills fires.
- The national fire danger rating project for the Commonwealth Attorney-General's department on behalf of the Council of Australian Governments (COAG).

## APPENDIX A

### APPENDIX A

#### ACADEMIC PUBLICATIONS

##### 2011

- Newnham GJ, Verbesselt J, Grant IF, Anderson SAJ. 2011. **Relative Greenness Index for assessing curing of grassland fuel**. Remote Sensing of Environment. 115(6):1456-1463.
- Mortimer E, Bergin A, Carter R. 2011. **Sharing risk: Financing Australia's disaster resilience**. Special Report Issue 37.
- Close DC, Davidson NJ, Swanborough PW. 2011. **Fire history and understorey vegetation: Water and nutrient relations of Eucalyptus gomphocephala and E. delegatensis overstorey trees**. Forest Ecology and Management.
- Beale J, Jones W. 2011. **Preventing and Reducing Bushfire Arson in Australia: A Review of What is Known**. Fire Technology. 47(2):507-518.
- Mutch RW, Rogers MJ, Stephens SL, Gill MA. 2011. **Protecting Lives and Property in the Wildland–Urban Interface: Communities in Montana and Southern California Adopt Australian Paradigm**. Fire Technology. 47(2):357-377.
- Jenkins ME, Adams MA. 2011. **Respiratory quotients and Q10 of soil respiration in sub-alpine Australia reflect influences of vegetation types**. Soil Biology and Biochemistry.
- Phillips M, Petersen A, Abbiss CR, Netto K, Payne W, Nichols D, Aisbett B. 2011. **Pack Hike Test finishing time for Australian firefighters: Pass rates and correlates of performance**. Applied Ergonomics. 42(3):411-418.
- Wittkuhn R, McCaw LW, Wills AJ, Robinson R, Andersen AN, Van Heurck P, Farr J, Liddelow G, Cranfield R. 2011. **Variation in fire interval sequences has minimal effects on species richness and composition in fire-prone landscapes of south-west Western Australia**. Forest Ecology and Management. 261(5):965-978.
- Hayes P, Omodei M. 2011. **Managing Emergencies: Key Competencies for Incident Management Teams**. The Australian and New Zealand Journal of Organisational Psychology. 4:1-10.

##### 2010

- Eriksen C, Gill N. 2010. **Bushfire and everyday life: Examining the awareness-action 'gap' in changing rural landscapes**. Geoforum. 41(5):814-825.
- Reisen F, Hansen D, Meyer(M)CP. 2010. **Exposure to bushfire smoke during prescribed burns and wildfires: Firefighters' exposure risks and options**. Environment International.
- Cruz MG, Gould JS. 2010. **Fuel and fire behaviour in semi-arid mallee-heath shrublands**. 6th International Forest Fire Research Conference.
- Wittkuhn R, Hamilton T. 2010. **Using Fire History Data to Map Temporal Sequences of Fire Return Intervals and Seasons**. Fire Ecology. 6(2):97-114.
- Haynes K, Handmer J, McAneney J, Tibbits A, Coates L. 2010. **Australian bushfire fatalities 1900-2008: exploring trends in relation to the 'Prepare, stay and defend or leave early' policy**. 13(3):185-194.
- Penman TD, York A. 2010. **Climate and recent fire history affect fuel loads in Eucalyptus forests: Implications for fire management in a changing climate**. 260(10):1791-1797.
- Cruz MG, Alexander ME. 2010. **Assessing crown fire potential in coniferous forests of western North America: a critique of current approaches and recent simulation studies**. International Journal of Wildland Fire. 19(4):377.
- O'Donnell AJ, Cullen LE, McCaw LW, Boer MM, Grierson P. 2010. **Dendroecological potential of Callitris preissii for dating historical fires in semi-arid shrublands of southern Western Australia**. Dendrochronologia. 28(1):37-48.
- Leavesley AJ, Cary GJ, Edwards GP, Gill MA. 2010. **The effect of fire on birds of mulga woodland in arid central Australia**. International Journal of Wildland Fire. 19(7):949.
- Cruz MG. 2010. **Monte Carlo-based ensemble method for prediction of grassland fire spread**. International Journal of Wildland Fire. 19(4):521.
- Cruz MG, Gould JS. 2010. **National fire behaviour prediction system**. Biennial Conference of the Institute of



Foresters of Australia, Caloundra, 2009.

Scott K, Setterfield SA, Douglas MM, Andersen AN. 2010. **Fire tolerance of perennial grass tussocks in a savanna woodland.** Austral Ecology. 35(8):858-861.

McGregor S, Lawson V, Christophersen P, Kennett R, Boyden J, Bayliss P, Liedloff A, McKaige BJ, Andersen AN. 2010. **Indigenous Wetland Burning: Conserving Natural and Cultural Resources in Australia's World Heritage-listed Kakadu National Park.** Human Ecology. 38(6):721-729.

Eriksen C, Gill N, Head L. 2010. **The gendered dimensions of bushfire in changing rural landscapes in Australia.** Journal of Rural Studies. 26(4):332-342.

Cowlshaw S, Evans L, McLennan J. 2010. **Work-family conflict and crossover in volunteer emergency service workers.** Work and Stress. 24(4):342-358.

Hollis JJ, Matthews S, Ottmar RD, Prichard SJ, Slijepcevic A, Burrows ND, Ward B, Tolhurst KG, Anderson WR, Gould JS. 2010. **Testing woody fuel consumption models for application in Australian southern eucalypt forest fires.** Forest Ecology and Management. 260(6):948-964.

## APPENDIX B

### RESEARCH UTILISATION PUBLICATIONS 2010-2011

#### FIRE NOTES – RESEARCH BRIEFS FOR INDUSTRY

<b>Issue 63</b>	Bushfire Arson: What Do We Know Now?	July 2010
<b>Issue 64</b>	Fire Intervals and Biodiversity responses in the South West of WA	August 2010
<b>Issue 65</b>	Simple Indices for Assessing Fuel Moisture Content and Fire Danger Rating	September 2010
<b>Issue 66</b>	Fire Dynamics in Mallee Heath	September 2010
<b>Issue 67</b>	Australian Seasonal Bushfire Assessment 2010-11: Summary	October 2010
<b>Issue 68</b>	Tanks on trial: Performance of rainwater tanks in bushfire conditions	November 2010
<b>Issue 69</b>	Passenger vehicle turnover in bushfires	November 2010
<b>Issue 70</b>	Residential boundary fences in bushfires: How do they perform?	November 2010
<b>Issue 71</b>	Applying social psychology to community bushfire safety	December 2010
<b>Issue 72</b>	New Zealand Seasonal Wildfire Assessment 2010-11: Summary	December 2010
<b>Issue 73</b>	Strategic Implications for Incident Control Systems in Australia and New Zealand	January 2011
<b>Issue 74</b>	The Relevance of the Pack Hike Test for Australian Bushfire Firefighters	February 2011
<b>Issue 75</b>	Know Your Patch to Grow Your Patch Issue	February 2011
<b>Issue 76</b>	Predicting Woody Fuel Consumption: Can Existing Models be Used?	March 2011
<b>Issue 77</b>	How Bushfire Firefighters Think About Worst Case Scenarios	March 2011
<b>Issue 78</b>	Eucalypt Decline in the Absence of Fire: Relationship to the Ectomycorrhizal Fungal Community	May 2011
<b>Issue 79</b>	The Process and Pattern of Eucalypt Forest Decline in the Absence of Fire	May 2011
<b>Issue 80</b>	Firefighter health and Safety	May 2011
<b>Issue 81</b>	Hydration of Australian rural bushfire fighters	May 2011

## APPENDIX C

### APPENDIX C

#### EVENTS

##### KNOWLEDGE/PROFESSIONAL DEVELOPMENT EVENTS/TRAINING 2010-2011

Topic	Details	Type, Location	Presenter(s)	Partner(s)	Date	No persons
Protecting Firefighters	Research Impact Assessment	Workshop, Melbourne	Brad Aisbett	AFAC	Nov	24
Evaluation of Community Education	Implementing evaluation of community education programs into agency practice	Presentation, Melbourne	Alan Rhodes	AFAC	March	18
Air Suppression Techniques	Review effectiveness with agencies and make recommendations to AFAC members re: application	Workshop	Richard Alder; Matt Plucinski	NAFC	Sept	12
Black Saturday Fires - Research	Extensive data collection conducted post fires. Need to review this and develop research questions.	Workshop, Melbourne	Alan Rhodes;	AFAC	Dec	19
Safe Decision Making	Human factors interview protocol. New guide to assist in investigating human factors that affect operational decision making	Clinic, Melbourne	Dr Mary Omodei; Peter Hayes	AFAC LaTrobe University	Oct	49
Induction	Introduction to the fire and emergency management industry for new CRC researchers	Forum, Darwin	Experienced industry personnel	AFAC	Sept	43
Enhancing volunteerism	Forum covering a range of issues in relation to volunteerism - National Employee Recognition scheme; FESA program; expectations of volunteers	Forum, Darwin	Volunteer Associations; FESA; Attorney General Depts; Adrian Birch	AFAC	Sept	60
Industry national conference	Annual Conference	Conference, Darwin	Various	AFAC/ Bushfire CRC	Sept	980
Spatial Technology	New spatial technologies being adopted by agencies. Need to develop a collaborative approach.	Forum, Darwin	Steve Forbes	EMSINA	Sept	48
Climate Change	Impacts of Climate Change on Emergency Management	Forum, Darwin	John Handmer, Graham Pearman	AFAC	Sept	32
Research Utilisation Strategy Consultation	Interactive workshop	Workshop, Melbourne	Stakeholders		Jan	16
Mallee Fuel and Fire Model	Familiarisation with new research and potential field application	Clinic, Mildura	Miguel Cruz	DSE	Oct	14

## APPENDIX C

Scientific Writing Workshop	Scientific writing	Workshop, Darwin	Danielle Clode		Sept	15
Seasonal Outlooks	Development of regional fire season outlook annually	Workshops, Melbourne, Auckland, Kununurra	Regional fire managers	AFAC, NAFMC	August, Dec, June	12 (NZ),
Eucalyptus decline	Demonstration to potential users of a new tool to estimate eucalyptus decline and imparting of new knowledge	Presentation, Melbourne	Tony Blanks, Neil Davidson	AFAC, FFMG	June	35
Community Safety Research	Workshop on National implications of Bushfire CRC research on community profiling, risk communication and program evaluation	Invitation Only Workshop, Launceston	Damien Killalea, Doug Paton, John Fein, Alan Rhodes	AFAC	April	16
Human Factors	Introduction to Human Factors concepts - Individuals (part 1) and Teams (Part 2)	Presentation, Brisbane	Mary Omodei, Christine Owen	QFRS	June	75
Human Factors	Introduction to Human Factors concepts - Individuals (part 1) and Teams (Part 2)	Workshop, Victoria regional	Mary Omodei, Christine Owen	CFA	June, Nov	2x 40
Black Saturday Fires - Research	Extensive data collection conducted post fires. Need to review this and develop research questions.	Workshop, Melbourne	Rob Llewellyn	AFAC, BCRC	Dec	15
Fire Weather Workshop	To look at the new BoM software	Workshop, Melbourne	Gary Featherston	AFAC, BCRC	May	29
National Bushfire Fuel Classification Systems	Workshop to bring together all of the bushfire fuel experts from Australia and New Zealand to discuss the framework for a national classification system.	Workshop, Melbourne	Range of experts	AFAC, BCRC, CSIRO	April	26

### COLLABORATIVE FORUMS/MEETINGS

Bushfire CRC Research	AIIMS Survey and Teams in Incident Management	Presentation, Melbourne	Christine Owen	AFAC	March	40
Bushfire CRC Research	Final Report on Volunteerism Projects	Presentation, Melbourne	Lyndsey Wright for A Birch	AFAC	May	14
Bushfire CRC Research	Update on Research	Presentation, Melbourne	Brad Aisbett	AFAC	May	22
Bushfire CRC Research	Presentation on Educational Resources, Overview	Paper, Sydney	Murray Carter, Gary Morgan	AFAC, DEC	Nov	28
Bushfire CRC Research	Presentation on economics project	Presentation, Melbourne	David Pannell	FFMG	June	25
Bushfire CRC Research	Update on Research	Presentation, Melbourne	Gary Morgan, Tony Blanks..	AFAC	June	30



## GLOSSARY OF TERMS

Research Advisory Forum	Research Presentations and stakeholder feedback	Forum, Adelaide	Various	UniSA	Nov	44
Research Advisory Forum	Research Presentations and stakeholder feedback	Forum, Brisbane	Various	QFRS	May	65

## GLOSSARY OF TERMS

AFAC	Australasian Fire and Emergency Service Authorities Council
AIC	Australian Institute of Criminology
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
COAG	Council of Australian Governments
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
FFMG	Forest Fire Management Group
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
PIFSA	Pacific Islands Fire Services Association
QFRS	Queensland Fire and Rescue Service
RFS	Rural Fire Service NSW
RMIT	RMIT University
SCU	Southern Cross University
TFS	Tasmania Fire Service
USDA-FS	US Department of Agriculture – Forest Service
UWA	University of Western Australia
VBRC	Victorian Bushfires Royal Commission