



BUSHFIRE CRC ANNUAL REPORT 2009 -10



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October 2010

CEO'S CERTIFICATION

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

- *the written Annual Report for the 2009-10 financial year;*
- *the CRC's milestone table for the 2009-10 financial year;*
- *the CRC's financial tables for the 2009-10 financial year;*
- *the CRC's 2009-10 Management Data Questionnaire; and*
- *the four Quarterly Reports provided online for the 2009-10 financial year*

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

I certify that the Commonwealth funding and Researcher/Participant Contributions were applied for the Activities of the CRC as specified in Schedule 1 of the Commonwealth Agreement.

I certify that the CRC has met its obligations in relation to the treatment of Intellectual Property.

I certify that the Chairman of the Board meets the requirements of independence set out in the Commonwealth Agreement and that the majority of Board members are not Research Providers.

I am aware that giving false or misleading information is a serious offence.

Signature:

Name: Gary Morgan

Position: CEO, Bushfire CRC

Date: 26 October 2010



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US-Australia Joint Symposium, Fire in the Interface, June 2010

EXECUTIVE SUMMARY

ACHIEVEMENTS AND ACTIVITIES FOR THE REPORTING PERIOD

High level achievements for 2009-2010 include:

Research

Bushfire CRC research outputs continued to have high impact this year. Building on the success of recent years, the research achievements included the following:

- The Bushfire CRC maintained a high publication average of 40-50 scientific papers with around 40 percent in A* and A journals. Many of the scientific papers are now being published through some of the more significant journals in the field, often with long lead times for publication. Quality papers on research conducted before 30 June 2010 will continue to appear over the coming years.
- Easy to digest field guides from two research projects were delivered to industry. These were the *Human Factors Interview Protocol* and *Fire Severity Categories for the Tropical Savannah Woodlands of Northern Australia*. These guides are readily accessible to the public and operational personnel in the industry. They are available for order on the Bushfire CRC website and through the online Shop of the Australasian Fire and Emergency Service Authorities Council.
- The Bushfire CRC *Fire Containment Guide* was delivered to industry - a text guide and an online calculator produced out of Project A3.1 Evaluation of Aerial Suppression Techniques and Guidelines. This Guide is for use by the decision makers in fire management to assist in the allocation of aerial and ground suppression resources to different types of fires.
- Research output after seven years now totals more than 826 publications. All reports, journal articles, presentations and posters are online at www.bushfirecrc.com and most also appear on the AFAC Knowledge Web, a product of the Bushfire CRC now managed by the industry.
- The Bushfire CRC has strengthened its international associations in particular in the United States, Canada and Europe. These partnerships will continue to provide research opportunities for collaboration and for benchmarking the quality of the research program.
- Following a direct approach from the US Department of Homeland Security to the Bushfire CRC on the issue of communities in rural-urban interface areas, a United States-Australasian fire research symposium *Fire in the Interface* was held in June (pictured left). Participants with specific expert knowledge were invited to the symposium to discuss the current state of knowledge, issues confronting communities and fire fighters, and the gaps in knowledge for addressing fire within the wildland-urban interface. More than 40 Australian, New Zealand and United States researchers, practitioners and policy-makers gathered in Melbourne and Canberra. The meeting was organised by the Bushfire CRC in conjunction with the departments of Prime Minister and Cabinet, and Attorney General in Australia, and the Department of Homeland Security in the United States.

Research Adoption

The Research Adoption process ensures that the research knowledge is transferred into industry to make the industry and the community safer. Highlights this year include:

- The Bushfire CRC held an international conference on the Gold Coast in September. The conference was seen as a major international event attracting 1132 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, three hands-on workshops were provided to assist in the transition of research into agencies responsible for community safety.

- To assist fire agencies, volunteers and the community understand the new fire knowledge and how best to apply this knowledge, the Bushfire CRC is turning scientific reports into easy to read publications. This included 35 *Fire Note* and *Fire Update* briefing papers (19 last year) distributed to the industry on subjects including aerial fire fighting, the organisations of incident management teams, fire fighter 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.
- The Bushfire CRC has partnered with the specialised groups of the peak industry body, AFAC, to introduce outputs of the research to all Australian and New Zealand fire and land agencies. This has taken place in meetings, forums, field trips and workshops, and has been assisted by the development of tailored products including decision support tools, DVDs and industry materials (*Fire Notes*).
- A workshop and field trip in northern New South Wales in August (right) provided an accessible demonstration to the forestry industry on how Bushfire CRC research enables prescribed burning in eucalypt plantations to assist in better fire protection measures without detriment to the trees.



Education

By end of June 2010 all students who had completed their studies were placed in industry employment or in research, indicating the positive benefit the Bushfire CRC is having in building capacity within the industry. A few students are scheduled to complete their studies in 2010-11 and are on track for successful completion.

New students to match the new extension program were sought with several scholarships offered after a national advertising campaign through the media and through partner channels.

Royal Commission

The 2009 Victorian Bushfires Royal Commission relied upon many Bushfire CRC members to provide scientific evidence.

The Royal Commission utilised the comprehensive report of the Bushfire CRC Research Taskforce, which compiled data in the immediate aftermath of the Black Saturday fires, in addition to other Bushfire CRC reports and experts on a range of topics, to assist the Commissioners in their deliberations. The Royal Commission engaged the Bushfire CRC with contractual work to assist it in its task of investigating the

impacts of these fires. This was a strong endorsement of the independent research capabilities of the Bushfire CRC.

Prior to the Bushfire CRC, very little fire-related social science research was conducted globally. As a consequence of the Bushfire CRC program focussed on social science, the Royal Commission was able to draw heavily upon this scientific expertise for evidence and analysis, and to guide its consideration of final recommendations.



The Bushfire CRC responded to an invitation by the Commission to submit a statement on the need for ongoing bushfire research. This was followed up with request for the CEO to speak in more detail on the matter before the Commission (pictured above). In total 10 Bushfire CRC researchers appeared before the Commission as expert witnesses, including the CEO and the Chairman. Five of the seven scientists who took part in an expert panel discussion for the Commission on land and fuel management in February were Bushfire CRC researchers.

The commissioners subsequently commended the organisation in their final report, saying they had “...benefited from extensive research conducted by the Bushfire Cooperative Research Centre...”

Black Saturday Research Taskforce final report



The Final Report of the Bushfire CRC Research Taskforce into the 7 February 2009 bushfires in Victoria was produced in November.

This report was delivered to the Victorian fire and land management agencies and then to the 2009 Victorian Bushfires Royal Commission. This was the outcome of a major research effort coordinated by the Bushfire CRC and of value to the Australian and international fire community.

Every day over a period of nearly two and a half months from mid-February in 2009, the Bushfire CRC placed teams of up to 50 researchers and agency staff from across Australia, New Zealand and the United States, to the areas affected by the fires. The Taskforce gathered data at 1300 houses, interviewed more than 600 residents and looked at the fire behaviour of the major bushfires.

The final report includes preliminary findings based on this data under

the broad areas of fire behaviour, human behaviour, building and land use, demographics, and studies that have integrated these elements.

The completion of this report demonstrates the success in capacity building and the ability of the Bushfire CRC to coordinate and manage a large and diverse research response in a short time frame. Through the capacity built up by the Bushfire CRC, researchers and fire agency staff from across Australia, New Zealand and the US were able to be assembled.

Prior to the formation of the Bushfire CRC, the collection of data of this substance would not have been possible. No other Australian bushfire inquiry has had the benefit of such a wealth of information.

Communications

The Bushfire CRC has had a high 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 Interim Report in May. During the course of the Royal Commission, the Bushfire CRC and its people were regularly in the media. There was also heavy media coverage of two of the contract research projects: the evaluation of the DC-10 air tanker and the trial of bushfire detection camera systems.

The international Bushfire CRC research conference on the Gold Coast attracted considerable media coverage, including (right) national media based at the conference for the duration of the event.



The Bushfire CRC website received a steady increase in hits over the year with demand particularly strong around major bushfire events, in particular around the release of the Interim Report of the 2009 Victorian Bushfires Royal Commission, 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.

Publications on the research that are written and designed specifically for the industry for improved fire management and community safety are available online and in printed format. The Bushfire CRC website and the Knowledge Web now include all publications, reports, conference papers and posters of the Bushfire CRC. New material is uploaded as it is produced.

RISKS, OPPORTUNITIES AND RESPONSES

The significant additional research workload upon Bushfire CRC researchers as a result of the 2009 Victorian Bushfires Royal Commission created some conflict in the delivery times of research outputs. However, successful negotiation and the provision of additional assistance enabled the high demands on Bushfire CRC researchers to be met to the satisfaction of all stakeholders.

Research into Industry

Now in the final year of its seven year funding and with most of the key research outputs and activities achieved or close to being finalised, the Bushfire CRC again spent much of the year focussed on its *Research Adoption Strategy* and completing the scientific requirements through the submission of journal articles and other academic outputs. This strategy will ensure that research outputs are founded in rigorous scientific publications and are properly managed through to industry adoption.

Scrutiny of Research

The Bushfire CRC continued to receive significant additional 'third party' exposure and scrutiny as leading researchers and post-graduate students provided both formal and less formal assistance to the 2009 Victorian Bushfires Royal Commission. The work of the researchers has been scrutinised by peers and by the international community and has been held in high regard.

The Bushfire CRC successfully completed the final year of its seven year funding life with more than 90 percent of the key research outputs and activities as defined by the original Commonwealth Agreement achieved.



Where outputs have been unable to be completed alternative products and/or ways to address the issue have been agreed upon between the Bushfire CRC, research partners and industry. Where appropriate, variations to the Commonwealth Agreement have been completed through the CRC Program procedures.

AWARDS, SPECIAL COMMENDATIONS, CRC HIGHLIGHTS

Awards

Bushfire CRC PhD student Briony Towers was selected as a top four finalist in the Early Career Scientist Award to present to the CRC Association Annual Conference in Alice Springs in May. Briony, from the University of Tasmania, was selected for her work on how children understand bushfire risk and how this work was taken up by fire agencies. The CFA in Victoria and Ettamogah Productions worked with Briony to develop a series of 30 second animated cartoons that were repeatedly shown on three free to air television networks across southern Australia over the past bushfire season. While Briony did not win the Award, her selection as a finalist - the first social scientist to present at a CRCA conference - was a significant achievement and attracted much media coverage.





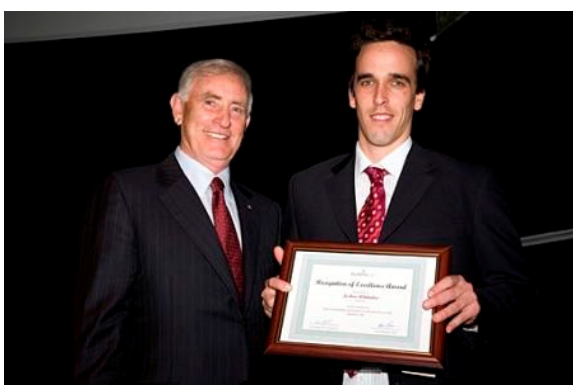
Dr Andrew Dowdy, (left) a Bushfire CRC researcher at the Bureau of Meteorology, was one of 16 early-career scientists who presented their research to the public in Fresh Science, a national program sponsored by the Australian Government and hosted by the Melbourne Museum.

Andrew has studied the occurrence of fires caused by lightning, particularly “dry-lightning” that occurs without significant rainfall. This

research is a systematic examination of the association between lightning and fires in Australia. He has also found that wind speed plays a bigger role than temperature in creating dangerous conditions for bushfires. His work with the Bushfire CRC has led to new possibilities for predicting bushfire conditions based on the weather.

Excellence Awards

A highlight of the Bushfire CRC annual conference was announcement of the recipients of the inaugural Bushfire CRC Awards for Excellence.



Award winners Josh Whitaker (at left with Chairman Len Foster) and Lachie McCaw (right).

These Awards were a new initiative to recognise and celebrate the work of our finest students and researchers. Work conducted over the life of the Bushfire CRC by a student and by a researcher was considered. The awards included \$10,000 to the researcher and \$5000 to the student for professional development.

The awards recognised individual excellence in meeting the Bushfire CRC objectives.

Following a call for nominations from all Stakeholders the Bushfire CRC Governing Board decided that the most worthy recipients were: Joshua (Josh) Whittaker, for the Student Award and Dr (Lachie) Lachlan McCaw, for the Researcher Award.

CONTEXT AND MAJOR DEVELOPMENTS DURING THE YEAR

A changed industry context

This year, as the original seven year research program drew to a close, 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.

To this mix was added a range of issues arising out of the tragic Black Saturday bushfires in Victoria during February 2009. It is with these new priorities that the Bushfire CRC needed to look ahead and plan a strategic research agenda for 2010 and beyond.

Through the Bushfire CRC, the sector partners agreed to continue to work 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 industry.

The Bushfire CRC received an additional three years funding from the Australian Government; \$15 million for research in the period 2010-2013. This will be used to conduct research into national issues arising from the 2009 Victorian Bushfires Royal Commission.

Further work has begun to identify an appropriate research vehicle and funding sources to secure the future of longer term fire-related research in Australia.

Discussions between the industry and research partners continue on how best to build on the success of the Bushfire CRC. The Bushfire CRC partners have agreed that into the future, Australia needs to conduct research across a range of fields for the benefit of our broad industry and the communities they serve. As one of the most bushfire prone areas on earth, the Bushfire CRC partners are seeking an end-user lead institute that will work closely with similar bodies internationally and will collaborate with organisations with an association with fire in areas such as building, planning, local government, health, media, risk management, insurance, water and power, and telecommunications.

Unprecedented external scrutiny

Another significant change in the industry context has been the unprecedented rise in the level of scrutiny of the management of bushfires in Australia, most recently by the 2009 Victorian Bushfires Royal Commission and the inquiry into bushfires by the Australian Senate Select Committee on Agricultural and Related Issues. The requirement for the industry to actively participate in these Inquiries placed considerable demands on researchers and Bushfire CRC staff over the year.

Conversely, these Inquiries provided considerable opportunities to broaden research/industry interactions and to provide high quality scientific knowledge to assist the high level inquiries in making strategic recommendations to improve community safety.

THE VALUE OF OUTCOMES

The expected monetary and non-monetary outcomes of the CRC

Under CRC Objective 2.1 Benefit to Australia, the actual and future benefits were predicted to be more than three times the Commonwealth Grant through a cost-benefit analysis.

Does the value of outcomes match the expectations?

An economic study compiled for the Fifth Year Independent Review showed that the likely economic NPV return from the Bushfire CRC is in the range of \$66m-\$450m. As the Commonwealth contribution to the Bushfire CRC is in the order of \$26m, this represents a factor of between 2.5 to 17 times the Commonwealth Grant depending upon the discount factors and assumptions used. This work has been reviewed by Prof David Pannell of the University of Western Australia.

How does the CRC intend to address any issues and maximise the value of outcomes over the remaining life of the CRC?

The Bushfire CRC has established a formal process with its industry, through AFAC, to ensure that the research is developed in cooperation between researchers, and all the fire and land management agencies in Australia and New Zealand. This process ensures that the final outputs are transferred as widely as possible into industry in a manner allowing for rapid assimilation and ease of delivery by the agencies to the communities for which they are responsible.

MAJOR DEVELOPMENTS AND INITIATIVES

Special service - Royal Commission

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

In evidence before the Commission Bushfire CEO Gary Morgan stressed that the Bushfire CRC did not have the capacity to do all the bushfire research required by agencies and the community. He said that he encouraged more research to be conducted, and that the Bushfire CRC was not in competition with the universities or CSIRO. He encouraged more total funds to increase research. [These themes were picked up in the final report of the Royal Commission released on 31 July 2010.]

In addition, the Commission requested the Bushfire CRC to make a formal submission on the questions - “what are the existing gaps in fire knowledge?” and “what model could be established to facilitate a coordinated approach to fire research?” The final report of the Royal Commission quotes extensively from this submission (*see the footnotes in the report at Volume II , Chapter 11*) on the history of fragmented research in Australia, the need for more skilled fire managers, the funding constraints on national bushfire research, the limited breath of research, and the collaborative approach to research seen in recent years.

[The Commission, in its Final Report, considered that a national research centre or institute is required for bushfire research with greater investment. It made a recommendation to this effect. Although the Commission did not propose a model, it identified the features to be considered when governments establish an institute.]

Clearly, without the Bushfire CRC, the 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.

Staff Appointments and Movements

As this was the final year of this funding grant, no major staffing appointments were made. However, key staff were being identified and approached to take leadership positions in the extension research program. This included key research leaders and key end-user participants.

NATIONAL RESEARCH PRIORITIES

NATIONAL RESEARCH PRIORITY GOAL HIGHLIGHTS

An Environmentally Sustainable Australia

Transforming the way we utilise our land, water, mineral and energy resources through a better understanding of human and environmental systems and the use of new technologies.

The Bushfire CRC's research is examining how land can be managed through the use of fire to ensure a reduction in risk to the community.

The focus is on:

- Maintaining and enhancing the quality and quantity of water.
- Maintaining the health of soils ecosystems
- Maintaining and enhancing the biodiversity
- Examining how climate change will impact on fire regimes, and ecological systems

Promoting and maintaining good health

Promoting good health and preventing disease, particularly among young and older Australians.

The Bushfire CRC research program includes assessing the impact of fires on the health and safety of communities and fire fighters. It is examining the impact of bushfire smoke on communities and determining ways to better predict where smoke will travel. This is helping to reduce the incidence of conditions such as asthma. A *Field Guide to Smoke Exposure Management* that was produced for the fire managers by researchers was heavily promoted throughout the year. The *Smoke Dispersion Forecast Training DVD* continues to be popular with fire agencies.

The Bushfire CRC is also undertaking research into the impact of smoke related problems specifically in relation to fire fighters to ensure better health, particularly among the ageing volunteer workforce. In addition, the Bushfire CRC is conducting research into how fire agencies can provide more productive roles for ageing volunteers.

Safeguarding Australia

Safeguarding Australia from terrorism, crime, invasive diseases and pests, strengthening our understanding of Australia's place in the region and the world, and securing our infrastructure, particularly with respect to our digital systems.

Core to the mission of the Bushfire CRC is reducing the bushfire risk to the community, critical infrastructure, industry and ecosystems. This includes research into the effectiveness of incident management systems and the effectiveness of techniques and technologies utilised by the fire and emergency services and land management agencies.

National Research Priorities and CRC Research

NATIONAL RESEARCH PRIORITIES	CRC RESEARCH (%)
AN ENVIRONMENTALLY SUSTAINABLE AUSTRALIA - <i>Transforming the way we use our land, water, mineral and energy resources through a better understanding of environmental systems and using new technologies</i>	
Water - a critical resource	5
Transforming existing industries	15
Sustainable use of Australia's biodiversity	10
Responding to climate change and variability	5
PROMOTING AND MAINTAINING GOOD HEALTH - <i>Promoting good health and preventing disease, particularly among young and older Australians</i>	
Ageing well, ageing productively	10
Strengthening Australia's social and economic fabric	10
FRONTIER TECHNOLOGIES FOR BUILDING AND TRANSFORMING AUSTRALIAN INDUSTRIES - <i>Stimulating the growth of world-class Australian industries using innovative technologies developed from cutting-edge research</i>	
Breakthrough science	10
Promoting an innovation culture and economy	10

SAFEGUARDING AUSTRALIA - <i>Safeguarding Australia from terrorism, crime, invasive diseases and pests, and securing our infrastructure, particularly with respect to our digital systems</i>	
Critical Infrastructure	15
Protecting Australia from invasive diseases and pests	5
Protecting Australia from terrorism and crime	5

GOVERNANCE AND MANAGEMENT

The Bushfire CRC operates through an incorporated not for profit company, Bushfire CRC Ltd.

The Company, Bushfire CRC Ltd was registered in March 2003 and began formal CRC operations in July 2003. Participating parties are members of the company, which is limited by guarantee.

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

The Stakeholders Council met twice this year to review and receive updates on the progress of research, education, communication and other activities, and to provide strategic advice to the Governing Board. These meetings were hosted by partners at the University of Melbourne and at the Bureau of Meteorology. The Governing Board met six times throughout the year. Both the Stakeholder Council and the Governing Board have the same independent Chairman.

The Governing Board has five committees:

- An **Audit and Compliance Committee** that oversees corporate governance, audit responsibilities, finance and compliance.
- A **Users 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.
- An **Research Utilisation Committee** to advise on the strategy for research adoption.
- A **Strategic Directions Committee** to advise on future planning initiatives.

CEO, Governing Board Members and Committee Members

Name	Organisation	CRC Position / Role
Len Foster	Bushfire CRC	Independent Chairman Director Strategic Directions Committee (Chair) HR Committee
Mark Adams	Dean, Faculty of Agriculture, Food and Natural Resources University of Sydney	Director (from 12 December 2009) Research Utilisation Committee
John Baird	Rector, Australian Defence Force Academy	Director (to 10 September 2009) Education/Research Adoption Committee (Chair)
Neil Bibby	Chief Executive Officer, Country Fire Authority	Director (to 7 October 2009) Audit Compliance Committee
Joanne Bloch	Independent	Director Audit Compliance Committee (Chair)
Naomi Brown	Chief Executive Officer, Australasian Fire and Emergency	Director HR Committee (Chair)

	Service Authorities Council	
Ray Canterford	Assistant Director, Bureau of Meteorology	Director (to 14 June 2010) Users Research Committee
Murray Dudfield	National Rural Fire Officer, New Zealand Fire Authority	Director Research Utilisation (Chair) Users Research and Education Committee
Shane Fitzsimmons	Commissioner, NSW Rural Fire Service	Director (from 20 November 2009) HR Committee Research Utilisation Committee
John Gledhill	CEO/Chief Officer, Tasmania Fire Service	Director (to 2 September 2009) HR Committee Education/Research Adoption Committee
Alistar Robertson	Dean, Faculty of Natural and Agricultural Resources	Director Users Research and Education Committee
Mike Taylor	Chair Murray Darling Basin Authority	Director (from 20 November 2009) Strategic Directions Committee Audit and Compliance Committee
Ewan Waller	Chief Fire Officer, Department of Sustainability and Environment	Director Users Research and Education Committee (Chair)
Gary Morgan	Bushfire CRC	CEO
Richard Thornton	Bushfire CRC	Deputy CEO

Program Leaders

Name	Organisation	CRC Position / Role
Rod Keenan	University of Melbourne	Program A: Safe Prevention, Preparation and Suppression
Mark Adams	University of Sydney	Program B: Fire in the Landscape
John Handmer	RMIT University	Program C: Community Self-Sufficiency for Fire Safety
Bob Leicester	CSIRO Manufacturing and Infrastructure Technologies	Program D: Protection of People and Property
Christine Owen	University of Tasmania	Program E: Education

Stakeholder Council Meetings, (top) November 2009 at the University of Melbourne, and (below) April 2010 at the Bureau of Meteorology.



RESEARCH PROGRAMS

KEY RESEARCH ACHIEVEMENTS

The Bushfire CRC continued its leadership in the area of research and the adoption of research outputs.

The Bushfire CRC as a result of the timing of the extension funding was largely in research finalisation and utilisation mode during 2009-2010 with most activity focused on the write-up of research and adoption activities. Most of the research activity had completed the research phase by December 2009, and the second half of the year had a main focus on transferring knowledge into the industry. There was extensive contract research undertaken during this second half of the year enabling the Bushfire CRC to maintain its critical mass of research activity.

This financial year had a number of highlights, central to this was our highly successful annual conference held in conjunction with the peak industry body, the Australasian Fire and Emergency Service Authorities Council (AFAC). This year the conference was held on the Gold Coast, attracting around 1132 delegates. The Bushfire CRC is fortunate to have such strong linkages with the industry in this way to give massive exposure of the research to the key industry players. The Bushfire CRC, as well as presenting its work through traditional conference presentations, also produced around 50 posters covering the work of the research programs and the students. As in previous years, these were later used as communications tools for discussion with the CEO and managers of the stakeholder organisations in the form of a book with A4 versions of the posters. The Bushfire CRC has also held professional development and research adoption pre-conference workshops in conjunction with the conference. Again, these attracted more than 100 participants, most of who will take back their learnings to their organisations and further support others through in-house training. This initiative has now been embraced by AFAC who in 2010 joined the Bushfire CRC in delivering professional development courses at the conference.

A critical part of the work of the Bushfire CRC during this last year has been driven by the bushfires of 7 February 2009 in Victoria, which saw the deaths of 173 people in Australia's worst natural disaster. The Bushfire CRC entered into a formal arrangement with the 2009 Victorian Bushfires Royal Commission (VBRC) that led to a number of targeted pieces of work directly for the VBRC that can be found under Exhibits at www.royalcommission.vic.gov.au:

- An evaluation of the distance from vegetation for house loss; a comparison of Black Saturday house loss with earlier fires including those of Ash Wednesday, Canberra and Sydney.
- An analysis of the fatalities in Black Saturday; this allowed for a comparative analysis with a 2009 extensive study by the Bushfire CRC examining 100 years of how, where and what those who died were doing immediately prior to their death.
- An analysis of the capabilities of various aerial fire fighting appliances (planes and helicopters) available to Australian fire authorities (not on public website)
- Selected advice to Counsel Assisting the VBRC on issues relating to prescribed burning.



In addition to the work for the VBRC, the Bushfire CRC also undertook an extensive postal survey of households in the areas affected by the Black Saturday fires. The report on this survey, which attracted more than 1300 respondents, is available on the Bushfire CRC website. The survey results were heavily

relied upon in the VBRC's final reports with multiple references to the findings. This survey together with the other reports flowing from the post Black Saturday fires research, present a substantial resource for further analysis, which will begin as part of the Bushfire CRC extension projects.

Major project work undertaken by the Bushfire CRC for the fire industry, funded by the Victorian Government, included the high profile evaluation of the DC-10 Very-Large Air Tanker. This was the first time such a large air-tanker had been used for fire suppression in Australia and the first time it had been evaluated for effectiveness. The evaluation was of the highest importance for the Government given that the contracting of the DC-10 to Victoria was a \$10m investment. The final evaluation report was released by the Victorian Government in September 2010 - the report concluded that the DC-10 had limited effectiveness under the Australian conditions and presented some safety issues.



Other significant work for the Victorian Government included the co-ordination of extensive fire reconstructions for the Kilmore and Murrindindi fires of Black Saturday.

The Bushfire CRC also undertook work to examine the effectiveness of fire detection cameras in conjunction with the Federal Attorney General's Department, the Victorian Government's Office of the Emergency Services Commissioner, the Country Fire Authority, Department of Sustainability and Environment and NSW Forests. This work, which was conducted by CSIRO, evaluated three camera systems from three different vendors in the Otway Ranges in Victoria and near Tumut in NSW to determine their effectiveness in detecting fire starts. The performance was judged in comparison to current methods of fire detection such as fire towers, triple zero calls from the public, and spotter planes. This was a substantial project conducted over three months.

During the financial year the Bushfire CRC has been building on the international linkages it has developed with the US Government agencies. In conjunction with the Department of Prime Minister and Cabinet, the Bushfire CRC worked with the US Department of Homeland Security to host a joint Australasia-US wildland-urban interface research symposium. This was held in Melbourne and Canberra in June 2010.

Researchers, practitioners and policy makers from the US, Australia, and New Zealand spent a week together developing research proposals for joint activities. Attendees came from the universities of California, Utah and California Polytechnic, from agencies including CalFire, National Fire Protection Agency, US Forest Service and policy makers from the US Department of Homeland Security and the National Fire Agency. In Australasia, the attendance was drawn from researchers from CSIRO, the universities of Melbourne, Wollongong, RMIT and ANU; practitioners from the Victorian CFA and DSE, Western Australian DEC, South Australian DEH, ACT RFS, NSW RFS, NSW Fire Brigades, QFRS, Tasmania Fire, NZ Scion; and policy makers from Department of Prime Minister and Cabinet and the Attorney General's Department.

The outcome of the symposium was an evaluation of the gaps in science knowledge, an agreement on the priorities for future collaborative research, and five fundable research plans. A feature of the meeting was when a delegation of the parties visited the US Ambassador in Canberra who gave his strong support to the bilateral discussions. The symposium included field tours of the Black Saturday fire areas in Victoria and the 2003 Canberra fire areas to get an agreed understanding of the fire issues in Australia.



Excellence Awards

A highlight of the Bushfire CRC annual conference was announcement of the recipients of the inaugural Bushfire CRC Awards for Excellence.

These Awards were a new initiative to recognise and celebrate the work of our finest students and researchers. Work conducted over the life of the Bushfire CRC by a student and by a researcher was considered. The awards included \$10,000 to the researcher and \$5000 to the student for professional development..

The awards recognised individual excellence in meeting the Bushfire CRC objectives

Following a call for nominations from all Stakeholders the Bushfire CRC Governing Board decided that the most worthy recipients were: Joshua (Josh) Whittaker, for the Student Award and Dr (Lachie) Lachlan McCaw, for the Researcher Award.

As a Bushfire CRC PhD student at RMIT University Josh not only successfully completed his studies but also contributed to the Program C *Bushfire Community Safety* book, provided material for input into the Garnaut Report on Climate Change, and played a lead role in the Bushfire CRC Research Response Taskforce following the 2009 Victorian Bushfires. It was recognised across the Bushfire CRC and the industry that Josh has contributed well above the normal expectations of a student.

Dr Lachie McCaw, a project leader at the Bushfire CRC, delivered high quality research outcomes in understanding the ecological impact of fire on the landscape. While Lachie's work has been principally focussed in south-west Western Australia, working with the Department of Environment and Conservation, he has taken on a national role in the broader evidence based decision making in the land management

area playing an important role in the completion and evaluation of the work on Project Vesta and is a mentor to emerging researchers in this field. He was the leader of the fire behaviour component of the Bushfire CRC Research Response Taskforce following the 2009 Victorian bushfires and is a role model for researchers in this industry for now and into the future.

PROGRAM HIGHLIGHTS

Final deliverables were completed across the research program. Highlights include:

Program A Safe Prevention, Preparation and Suppression

- Burning and fire behaviour guides for the Mallee heath lands
- Guidelines for the effective use of aerial fire fighting (*Fire Notes* 38 and 50)
- Development of the Phoenix Rapid Fire model to enable it to be embedded in Victorian Department of Sustainability and Environment's Fire Web for the 2009/10 bushfire season. It was also relied upon by the 2009 Victorian Bushfires Royal Commission.

Program B Fire in the Landscape

- Completion of the research report on the work on fire intervals and biodiversity responses to fire in south-west Western Australia and the production of educational DVD on the project findings.
- Submission of the manuscript to the publisher for a major book on prescribed burning co-authored by the Program Leader.
- A major presentation of the High Fire research at a high country forum of more than 100 regional fire and land managers from four states and territories and the general public in Albury, New South Wales.
- A substantial input in the VBRC's "hot-tub" and as expert witnesses on prescribed burning by many of the Bushfire CRC's researchers.

Program C Community Self Sufficiency for Fire Safety

- Completion of the *Community Bushfire Arson Prevention Handbook*, developed and launched by the Federal Attorney General.
- Development of a new masters level module based upon the Bushfire CRC research on community safety program evaluation.
- Significant input to the VBRC by Bushfire CRC community safety researchers as expert witnesses.

Program D Protection of People and Property

- Significant input by Bushfire CRC researchers on national Building Standards to the VBRC.
- Delivery of substantial guidelines on incident management teams, including a comprehensive national survey on the Australian inter-service incident management system.
- Delivery of a major omnibus report on the retention, recruitment and recognition of fire and emergency service volunteers.
- Delivery of a major professional development course on occupational health and safety for fire fighters - first delivered at the 2009 Conference on the Gold Coast.

CONSULTANCIES

Nature of major consultancies and their contribution to the CRC

The Bushfire CRC has continued to undertake consultancies for individual fire service and land management agencies and for the 2009 Victorian Bushfires Royal Commission during this financial year. These have all enabled the Bushfire CRC to undertake a broader scope of work than would have been otherwise possible.

Work with individual fire service and land management agencies has enabled an extension of existing Bushfire CRC projects into guidelines and other products that are more accessible to the industry.

Major pieces of work arising from the Black Saturday fire in Victoria have been undertaken for the Victorian agencies and the 2009 Victorian Bushfire Royal Commission.

Reports that have been publically released are at www.royalcommission.vic.gov.au or www.bushfirecrc.com

These have included:

- Places of last resort, for the CFA
- An analysis of the 173 fatalities, for the Royal Commission
- An analysis of the distance from vegetation for house loss
- An analysis of aerial suppression guidelines

The Bushfire CRC has also co-ordinated consultancies for the Department of Sustainability and Environment Victoria examining:

- Fire danger rating science
- A reconstruction of the fire events of Black Saturday
- An evaluation of the economics of bushfires

The Bushfire CRC also conducted a national consultancy project for the NSW Fire Brigades on the evaluation framework for the economic impacts of large disasters.

A major project was undertaken for the Victorian Government when the Bushfire CRC was asked to assess the effectiveness of a DC-10 Very Large Air Tanker (VLAT) that was contracted for the summer bushfire season. The Bushfire CRC's research found that this aircraft was unsuitable for use in Victoria under the conditions tested, which enabled the Victorian Government to make a more effective choice of aircraft for the coming season. This has potentially saved millions of dollars for the Victorian taxpayers.

Nature of any grants and how they contribute to the CRC

The Bushfire CRC has not applied for nor received any grants during this period.

Any changes proposed to future research directions

Following the awarding of an extension of the Bushfire CRC by the Australian Government in early 2009, the Bushfire CRC and the industry are now undertaking a new research agenda under a new Commonwealth Agreement which was signed on 14 July 2010.

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 Spatial Information CRC that was 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 DC 10 air tanker, providing research into the reconstruction of some of the major fires on Black Saturday and providing advice on the movement of people during the fires.
- The Bushfire CRC had an active collaboration with the 2009 Victorian Bushfires Royal Commission providing research services and advice to the Counsel Assisting the Commission
- The Bushfire CRC conducted a workshop with the US Department of Homeland Security, the Department of Prime Minister and Cabinet, and the Attorney-General's Department, to scope project plans for joint research between the US and Australia on fire in the urban interface areas. (right).
- 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 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*.



COMMERCIALISATION AND UTILISATION STRATEGIES AND ACTIVITIES

The detail of the commercialisation and utilisation strategies can be found in the Commercialisation and Utilisation Strategy reviewed in October 2008.

A copy of this can be found at <http://www.bushfirecrc.com/members/downloads/Bushfire-CRC-Commercialisation-and-Utilisation-plan-ammended-april-2007.pdf>

INTELLECTUAL PROPERTY MANAGEMENT

Refer to the detailed Bushfire CRC Commercialisation and Utilisation Plan. (See link above)

TRANSITION INFORMATION (EXTENSION CRCS ONLY)

All research outputs are in the public domain, or in the process of being placed there, so matters of IP ownership from the original Commonwealth Agreement do not present as an issue.

All financial transactions have been recorded up until the date of the completion of the Audited Financial Statements on the Account. Any subsequent transactions that occur after this audit date will be taken into account by 31 December 2010 for a final reconciliation of accounts.

A final balance of the Account for transfer to the extension CRC will be confirmed around that date.

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 communication's objectives of all the stakeholder fire and land management agencies and research organisations.

Progress continues on a range of communications activities that are aligned to the strategic direction 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 community
- The general public

Activities are focussed on priority areas including:

- online communications
- publications
- media
- events

Communicating our work

With the Bushfire CRC at a point of closing out one research program and beginning another, while bringing on new partners and international collaborations, a sound communications strategy to guide activities over the next phase of the CRC is essential. During this reporting period an external audit of our current strategy began with a view to providing direction on how to position the Bushfire CRC to actively promote its work to a range of audiences. This work is ongoing through 2010 to 2011.

Online update

The Bushfire CRC website is in the process of being overhauled to take into account the new research program, and include the new researchers and new partner organisations. Given that 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

Gold Coast Conference and Bushfire CRC workshops for industry



Our annual conference, in conjunction with AFAC, at the Gold Coast Convention Centre in September again exceeded expectations with 1132 delegates from 14 countries attending over the three days.

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 - is an acknowledgement that the industry is seizing the opportunity to be informed of the latest developments in its field.

This was a prime communications event for researchers. All Bushfire CRC postgraduate students are 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.

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 161 delegates participating in the two Bushfire CRC pre-conference workshops and a full-day seminar. These sessions allowed many of our researchers to present their research to the broader industry and to discuss ideas for better utilisation.

The topics delivered were:

- Protecting Fire Fighters - a workshop at which 44 participants learnt about the latest Bushfire CRC research into fire fighter health and safety; safe decision making and behaviour; plus effective incident management teams and how the research can be integrated and adopted as part of the pathway to greater fire fighter safety.
- Community Safety and Engagement, a workshop where 40 researchers and agency personnel interacted on the implementation of good practice for the "Prepare, Act Survive" position that provides for safer communities.

- Fuels and Weather seminar - 77 participants. This seminar raised many issues on how the research can be utilised to develop better policies and practices. The session was video-taped and was supplemented with short interviews of the main presenters. This is now available both online and as a package of DVDs.

The workshops were followed by two days of conference presentations (many highlighting the implementation of Bushfire CRC research), a research poster display and an extensive trade exhibition.

Conference presentations, posters, videos and photographs were uploaded on the Bushfire CRC website and the Knowledge Web.

The exhibition associated with the Conference had 85 organizations occupying 133 exhibition spaces. Again this proved to be successful in allowing the researchers and partners to interact with representatives of the various enterprises, including large corporations and SMEs. 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.



Australasia-US collaboration

More than 40 invited Australian, New Zealand and United States researchers, practitioners and policy-makers gathered in Melbourne and Canberra from 14-18 June 2010 for the research symposium.

The event was organised by the Bushfire CRC in conjunction with the departments of Prime Minister and Cabinet, and Attorney General in Australia, and the US Department of Homeland

Security. The week-long symposium included meetings in Parliament House Canberra, and field trips to areas burnt in Black Saturday in Victoria and in Canberra in 2003. Over the week, the participants shared knowledge on bushfire risk on the interface and to developed proposals for collaborative research projects in the areas of fire behaviour, interface planning and community safety.

High Country Forum



A two-day forum on Fire in the High Country attracted 110 people in May. The forum was held in Albury and featured much Bushfire CRC research from the HighFire Project as well as other Bushfire CRC research related to the issue. Positive feedback from the attendees reinforced the success of the forum. An ABC multi-platform reporter attended both days and interviewed key participants. The presentations, related

documents and links to wide media coverage are now online at:

www.bushfirecrc.com/training/highcountryforum.html

Plantation burn field trip



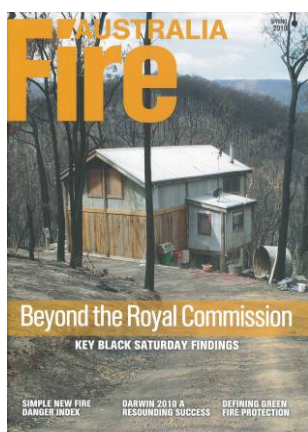
A seminar and field trip in Casino in northern New South Wales was held in August to showcase the outputs of the latest research by the Bushfire CRC and how these can be used in the field when managing fuel in eucalypt plantations.

Bushfire CRC PhD student Phil Lacy lead the activity, which was based around his research and his recently released field guide *Burning Under Young Eucalypts*. The day attracted 30 participants from Bushfire CRC Stakeholder organisations and the eucalypt plantation industry.

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 four times a year with a distribution list of 6000 that includes all Bushfire CRC researchers and end-users, AFAC members, the fire protection industry, academic libraries, and selected local, state and federal members of parliament. Bushfire CRC activities associated with the Black Saturday fires, including the Royal Commission, provided a wealth of content for *Fire Australia*'s audiences this year.



Research Briefs

One-page Bushfire CRC *Fire Updates* and four-page *Fire Notes* on research projects were emailed to end-users and researchers on a regular basis throughout the year. *Fire Updates* serve as a brief summary of the project designed to keep all Bushfire CRC members abreast of current developments. With much of the

research program winding down there was less need for regular *Fire Updates*, although that output is expected to increase again the following year as the new research program begins.

Fire Notes however, increased dramatically in importance this year as they contained more in-depth summaries of each closing research project and each student PhD. These publications are also available online for general access. This year there were 30 *Fire Notes* (11 in the previous year) and five (7) *Fire Updates* published.



Newsletter

This year 12 (monthly) newsletters were distributed to Bushfire CRC end-users, researchers, and students. These are also available online. In addition, regular full reports on Bushfire CRC activities were provided to Board and Stakeholder Council members.

Publications

There is a growing amount of research content produced by the Bushfire CRC that is now available for Bushfire CRC members and the broader industry. The publications output now totals 826 items including research reports, journal articles, field guides, presentations and posters - Stakeholders have also been provided with a printed list of publications. The 2009 Bushfire CRC and AFAC annual conference on the Gold Coast produced a significant amount of new material on key research issues. All this content is online at www.bushfirecrc.com and the AFAC Knowledge Web.

Knowledge Web

The AFAC Knowledge Web (www.afac-kw.com) has expanded the concept of the Bushfire CRC Fire Knowledge Network to draw in the operational knowledge of fire, land management and emergency service organisations in Australia and New Zealand, creating an online source of knowledge and sharing for the industry.

As a product of the Bushfire CRC and a prominent example of knowledge transfer, it is fitting that the Knowledge Web now includes all outputs (publications, reports, conference papers and posters) of the Bushfire CRC. New material being regularly uploaded as it is produced so this valuable community and industry resource will continue to expand.

Communicating with the public

Online Communications

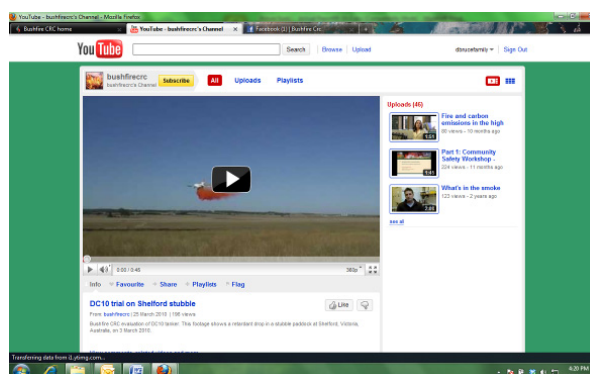
The Bushfire CRC website is a prime communications tool for both internal and external audiences. It received a steady increase in hits over the year with demand particularly strong around major bushfire events, both in Australia and internationally, and with the launch of new research. The website draws many enquiries from the interested general community in fire zones around Australia as well as industry and academic enquiries, including school and tertiary students. A new online section was developed specifically to cater for enquiries from primary and secondary school students.

Bushfire CRC online

Visitation to the site remains consistently high over the year with papers from the 2009 Gold Coast 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. 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 small base of followers is developing; many from regional Australia and overseas.



Media

The annual conference on the Gold Coast attracted broad media coverage on radio, print and television, both from regional and national media. Many sought comment on the new community fire warnings system and how this would be implemented.

Other highlights included:

- ABC Radio sent its National Rural Affairs Reporter to attend for the entire three-day conference. The reporter interviewed more than two dozen conference presenters, including many Bushfire CRC researchers and students.

- The national ABC TV program *Landline* hosted its edition from the Trade Exhibition floor and included an extended interview (right) with CEO Gary Morgan on the national fire outlook.
- This was the second time the ABC has dedicated such a large amount of resources to support this annual conference, after its substantial support in Adelaide the previous year. In its role as the emergency services broadcaster, our conference was an ideal opportunity for the ABC to enhance its reputation in the area.

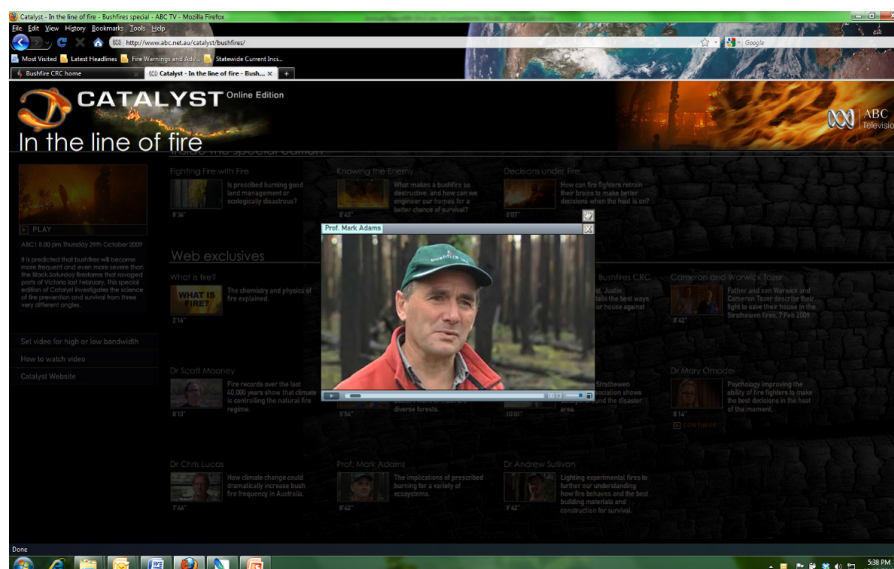


The release of the “2009 Victorian Bushfires Royal Commission Interim Report” in August led to a high demand for comment from the Bushfire CRC across a range of issues. The Bushfire CRC, interviewed by a range of media outlets, stressed that the final report would provide a more complete analysis of the fires and that it was vital that information continued to be collected and analysed by researchers.

Media coverage included:

- The release of the Royal Commission’s Interim Report, Gary Morgan and Program Leader Prof John Handmer shared a two-hour slot on ABC Melbourne Radio 774 Drive Program taking talkback calls and discussing all aspects of the report.
- The Bushfire CRC provided expert commentary in two Media Roundups out of the Australian Science Media Centre. One on the 2009 Victorian Bushfires Royal Commission Interim Report, the other on the potential for a severe fire season for 2009-10. These online Roundups are communicated to media across Australia and internationally.

In October, the ABC TV program *Catalyst* featured a special edition called “In the Line of Fire” - this edition is investigating the science of fire prevention. The program was in contact with the Bushfire CRC office and other partner organisations in putting this show together. It featured several Bushfire CRC researchers and their work, including Prof Mark Adams (below), Dr Mary Omodei and Dr Andrew Sullivan. Footage taken of the Bushfire CRC Research Taskforce on the fireground shortly after the Black Saturday fires in February this year was also shown.



Bushfire CRC spokespeople were interviewed on the announcement of trials of the DC10 water tanker in Victoria, and the bushfire detection cameras in regional New South Wales and Victoria.

Researchers at RMIT University were interviewed by regional radio stations in the areas relevant to the release of the mail survey component of the Bushfire CRC Research Taskforce.

A Bushfire CRC report to the Royal Commission on residential development in high bushfire risk areas was extensively reported on in the media.

The September/October edition of US magazine *Wildfire* featured an article on the Bushfire CRC Research Taskforce.

The March 2010 edition of *Asia Pacific Fire Magazine* featured Bushfire CRC evaluation of the DC 10 air tanker as its cover article (right).



Science research promotion



The Bushfire CRC was represented at the World Congress of Science and Factual Producers in Melbourne in early December. This is an annual conference for all the major science and documentary producers and broadcasters from around the world.

There has been a steady interest in sourcing factual material and opinion from the Bushfire CRC over this year and our presence at the World Congress further positioned us as the main contact point in Australia for this type of information.

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

END-USER INVOLVEMENT AND IMPACT

The Bushfire CRC end-users are involved in a wide range of activities at both the formal and informal level.

The Stakeholder Council comprises a representative from each of the Bushfire CRC partners. The Council met twice this year - at the University of Melbourne and at the Bureau of Meteorology - to receive updates on the progress of research, communication and commercialisation activities and to provide strategic advice and direction to the Governing Board. This Council provides advice at an executive level on the needs of stakeholders and appropriate stakeholder membership of the Governing Board.

The Governing Board governs the Bushfire CRC. This Board consists has skills-based members with the majority not being researchers but users and independents. The Board met six times this financial year.

All research programs and individual research projects have an end-user leader, along with a research leader.

For more details on the involvement and impact of end-user activities see sections on Communications and on Education and Training.

Also see Table at back of Annual Report - *End-user involvement*.



PROGRAM E: EDUCATION AND TRAINING

EDUCATION AND POSTGRADUATE SCHOLARSHIPS

The Bushfire CRC places a strong emphasis on the role of education in building the capacity of the industry to address the challenges of the future. The Bushfire CRC has a diversified education and training program that provides opportunities for both students and industry personnel.

The Education program matched to the 2003-2010 research program was in its final stages during this reporting year. By end of June 2010 most students had completed their studies, with several others on track for imminent completion. New students to match the new extension program were being sought. See table *Student Destinations* at back of Annual Report.

Educational opportunities are offered to students through Bushfire CRC scholarships. These scholarships are available to students undertaking a higher degree by research in an area associated with the Bushfire CRC research program. Students receive a stipend and are also eligible for project support funding; supervisors are drawn from both academia and industry. Research undertaken by students must value add or extend the projects with which they are associated.



All students are required to participate in the annual industry conference, this year at the Gold Coast Convention Centre (left). Here, they had the opportunity to present their work (either in posters or oral presentations) and engage with industry practitioners, many of whom have subject matter expertise in the areas students are investigating. Many students also engaged with the industry through the specialist working groups established by AFAC.

A number of Bushfire CRC students and graduates were active participants in the research efforts following the events of Black Saturday that continued into this year. Without the capacity built through the students it would not have been possible to undertake research at this level over such an extended period. A number of the students involved in this research effort presented their work in national and international forums, including the 2nd *Human Dimensions of Wildfire Conference* in Texas in April.

To support students in their endeavours to gain employment after completion of their work, the Bushfire CRC profiles students across a range of publications, including *Fire Australia* and in *You Tube* videos. These profiles enable the students to outline their research and career aspirations in publications that are widely circulated throughout the industry.

Graduates of the Bushfire CRC scholarship program have been employed by research partners, end-user organisations, associated SME's and other government departments. See *Student Destinations* table at back of Annual Report. Such is the demand for graduates at this level in the sector that many are successful in their search for employment prior to submission and elect to complete final write up of their research from that position. There is strong industry support for students electing this pathway.

RESEARCH ADOPTION AND TRAINING

The strategic integration of the AFAC Approach to Knowledge Management and the Bushfire CRC Research Adoption strategy has matured to the extent that the Bushfire CRC seminars/forums and workshops program has been integrated with AFAC's Knowledge Events through a joint initiative now known as Professional Development Events. This initiative has led to the development of guidance and tools designed to assist with the planning and implementation of professional development events. This will ensure they are seen as valuable opportunities, are implemented consistently and evaluated, provide good value for money and are sound investments in knowledge. This initiative will strongly support the adoption of new research from the Bushfire CRC among AFAC member agencies.

Industry Meetings

Meetings with national industry groups, under the auspices of AFAC, have been utilised by the Bushfire CRC for the purposes of creating awareness of the research, professional development for industry, understanding the implications of the research, and to inform the Bushfire CRC of the preferred utilisation pathway and product development.

For example, some research outcomes may lead to the production of a field guide, others may lead to publication of technology transfer material (*Fire Note*) and inclusion into learning materials for existing VET training packages, while other research may be suited to professional development events (seminars, workshops, field trips). Providing the opportunity for industry to influence the utilisation pathway encourages uptake and buy-in and reduces the risk of the Bushfire CRC developing inappropriate user products.

National industry meetings over the past year have included:

Occupational Health and Safety Group, Rural and Land Management Group and Learning and Development Group - the Protecting Fire Fighters Package



Each national industry representative AFAC Group (each of 20 - 30 members) has on at least two occasions participated in the development of the utilisation pathway. This included the hosting of a national workshop; and a subsequent national professional development event along with the production and publication of workshop materials, a series of

Fire Notes and presentations including video. All of these are available on the website. See the Protecting Fire Fighters *Fire Update* 35. This work is not only significant because of broad industry engagement, but because it integrated three separate research projects (Fire Fighter Health and Safety, Safe Behaviour and Decision Making and Enhancing Emergency Incident Management Team Effectiveness and Organisational Learning) to make the research more approachable and relevant to the user community.

Individual researchers have also presented their project work to these industry groups and also to individual fire and land management agencies.

Occupational Health and Safety Group

In addition to the Protecting Fire Fighters Package, this industry group has been closely involved in the air toxics research and informed the development of a risk-based guide. It has considered aspects of the fire fighter health and safety research and helped to guide the creation of the Bushfire CRC Extension Project, which now incorporates fatigue.

Volunteer Management Sub Group

This industry group has been closely involved with the Enhancing Volunteerism research and has proactively included the researchers into its meeting schedules. An industry workshop in late 2009 considered the research along with activities that the various agencies are currently implementing to overcome their volunteer recruitment and retention challenges. The research has informed recruitment campaigns and focussed attention on barriers to retaining existing volunteers, such as reducing impacts on family and work and improving leadership.

Rural and Land Management Group

This industry group has incorporated the Bushfire CRC Research into its regular agenda items, which indicates mainstreaming of research into its business. Further, the reporting on the research has mostly been done by industry representatives, with researchers appearing for guest presentations. This is indicative of industry taking ownership of and accepting responsibility for utilisation of the research. The groups have considered many research projects - the three Protecting Fire Fighters Projects, Burning Under Young Eucalypts, Grassland Curing, High Fire, Fire Behaviour Modelling, Air Toxics, Suppression Guide (aerial) - and have sponsored the development of video-based case studies of regionally based research projects. The first such video highlights the work done in the south west of Western Australia on fire and biodiversity.

Community Safety Group

AFAC has facilitated two national workshops on community safety in bushfires (with emphasis on the Prepare, Stay and Defend or Go Early policy) and triggers for scaled warnings. Both of these were well attended and utilised the evidence presented by Bushfire CRC researchers to inform the development of solutions. Position papers and discussion papers were prepared, modified and utilised by the Royal Commission. The work of Bushfire CRC researchers Alan Rhodes, Doug Paton, John Handmer, Josh Whittaker and Justin Leonard was extensively utilised and the more recent Black Saturday research has again been utilised to update the national position statement. AFAC has also facilitated consideration of the research from other Bushfire CRC projects including Understanding Communities, Evaluating Community Education Programs, Bushfire Arson, and Building and Occupant Protection.

Higher Education

Feedback from educational providers has led to a slight shift in emphasis in the education program away from embedding research into courses or even developing new courses towards one of providing resource materials that can be made broadly available and selected by educational providers as they wish. In this way educational products, such as case studies, can be developed and promoted without being dependent on competing for space in busy educational curricula. Nonetheless, the Bushfire CRC will continue to build partnerships with educational providers. The Bushfire CRC website now has a Higher Education section that presents the research through an educational perspective. Building materials to populate this will become a major part of the future effort in the adoption program.

Fire Notes

The production of *Fire Notes* has been supported through our Research Adoption Program. Over the past 12 months 30 *Fire Notes* have been published - distributed by email to stakeholders and placed online. Many *Fire Notes* are published to coincide with research adoption events. They complement and reinforce the content and are a legacy for further use.

Specific Products

Specific products that have been developed include:

- An online Protecting Fire Fighters Package. This combines the research of three projects into an online information package that was developed as a result of workshops between users and researchers. Details of this are available in *Fire Update* 35 and on the Bushfire CRC web site.
- Two models (Project Vesta, and a *Fire Containment Guide* that was developed by the Aerial Suppression research team) are under currently review and validation by the industry over the southern summer period.
- A new Bushfire Structure Vulnerability Assessment tool has recently been developed. A business model for its validation, utilisation and maintenance is yet to be developed, and consultation is underway with AFAC.

Professional Development Events

Name	Date	Number of attendees
Annual Conference, Gold Coast	22-24 Sept 09	1132
Annual Conference Workshop - Protecting Fire Fighters	22-Sep-09	44
Annual Conference Workshop - Community Safety	22-Sep-09	40
Annual Conference Seminar - Fire, Fuel and Weather	22-Sep-09	77
Burning Under Young Eucalypts - Field Trip and Seminar	26-Aug-09	30
Managing the Unexpected in Prescribed Burning and Fire Suppression Operations, Seminar	10-Aug-09	76
Forest Fire Research - A European Program, Seminar	22-Jul-09	19
Evaluating Community Education Program, Seminar	8-9 July 2009	26
Fire in the high country, Symposium	18 - 19 May 10	104
Total number of persons at Research Adoption events		1548

BUSHFIRE CRC students – employed – June 2010

	Name	Project title	Status/due date	Employer
1	Phil Lacy , PhD	Burning under young eucalypts	submitted	PF Olsen
2	Madeline Osborn , PhD	The role of fungi in fire prone forest communities	submitted	DAFF- ACT
3	Alan Rhodes , (unfunded) PhD	Evaluation of the “stay or go” policy and community preparedness	2013	CFA -VIC
4	Phil Zylstra , PhD	Plant species contributions to fire intensity – towards a total fuels model	submitted	NSW NPWS -DECC- Cooma
5	Rohan Sadler , PhD	Long term monitoring and modelling in quantifying the role of fire in grasslands	submitted	UWA
6	Brendan Pippen , PhD	Predicting factors affecting fire behaviour in heathland vegetation.	submitted	Dept Climate Change-ACT
7	Annemarie De Vos , PhD	Health effects of occupational exposure to bushfire smoke in WA	submitted	Initially Asthma CRC-WA now working in Netherlands
8	Karyn Bosomworth , PhD	Does current bushfire risk management policy and practice support community and natural resource resilience to climate change?	2010	DSE - VIC
9	Adam Leavesley , PhD	Impact of fire mosaic on birds in mulga woodlands of central Australia.	submitted	Bushfires NT
10	Paul Fox Hughes , PhD	A meteorological investigation of the “Springtime Bump” in Tasmania.	2012	Bureau of Meteorology, Tasmania
11	Laura Kelly , Ma	Community resilience to and recovery from wildfire in New Zealand	submitted	Working in the UK
12	Rob De Ligt , Hons	Patterns in the probability of burning with time-since-fire in the Greater Sydney region	submitted	ANU
13	Josh Whittaker , PhD	Adaptive capacity and social resilience to bushfires in southeast Australia	submitted	RMIT
14	Luke Balcombe , Ma	The perceptions of bushfire hazard in urban fringe areas of tropical Australia.	submitted	Environmental scientist in private firm - undertaking a PhD, Griffith University
15	Bevan McBeth , PhD	Soil, fire and physiological processes and dieback in coastal eucalypt forests.	2011	Southern Cross University
16	Sonia Whiteley , PhD (unfunded)	Preparing for the worst: measuring the outcomes of community bushfire safety programs	2012	Department of Justice, VIC
17	Meaghan Jenkins , PhD	Carbon budgets and implications for fuel load and flammability of shrub-dominated ecosystems in the high country	submitted	University of Sydney
18	Tim Prior , PhD	Community responses to bushfire threat	submitted	UTS - Institute of Sustainable Futures

19	Jaymie Norris, PhD	Microbial clues for ecological sustainable management of fire prone landscapes.	2010	DSE - VIC
20	Ken Scott, PhD	Fire & savannah grass ecology	submitted	NT Gov - fire management
21	Matt Phillips, PhD	Physiological demands of Australian volunteer fire-fighters during bushfire suppression	2010	Dept Defence - ACT
22	Andrew Edwards, PhD	An algorithm for mapping burn severity from satellite remote sensing: tropical savannahs, northern Australia.	2010	Bushfires NT
23	Mae Proudley, Ma	Reducing bushfire risk through improved household decision making.	submitted	RMIT
24	Sean Cowlshaw, PhD	Effects of Fire Service Volunteering on families of volunteers	submitted	Monash University
25	Julian Black, PhD	Predicting the dynamic spatial pattern of fire front progress and fire destruction in the rural urban interface zone	2011	Terramatix
26	Lyndsey Vivian, PhD	Determinants of variation in fire response types in the composition of montane plant communities.	submitted	ANU
27	Christine Eriksen, PhD (project support only)	Local environmental knowledge of bushfire management: a case study of new rural landscapes in NSW	submitted	University of Wollongong

BUSHFIRE CRC students - in study – June 2010

	Name	Project title	due date	Supervisor
27	Annette Salter, PhD	Applications of multi-media education strategies in fire behaviour	2011	Dr Christine Owen UTAS
28	Kerryn McTaggart, PhD	The effect of fire on soil microbial populations and their processes in Australian alpine ecosystems.	2011	Dr Tina Bell, University of Melbourne
29	Bryony Horton, PhD	Fire management and tree decline: mycorrhizal indicators of declining forest health.	2010	Dr Neil Davidson UTAS
30	Carola Karramotto de Bednarik, PhD	Relative importance of fire regimes, environmental gradients and climate change for rainforest distribution in the Sydney region.	2010	Dr Geoff Cary ANU
31	Alison O'Donnell, PhD	Fire patterns and vegetation structure in semi-arid south-east western Australia	2010	Dr Lachie McCaw, DEC WA Dr Pauline Grierson UWA
32	Rowena Morris, PhD	The effect of prescribed burning on sediment movement in the Mt Lofty Ranges	2011	Dr Meredith Henderson SA DEH
33	Anne Miehs, PhD	The role of coarse woody debris in fire-prone forests: Achieving both fire management and conservation objectives.	2010	Dr Alan York University of Melbourne
34	Briony Towers, PhD	Developmental perspective on bushfire risk communication	2011	Prof Douglas Paton UTAS
35	Claire Johnston, PhD	Worst Case Scenarios: their role in safe decision making in bushfire fighting.	2010	Dr Mary Omodei, La Trobe University
36	Greg Hickey, PhD	Enhancing effective multi agency operations.	2009	Dr Christine Owen UTAS
37	Jennifer Hollis, PhD	Coarse woody fuel availability and consumption in Australian forest fires	2010	Dr Lachie McCaw, DEC
38	Peter Hayes, PhD	Do teams that have worked together make better teams than ad hoc teams?	2011	Dr Mary Omodei, La Trobe University
39	Jenni Raines PhD	Fatigue and recovery in rural Australian bushfires	2011	Dr Brad Aisbett, Deakin University
40	Helen Daily PhD	Development of pasture growth models for grassland fire danger risk assessment	2011	Dr Stuart Anderson, SCION Dr Peter Lane UTAS
41	Francesca Harris-Spence, PhD	Catchment management groups - volunteer community organisations and bushfire management	2011	Dr Matthew Tonks (UWA) Dr Marcus Lane (Uni Adelaide)
42	Colin Simpson, PhD	Advanced modelling of the interactions between wildfires and the atmosphere	2013	Prof Alan Sturman Uni Canterbury

End-user Involvement in CRC activities

End user	Relationship with CRC (e.g. <i>Industry, Participant, International</i>)	Type of activity and end user location	Nature / scale of benefits to end user (e.g. <i>exports increase, productivity, employment</i>)	Actual or expected benefit to end user (\$ terms)
ACT Emergency Services Authority	Industry Participant	Research Utilisation (ACT)	Research outputs used in improving effectiveness and efficiency of programs across the business focusing on improved outcomes for the community	Significant but not able to be assessed at this level.
Country Fire Authority of Victoria	Industry Participant	Research Utilisation (Victoria)	Research outputs used in improving effectiveness and efficiency of programs across the business focusing on improved outcomes for the community.	Significant but not able to be assessed at this level
Fire and Emergency Services Authority of Western Australia	Industry Participant	Research Utilisation (Western Australia)	Research outputs used in improving effectiveness and efficiency of programs across the business focusing on improved outcomes for the community.	Significant but not able to be assessed at this level
Metropolitan Fire and Emergency Services Board (Melbourne)	Industry Participant	Research Utilisation (Victoria)	Research outputs extrapolated to an urban environment and used in improving effectiveness and efficiency of programs across the business focusing on improved outcomes for the community.	Significant but not able to be assessed at this level

New South Wales Fire Brigades	Industry Participant	Research Utilisation (New South Wales)	Research outputs used in improving effectiveness and efficiency of programs across the business focusing on improved outcomes for the community.	Significant but not able to be assessed at this level
New South Wales National Parks and Wildlife	Industry Participant	Research Utilisation (New South Wales)	Research outputs used in improving effectiveness and efficiency of programs in maintaining and supporting organisational objective and particularly in the interaction between fire and the environment.	Significant but not able to be assessed at this level
New South Wales Rural Fire Service	Industry Participant	Research Utilisation (New South Wales)	Research outputs used in improving effectiveness and efficiency of programs across the business focusing on improved outcomes for the community.	Significant but not able to be assessed at this level
Queensland Fire and Rescue Service	Industry Participant	Research Utilisation (Queensland)	Research outputs used in improving effectiveness and efficiency of programs across the business focusing on improved outcomes for the community.	Significant but not able to be assessed at this level
South Australian Country Fire Service	Industry Participant	Research Utilisation (South Australia))	Research outputs used in improving effectiveness and efficiency of programs across the business focusing on improved outcomes for the community.	Significant but not able to be assessed at this level
South Australian Department of Environment and Heritage	Industry Participant	Research Utilisation (South Australia))	Research outputs used in understanding the interaction between fire and the environment	Significant but not able to be assessed at this level
State Forests NSW	Industry Participant	Research Utilisation	Research outputs used in	Significant but not able to be

Tasmanian Fire Service	Industry Participant	(New South Wales) Research Utilisation (Tasmania)	improving management of fire in the forest environment Research outputs used in improving effectiveness and efficiency of programs across the business focusing on improved outcomes for the community	assessed at this level Significant but not able to be assessed at this level
Forestry Tasmania	Industry Participant	Research Utilisation (Tasmania)	Research outputs used in improving management of fire in the forest environment	Significant but not able to be assessed at this level

Tasmania Parks and Wildlife Service	Industry Participant	Research Utilisation (Tasmania)	Research outputs used in improving effectiveness and efficiency of programs in maintaining and supporting organisational objectives and particularly in the interaction of fire and the environment	Significant but not able to be assessed at this level
Department of Sustainability and Environment Victoria	Industry Participant	Research Utilisation (Victoria)	Research outputs used in improving effectiveness and efficiency of programs in maintaining and supporting organisational objectives, particularly in the interaction of fire and the environment	Significant but not able to be assessed at this level
Department of Environment and Conservation, Western Australia	Industry Participant	Research Utilisation (Western Australia)	Research outputs used in improving effectiveness and efficiency of programs in maintaining and supporting organisational objective and particularly in the interaction between fire and the environment	Significant but not able to be assessed at this level

PERFORMANCE MEASURES

Progress on Performance Measures

PERFORMANCE MEASURE	2008-09 PROGRESS / ACHIEVEMENT	2009-10 PROGRESS / ACHIEVEMENT
CRC Programme Objective 1: <i>To enhance the contribution of long-term scientific and technological research and innovation to Australia's sustainable economic and social development</i>		
Centre Objective 1.1: Achievement of and delivery of research outcomes		
Develop at least four new technological breakthroughs	Programs are being developed and rolled out in cooperation with industry partners.	Programs are being developed and rolled out in cooperation with industry partners. <ul style="list-style-type: none"> - Phoenix rapid fire - UWA fire Spread simulator - CSIRO bushfire vulnerability model - New fire weather models
Centre Objective 1.2: Seminars, workshops and presentations		
More than five seminars, workshops and public forums each year	Bushfire CRC International Research Conference and Annual conference in partnership with Australasian Fire and Emergency Service Authorities Council attracted 1100 participants from across the fire and emergency industry. September, Adelaide. One cross-program pre-conference workshop. Numerous program and project based workshops. Australian Science Festival Expo participant.	Bushfire CRC Annual Conference in partnership with Australasian Fire and Emergency Service Authorities Council attracted 1000 (check numbers) participants from across the fire and emergency industry: September, Gold Coast. One cross-program pre-conference and three post conference study tours were conducted in connection to the conference Numerous program and project based workshops.
Centre Objective 1.3: Centre publications transferring R&D outcomes and technology to end users and the public		

PERFORMANCE MEASURE	2008-09 PROGRESS / ACHIEVEMENT	2009-10 PROGRESS / ACHIEVEMENT
At least 50 end user focused publications and reports	Completed A wide range of end user publications and reports have been completed for each program. All publications or links are on the Bushfire CRC website the AFAC Knowledge Web.	Completed A wide range of end user publications and reports have been completed for each program. All publications or links are on the Bushfire CRC website the AFAC Knowledge Web.
Centre Objective 1.4: Scientific status and end user satisfaction		
Demonstrated leading edge research and development quality through peer review processes	Fifth Year Review confirmed the quality of science and the rate of research adoption plus the development of a culture of research within the industry. International collaborations confirm the high standing of research activities.	Research organisations continue to support the increasing publications in peer review journals and similar. Bushfire CRC research was relied on heavily in the Royal Commission into the 2009 Victorian Bushfires.
Centre Objective 1.5: International interest in research		
Collaboration with at least four overseas groups	Completed.	Completed.
Centre Objective 1.6: Scientific Status		
Rated world class in its activities by an independent international review board	Independent Fifth Year Review and international collaborations confirm the high standing of research activities	Independent Fifth Year Review and international collaborations confirm the high standing of research activities.
Centre Objective 1.7: Project Reviews		

PERFORMANCE MEASURE	2008-09 PROGRESS / ACHIEVEMENT	2009-10 PROGRESS / ACHIEVEMENT
Regular meetings of a Users, Researchers and Technical committee Regular project reviews held by Project Leaders	Periodic and ongoing project reviews have been undertaken through regular meetings between researchers and end users. Annual conference in Adelaide in September with 100 researchers and 1100 industry participants. Formal review of all project deliverables as part of the budget process	Annual conference in Gold Coast in September with 100 researchers and 1000 industry participants. All projects are subject to an end of project review.

CRC Programme Objective 2: To enhance the transfer of research outputs into commercial or other outcomes of economic, environmental or social benefit to Australia		
Centre Objective 2.1: Economic Benefit to Australia		
Actual and future benefits > 3 times the Commonwealth Grant through cost benefit analysis.	On track.	Demonstrated through economic analysis of research impacts.
Centre Objective 2.2: Economic benefit to Centre		
Economic benefit to Centre. Additional income through contracts and consultancy: \$2M	Whilst not the primary focus of the centre, contact research and consultancy work was significant this year, particularly following the February bushfires in Victoria – additional income of \$1.5m this year from Victorian agencies for the 2009 Victorian Bushfires Royal Commission.	Whilst not the primary focus of the centre, contact research and consultancy work continue – additional income of \$1M in 2009/10.
Centre Objective 2.3: Research Publications		
10 Book chapters	Book chapters – completed.	Book chapters – completed. Books – 5 completed; 1 in press; 2 in

2 Books 25 refereed Journals per annum 30 refereed conference papers per annum	Books – completed. Journals – on track. Conference papers – on track.	preparation Journals – approx 150 published and a large number in-press. Conference papers – on track.
Centre Objective 2.4: Patents		
5 Patents	Not anticipated this CRC will deliver any patents	The Bushfire CRC has not filed any patents during the past 12 months and does not anticipate filing for any in the life of this program.
Centre Objective 2.5: Achievement of and delivery of research outcomes		
Develop at least four new technological breakthroughs	In progress.	See 1.1.
Centre Objective 2.6: Financial return to the Centre		
Exceed budget plan	On target	On target
Centre Objective 2.7: Adoption of the research outputs by End Users		
Greater than 60 percent of the know-how and research deliverables adopted by end users	Significant research adoption activities in place across all programs	Research Adoption activities have continued to be expanded over the past 12 months .
Centre Objective 2.8: IP Review Intellectual Property		
Intellectual Property Reviews to be held once a year	Completed	Completed

CRC Programme Objective 3:
To enhance the value to Australia of graduate researchers

Centre Objective 3.1: Placement of Centre trained students and researchers into industry		
10 PhD's fully employed by User Groups	On track	Completed
Centre Objective 3.2: Staff/Student exchange		
At least one student and one postdoctoral fellow per annum on an exchange program	Do not have formal exchange programs as this impacts on the delivery of research and on PhD completion. However, all researchers and students have numerous opportunities to interact and work with end-users.	Do not have formal exchange programs as this impacts on the delivery of research and on PhD completion. However, all researchers and students have numerous opportunities to interact and work with end-users. Many students have taken up employment with end user partners on a full or part-time basis towards the end of their studies.
Centre Objective 3.3: Postgraduate students trained to become the future leaders in Australia in the design, research and management of bushfire management		
At least 20 fully funded PhD students graduated with further training in research management and all employed within three months of graduation	On track	On track
Centre Objective 3.4: Industry training		
All students to undergo an industry/end user induction	Completed.	Completed.
Centre Objective 3.5: PhD Degrees Awarded		
Greater than 90% of students completing postgraduate studies	Review of student withdrawals identified no systemic problems or issues particular to the Bushfire CRC. On track to have close to 90% completion.	Late candidature withdrawals and extensions have resulted in a lower than desirable completion rate. However almost 90% of students are anticipated to complete their post graduated studies.

Centre Objective 3.6: Health and Safety		
Zero lost time injuries	Zero	Zero

CRC Programme Objective 4: To enhance collaboration among researchers, between researchers and industry or other users, and to improve efficiency in the use of intellectual and other research resources		
Centre Objective 4.1 Frequency of interchange of personnel between participating organisations between participating organisations		
At least one student and one postdoctoral fellow per annum on an exchange program.	See 3.2	<p>A number of students and researchers presented work from Black Saturday to international research forums and collaborated with international researchers.</p> <p>Dr Tina Bell (Program B) received a Fulbright scholarship to work with US counterparts.</p>
Centre Objective 4.2: Projects involving end user participants		
60 percent of projects to involve end user participants	Completed	Completed – user engagement across all programs
Centre Objective 4.3: Extent of participation by each participant in research and support programs		
Participants involved in research and support programs	Completed.	Completed
Centre Objective 4.4 Time commitment of researchers		
Less than 10% with 20% of time or less	Review has indicated those with less than 20% of time commitment to the CRC are in oversight roles. Less than 10% of researchers have less than 20% time commitment to the Bushfire CRC.	Many research projects have been completed during 2009/10 with a number of researchers diversifying their research endeavours.

Centre Objective 4.5 Degree of consultation between research providers and end users		
Research reviews at least twice a year between research providers and end users	On track. Stakeholder meetings held twice a year. Board Research Committee meets twice a year.	On track. Stakeholder meetings held twice a year. Board Research Committee meets twice a year.
Centre Objective 4.6 The extent of participation by each participant in research and support programs		
All participants to be involved in active and proposed research projects	. Completed	Completed – major involvement is now in research adoption and utilisation activities.
Centre Objective 4.7 Communication to Users		
At least 50 newsletters to all Core and Associate Participants .	Completed	Completed.
Centre Objective 4.8 Evidence of collaboration between participants		
Active integration with more than 90% of Bushfire CRC projects to involve more than two participants	Completed.	Completed.
User participants to have contributed the equivalent of one person year of in-kind from their organisation over the life of the Bushfire CRC	Completed.	Completed.
Centre Objective 4.9 Collaboration with other research groups within Australia		
At least three formal collaborative associations with other CRCs	. Completed	Completed. Bushfire CRC CEO is a Board member of CRCA.

ADDITIONAL REQUIREMENTS FOR SOME CRCS

THIRD YEAR REVIEWS – 2002 AND 2004 ROUND CRCS

Third Year Review Recommendations

Recommendation	Implemented (Y or N)	Reasons why not implemented	Strategies to implement
<u>Recommendation 1.</u> The fostering of constructive interaction and the stimulation of new people and new energy, and providing local, national and international links should continue as a key objective of the CRC.	Y		
<u>Recommendation 2.</u> The direction and programs are set and the CRC may now concentrate on leadership; directional leadership from the Board, stable and supportive leadership from the senior staff, and research leadership at the programme level.	Y		
<u>Recommendation 3.</u> The senior management should devise and implement mechanisms to bolster leadership at program and project levels to give themselves the space to focus at a higher level.	Y		
<u>Recommendation 4.</u> The Board should capitalise on its unique place to promote discussion and policy support for big picture issues like the appropriate balance between fire prevention and fire fighting.	Y		

GLOSSARY OF TERMS

ADFA	Australian Defence Force Academy
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
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
IMT	Incident Management Team
JCU	James Cook University
MFB	Metropolitan Fire Brigades
NPWS	National Parks and Wildlife Service NSW
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