



# RESEARCH ADOPTION PLAN 2009-2010



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# RESEARCH ADOPTION PLAN 2009-2010

## INTRODUCTION

From 2009 the Bushfire CRC, Australia and New Zealand's first nationally coordinated, multi-disciplinary bushfire research program enters the final phase of its seven-year life.

Building on the earlier research efforts of individual agencies, the Bushfire CRC's research focus, over the past five and a half years, has been to find improved ways of reducing the level of bushfire risk for given levels of investment and resourcing by governments and the wider community.

With some confidence it can now be seen that the combined efforts of 19 fire, emergency and land management agencies from across Australia and New Zealand, and the research capabilities of some 20 universities and related research providers, is resulting in clear industry and community benefits.

The last year has seen a gradual switch of the Bushfire CRC's research focus towards an increasing emphasis on converting the research effort into operational and strategic reality. This is reflected in the major activities planned by the Bushfire CRC over its final 18 months.

The *Research Adoption Plan* outlined here is based on an approach that combines product development / finalisation with stakeholder engagement. It is an approach that draws heavily on the existing AFAC consultative networks and one that attempts to provide considerable on-going opportunities for individual researcher/stakeholder representative interactions.

The document implements the strategy as outlined in the *Research Adoption Strategy 2008-2010*, which has been approved by the Bushfire CRC Governing Board and is available on the Bushfire CRC website.

## Themes

The outputs from research conducted by the Bushfire CRC, and the planned activities over the next 18 months are grouped below under four themes - themes that have been nominated by fire and land management industries as high priority areas. They are;

- aerial suppression;
- community safety and engagement;
- protecting fire fighters; and
- prescribed burning

(A description of individual research projects can be found at [www.bushfirecrc.com](http://www.bushfirecrc.com))

All research projects, and postgraduate student projects conducted during the life of the *Bushfire CRC* have involved the production of scientific publications.

Beyond the science community, making the research accessible to stakeholders and to the wider community has involved a range of processes. These have included:

- The production of *Fire Notes* and *Fire Updates*;
  - A considerable investment of time and resources in the development and maintenance of the *Bushfire CRC* website (and the more recent development, by AFAC, of a *Knowledge Web* that has been designed to build on the pioneering work of the Bushfire CRC's website);
  - The conduct of regular seminars, forums and workshops;
  - The publication of a book *Community Bushfire Safety* that provides an overview of a number of Bushfire CRC research studies that have been designed to help better understand the important role the community plays in bushfire safety. It is unique to the fire industry, both in Australia and
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internationally, with its focus on community safety as a key component of bushfire management. (The involvement of social sciences in Australian bushfire research only seriously commenced with the establishment of the Bushfire CRC);

- The pending publication of a book that will summarise the outcome from the considerable prescribed fire related research that has occurred under the Bushfire CRC's Program B;
- A major involvement each year in the industry's annual conference (the most recent being the *International Bushfire Research Conference* - incorporating the 15<sup>th</sup> Annual AFAC Conference which attracted around 1100 delegates to South Australia's capital, Adelaide, in September 2008); and
- The production of targeted products to meet specific needs. As an example, the *Making a Difference* document was originally produced in late 2007 for use at Stakeholder Council. This document has gone on to prove itself to be most useful at in a number of subsequent situations.

## Industry Impact

In order to develop approaches that best meet the research adoption needs of individual research projects, the Bushfire CRC and AFAC have jointly developed a methodology known as an *Industry Impact Assessment*. This approach assists in the understanding of the individual research outcomes within the context of the problem originally addressed. Solutions that make best use of the research can then be developed.

These *impact assessments* are usually facilitated through linkages to AFAC business groups and they may also involve specialist interest groups, regional or national workshops and, at times, the involvement of the AFAC business group itself. More information about this process can be found at [www.bushfirecrc.com](http://www.bushfirecrc.com)

## Research Products

The products developed to assist with the adoption of research range from awareness raising ones, through a range of educational activities to specialised tools such as burning guidelines. These products, both individually and in combination, comprise both tangible outcomes (burning guides, smoke management programs) and activities that enable knowledge management. Clearly some products, such as those that involve the embedding of knowledge into vocational training or higher education may take considerable time to fully implement, and some will not be fully completed until after the Bushfire CRC ends. The rationale and framework underlying the education and training approach is available on [www.bushfirecrc.com](http://www.bushfirecrc.com)

In a strategic sense the Bushfire CRC is well placed in terms of its ability to influence national policy in its industry, as a consequence of its unique partnership with AFAC. The most obvious examples to date of this key strategic linkage are in the areas of vehicle use in wildfire situations, and in relation to the 'stay and defend or leave early' approach to community safety in bushfire prone areas.

In terms of achieving a wider community appreciation of important research outcomes, promotional activities are also critical. These activities not only raise awareness of the research and its potential outcomes with industry and the community - they also have the potential to gain broader support for the Bushfire CRC and for research within the fire and emergency services sector more generally. This research adoption plan includes proposals that are designed to achieve a wider appreciation of key research findings and their implications in both industry and in the wider community.

Specific activities planned to facilitate adoption of the research around the four themes discussed previously follow. A calendar of events will be available on [www.bushfirecrc.com](http://www.bushfirecrc.com) and on the AFAC knowledge web.

## AERIAL SUPPRESSION

The research focus on aerial suppression brings together elements from a number of research projects across the Bushfire CRC.

Ultimately the objective is to produce a decision support system that will assist aircraft managers (and Planning Officers and Incident Controllers, State and Regional Co-ordinators and Chief Officers) to better utilise the available resources to ensure their effective and efficient use. The key here is to understand what is at risk, what resources are available (and their capabilities), and what they cost. These considerations then need to be matched with a measure of the difficulty of suppression for given fuels and weather.

In considering a risk based approach to the management of landscape fire, the relevant elements include prevention (minimising the incidence of wildfire), preparedness (the preparation for wildfire occurrence); suppression (restricting the spread of a wildfire) and recovery (the post-fire phase). In developing a 'Fire Management Business Model' (Project A4) there is considerable overlap between this theme and the three other outcome areas (or themes) and particularly between this one and prescribed burning.

As such, some of the adoption products for aerial suppression and prescribed burning have been combined, particularly in the educational area.

### Proposed Seminars/Forums, Workshops and Specialist Courses

The majority of educational activities listed under the prescribed burning outcomes are also applicable to understanding the fire management context of aerial suppression. For this reason the commitments listed below should be read in conjunction with those listed under prescribed burning.

Aerial suppression specific commitments include:

#### 1. Aerial suppression industry forum - May 2009

This invitation-only, industry-based forum will enable participants to build an understanding of the impact of the research on the operations of the aircraft industry.

#### 2. Fire Notes

Four *Fire Notes* relating to aerial suppression have been published. These can be found at [www.bushfirecrc.com](http://www.bushfirecrc.com). An additional *Fire Note* is currently being prepared on Guidelines to assist aerial suppression and should be available in April.

#### 3. Specific products

Guidelines to assist in the selection and effective use of aerial suppression resources are currently in preparation. Publication is currently expected to occur in July.



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## COMMUNITY SAFETY AND ENGAGEMENT

This targeted outcome includes the following projects: understanding communities, bushfire arson, effective risk communication, evaluation of stay or go policy and the evaluation of community education programs. The research adoption phase of this research will see the development of a conceptual model that will enable agencies to evaluate the appropriateness of their various education and intervention strategies. The model will primarily be in the form a synthesis of a broad range of related research. This synthesis will provide an evidence-base for agencies that will support the ongoing development of their approaches to community safety.

### Proposed Seminars/Forums, Workshops and Specialist Courses

#### 1. Evaluating 'Stay or Go' - TBA

Research has demonstrated that a well-prepared house can provide protection for people from fire, and that the presence of people prepared and able to defend a property is the most significant factor in determining its survival.

Workshop participants will have the opportunity to hear an update on the latest 'Stay and Defend or Leave Early' research, and to hear from agency representatives as to how the policy has been implemented to date. Discussion will focus on working through impediments to the successful implementation of the policy and, as appropriate, on formulating recommended amendments to the existing policy/guidelines.

#### 2. Bushfire Arson - February 2009

This invitation-only, industry-based forum will enable participants to build a better understanding of the impact of the research on industry operations. It will also, as appropriate, identify future research directions.

#### 3. Workshops

##### 3.1 Community Safety and Engagement Update - September 2009

In this pre-conference workshop, participants will be provided with an update on several recent projects that were designed to enhance community safety during bushfires. Examples of various steps agencies have taken / can take to inform and engage the community will be outlined and discussed.

##### 3.2 Community Education Evaluation Workshop - TBA

Participants will learn about the comprehensive research analysis that has been undertaken of current bushfire-related 'Community Education Programs' and how their effectiveness was evaluated. Participants will learn how to evaluate the effectiveness of their own agencies' community safety and education programs and how to improve future safety programs.

##### 3.3 Arson - TBA

This workshop will provide participants with an overview of the findings of research that investigated the number, size and distribution of potentially illegal fires lit in vegetation in Australia in recent years. Participants will discuss how the findings can better inform fire investigation, planning and implementation and how they can lead to a better targeting of resources for ignition reduction education programs. Actions agencies can take to minimise the number of unwanted ignitions will also be discussed.

#### 4. Fire Notes

11 *Fire Notes* have been published. These can be found at [www.bushfirecrc.com](http://www.bushfirecrc.com) A further 17 *Fire Notes* have been identified for production. It is anticipated that these will be completed over the next 18 months.

#### 5. Postgraduate Theses

One Doctoral and three Masters postgraduate studies have been completed. A further ten Doctoral studies are still underway. A list of students and thesis topics is located at [www.bushfirecrc.com](http://www.bushfirecrc.com)

#### 6. Specific Products

A Book on the integration of Community Safety and Engagement and Protecting Firefighters is due for completion in August.





## PRESCRIBED BURNING

Prescribed burning is defined as *the controlled application of fire under specific environmental conditions to a predetermined area and at the time, intensity and rate of spread required to attain planned resource management objectives.*

Research in this area has included four main elements:

- basic understanding of fire ecology and fuels using specific area studies
- fire behaviour research that examines how fuels are consumed and the characteristics of the combustion process;
- the impact of prescribed burning on subsequent wildfire suppression and asset protection; and
- the development of tools and knowledge that can help to understand fire propagation and the impacts of climate change on risk.

### Proposed Seminars/Forums, Workshops and Specialist Courses

#### 1. Workshops / Forums

##### 1.1 High Fire Specialist and Public Forums - TBA

Specialist forums as requested by Program Leader B (Dargo High Plains Victoria and Snowy Plains, NSW) March-April 2009. On location at long-term field sites on private land.

Participants, including local land and fire managers and residents, will learn about research into high country fuels and ecosystems and how bushfire might be better managed in high country landscapes.

##### 1.2 Prescribed Burning Summit - TBA

The purpose of this summit is to bring together a range of researchers and policy makers with an interest in the role of prescribed fire in landscape management. Participants can anticipate developing a better understanding of the various research approaches on prescribed burning.

##### 1.3 Briefing for Departmental Heads - TBA

An update by researchers and policy specialists supported by a literature synthesis and related scientific publications.

Government agencies in Australia and New Zealand spend hundreds of millions of dollars annually on the management of bushfires. This briefing will provide an update for Departmental Heads and senior decision-makers on the implications of Bushfire CRC research on bushfire management. The briefing is designed to assist CEOs / Chief Officers to better understand the parameters and the uncertainties associated with relevant risk models Officers. It will also provide insights into some of the complexities associated with the use of prescribed fire.

##### 1.4 Fire Weather - September 2009

This half-day pre-conference workshop at the Bushfire CRC Annual Conference will bring participants up-to-date with the findings of recent research into fire weather. Research outcomes focussing on a number of high hazard episodes, as well as 'mean' weather behaviour will be discussed, with a view to assisting fire and land management personnel in their strategic planning.

##### 1.5 Fuel Systems - September 2009

This half-day pre-conference workshop at the Bushfire CRC Annual Conference will hear from a range of researchers investigating bushfire fuel behaviour in a variety of landscapes.

Participants will have the opportunity to discuss the links between fire and land management and the management of critically important resources such as water and forests.

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## 1.6 Risk Management Techniques for Plantation forests - TBA

Fire behaviour in eucalypt plantations exhibits some very different and, to date, imperfectly understood characteristics. This workshop will give participants the opportunity to learn about a range of Bushfire CRC research pertinent to plantation management. Topics will include prescribed burning in relation to eucalypt plantations and the use of aircraft in plantation fires.

## 1.7 Workshop for Policy and Planning Officers - TBA

This workshop will provide an update for policy and planning officers on the implications of research outcomes on bushfire management. The workshop is designed to assist practitioners to better understand the current risk models and thereby be in a better position to use them in their own situations. There will be the opportunity for practitioners to apply the new models to local scenarios and to discuss the implications for changes in practice.

## 1.8 Fire Management Business Model - TBA

Participants will learn how the *Fire Management Business Model* will assist them to better prepare for climate related changes to fire regimes. Participants will gain a better understanding of how changes in one aspect of bushfire management can affect other aspects of land and fire management.

## 1.9 Climate Change and its Impact on Bushfire Management - TBA

One of the more difficult issues facing those involved in the management of bushfires is assessing the likely impact of climate change on the bushfire threat. In this workshop participants will hear from researchers involved in the fields of fire behaviour, prescribed burning, aerial suppression techniques and fuel regimes. The implications for climate change on land and fire management will also be explored.

## 2. Specialist Courses

### 2.1 Fire Behaviour / Fire Weather / Fuel Systems

Southern Australia; Northern Australia Dates TBA

These courses are targeted at regional fire planning officers and related personnel with an interest in developing an improved understanding of the implications of research outcomes in fire behaviour, fire weather and fuel systems, particularly in a changing climate. Participants will learn about bushfire management models of fire suppression and management which combines seasonal and geographic data, fire behaviour science and capability information and how they can use this information to inform both operational and strategic decision making.

### 2.2 Fire Behaviour / Fire Weather / Fuel Systems -Building Trainer Expertise

Southern Australia; Northern Australia Dates TBA

In these two three day courses participants will review their current training strategies in relation to the research content provided in SC1-ASPB '*Fire behaviour/fire weather/fuel systems*' and plan and develop new training delivery approaches. Some time will be spent on reviewing the latest approaches to adult learning and training and on participants gaining experience in micro-teaching and/or developing curricula in selected research content.

## 3. Fire Notes

24 *Fire Notes* have been published. These can be found at [www.bushfirecrc.com/](http://www.bushfirecrc.com/) A further 22 *Fire Notes* are in preparation, for completion over the next 18 months.

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#### 4. Postgraduate Theses

Six Doctoral theses have been completed, and another twelve and one Masters level postgraduate studies are underway. A list of students and thesis topics is located at [www.bushfirecrc.com/](http://www.bushfirecrc.com/)

#### 5. Specific Products

- Long-term research sites have been established and documented across most sites in Australia. Specific information about these sites is currently available from the Bushfire CRC website. It is intended that MOUs will be prepared and signed with each relevant managing agency concerning the future management and monitoring of each site.
- A field guide for *Burning Under Young Eucalypt Plantations* is in preparation with a publication scheduled for April 2009.
- A book synthesizing all the research carried out as part of Program B is in its final preparation and will be published in 2009.



## PROTECTING FIRE FIGHTERS

Topography, vegetation and climate combine in many parts of southern Australia to produce one of the most severe fire prone areas on Earth.

Agencies and indeed the wider community rely on appropriately trained personnel with a variety of skill levels for the safe and effective use of prescribed fire and for a rapid, safe and thorough response to wildfire.

All firefighters must be adequately trained and equipped and have their competency recognised prior to their involvement in firefighting operations.

Several research projects have explored factors that have an influence on the health and safety of fire fighters. The key occupational health and safety research of the Bushfire CRC has explored fire-ground fitness, hydration and the impact of air toxics (from burning vegetation) on fire fighters.

Other research has focussed fatigue while fighting bushfire - this research has published an overview of factors contributing to firefighter fatigue during bushfire suppression work. The research in this area is determining the effect of fatigue, stress, fitness and crew management on the health and safety of firefighters and identifying how this impacts on decision-making ability.

Researchers have also been investigating safe behaviour and decision making - what are the human factors that influence decision making on the fire-ground - such as physical and mental stress, group pressures at crew and management level, and the individuals on thought processes?

And volunteers - around 250,000 volunteers across Australia assist paid fire agency staff in carrying out bushfire mitigation and suppression operations each year. This volunteer effort is estimated to be worth about \$1.2 billion to the community annually. Bushfire CRC researchers have been examining how agencies can best recruit and retain their volunteer workforce.

### Proposed Seminars / Forums, Workshops and Specialist Courses

#### 1. Seminars / Forums

##### 1.1 Enhancing Volunteerism - TBA

This invitation only forum will provide an opportunity for stakeholders to be involved in a preliminary impact assessment of the research outcomes on the recruitment and retention of volunteer fire fighters.

##### 1.2 Safe Decision Making - May 2009

This invitation only forum will provide an opportunity for stakeholders to be involved in a preliminary impact assessment of the research outcomes.

#### 2. Workshops

##### 2.1 Protecting Fire-fighters - September 2009

This pre-conference workshop at the Bushfire CRC Annual Conference will synthesise research outcomes from the research projects *Safe Decision-Making*, *Fire-fighter Health and Safety* and *Enhancing Incident Management Teamwork*. Participants will be provided with an update on the research to date and have the opportunity to discuss what the implications mean and the likely changes needed in organisational policy and practice.

##### 2.2 Enhancing Volunteerism - September 2009

Rural fire services rely heavily on volunteers. This pre conference workshop will provide participants with information to help them develop agency strategic plans and develop policy concerning new ways to recruit and retain the volunteer workforce.

### 3. Specialist Courses

#### 3.1 Protecting fire-fighters - TBA

In this three-day course participants will gain a richer understanding of the research conducted to date in the areas of *safe decision-making*; *fire-fighter health and safety* and *enhancing incident management teamwork*. Participants will have the opportunity (where appropriate) of considering data pertinent to their agency context and to discuss the implications for changes that might be needed. Participants will gain an understanding of what factors lead to fire-fighters making unsafe decision and what can be done to assist. Participants will also learn about how they can determine and monitor the effects of fitness, stress, fatigue and what this means for crew management. Participants will consider how effective teamwork and organisational support has been measured and where agencies may look to improve teamwork and incident management.

#### 3.2 Protecting Fire fighters - Building trainer expertise - TBA

In this three day course participants will review their current training strategies in relation to the research content provided in SC1-PFF '*Protecting fire-fighters*' and plan and develop new training delivery approaches. Some time will be spent on reviewing the latest approaches to adult learning and training and on participants gaining experience in micro-teaching and/or developing curricula in selected research content.

### 4. Fire Notes

Eleven *Fire Notes* have been published. These can be found at [www.bushfirecrc.com](http://www.bushfirecrc.com) A further 19 *Fire Notes* have been identified for development.

### 5. Postgraduate Theses

One postgraduate thesis has been completed and a further ten are currently being completed. A list of students and thesis topics are located at [www.bushfirecrc.com](http://www.bushfirecrc.com)

### 6. Specific Products

- A 'risk based' toolkit to assist with the management of exposure to Air Toxics is being developed. It should be available by mid 2009.
- 'Good Practice' guidelines for the retention and recruitment of volunteers are in preparation. They should be available by mid 2009.

