

# **The Australian Bushfire Cooperative Research Centre Program: – A National User-Driven approach towards a coordinated Fire Research Program**

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## **Abstract**

The Bushfire Cooperative Research Centre (CRC) is a new tool in Australia which enables researchers and end users (fire services, land managers, vulnerable communities) to come together to achieve united, identified goals.

The Bushfire CRC guarantees research programs for a seven year period with Federal Government funding and guaranteed commitment from industry, business and researchers over the same period.

The Bushfire CRC was proposed after the devastating NSW Bushfires of 2001/2002. Australia has a long history of bushfires ravaging the country. A CRC was seen as a solution to a coordinated approach to bushfire research in Australia.

The purpose of the Bushfire CRC is to manage the bushfire risk to the community in an economically and ecologically sustainable manner. It will bring together the best researchers in Australia with coal face firefighters in a national effort to deal with bushfires.

The Bushfire CRC will operate five separate programs that will seek the following outcomes:-

- A better understanding of bushfire behaviour so as to better manage fires and reduce the risk to firefighters and the community.
- Develop tools for the effective, safe and ecologically sound planning and use of prescribed fire and fire regimes.
- Create partnerships between fire agencies and communities to reduce the vulnerability of communities to bushfire.
- Reduce loss of buildings and injury to occupants and increased safety of firefighters and the increase of volunteerism.
- Develop the next generation of qualified fire researchers.

## **Introduction:**

One of the many tools being employed in Australia to combat what is known intimately as a Wildland Fire and we refer to as bushfires, the Australian Bushfire Cooperative Research Centre.

What is a Cooperative Research Centre (CRC) and how can we utilise this CRC to effectively combat wildland fire?

Cooperative Research Centre (and I will refer to them throughout the rest of this paper as CRC's) undertake collaborative research and education programs in the fields of natural sciences and engineering, with a strong focus on commercial and other applications. The Government objectives for the CRC Program are:

- To enhance the contributions of long term scientific and technological research and innovation to Australia's sustainable economic and social development.
- To enhance the transfer of research outputs into commercial or other outcomes of economic, environmental or social benefit to Australia.
- To enhance the value to Australia of graduate researchers; and industry or other users, and to improve efficiency in the use of intellectual.

The main aim of the Cooperative Research Centre is to bring together industry users, in this case the Fire Services, Forestry and Natural Resource Departments, National Parks and Land Managers together with researchers such as large Universities, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and business. All of these various organisations work together in a unique blend combined with Commonwealth Government funding to achieve joint goals and objectives. The Commonwealth Government contributes approximately \$145 million per annum through these programs and industry has committed \$1.4 billion for the terms of Centres established so far.

CRC's are formed for terms of seven years; this allows researchers to collaborate fully with industry end users to identify programs that will aid industry and community. This long term funding allows strategic planning and long-term programs that both researchers and industry are confident will continue. This allows commitment and partnerships to form between research and industry that would not happen without these centres and guaranteed funding from Government, Industry and Researchers.

This CRC Program also furthers education and training, it aims at allowing researchers to develop special skills in the industry focus. In the case of the Bushfire CRC it assures the ongoing training and development of researchers and scientists in all the areas of bushfire research. This is a major achievement as up to this point it was becoming obvious that new researchers in the bushfire field were becoming few and far between. The CRC Program aims at developing 20-40 PHD students over the course of the program. The interaction between research and industry develops researchers focused on user needs.

## **Why a Bushfire CRC?**

Why a Bushfire CRC? For the benefit of our overseas visitors I need to define what a bushfire is. A bushfire is an all round term used in Australia to cover any wildland fire, it

covers forest fires, scrub fires, grass fires and any vegetation in between. It is a quaint colloquial term that covers any wildfire progressing through any type of vegetation, natural, imported, wild or plantation.

Australia has long been ravaged by bushfires, the history of bushfires in New South Wales (NSW) attest to this. I will only concentrate on the history of bushfires in NSW as this is the state I am most familiar with. Of course there were many other fires of great magnitude such as Black Friday in Tasmania and Ash Wednesday in Victoria.

### **A History of Bushfires in NSW**

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|---------|--|
| 1926/27 | Major fires in the northern, western and southern districts over a four-week period burned 2 million hectares and killed three people.   |
| 1939    | On January 13 fires in the southern and eastern parts of the State resulted in 13 deaths. Over 400 buildings were lost and an area of approximately 2,400,00ha burnt.  |
| 1944    | Fires in the Blue Mountains, Sydney and Gosford areas destroyed 150 homes.   |
| 1952    | A major fire season occurred in 1951-52 when about 4 million hectares of land in the eastern and central parts of the State were burnt. During the Spring of 1951 fire fighters were deployed to numerous fires north of Newcastle. In January 1952 large fires commenced in the southern districts of the State. Eighty-five homes were lost and 7 people lost their lives during the fire season |
| 1957    | On 30 November 1957 large fires commenced in the Blue Mountains. Four bushwalkers died trying to outrun the fire. By 2 December 158 houses, churches, schools and a hospital were totally destroyed. Homes were also destroyed in northern Sydney and on the Central Coast.  |
| 1964/65 | Major fires occurred in the Snowy Mountains, Southern Tablelands and outer metropolitan area. The Chatsbury/Bungonia fire covered 250,000ha and destroyed the village of Wingello. Three lives were lost. In March the Tumut Valley fire burnt 80,000ha.   |
| 1968    | In November/December 1968 large fires occurred in Sydney, Blue Mountains and the Illawarra. Over 200 hundred buildings including 150 homes were lost and 14 deaths were recorded.  |
| 1969/70 | The Roto fire burnt some 280,000ha in a three week period.   |
| 1972/73 | The south-eastern corner of the State suffered the worst fires since 1968 with over 200,000ha burnt. The Burrinjuck fire burnt 16,000ha and was reported to have travelled 19km in three hours, denuding a hillside in its path.   |
| 1974/75 | The severest season for perhaps 30 years in the far west with 3,755,000ha burnt, 50,000 stock lost and 10,170km of fencing destroyed. 1.5 million ha were burnt in the Cobar Shire in mid-December and 340,000ha in the Balranald fire. The Moolah-Corinya fire burnt 1,117,000ha and was the largest fire put out by Bush firefighters. Its perimeter was over 1,000 km.                          |

- 1977 In the Blue Mountains area 49 buildings were destroyed and 54,000ha were burnt. Sydney suburbs up to 60 km away were showered with fallout from blackened leaves.
- 1979 Following severe drought conditions over most of the State major fires were widespread. In Mudgee one life was lost and 55,400ha burnt. Fourteen houses were lost in Warringah Shire. Fires occurred in most areas of the State resulting in an area of 1 million ha burnt.
- 1982/83 \$12 million worth of pine plantation was destroyed in southern NSW in a fire, which burnt 25,000ha in only two and a half hours. The Grose Valley fire burnt 35,000ha.
- 1984/85 This was the worst fire season for ten years in the grassed western areas of the State. On Christmas Day more than 100 fires were started by lightning strikes and 500,000ha burnt as a result. The largest fire was at Cobar in mid-January with 516,000ha burnt. During the season there were 6,000 fires State-wide, 3.5 million ha burnt, four lives lost, 40,000 stock lost and \$40 million damage.
- 1987/88 Over 115,000ha were burnt in the Bethungra and Warurillah/Yanco fires with three lives lost at the Bethungra fire. Major fires also occurred in the south eastern part of Kosciusko National Park where 65,000ha were burnt in the Park and surrounding areas.
- 1990/91 In November fires raced through the council areas of Hay and Murrumbidgee, claimed nearly 200,000ha of prime grazing land, destroyed 100,000 sheep and hundreds of kilometres of fencing. Just one week later 80,000ha of land were burnt as fires claimed another 76,000 sheep and 200 cattle in Hay and Carrathool Shires. On December 23, hundreds of fires were reported across the State with eight emergency declarations made in the Hornsby, Ku-ring-gai, Cessnock, Hawkesbury, Warringah, Wollondilly, Gosford and Wyong council areas. Eight homes were lost in these fires.
- 1994 In January 1994, Coastal NSW experienced an extended period of extreme fire weather from the Queensland border to Batemans Bay. More than 800 fires started between December 27 1993 and January 16 1994 burning an area of 800,000ha. Fire swept through the greater Sydney area on a scale not previously experienced before. Four people lost their lives and 206 properties were totally destroyed.
- 1997 Major fires occurred on the North Coast, Central Tablelands, Sydney and Western Districts (notably the Pilliga Scrub). Ten houses were destroyed and four people lost their lives.
- 2001/2002 Dry thunderstorms started several fires across the State in October and December 2001. From 24 December under deteriorating weather conditions, fires impacted upon urban areas of Sydney. Over the next 23 days fires burnt 754,000ha of land, placing over 20,000 properties directly at risk. A total of

109 buildings were lost and it is estimated that the damage bill will be in the vicinity of \$75,000,000. No loss of lives.

- 2002/2003 A total of 61 major bushfires involving 81 local government areas between 27 September 2002 and 24 February 2003. Fire agencies combated major fires from the Queensland to the Victorian Border with the assistance of interstate resources from throughout Australia.
- Continuous major bushfires for 151 days.
  - Area Burnt was approximately 1,465,000ha in NSW
  - Approximately 1,054,000ha were burnt in Victoria.
  - Approximately 156,500ha were burnt in ACT.

#### Aircraft utilised

- At the height of the activity, in one day 103 aircraft were deployed (approximately 80% rotary wing and 20% fixed wing).
- Number of aircraft taskings 2,098.
- Number of aircraft days 9,986.

#### Fatalities

- Tragically there was a loss of three firefighters. These were not directly related to bushfire emergencies.
- Tragically three civilians died during the Section 44 declarations.

#### Losses (estimated)

- 86 Residential homes destroyed.
- 28 Residential homes damaged.
- 33 Other major structures were destroyed.
- 188 Sheds, garages, outbuildings, etc. were destroyed.
- 1 Base camp
- 102 Vehicles, boats, caravans, etc. were destroyed.
- Approximately 3,400 stock including horses, cattle and sheep
- 1 Koala colony

With a long and eventful history of bushfire in Australia culminating in the devastating 2001 bushfires in New South Wales a Bushfire Research Workshop was convened by the Minister of Science, the Honourable Peter McGauran, where it was agreed there was a need for a coordinated approach to bushfire research in Australia.

A proposal for the Bushfire CRC was then coordinated by the Australian Fire Authorities Council (AFAC).

### **Purpose of the Bushfire CRC**

The purpose of the Bushfire CRC is to manage the bushfire risk to the community in an economically and ecologically sustainable manner to increase the self-sufficiency of communities in managing the risks from bushfire.

For the first time the Bushfire CRC will bring together the best researchers in Australia with the coal face fire fighters in a national effort to deal with bushfires.

Already both researchers and fire fighters have sensed an electric feel about this program and the coming together of academics and front line fire fighters. With this coming together of all the stakeholders it is felt that research will be able to be quickly applied to assist in the prevention and fighting of bushfires.

### **Structure of the Bushfire CRC.**

The Bushfire CRC began its work in July 2003 for a seven year period and will have total resources of \$110 million. The Commonwealth Government will commit \$24.8 million over its seven year life span and an additional \$87 million will be contributed by the participants in the Bushfire CRC.

The Management structure of the Bushfire CRC will consist of an Executive Board, under the chairmanship of myself. The Executive Board will govern the Bushfire CRC; the majority of the members of the Board will be the end users representing stakeholder's interests. The Executive Board will be accountable to a council representing stakeholders.

The Bushfire CRC will be lead by the Chief Executive Officer and a small management team which will consist of a Research Manager, Communications Manager, Technology Transfer / Commercialisation Manager, Business Manager and Administration task.

Bushfire CRC participants consist of: -

- CSIRO,
- Emergency Management Australia,
- Australian Building Codes Board,
- Forest Research - New Zealand,
- WA Department of Conservation and Land Management,
- Victorian Country Fire Authority,
- NSW Fire Brigades,
- WA Fire and Emergency Service,
- Victorian Department of Natural Resources and the Environment ???,
- NSW National Parks,
- Queensland Fire and Rescue Service,
- The ACT Department of Justice and Community Safety,
- Forestry – Tasmania,
- Queensland Department of Primary Industry,
- Metropolitan Fire and Emergency Services Board,
- Tasmania Department of Primary Industries, Water and Environment,
- ACT Emergency Services Board,
- Tasmania Fire Service,
- Country Fire Services of South Australia,
- Queensland Environmental Protection Agency,
- Tasmanian Government,
- State Forests of NSW,
- Forest Science Centre,

- The University of Melbourne,
- The University of New South Wales ADFA,
- The Australian National University,
- The University of Sydney,
- Griffith University,
- La Trobe University,
- Royal Melbourne Institute of Technology,
- University of Western Australia.

**The Objectives of the Bushfire CRC are: -**

1. To develop an internationally renowned centre of excellence to lead and coordinate bushfire research in Australia by: -
  - Establishing a sustainable output of university graduates to specifically undertake research into bushfires and hence build the Australasian knowledge base relating to bushfire.
  - Maintaining the bio diversity of Australia through improved bushfire management based on knowledge of the impact and positive use of bushfire in relation to sustainable resource management.
  - Facilitating the transfer of the innovative technology components of outputs to industry through appropriate commercial arrangements that generate revenue streams enabling the Bushfire CRC to ultimately function independent of Federal funding.
  
2. To provide a research framework that will improve the effectiveness of bushfire management agencies by: -
  - Facilitating collaboration between end users and researchers to specify outputs (products and services) that improve community safety and fire fighter wellbeing, protect property and reduce risk and cost associated with the sustainable management of bushfire.
  - Ensuring the expectations of end users, in terms of usefulness and performance of research, are fully met to encourage a high level of adoption of future outputs.
  - Ensuring the timely and appropriate delivery of outputs through continuous end user evaluation.
  
3. To increase the self-sufficiency of communities in managing the risks from bushfires by: -
  - Understanding and encouraging appropriate community behaviour towards bushfires.
  - Increasing the understanding of the role and importance of volunteerism in relation to the management of bushfire.

The Bushfire CRC Program consists of five inter-related programs of research. These five programs and the outcomes of each program are: -

## **Program A - Safe prevention, Preparation and Suppression.**

Program A will seek to develop technologies to increase the understanding of the behaviour of, and the ability to manage bushfires in order to reduce the risk to fire fighters and the community.

## **Program B - Management of Prescribed and Wildland Fires in the Landscape**

Program B will seek to develop tools for the effective, safe and ecologically sound planning and use of prescribed fire and fire regimes.

## **Program C - Protection of People and Property**

Program C will seek to coordinate research in Australia to increase the self-sufficiency of communities in managing the risk from bushfires. Program C will attempt to create a partnership between local communities and fire agencies to reduce the vulnerability of the community to bushfire. By reducing the Communities reliance on fire agencies to protect them and taking on responsibility for their actions and risk much safer communities will result.

## **Program D - Protection of People and Property**

The objectives of the program are to reduce the loss of buildings and the injuries to occupants, to increase the safety and well-being of fire fighters and to increase the availability and retention of essential volunteers.

## **Program E – Education and Training**

Program E will seek to develop the next generation of qualified fire researchers, improve the use of Australian intellectual and research resources and maintain Australia at the forefront of international bushfire research.

## **Conclusion**

The Bushfire CRC is a long term strategy to bring together the many players involved in combating bushfires in Australia. It will combine education and research with industry and firefighting agency end users to find unique solutions to age old problems. Through a combination of Federal funding and research and end user funding all participants will work hand in hand to meet the same goals.

The Bushfire CRC hopes to provide best practice solutions for education and prevention of bushfires for the community and measures to make communities much more self reliant. The



CRC hopes to increase our knowledge of bushfire behaviour and from this improve firefighting suppression methods, firefighter safety and environmental damage. The CRC also hopes to increase the safety of people and buildings by building more bushfire resistant buildings and legislating where they should and more importantly should not be built.

These goals and objectives will greatly aid not only the Australian community but also the international community as the lessons learned from the Bushfire CRC and the strategies employed should in many cases be able to be applied to applicable situations overseas.

The Bushfire CRC can be seen as a new long term solution to an age old problem