



Wildfires in Australia

In this, the first of two reports on the Australasian Region, **Richard Thornton** reveals that Australia is one of the most fire-prone environments in the world, owing to a unique combination of vegetation, climate and landscape

LARGELY THANKS TO A STRONG LA Niña event, rainfall over much of eastern Australia was above average for 2010 and the first half of 2011. Prior to this, the El Niño Southern Oscillation was responsible for a 13-year drought in much of southern Australia. The recent rainfall led to major flooding in significant areas of Queensland, New South Wales and Victoria (CRJ 7:1). Rainfall flowed via swollen rivers to inland areas that had been parched for many years.

As a result, the fire risk in the eastern states during the 2010/11 season was one of the lowest in some years. It was, however, different in the south west of western Australia, where drought continued and several significant bushfires occurred on the outskirts of Perth during early 2011.

The wet weather has led to a strong growth in grass in many places, increasing the risk of potentially serious grass fires, especially in central and northern Australia, this coming fire season.

Australia is geographically diverse, with landscapes ranging from the deserts and semi-

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arid areas of the inland, to tropical rainforests in parts of the north east, vast areas of savannah woodlands across the tropical north, mountain forests in the east, cool temperate rainforests

in the far south east, open eucalypt forests in the south west and large expanses of dry eucalypt forest across much of the south east.

In land area, Australia is the world's sixth largest nation, but with a comparably small population (22.6 million). It is the driest inhabited continent. Its interior has one of the lowest rainfalls in the world and about three-quarters of the land is arid or semi-arid. Its fertile areas are well-watered, and these are used to produce significant agricultural exports. Most of the population is concentrated along the eastern seaboard and the south western corner of the continent, making Australia very urbanised.

In an average year, around 29 million hectares of Australia are burnt by fires. With seasonal fluctuations this area can



Burnt fires near Kinglake, Victoria, after the Black Saturday bushfires of February 7, 2009, which killed 173 people

vary by a factor of four from the average.

Around 90 per cent of the area burnt by fire in Australia each year is found north of the Tropic of Capricorn, with burning occurring during the 'dry season,' generally between April and November. Most of the remaining burnt area (around three million hectares) is found in the temperate, more densely populated southern region of Australia, with high fire danger generally occurring between November and March.

There are significant differences in the types of fires that occur in northern and southern Australia. Northern fires tend to occur in savannah woodlands and in hummock grasslands, where the amount of fuel is generally limited and weather conditions in the dry season are usually stable. Maximum fire intensities rarely exceed 20,000 kW/m. During bushfires in the mountain forests of southern Australia maximum intensities can reach up to 100,000 kW/m.

Fire management remains largely the responsibility of state and territory governments, rather than the national government. The volunteer-based organisations in rural Australia remain essential to the overall fire suppression effort and a generally high level of effective suppression continues in the south.

Between 2000 and 2010, Australia experienced particularly serious fire seasons culminating in February 2009, with fires razing areas to the north and east of Victoria's capital, Melbourne, and the loss of 173 lives and over 2,000 homes.

Most of the deaths and damage occurred on Saturday, February 7, named 'Black Saturday', but many of the various other fires that broke out that day took up to two weeks to contain.

The subsequent Royal Commission of Inquiry examined what it termed 26 "significant fires" on the day. The causes of the fatal fires were determined as:

- Kilmore East (119 fatalities) – electrical failure;
- Churchill (11 fatalities) – suspicious;
- Murrindindi (40 fatalities) – undetermined and still under investigation;
- Bendigo (one fatality) – suspicious; and
- Beechworth – Mudgegonga (two fatalities) – electrical failure.

On the day of ignition, Victoria was enduring one of its most severe and prolonged heatwaves. During the final week of January 2009 the temperature in Melbourne was above 43°C for three consecutive days. Saturday, February 7, was forecast to reach temperatures in the low 40s, accompanied by strong winds.

Temperatures were nearing 40°C by 11:00hrs in many parts of the state and later climbed to the mid 40s. Melbourne reached 46.4°C. Relative humidity dropped to single figures in many places. Strong north westerly winds in the morning grew to storm force as the day progressed and a violent south westerly wind change moved across the state during the afternoon, greatly intensifying the fire behaviour.

The Royal Commission report stated: "The Commission is in no doubt that the influence of the long drought years, which broke a number of meteorological records, and the impact of the heatwave immediately preceding the fires, helped create the conditions for a major conflagration to occur once the fires started. Nevertheless, although this served to highlight the extreme level of risk that existed, the Commission does not consider that the resultant fires could be judged as representing a shift change that sets them apart from what Victoria has experienced from time to time in the past."

The Royal Commission made 67

recommendations under headings including: Victoria's bushfire safety policy; emergency and incident management; fireground response; electricity-caused fire; deliberately lit fires; planning and building; land and fuel management; organisational structure (of the fire services); and research and evaluation.

Both the then State Government and the new one elected in November 2010 pledged to implement the recommendations.

Historically, the area of southern Australia burnt by fire has declined somewhat over the past several decades as a consequence of changed land use patterns and fire suppression practices. In the tropical north, however, the cessation of traditional indigenous practices has led to a higher prevalence of hot, vast fires late in the dry season.

Landscape fire

While there are considerable difficulties associated with establishing what pre-European fire regimes existed in southern Australia, what can be said with confidence is that pre-European aboriginal people did make use of landscape fire. Also, lightning was, and remains, a major source of fire ignition across much of the Australian continent.

Urban attitudes to the use of prescribed fire have also been a factor in the decline of its use to restrict fire risk in a number of areas. During this same period land management agencies, and to an extent rural fire services, have struggled to maintain a balanced approach to the 'prevention, preparedness, response and recovery' mix.

Across the northern savannah fire regions there has been a move to prescribed burning early in the dry season, from June to August, in an attempt to stop the big, high-intensity fires of the late dry season. Often undertaken in association with the indigenous people, this burning also aims to promote biological diversity and reduce the amount of greenhouse emissions from large fires.

A major issue in the north has been the increased fire intensity brought about by introduced pasture grasses such as Gamba which, if not grazed by livestock, grows thickly as high as three metres. It does not burn until late in the fire season, and does so with the intensity of a forest fire.

The period 1998-2010 has seen an unprecedented level of scrutiny of the management of bushfires in Australia. Yet, despite numerous reports and recommendations, fundamental issues continue to remain unaddressed.

As an example, close to half of the

► State of Victoria's native forests and woodlands (over three million hectares) have now been burnt since late 2002, much of them by severe wildfire.

In August 2010, a national inquiry by the Australian Senate described itself in its final report as the 19th major bushfire-related inquiry to be conducted in Australia since 1939 and the third to be conducted federally since 2003.

Paradoxically, in many locations, natural fires are essential to maintain ecosystem services, biodiversity and productivity. Fire is also widely used as a land and risk management tool. Each year however, fires can cause widespread loss of life, ecosystem damage, and adverse economic and social effects. They also contribute increasingly to greenhouse gas emissions.

Recent trends

Arizona State University Professor, Stephen Pyne states that: "Australia is among the world's fire powers. It has fires, fire institutions, fire scholarship, and vigorous fire politics. Only America has invested a comparable fraction of its national culture into the subject, so what Australia has to say about fire matters far beyond its own shores."

Pyne concludes that while Australia is one of the "Big Five in fire science" its fire management problems have been growing. Having paid high praise to previous generations, and particularly those who worked in forest and fire management in the decades following the Second World War, Pyne found much of concern in some more recent trends.

In evidence to a 2010 Australian Senate



Researching the effects of the Black Saturday Bushfires, which caused such devastation and 173 deaths

Committee investigation of bushfires, Australian National University Professor of Forestry, Peter Kanowski, recounted how a 2004 inquiry he took part in had identified: "A repeated cycle of response by governments and the community to major fire events: First, suppression and recovery processes are always accompanied by assertions, accusations and allocations of blame, even while the fires are still burning; second, inquiries are established and report; third, recommendations are acted upon, to varying degrees; fourth, the passage of time

sees growing complacency and reduced levels of preparedness... and the cycle begins again with the next major bushfire event."

It is critical that Australia recognises this cycle, learns from these recent tragic incidents and does not simply allow their repetition. **CRJ**

■ *The next report will be from New Zealand, followed by reports from the North American network, the Fire Management Working Group of the North American Forestry Commission, in which Canada, Mexico and the USA are partnering.*

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Regional networking

In 1993, the Australian Fire Authorities Council (AFAC) was established to improve the collaboration and co-ordination of efforts between those Australian agencies with a responsibility for the protection of life and property from fire and other emergencies. With membership comprising agencies from the greater Australasia-Pacific region, the Council's name changed to the Australasian Fire and Emergency Service Authorities Council in 2007. The current membership of AFAC stands at 35 full members and eight affiliate members from across the region.

The organisation fosters and promotes an integrated approach to emergency service operations and business management by identifying opportunities to share knowledge, collaborate and optimise the use of resources. AFAC members collaborate on international, national and regional matters. The organisation helps strengthen fire and emergency services so that they can improve their safety results effectively and efficiently.

The Forest Fire Management Group, a committee of

Australian and New Zealand land management agencies, plus representatives from research, education and the forest industry, which reports to the Commonwealth's Primary Industries Ministerial Council, provides a forum and centre of expertise on forest fire management and control. It provides a high level of technical and policy advice on fire control matters, and assists interstate and international liaison and consultation.

The Australasian Wildland Fire Network is one of 15 Regional Wildland Fire Networks within the Global Wildland Fire Network. AFAC works in this network with the Forest Fire Management Group, the Australasian Bushfire Co-operative Research Centre, the Australian National Aerial Firefighting Centre and the Pacific Islands Fire Services Association to balance the role of fire as a necessary part of the environment, with the need to keep communities in Australia, New Zealand and the Southern Pacific Islands safe and resilient.

Reciprocal agreements have been signed between Australia, New Zealand, Canada and

the US for exchanging personnel and mutual assistance during fire emergencies. The exchange of operational personnel is possible between these countries because they all use the Incident Command System (ICS – see CRJ 1.2). This provides standardisation through terminology and organisational structures for effective incident management.

Faced with emergency response issues similar to North American countries, Australia and New Zealand evaluated incident management systems and adopted the ICS, modifying it to meet their needs. If the adopting the ICS is to enhance co-ordination between countries through sharing resources such as fire management teams, it is recommended that the sending country and receiving country both use the same incident management system.

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