

FIRE AS A HAZARD – CAUSE, EFFECT, RESPONSE: AUSTRALIA 2009

'Authorities say that bushfires can travel at 145 km per hour, sounding like the roar of a jet engine. There are witnesses to the fires on February 7th, 2009 who can confirm this because they were driving faster – to escape them. Other people weren't so lucky.'

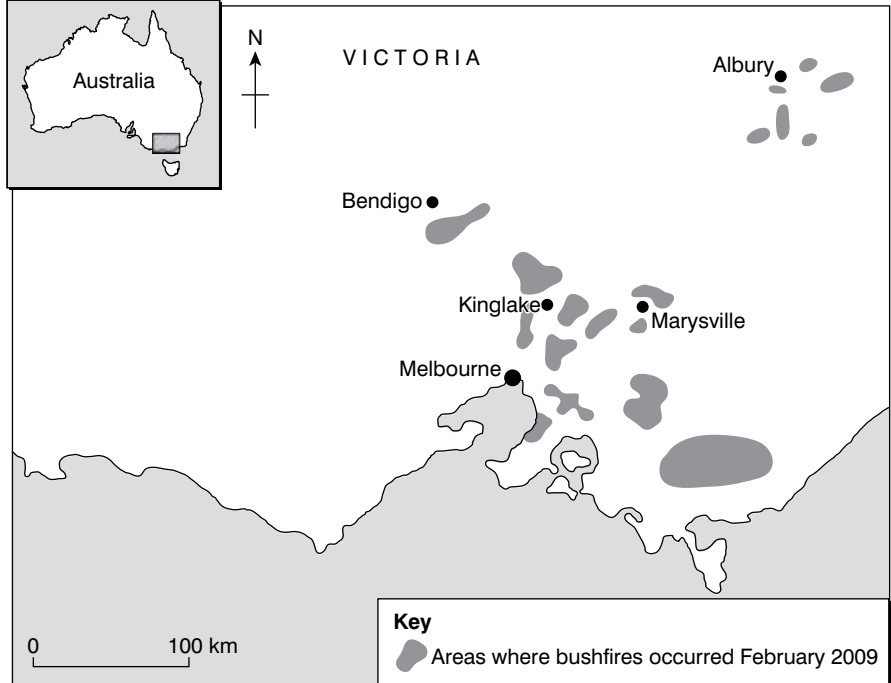
<http://www.guardian.co.uk/world/2009/dec/27/australia-bushfires-victoria-173-dead>

This **Geofile** is a study of the worst bushfires in Australian history. 'Black Saturday', 7 February 2009 was the worst day of bushfires that destroyed 2,000 properties in 78 communities, leaving 173 people dead. The fires burned within an 80km radius of Melbourne in the south-eastern state of Victoria. Three of the settlements were Kinglake, Kinglake West and Marysville (Figure 1). Marysville, for example, a dispersed settlement of about 600 people, was a destination for tourists attracted by its origins in the 1840s gold rush and by the thickly forested hills, where species such as wallabies and koalas could be seen in their natural habitat. This unit will give a definition of the term 'bushfire', looking at the general factors which cause them, before examining specifically the events of February 2009. It will also consider some effects of and responses to this disaster. Given the complex place of bushfires in Australia, are they more than just a natural hazard?

Essentials of a bushfire

A bushfire is an unplanned fire in an area of natural vegetation. It has three essentials: heat, produced naturally or by human actions, oxygen and fuel. The size and intensity of a bushfire is influenced by many factors (Figure 2). As a natural element, fire has been one of the main forces in the evolution of Australian flora and fauna. It is an essential component of the environment, needed to maintain the ecosystems. The country is dominated by drought- and fire-tolerant vegetation, such as the eucalypts. A eucalypt forest is characterised by a number of tiers – large eucalypt overstorey, with a multi-layered structure of smaller trees, then bushes and grasses. Many plant species need fire as part of the

Figure 1: (a) The locations of Kinglake and Marysville, Victoria, SE Australia: (b) satellite image of the fires



Source: NASA

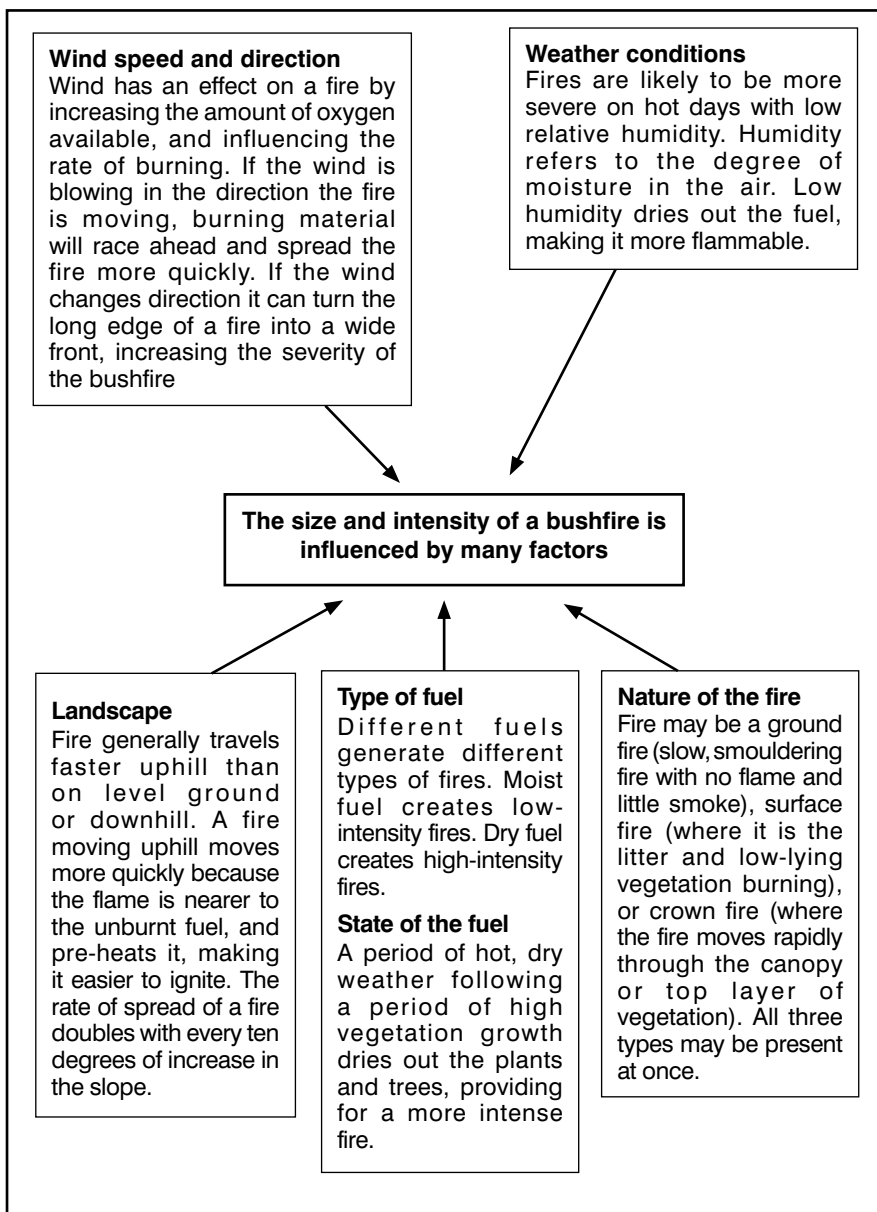
process of germination. Burning makes organic matter decompose quickly into its mineral components. Following a fire, the plants grow fast, and essential nutrients like nitrogen are recycled.

Aboriginal people have been in Australia for possibly 60,000 years, using fire for warmth, hunting, communication, ceremonies, cooking, warfare, and for clearing vegetation, encouraging it to regenerate and

providing a fire-safe environment. The use of fire to control the environment created a patchwork of vegetation at different stages of growth. When Europeans first came to Australia they disrupted these traditional burning practices as they cleared the land for crops and animal grazing.

Today, there are different demands on the environment. Some Aboriginal people want to maintain

Figure 2: The relationship between factors



Bushfires are an accepted hazard in Australia, but the scale of the disaster of February 2009 left everyone traumatised. They burned for a month. Why? A 10-year long drought had caused a build-up of highly inflammable litter from the trees. During this period there had been poor management of forests to burn off this litter. At a time when temperatures were over 40°C, there were fierce winds to drive the fires. What can ignite fires? Lightning, sparks from barbecues or electricity cables, and arsonists.

The Indian Ocean dipole

The people of Victoria inhabit a distinct and dangerous fire region. The main factor behind long dry periods is a phenomenon known as the Indian Ocean dipole, an alternating pattern of ocean temperatures found to the west and north of the Australian continent. In the ‘negative’ phase, the seas to the west of the continent are cool, while warm waters dominate in the Timor Sea to the north. This produces winds that pick up moisture from the ocean and sweep it down towards southern Australia to deliver cool, wet conditions. In the ‘positive’ phase, the pattern of ocean temperatures is reversed. The winds are weaker, they cannot pick up so much moisture, and south-eastern Australia experiences drier conditions. The problem was that the dipole got stuck in its ‘positive’ phase. When a high pressure system stalls in the Tasman Sea and a cold front approaches, hot northerly winds flow persistently from central Australia across the densely vegetated south-east of the continent (Figure 3). The passage of the cold front can cause the winds to change direction abruptly. Fires driven by a strong, steady wind are usually long and narrow. When the wind changes direction with the passage of a cold front, the long side of the fire can suddenly become the fire front.

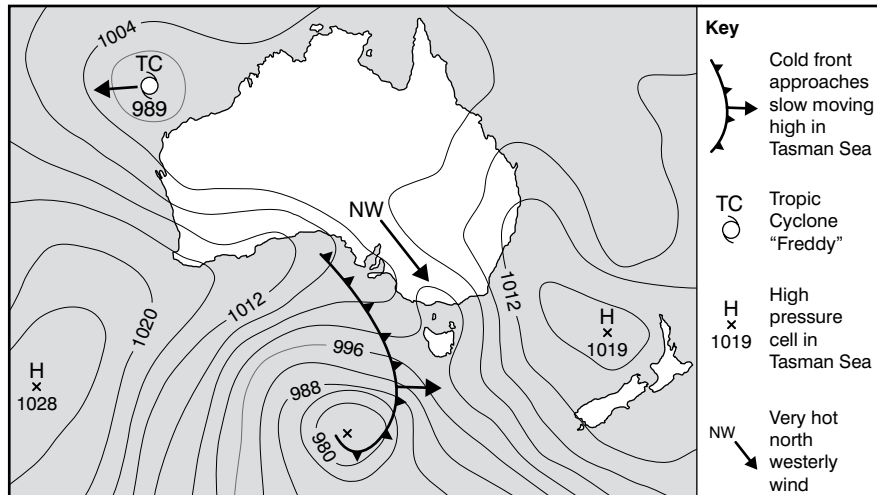
Strong winds cause a dangerous mixing of air and fuel. The mountain landscape of steep slopes, ridges and valleys channels the hot air, causing temperatures to rise and the humidity falls. Growing across Australia, eucalypts are highly adapted to fire. However, a distinctive type of eucalypt has developed in the south-east. Here, the mountain and alpine ash type eucalypts have a specific type of

their traditional practices. Many conservationists want to reduce the impact of ‘artificial’ management processes. Pastoralists want to maintain an environment suitable for their grazing animals. And tourists want smoke-free, unburned, ‘undestroyed’ surroundings.

The destruction caused by bushfires over the years has led to the conclusion that they need to be controlled, in order to protect people’s lives and property. How can bushfires be managed? Here is the issue. Should they be managed for the benefit of people and property, in which case the environment will change; or are they to be managed for the environment, which means that people will have to change the way they live? How can these contradictory views be balanced?

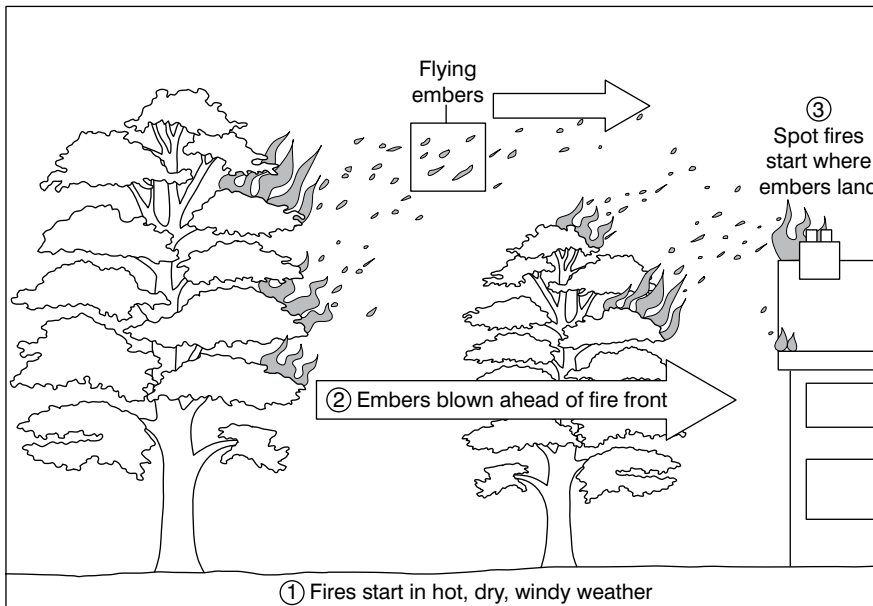
Not only is bushfire control about management, values and choice, it is also about ‘citizenship’ – being responsible for every action taken, because it has an impact on others in the community. Governments and individuals are involved. In southern Australia, the issue of conflicting demands affects areas where the bush meets the city or farms at the rural-urban fringe. One concern in management is the question of controlled burning – starting controlled fires at intervals, to reduce the amount of combustible vegetation so that later natural fires will be less intense and extensive. Many fires start in national park areas and then spread to neighbouring farms. If fires can be controlled within national parks, the chances of them escaping can be reduced. Should national parks be treated any differently to other areas of bush?

Figure 3: The weather elements leading to the dangerous fire situation of February 2009



to live in these locations, have to learn to manage their environment, by not letting the undergrowth build up. Where there is abundant undergrowth, fires have the fuel to consume whole trees as well, so the fires become very hot and very destructive. The way to prevent this happening is controlled ignition of undergrowth. However, this type of management is often unpopular with residents, who don't like being smoked out of their homes when it is done, and some people will also resent having the views from their house turned to a blackened mess. There is also the fear that such burning might get out of control and result in the very kind of damage it is intended to prevent.

Figure 4: How bushfires spread



Climate change

Climate change is affecting natural cycles. Current climate projections point to an increase in fire-weather risk, from warmer and drier conditions. Random events in chaotic conditions are an increasing trend. Severe heatwaves were once every 22 years and are now every one or two years. Two simulations used by Australia's lead scientific agency, CSIRO, and the Australian Bureau of Meteorology, point to the number of days with very high and extreme fire danger ratings increasing by some 4–25% by 2020, and 15–70% by 2050. A report, 'Climate Change in Australia' gives, as an example, the case of Canberra, which may be looking at an annual average of 26–29 very high or extreme fire danger days by 2020, and 28–38 days by 2050. The 2009 fires erupted at the end of a record heatwave, and it seems that this was a situation made worse by climate change.

regeneration. They do not grow lignotubers underground like other types, and they rarely coppice. They depend on a wildfire to crack open the seeds high in the crowns of the trees to germinate successfully. These eucalypts usually grow in stands of the same age, and renew themselves as a group. They have evolved to regenerate in this way once every few hundred years – since settlement by Europeans, more frequently. Not all the communities that were destroyed in 2009 were in or near the forests of ash, but many were, and the fire ecology of the trees is important in this environment. The forests only burn on rare days at the end of long droughts, after prolonged heatwaves, and when the chemistry is right. When they do burn, they do so with great power.

So, February 2009 had conditions for a perfect firestorm. There had been 10 years of drought, therefore the leaf litter that had built up under the Eucalyptus trees was extremely dry, and also rich in highly flammable oils. The trees explode, and fire travels easily through the oil-rich air of the tree crowns (Figure 4). Over the 10 years of drought there had been little management to guard against fire. Today's Australians have forgotten what the ancient custodians of the land, the Aborigines, knew. They recognised that frequent and mild fires ensured that the bush would be healthy and safe.

Left alone, Nature will start, through lightning strikes, repeated fires which burn out grasses and shrubs, leaving trees charred though not destroyed. People, if they want

The Bureau of Meteorology had forecast the conditions correctly, and an alert was issued. The official survival advice to 'leave early or stay and defend your home' is based on the understanding that people prefer to stay in their homes and defend them if they can; it tries to cut down late evacuation, which is often fatal; it encourages planning and preparation; and it has saved lives and homes. It will continue to be a good guide for people in most areas of Australia, but it betrayed the people in this part of Victoria in these particular circumstances after an extended heatwave and a long drought, when temperatures reached

40 plus degrees, and winds were high. Clearing the garden, cleaning the gutters and installing a better water pump cannot save an ordinary home in the path of a relentless surge of fire, unless the property has a secure fire refuge or bunker.

The Green agenda

The 2009 Victorian Bushfires Royal Commission was established by the federal government to investigate the events. It was held in Melbourne. Out in the bush, there was a fear that it was all ‘urban-centric’, with not enough emphasis on the management of the forest land to control the build-up of fuel because of the influence of the environmental lobby, or ‘Greenies’, as they are scornfully known. The story of Liam Sheahan and his brush with authority illustrates this. In 2002, he decided to chop down 250 of the 30,000 or so trees that surrounded his hilltop property in Reedy Creek, to protect his homestead from bushfires. The following year, he was very heavily fined for violation of the environmental regulations. His firebreak worked, however, while seven of his neighbours’ properties burned down.

David Packham, from Monash University’s School of Geography and Environmental Science, was one of the architects of the ‘leave early or stay and defend your home’ policy. He believes that there has been a fire exclusion policy in south-eastern Australia for the last 30 years, that politicians have a Green agenda and that people think they are the masters of bushfires because modern technology like helicopters and mobile phones is available. A film of him being interviewed by Australia’s Channel 9 about the points mentioned above was posted on YouTube by ‘SOS News’, which describes itself as ‘the people’s non-govt. controlled free media source revealing facts they don’t want you to know’. YouTube also shows some vivid clips of the bushfires.

The state of Victoria does conduct fuel reduction burning, but figures released showed that about a fifth of the bush land targeted over the past decade remained untouched. In 2008 the state government also rejected a recommendation from a parliamentary committee that

urged a tripling of annual burn-offs. 2008 was the most effective year for prescribed burning since the early 1990s, with the state target exceeded by about 20%, but in 2005–06, the area subject to controlled burns was over 60% below the target. Sometimes the weather conditions simply are not safe to allow burning.

Environmental groups, like the Wilderness Society, are not opposed to fuel reduction burning in principle. Burning has to be used selectively – under the right circumstances, in the right place, at the right time, and for certain vegetation types, because the impact on biodiversity can be extreme. One of the most contentious areas is the subject of roadside fuel. Many people were killed in their cars as they tried to escape the fire, driving along roads lined with burning trees, leaves and debris. Had the roadsides been cleared, locals argue, lives would have been saved. Roadsides are the last areas of habitat for some species, especially bird species, and without the vegetation they would become extinct. Protecting lives or protecting biodiversity? The public debate became polarised and antagonistic – country against city, bush-dwellers against ‘Greenies’.

The Royal Commission’s recommendations

The Royal Commission made 67 recommendations. During the inquiry it emerged that 113 people were killed sheltering in their houses, undermining the long-held belief that people save houses and houses save people. One of the most significant proposals was for a change to this policy. However, rather than abandoning it, the Commission advocated adopting a hybrid model that includes strengthening public warnings, providing designated community refuges and bushfire shelters in areas of high risk, and developing plans for emergency evacuations. The Commission also wanted the state government to quadruple the amount of controlled burning it undertook, and to develop a voluntary scheme to acquire land in areas of unacceptably high bushfire risk. It further recommended that ageing power lines be replaced with underground cables. The Royal Commission was critical of the emergency system warning about the speed and direction of the fires, which fell apart under pressure. But could any system have coped with such unprecedented conditions on that day?

FOCUS QUESTIONS

- 1 Use your atlas to locate the state of Victoria in south-eastern Australia and the places mentioned in Figure 1.
- 2 Using a diagram – topic web, A-map or similar – make notes on the issues considered in this **Geofile** unit.
- 3 Decide the extent to which bushfires are a natural hazard in Australia.
- 4 What effects do they have – on people and the built and natural environments?
- 5 Describe and explain the attitudes to controlled burning of each of the following people:
 - Park Ranger
 - Government official
 - Bush resident
 - Wilderness Club member
 - Tourist operator
 - City resident
 - Volunteer fire-fighter
 - Bush walker
 - Farmer
 - Ecologist
- 6 How can bush fires be managed? For what purposes? Whose responsibility is it to manage them? Discuss the issues raised by the increased development of rural areas. Who lives in a community in a bushfire zone, what should they know and how should they be prepared?