



THE LESSONS LEARNT

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The 173 people who died as a result of the fires in Victoria on 7 February 2009 leave behind family, friends and communities who have suffered great individual and collective loss. They also leave behind lessons that must be used to build on our existing knowledge about how and why people die in bushfires.<sup>1</sup>

The Commission heard evidence from police and the family, friends and neighbours of those who died, as well as others who were involved in or affected by the bushfires of Black Saturday. The resultant evidence is the most comprehensive ever assembled about the circumstances of deaths in an Australian bushfire. It thus offers an unprecedented opportunity for analysis.

Looking back on the experience of 7 February, it is plain that on such days, when bushfires are likely to be ferocious, leaving well before the fire arrives is the only way of ensuring one's safety.

A number of themes emerge from the evidence relating to the circumstances of the deaths that occurred. The Commission was mindful of them in its analysis and in developing its recommendations relating to changes to be made to community safety policies and to advice aimed at reducing the risk of deaths occurring in bushfires in the future.

## 21.1 THE REVIEW OF FATALITIES

The Commission engaged Professor John Handmer of RMIT University, working in partnership with the Bushfire Cooperative Research Centre, to analyse evidence about the deaths that occurred as a result of the 7 February fires. Professor Handmer's field of expertise is community safety in natural disasters. In February 2010 the Commission supplied to him summaries of relevant evidence from witness statements Victoria Police had obtained. The summaries were provided with Victoria Police's consent after steps had been taken to protect the privacy of the deceased.

Victoria Police obtained statements about the fire-related deaths in February 2009 from hundreds of witnesses, among them family members, friends, colleagues and neighbours. The statements provided important information about people's fire plans and their actions on 7 February. Some witnesses also told police investigators about seeing the fires and seeing people preparing for, fighting and fleeing them. Additionally, evidence was obtained about the nature and condition of the properties where people died and about these people's health before they died. Finally, Victoria Police took statements from arson chemists who inspected the properties where people died and made observations about defendability of the properties, the nature of the destruction, apparent firefighting efforts, and what people were doing immediately before their deaths.

The Commission used these statements in their original form during its hearings into the fire-related deaths. Professor Handmer was given summaries of information in some of the statements to help him conduct his analysis before the Commission's hearings into the deaths were completed. Further material later became available to the Commission for use in some hearings into fire-related deaths—particularly those that occurred later in the hearing schedule. Professor Handmer did not receive any of the audiovisual material that Victoria Police had assembled and made available to the Commission. Most of this material was confined to photographs of the site and a visual description of the movements of the individual or individuals concerned in the last few hours before their death.

Professor Handmer delivered his report to the Commission in April 2010. In the report and in subsequent oral examination, he noted, among other things, the following in relation to those who perished:

- Fifty-eight per cent had made no preparations either for staying and defending or for leaving early. A number were prepared to leave but were apparently awaiting a warning.<sup>2</sup>
- Twenty per cent intended to stay and defend and were well prepared; another 14 per cent had made some limited preparations.<sup>3</sup>
- The fire took by surprise 30 per cent of those who died.<sup>4</sup>
- Twenty-four per cent seemed unaware that they were in a bushfire risk area, and 38 per cent did not seem to have a basic knowledge of what precautions needed to be taken to give themselves some degree of protection.<sup>5</sup>
- Fourteen per cent were fleeing the fire at the time of their death; of these, 4 per cent were fleeing in a vehicle and the remaining 10 per cent were on foot, although a number had fled their vehicles while trying to leave the area.<sup>6</sup>

- Sixty-nine per cent were classed as ‘passively sheltering’ inside a house or other building at the time of their death—as opposed to ‘actively defending’—although some of these people might have retreated inside (having tried to defend) when the fire front arrived.<sup>7</sup>
- Forty-four per cent were classed as ‘vulnerable’ because they were aged less than 12 years old or more than 70 years or because they were suffering from an acute or chronic illness or disability.<sup>8</sup>
- Thirty-two per cent lost their lives on properties whose defendability was questionable.<sup>9</sup>

Professor Handmer said the material he analysed contained ‘unprecedented detail on the circumstances surrounding each fatality’ because it allowed him to ‘see what people intended to do and what they did in addition to what the final situation was’.<sup>10</sup> He offered three principal interpretations of the data:

- The ‘prepare, stay and defend or leave early’ policy appears ‘sound on paper’ but ‘implementation presents major challenges’.
- Over half of those who died believed that by staying to defend their properties, they were ‘taking effective action in terms of their safety’.
- Most of those who died ‘did not, and often could not, respond appropriately to the risk that the bushfires presented for them on 7 February’.<sup>11</sup>

Professor Handmer also concluded, among other things, that the question of evacuation in cars warrants re-examination because, compared with historical data, few people died in cars on 7 February and recent advances in car technology have made cars safer (relative to older cars) to be in during bushfires.<sup>12</sup>

The Commission was aware that the results of any study such as the one by Professor Handmer should be interpreted with care. Despite the considerable amount of material available as a result of the police investigations, it remains difficult to reach definitive conclusions on some matters because people’s intentions are not absolutely clear in all cases and the circumstances of the final moments of many who died are unclear. For example, Professor Handmer found that 69 per cent of those who died were passively sheltering at the time of their death. But, as he acknowledged, ‘uncertainty arises where there was not sufficient evidence to categorise fatalities under a particular condition such as “sheltering”’. In view of this uncertainty, some of those who were classified as passively sheltering could possibly also have been classified as engaged in ‘questionable/some defence’.<sup>13</sup> Professor Handmer also noted that at least some of those classified as ‘sheltering passively’ might have been sheltering in a structure that was being defended by someone else.<sup>14</sup>

In the case of many of those who died, the Commission heard detailed accounts of their circumstances in the hours immediately preceding their death. Through these accounts it was able to gain a considerable degree of insight into people’s activities immediately before the fire’s arrival, including whether they were ‘actively defending’ or ‘passively sheltering’. The Commission agrees that the categorisation of ‘passively sheltering’ can be misleading if that conclusion is drawn solely from the final moments of a person’s life, without taking account of their previous activity. Many of these people are thought to have made some effort to defend their home but then withdrew inside when the firefront hit (in accordance with CFA advice) and were fatally caught in this situation. Others could have been working indoors, dousing internal flare-ups before succumbing to the effects of the fire.<sup>15</sup>

## 21.2 THEMES THE COMMISSION IDENTIFIED

Using Professor Handmer’s work as a basis, and drawing on its own observations and information obtained during the hearings, the Commission identified a number of themes associated with the deaths that occurred as a result of the 7 February bushfires. These themes relate to levels of preparedness, bushfire awareness and knowledge, house defendability and the defence of houses, triggers and warnings, the significance of the wind change, gender and age differences, and the extent and nature of vulnerable groups.

Two-thirds (113) of the individuals who died on 7 February died in or very near a house or similar structure. Twenty-four people died fleeing the fire in vehicles or on foot. Some who were fleeing on foot had originally tried to flee in their vehicle and when this failed they left their vehicle to escape on foot. The remaining 36 people died in a variety

of circumstances. Some died relocating to a 'safer' place; some were tourists or non-residents who were caught out and had nowhere to go or did not know where to go. Others died in sheds, outbuildings and spas. Three suffered heart-related events. Some died in the days following 7 February from injuries sustained during the fires. An interstate firefighter died a week after the fires, having been struck by a falling tree.<sup>16</sup>

The Commission observes that a number of the people who died were not suitably clothed. Some were found wearing bathing suits or shorts and T-shirts. Either some were caught unexpectedly by the fire's arrival or they were ignorant of the high risk posed by exposure to radiant heat from a bushfire.<sup>17</sup>

Where people died as a consequence of the Black Saturday fires contrasts strikingly with previous trends. Historically, about 32 per cent of people have died in late evacuations. Until 7 February the Ash Wednesday (1983) fires were probably Australia's best documented fires because of the high number of fatalities. Those fires affected parts of South Australia and Victoria, destroying more than 2,000 homes and killing 75 people. Most people died during late evacuations and the majority of those were women and children, whereas most of the men killed had been defending property. It is important to note, however, that, as happened on 7 February, many people affected by Ash Wednesday appear to have been caught unawares by the sudden wind change in the early evening.<sup>18</sup>

The Commission notes that in a number of cases of those who died on Black Saturday, men wanted to stay with their home while women were more inclined to leave. Some women who initially intended to leave ended up staying with their husbands or partners because they were reluctant to leave them on their own.

Professor Handmer suggested that the gender distribution was not unlike that for previous fires.<sup>19</sup>

### 21.2.1 PREPAREDNESS, AWARENESS AND KNOWLEDGE

To be considered 'well prepared' to defend a property means, according to CFA advice issued before 7 February, having an independent water supply and appropriate firefighting equipment and clothing and having prepared a 'defendable space'—that is, having an area around the house that has been adequately cleared of fuel.<sup>20</sup>

The Commission notes that a considerable number of those who died had made some preparations in accordance with the CFA's advice. Following from Professor Handmer's study, the Commission also notes that a number of people who died genuinely believed they were adequately prepared to defend their properties.<sup>21</sup> Many who died, however, experienced difficulties with the fire protection equipment they had available—including failure of the water or power supply (or both), hoses and pipe-work melting or buckling because of the heat, and fuel vaporising from pumps.<sup>22</sup>

A number of people who were well prepared to defend their property died on 7 February. This demonstrates the difficulty of adequately preparing for a ferocious fire and that in such conditions even high levels of preparation are no guarantee of survival. The smallest shortcoming in preparation can become magnified and mean the difference between surviving and dying. As Professor Handmer noted, 'There are many links in the chain of preparedness, and any one of them breaking can lead to serious consequences'.<sup>23</sup>

To prepare a house and defend it successfully people need to understand the surrounding vegetation's effects on the defendability of their home, how to install and use bushfire safety equipment, the behaviour of different types of fire, and how fire can affect their home. A number of problems to do with lack of awareness and knowledge about bushfires and safety emerged from the evidence about the deaths that occurred as a result of the 7 February fires: many people did not understand what was needed to survive a fire of this ferocity and what to do when their initial plans failed.<sup>24</sup>

Of those who died in their homes or in other houses or structures, about 38 per cent died in a bathroom, even though there might have been a safer place in the house.<sup>25</sup> In its submission AFAC (the Australasian Fire and Emergency Service Authorities Council) noted:

If the house catches fire and the occupant(s) cannot extinguish the fire, the safest action is to wait by an exit door (preferably the laundry door if there is one, near water) and wait for as long as possible until forced to leave due to the intolerable conditions in the house.<sup>26</sup>

Despite the fact that many bathrooms do not comply with AFAC's shelter criteria because they do not have exit doors or windows, the Commission notes that bathrooms are wet areas, invariably have concrete floors, often have tiled walls and exhaust fans, and have ample water if the bath has been filled. They often appear to be the last and safest refuge if the house catches alight and it is still unsafe outside. Although many people succumb to smoke, as they would if they were elsewhere in the house, a bathroom is a logical place to shelter if nothing else is available. It is true that the safest course might be to shelter near an exit door, but this presupposes that the house survives until the fire starts to abate outside. In the case of the Black Saturday fires, there was evidence of the front lasting up to one hour or of conditions outside being unsafe for up to this long in a number of instances.

Other people had little or no awareness or knowledge of bushfires because they were visiting the area as tourists or house-sitters and would not have had access to local information and education.<sup>27</sup>

### 21.2.2 HOUSE DEFENDABILITY

Professor Handmer noted that about a third of the fatalities were associated with homes that were not defensible.<sup>28</sup>

Usually a person's choice to stay and defend their property is based on a presumption that their actions will keep them safe and prevent or reduce property damage caused by bushfire. The effectiveness of their actions is dependent on the building being defensible. People have traditionally assessed the defensibility of their homes using information provided by fire agencies as a guide. Such an assessment is based on a number of characteristics, among them the material used in constructing the building, the building's size and layout, its position in the landscape, aspect, topography, and the amount and type of 'fuel' (such as vegetation and wood piles) surrounding the house.<sup>29</sup>

Many of the houses in which people died were perilously close to bushland and in locations where the houses' defensibility would be seriously compromised by high fuel loads that would have generated ember attacks over a long period. Several witnesses' descriptions or images illustrated that many of the properties where people died would have been (virtually) undefensible in a ferocious fire because of the properties' proximity to dense vegetation or their location at the top of a steep slope or ridge.<sup>30</sup>

The Commission is aware that in many cases people did successfully stay and defend their home. The deaths, however, are a solemn reminder that staying to defend a property in a ferocious bushfire is extremely dangerous. Small deficiencies in people's preparedness or capacity to defend often prove disastrous. When problems arise there is little time or capacity to rectify them and the consequences can be lethal.

### 21.2.3 TRIGGERS, WARNINGS AND BEING TAKEN BY SURPRISE

People went to differing degrees of effort to ensure that they were informed and took timely action on 7 February. The information they gained often took the form of a 'trigger' for action. The trigger could have been seeing or smelling smoke, being told of the approach of the fire by neighbours, friends or family, or a warning by authorities or the media that a fire was burning in or approaching an area. Professor Handmer found:

No matter how thorough preparedness and fire plans, they need to be activated. This requires some sort of trigger, which may be a specific warning, a high level of perceived threat or something else.<sup>31</sup>

A number of people who were waiting for a trigger or warning to prompt them to act were caught by surprise. Many were taken by surprise by the very existence of the fire or by the fire arriving much sooner than expected. It is also likely that a large proportion were surprised by the fire's intensity and rate of spread and the amount of time it took for the front to pass. Some did not know of the fire until it was too close to take action, despite having made plans and being well prepared. Others were caught out by unexpected events such as the failure of a crucial part of their bushfire plan and did not have any contingency plans.<sup>32</sup>

On the basis of the available information it appears to the Commission that, among those who died, some misinterpreted the information they had received, not realising how little time they had to respond or how soon the fire would reach them. As discussed, the nature of a ferocious fire can be such that some of the environmental cues—for example, smoke and embers—that alert people to a fire and its proximity are not immediately apparent. Lack of adequate time meant that plans were not able to be implemented in a number of cases.<sup>33</sup>

The Commission also notes that many of the people who died had monitored the radio and the internet, expecting to receive warnings that would allow them to evacuate safely if required. In a number of instances, however, they did not receive the warnings they were expecting. In the absence of a warning some of these people did not leave their properties (as planned), and they subsequently died.<sup>34</sup> The Commission notes, too, that a number of people who died were indeed warned by authorities and encouraged by friends and family to leave but chose to stay at their property.<sup>35</sup>

#### **21.2.4 THE WIND CHANGE**

One thing that caught many people by surprise was the wind change. The prevailing hot winds from the north-west shifted to the south-west bringing with them a cool change late in the day on 7 February. During the early part of the day the fires ran towards the south-east and numerous spot fires were generated by the wind. When the cold front arrived in the afternoon, however, some people who had been watching the fires and thinking the danger had passed them by found themselves directly in the path of a massive fire front as the wind swung around to the south-west and formed intense sections of fire over the length of the fires' eastern flank.<sup>36</sup>

The Commission is of the view that the wind change was a major cause of the deaths that resulted from the 7 February bushfires. Improving community awareness of the potentially deadly impact of a wind change in a fire is a crucial task for government agencies.

#### **21.2.5 VULNERABLE PEOPLE**

Professor Handmer found that 44 per cent of people who died as a result of the 7 February bushfires were vulnerable by one measure or a combination of measures: 29 per cent had chronic or acute clinical health conditions that would have been likely to affect their mobility, judgment or stamina; 16 per cent were aged 70 or more; and 9 per cent were aged less than 12 years.<sup>37</sup>

It is also particularly relevant that on 7 February fire fronts often lasted for up to an hour, in contrast with previous experience and advice in the CFA documents that fire fronts typically pass within 15 minutes. This meant that much greater stamina and strength were needed to successfully defend a house and the period of extreme stress was much more sustained.<sup>38</sup>

It has always been a part of the CFA's 'prepare, stay and defend or leave early' policy that children, elderly people and people with disabilities are strongly advised to leave early. The Commission agrees emphatically.

#### **21.2.6 CONCLUDING REMARKS**

The analysis of all the deaths that occurred as a result of the Black Saturday fires gave the Commission invaluable insights into the circumstances of each of the personal tragedies involved. From the manner in which all who perished dealt with their personal emergency, it learned much about the pitfalls and errors of judgment that occurred, about the way events unfolded beyond a person's capacity to influence those events, and about the sheer bad luck many experienced, despite their best endeavours. It also learned much that, together with other evidence, helped it develop recommendations it hopes will help make Victoria a safer place to live in and enjoy.

- 1 One of the people who died was Mr David Balfour, an ACT firefighter who died on 17 February 2009 from injuries sustained while working. Mr Balfour's death was not considered in Professor Handmer's analysis. Exhibit 574 – Interactive Presentation – INTMEN 002899 (EXH.574.0001)
- 2 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0019, 0021, 0034
- 3 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0018, 0021
- 4 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0021–0022
- 5 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0018, 0021
- 6 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0024
- 7 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0024–0025
- 8 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0015
- 9 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0027; Handmer T18551:14–T18551:16
- 10 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0005, 0011–0012; Handmer T18538:6–T18538:7
- 11 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0006
- 12 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0036; Handmer T18566:13–T18568:23
- 13 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0012–0013
- 14 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0026, 0036
- 15 Exhibit 567 – Interactive Presentation – INTMEN 001887 (EXH.567.0001); Exhibit 884 – Interactive Presentation – INTMEN 001835 (EXH.884.0001); Exhibit 950 – Interactive Presentation – INTMEN 001779 (EXH.950.0001); Handmer T18560:8–T18560:25
- 16 This information is drawn from an analysis of all the evidence lead during the fire related deaths hearings
- 17 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0020, 0024; Exhibit 950 – Interactive Presentation – INTMEN 001779 (EXH.950.0001); Exhibit 764 – Interactive Presentation – INTMEN 001785 and INTMEN 001979 (EXH.764.0001)
- 18 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0029; Exhibit 16 – Statement of Haynes (WIT.001.001.0001\_R) at 0043\_R
- 19 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0027, 0030
- 20 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0018
- 21 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0006, 0020
- 22 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0020; Exhibit 296 – Interactive Presentation – INTMEN 001828 (EXH.296.0001)
- 23 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0035
- 24 Exhibit 9 – Stay or Go Tender Bundle – Living in the Bush (TEN.001.001.0004); Exhibit 894 – Review of fatalities in the February 7, 2009, Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0035–0036
- 25 This information is drawn from an analysis of all the evidence lead during the fire related deaths hearings
- 26 Submissions of AFAC – A New Bushfire Safety Policy – Replacing Stay or Go (RESP.7500.007.0001) at 0017
- 27 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0006, 0017–0018
- 28 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0027
- 29 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0027; Exhibit 9 – Stay or Go Tender Bundle – Living in the Bush (TEN.001.001.0004) at 0011
- 30 For example, the two people who died at The Eagles Nest Road, near Marysville, see Exhibit 380 – Statement of Lynch (WIT.094.001.0001\_R) [5]
- 31 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0020
- 32 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0023, 0033
- 33 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0020; Exhibit 877 – Interactive Presentation – INTMEN 001837 (EXH.877.0001); Exhibit 949 – Interactive Presentation – INTMEN 001868 (EXH.949.0001)
- 34 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0020; Exhibit 968 – Interactive Presentation – INTMEN 001910 (EXH.968.0001)
- 35 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0019; Exhibit 972 – Interactive Presentation – INTMEN 002017 (EXH.972.0001); Exhibit 492 – Interactive Presentation – INTMEN 001843 (EXH.492.0001)
- 36 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0020; Exhibit 4 – Statement of Rees (WIT.004.002.0001) [21]–[22], [45]–[46], [57]–[58], [68], [85]–[87], [106], [118]
- 37 Exhibit 894 – Review of fatalities in the February 7, 2009 Bushfires – Final Report (Amended version without mark up) (EXP.029.003.0001) at 0015–0016, 0027
- 38 Handmer T18563:4–T18563:9



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