



**Bushfire CRC Extension
Community Members' Decision Making Under Stress (Project C9)**

Community Members' Decision Making Under the Stress of Imminent Bushfire Threat - Murrindindi Fire

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Executive Summary

- This is a report of findings from a pilot analysis of three data sets concerning experiences of those affected by the Murrindindi Fire on Saturday, 7 February 2009: (a) 51 transcripts of interviews with survivors conducted by members of the Bushfire CRC Research Taskforce; (b) 15 lay witness statements to the 2009 Victorian Bushfires Royal Commission; and (c) evidence presented to the Royal Commission concerning the 38 fatalities that occurred on 7 February 2009 as a result of the Murrindindi Fire. The Interim and Final Reports of the Royal Commission were also consulted.
- There were two aims: First to investigate community members' plans, decisions and actions in relation to the Murrindindi Fire. Second, to develop data analysis procedures to apply subsequently to: (i) the complete data set of 608 Taskforce interview transcripts; (ii) the complete data set of approximately 100 Royal Commission lay witness statements; (iii) the evidence presented to the Royal Commission concerning the 173 fatalities resulting from the 7 February 2009 Victorian bushfires.
- The body of the report describes findings from the pilot study of decision making by community members under imminent bushfire threat. The procedures developed appear to be suitable to apply to the three larger data sets: (i), (ii), and (iii), described above.
- Ten 'lessons' about decision making by community members under imminent bushfire threat emerging from the pilot study are proposed.
 1. Lack of accurate, timely, specific, and personally-relevant information about the fire threat undermines sound survival-related decision making. Uncertainty is a major threat to survival. (page 55)
 2. Communities influence decision making by individual members via shared, normative, beliefs about bushfire risk. If a majority of community members believe that their community is not at risk, most individuals will be psychologically unready to make sound survival-related decisions under imminent bushfire threat. (page 54)
 3. Advice and information from particular 'others' will be a major determinant of an individual's decision making—the more so under conditions of uncertainty. Information and advice from close family members, and from people perceived to have bushfire-related expertise (firefighters, SES, police) will be extremely influential. (page 55)
 4. What others are observed to be doing is an important determinant of an individual's decision making. People are social beings and take their cues about what to do by noting what others are doing in a given situation—especially a situation characterised by uncertainty. (page 55)
 5. Under imminent bushfire threat decision making and action is gendered. Men are more likely to stay and defend their property; women are more likely to leave—especially if they have strong feelings of responsibility for the physical **or** psychological wellbeing of other family members. (pages 12, 28, 43)

6. Commitment to a bushfire plan may be a path to disaster—especially a plan to stay and defend. Better that any plan is conditional upon specific conditions being met before being implemented, and has fall-back options. (pages 10, 12, 18, 35-39)

7. The legendary ‘Murphy’ was an optimist with regards to bushfires. All involved should be warned to expect and be ready for something really important going seriously wrong at the worst possible time with potentially fatal consequences (page 19, pages 35-39). [The general literature on human factors aspects of safety in hazardous environments suggests that thorough rehearsal and practice of intended actions may offer some protection].

8. Some individuals should not be in a situation where they are at risk of bushfire attack: people under 18, those aged 70 or more, those with disabilities or other impairments—physical, social, psychological. (Table 3, pages 51-53)

9. In *extremis*, an individual’s ability to: (a) down-regulate negative emotions like fear and anxiety; (b) maintain an attentional focus on emerging threats from the environment; and (c) keep actions coupled tightly to surviving in a potentially lethal environment will largely determine survival. (pages 21-23).

10. For a variety of complex reasons, some individuals will choose to act in ways that jeopardise their safety, and the safety of others. (Table 3, pages 51-53)

- The original Report, prepared in June 2010, was revised in April 2011 in the light of feedback comments from R. Thornton. The authors are grateful for the opportunity to correct errors, remedy instances of lack of clarity, and provide additional information from the 2009 Victorian Bushfires Royal Commission’s Final Report (2010).

Community Members' Decision Making Under the Stress of Imminent Bushfire Threat - Murrindindi Fire

Introduction

On Saturday, 7 February 2009, Black Saturday, Victoria experienced Australia's single worst day of bushfires in recorded history. There were 173 fatalities; more than 2,000 homes were destroyed; about 5,000 people were made homeless; several communities were devastated; there were severe economic, social, and environmental costs (2009 Victorian Bushfires Royal Commission, 2009).

The Black Saturday fires occurred on a day of extreme weather conditions—high temperatures and low relative humidity, and strong winds—shortly after a period of sustained high temperatures across the State. The average rainfall for the previous 12 months was well below average, and followed 10 or more years of drought conditions.

On the day, numerous fires broke out across Victoria. Eight of these were particularly destructive: the Beechworth, Bendigo, Bunyip, Churchill, Horsham, Kilmore East, Lynbrook (Narre Warren), and Murrindindi fires.

On 16 February 2009 the Victorian Government established a 2009 Victorian Bushfires Royal Commission. The Royal Commission commenced proceedings on 20 April 2009 and ceased hearings on 27 May 2010. Evidence presented to the Royal Commission suggests that a significant number of the 173 fatalities may not have occurred if people had made decisions more appropriate to their situation in the face of imminent threats from the fire.

The first aim of the present study was to investigate the evidence available about how people affected by the Murrindindi Fire made survival-related decisions under the threat of imminent bushfire attack. Subsequent reports will examine survival-related decision making in the other major fires. The second aim was, in pursuit of the first aim, to develop and test data organisation, coding, and rating procedures so these could be used reliably to analyse three data sets available concerning the experiences of survivors of the 7 February 2009 Victorian bushfires: (a) all 608 transcripts of interviews conducted by the Bushfire Research Taskforce; (b) written statements provided to the Royal Commission by approximately 100 lay witnesses describing their experiences on 7 February 2009, together with transcripts of their cross examinations; and (c) evidence presented to the Royal Commission about 173 deaths that occurred as a result of the fires on 7 February 2009.

The Murrindindi Fire (Sources: The Interim and Final Reports of the Royal Commission)

A little before 1500 on Saturday 7 February 2009, a fire was reported at Murrindindi Mill, about 2 kilometres south of Murrindindi on private land. While firefighting assets were deployed promptly, the weather conditions were such that the fire spread rapidly in a south-easterly direction into forests on the Black Range between the Melba and Maroondah Highways (Figure 1). At about 1630 spot fires were reported in the Narbethong area. Spot fires joined and burned towards Marysville from both the south-west and the south-east. A convoy of Marysville residents (about 50 cars) led by police left Marysville heading towards Yea at about 1645. At about 1715, electrical power in Marysville was lost. At about 1800 an unsuccessful back-burn was attempted near Falls Road in an effort to protect the town. This was hastily abandoned as it was overrun by the advancing main fire at about 1830 following a south-westerly wind change. The eastern flank of the fire became an extensive front. DSE and CFA crews withdrew to Gallipoli Park oval as part of their operational plan for withdrawal to a place of relative safety if threatened with entrapment (Note 1). More than 50 civilians also sheltered in vehicles on and around the oval (McLennan, 2010). At about 1850 the town came under severe ember attack from forested areas to the west and south (Figure 2). The town water supply failed. Most of the structures in the central part of Marysville were

destroyed, along with many vehicles. The fires reached Buxton at about 19.30 and travelled as far north as Taggerty. The Murrindindi Fire resulted in a total of 38 civilian deaths on 7 February, most in or near Marysville. Approximately 600 houses were destroyed. The fire eventually slowed under cooler conditions on Sunday 8 February. It continued to burn in rugged terrain for another 26 days before it was finally contained (2009 Victorian Bushfires Royal Commission, 2009).

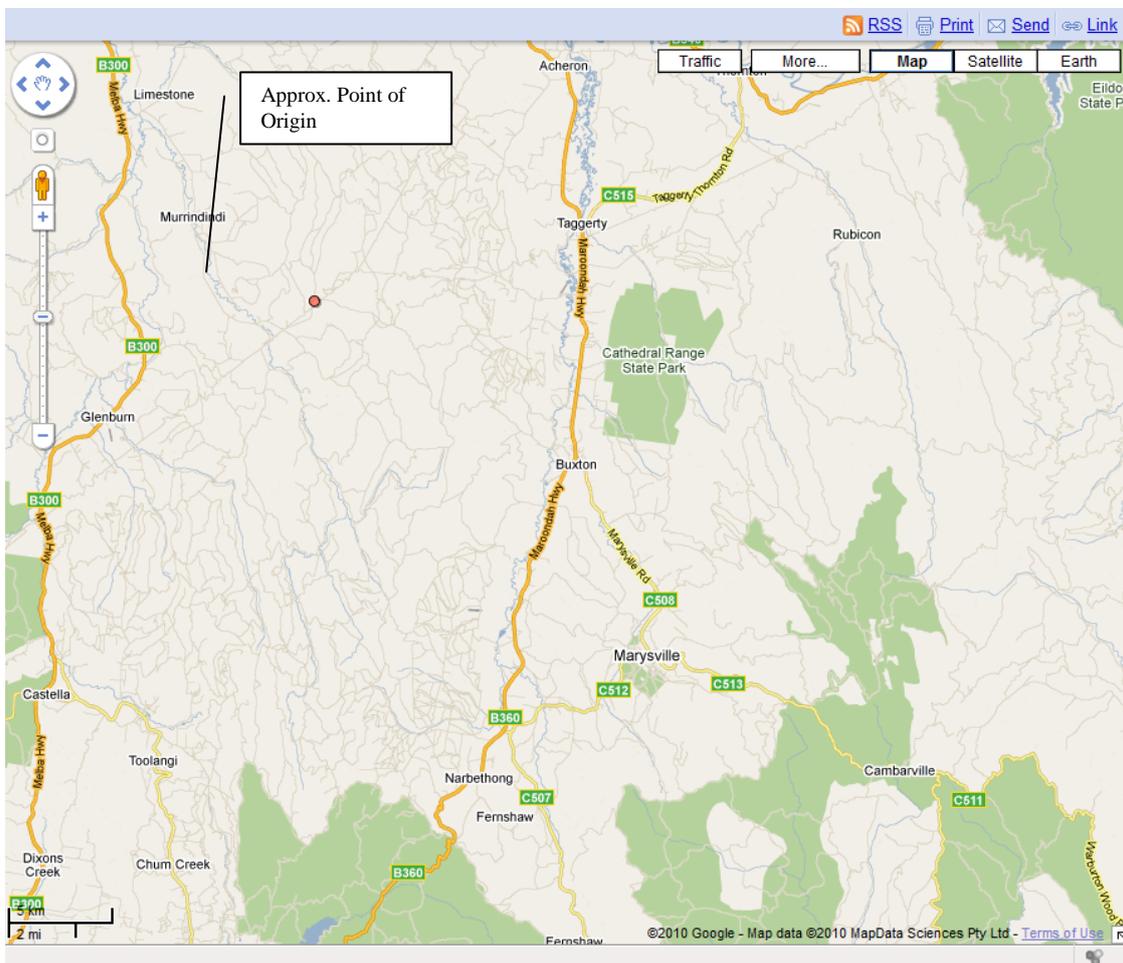


Figure 1
Locations map showing the point-of-origin of the fire and the three communities most affected: Marysville, Narbethong, and Buxton (2009 Victorian Bushfire Royal Commission, 2010)

Sources

Three major sources of information have been used in preparing this report:

- Transcripts of interviews with survivors of the Murrindindi Fire conducted by members of the Bushfire Research Taskforce.
- Exhibits and transcripts of evidence given to the Bushfires Royal Commission by survivors of the Murrindindi Fire (lay witnesses).
- Transcripts of evidence given to the Bushfires Royal Commission concerning the deaths of 38 people who perished in the Murrindindi Fire.

This material was supplemented by: (a) post-February 7 on-line news accounts of survivors' experiences; (b) books describing survivors' experiences (e.g., Franklin, 2009; McGourty, 2009); (c) video footage in the public domain showing events at Gallipoli Park oval at Marysville; and (d) the Interim and Final Reports of the 2009 Victorian Bushfires Royal Commission.

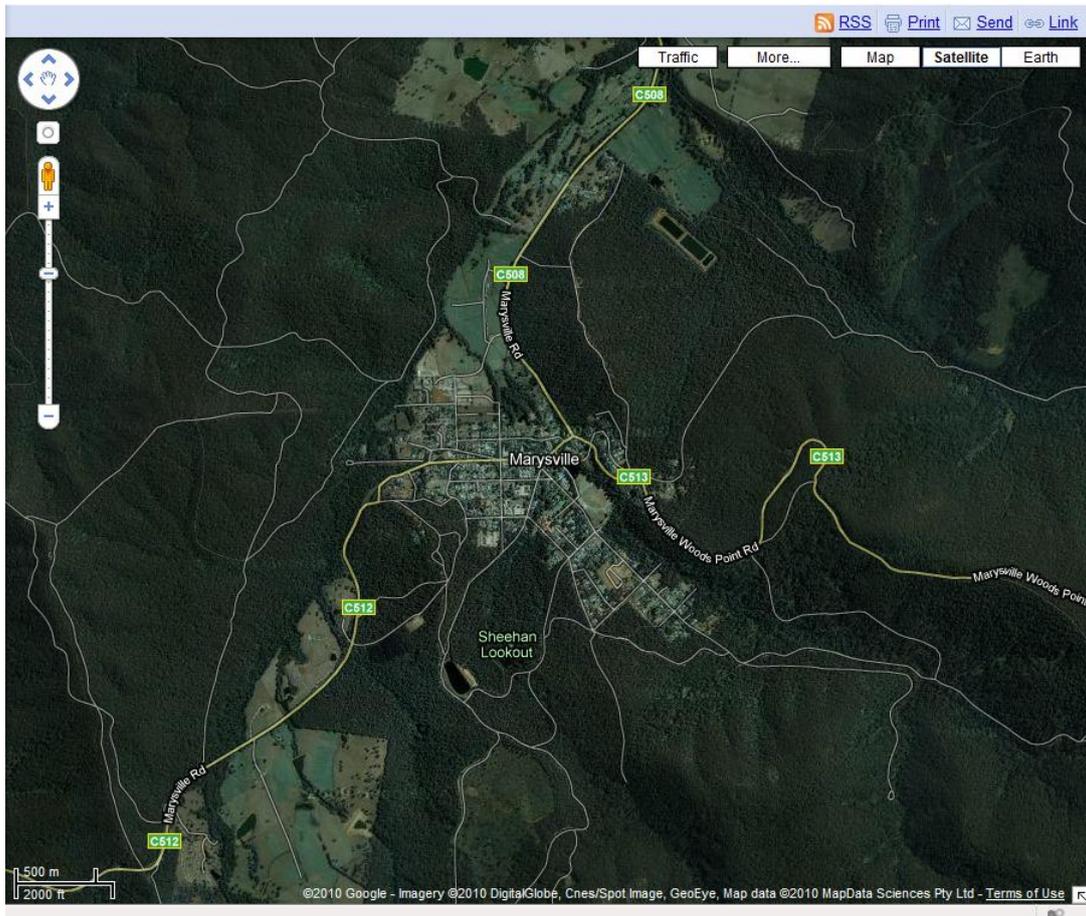


Figure 2: Satellite image showing the town of Marysville and the surrounding forested areas before 7 February 2009.

Marysville and Environs Prior to Saturday, 7 February 2009

Before the fire, Marysville was a small 'tourist town' about 100 k. north west of Melbourne. In winter it was a gateway to snowfields at Lake Mountain. Larger population centres are at Alexandra (41 k. to the north); Healesville (34 k. to the south east); and Warburton (45 k. to the south). Three sealed roads provide access to the town: Marysville Road (from Narbethong to the south west); Marysville Road (from Buxton to the north); and Marysville-Woods Point Road (from the east). Data from the 2006 Census indicated a resident population of 519, in 385 private dwellings (Australia Bureau of Statistics, 2008).

Section I: Murrindindi Fire Taskforce Interview Transcripts

Immediately following the 7 February 2009, the Bushfire CRC established a Research Taskforce to undertake research for fire and land management agencies in Australia. The research was to cover three areas:

- Fire Behaviour
- Building (Infrastructure) and Planning Issues
- Human Behaviour and Community Safety Issues

The initial data for the Human Behaviour and Community Safety Issues component were gathered by a team of interviewers, mostly from RMIT and La Trobe universities, and from community safety staff in fire agencies. More than 600 semi-structured interviews were conducted with survivors in fire affected areas. A copy of the interview guide is in Appendix A. Because of the damage to infrastructure and the large number of people who were displaced it was not possible to construct a random sample of residents to interview. Interviews were conducted at properties where people were present on those days in which Taskforce teams were in the area. However, the total interview sample covered a range of locations, communities, property types, household compositions, fire intensities, and outcomes. The interviews were recorded digitally, and subsequently transcribed. A detailed description of procedures is in Whittaker, McLennan, Elliott, Gilbert, Handmer, Haynes and Cowlshaw (2009).

Methodology

The 51 transcribed interviews, in *Word* format, from the Murrindindi Fire were read into an *nVivo9* text analysis file, and the *nVivo9* software was used to manage and analyse the 51 interviews.

The interviews were categorised and coded to record interviewee intentions; actions; threat severity; bushfire preparation, awareness, knowledge, and expectations; and judgement and decision process elements using structured coding templates. Categories of judgement and decision process elements were established on the basis of: (a) previous research about decision making under stress—notably that by Leach and Ansell (2008) and Leach and Griffith (2008); and (b) four theories and models of health promotion and injury prevention reviewed by Beatson and McLennan (2010) and found to have potential utility for understanding human behaviour in response to bushfire threat. A copy of the coding template for intentions and actions is in Appendix B; that for bushfire preparation, awareness, knowledge, and expectations; and judgement and decision process elements is in Appendix C. The categorisations and codings were made by two coders independently. The level of agreement was acceptable: the simple independent decision-wise agreement rate = $1540/1928 = 80\%$; the lowest levels of agreement were for sense of community and attachment to place, combined: $58/78 = 74\%$. Disagreements were resolved by joint re-examination of the transcripts in question, and discussion to achieve consensus. The level of bushfire threat experienced was determined using an eight-point (0 – 7) Bushfire Threat Rating Scale. A copy is in Appendix D. Ratings were made by two raters independently. The level of inter-rater reliability was high ($r = .89$); disagreements were resolved by joint re-examination of the transcripts in question, and discussion to achieve consensus.

Results and Discussion

Actions, Intentions and Bushfire Threat Severity

Figure 3 shows the range of actions taken by interviewees before and during 7 February 2009. Of the 51 interviewees, two were on operational duties (CFA, SES) on the day and their accounts have been excluded from the subsequent analyses. Of the 49 remaining interviewees: seven (14%) were not at home on 7 February 2009 when the fire struck. However only two (4%) of them had made a conscious decision to be absent from their property on the day because of the fire danger warnings in the days preceding 7 February: the remaining five (10%) were absent ‘accidentally’—that is, they were engaged in activities which took them away from their properties, such as business, and social and family gatherings. Of the 42 (86%) interviewees at their properties on 7 February, 21 (43%) left before the fire struck: 17 (35%) of these reported not being in danger, while four (8%) reported that they left at the last minute and had to survive a dangerous situation. Twenty one (43%) attempted to defend their property: 14 (29%) were successful, while seven (8%) were unsuccessful. Of the seven interviewees who failed in their attempts to save their property: five (10%) fled, one taking last resort shelter in a vehicle at Gallipoli Park as the fire passed through; while two (4%) took last resort shelter on or near their property.

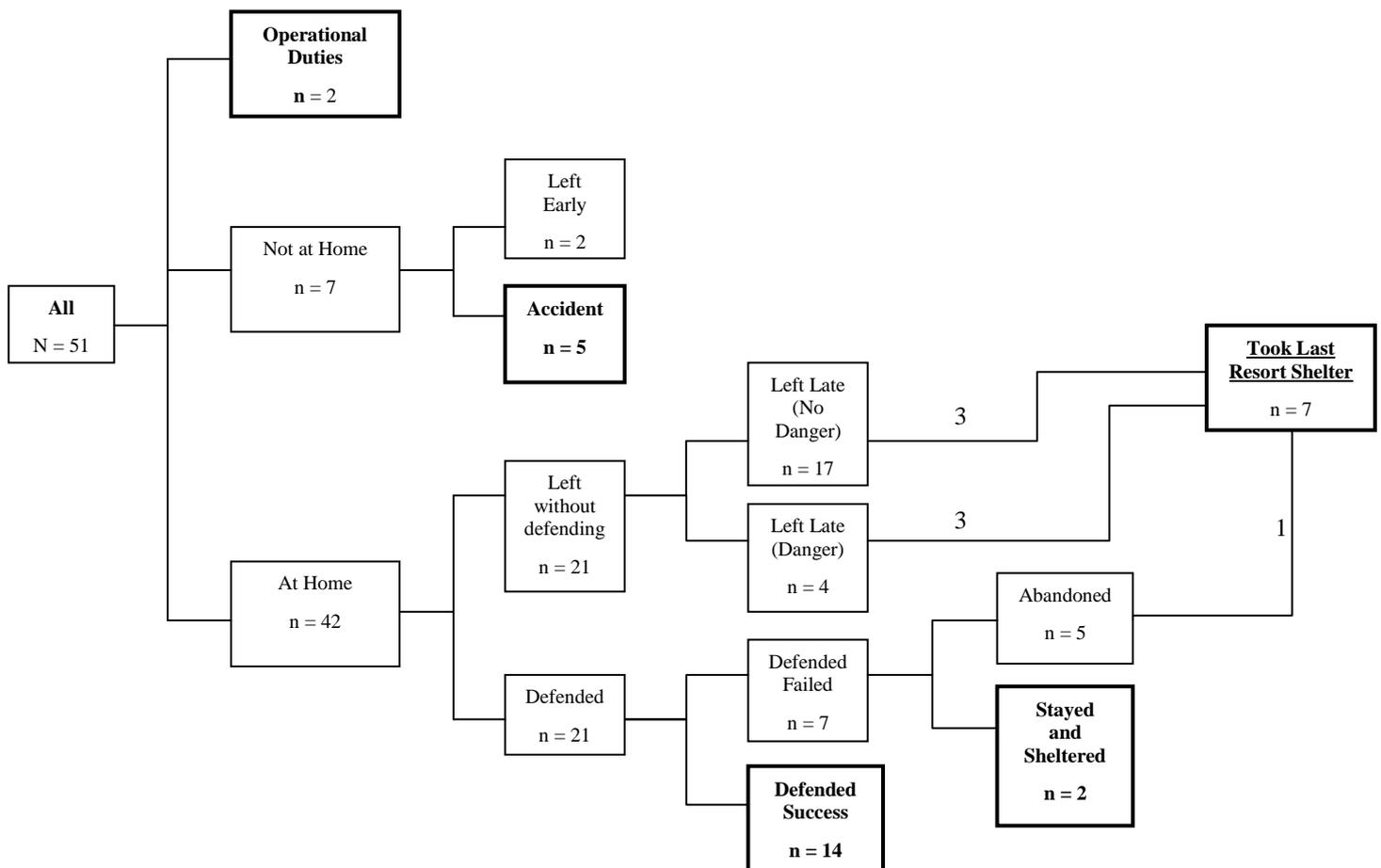


Figure 3: Path diagram showing the decisions and actions by survivors of the Murrindindi Fire who were interviewed by members of the Bushfires Taskforce.

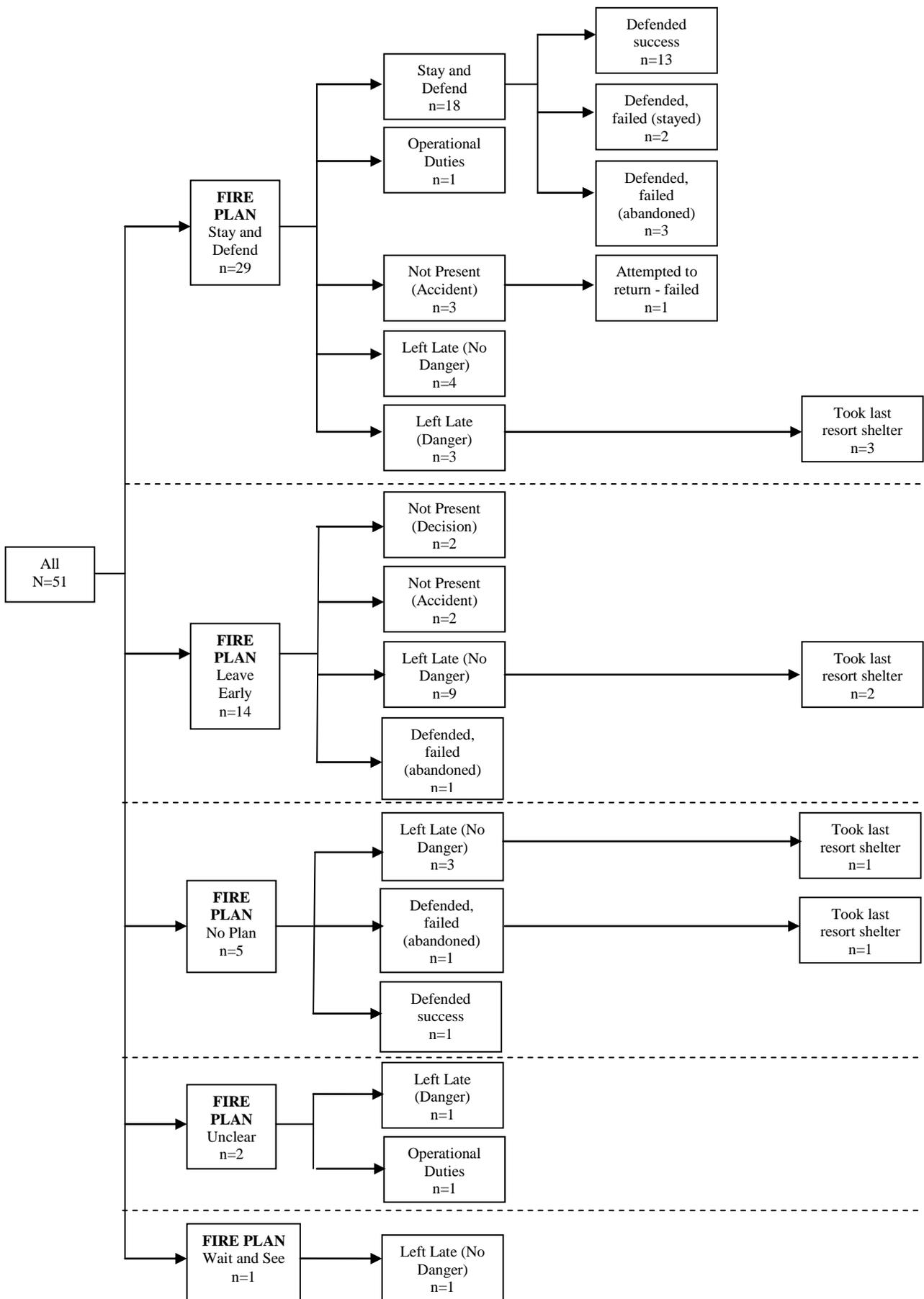


Figure 4: Path diagram showing the decisions by survivors of the Murrindindi Fire as a function of their initial fire plans

Figure 4 shows the initial plans/intentions of the 51 interviewees (left side of Figure 4) and the actions taken subsequently: overall, there was a low rate of implementation of fire plans by the interviewees (20/43 = 47%). However, of the 14 interviewees who reported that their plan was to leave early, only one was on the property when the fire struck (attempted to defend, unsuccessful).

Threat Levels Experienced

--Overall:

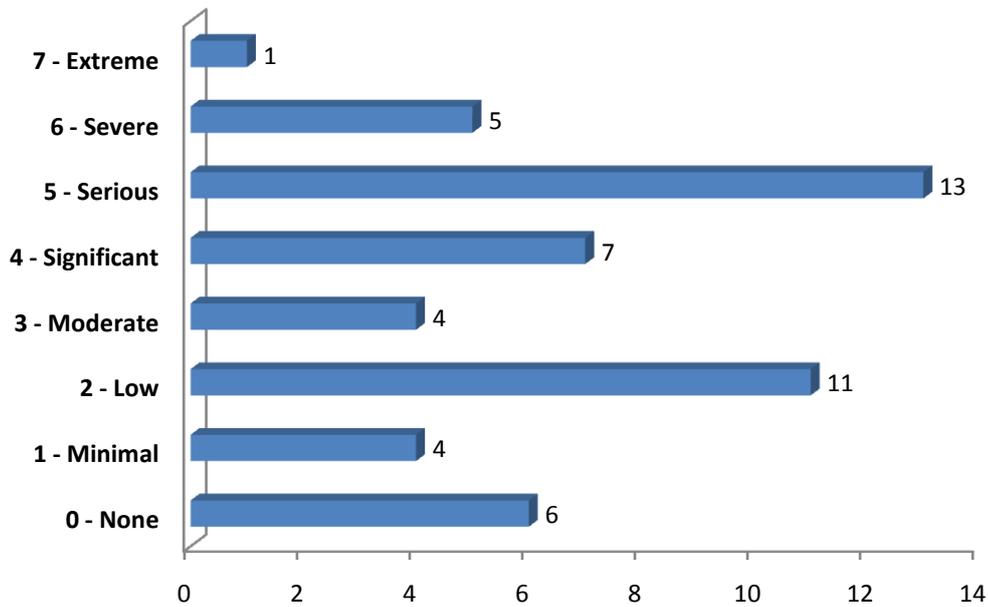


Figure 5: Frequency Distribution of Bushfire Threat Scale Ratings -All

The distribution of threat levels is essentially bi-modal, with most of those who successfully defended their property ($n = 14$) being given a rating of 5 (“Serious”), and most of those who left in no danger ($n = 17$) being given a rating of 2 (“Low”). The one interviewee whose experiences were rated as “Extreme” attempted to defend his home but was unsuccessful: his adult daughter sustained serious injuries as they sought to flee from the burning house.

--Mean threat level in relation to: plan and outcome (S&D = 'stay & defend'):

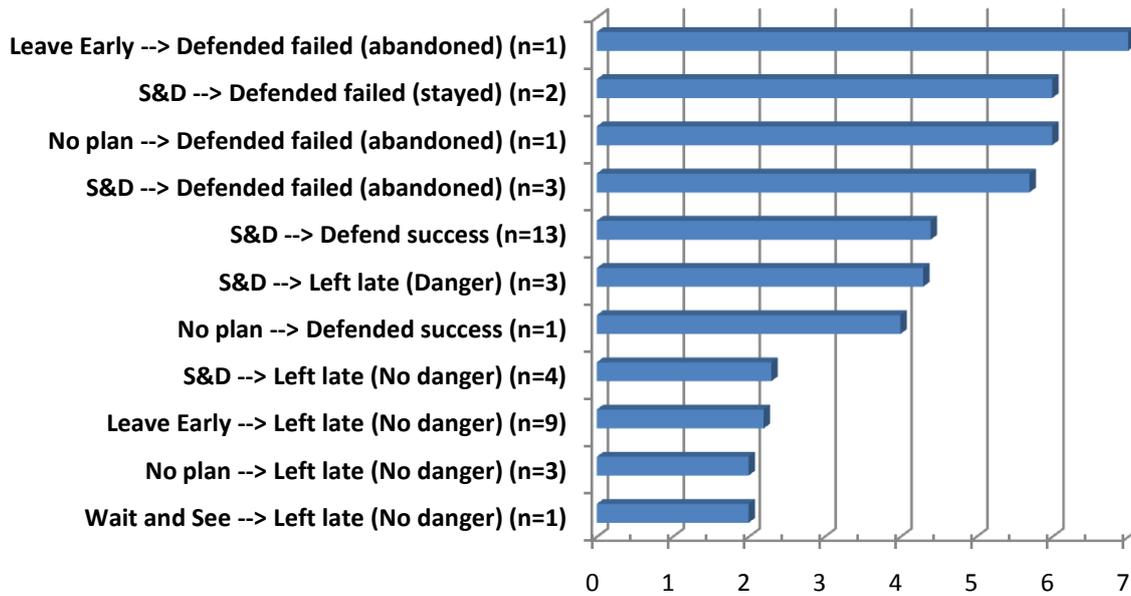


Figure 6: Bushfire Threat Scale Mean Ratings – By: plan prior to, and actions on, 7 February

The numbers of survivors in many of the categories are too few to permit detailed comparisons, but the overall picture is that attempting to defend one's home and failing will most likely expose the householder to danger. This suggests strongly that preparation for property defence should encompass a back-up plan to allow survival despite the loss of the house—a means of escape or some form of last-resort shelter.

Participants

Table 1 summarises the information about participants interviewed, in each of the outcome groups.

Table 1: Gender and Age of Participants by Actions and Outcomes

Outcome group	Males			Females		
	n	%	Mean Age	n	%	Mean Age
Defended Successfully	10	71	61	4	29	55
Defended - Unsuccessful	5	71	64	2	29	65
Left – No Danger	6	35	52	11	65	51
Left – Danger	3	75	60	1	25	60
Not present – Decision	0	0	--	2	100	50
Not present – 'Accident'	2	40	60	3	60	54

The decisions and actions taken under imminent threat of bushfire seem to be influenced strongly by gender. Generally: men defended, women left safely. Most of the women interviewed who left safely said they did so mainly out of concerns for the safety and wellbeing of family members.

Preparedness, Knowledge and Awareness

The information has been organised according to outcome: Defended Successfully (N = 14); Attempted to Defend: Failed (N =7); Left Late Safely (N = 17); and Left Late: Danger (N = 4). Because of the small numbers in the categories, no statistical tests of the significance of apparent difference among the four outcome groups have been attempted. Instead, the findings have been presented graphically so as to display apparent trends. In Figures 7 through 10, each dot represents the mean rating level [1 (= low) – 4 (= high)] for the characteristic in question: level of long-term bushfire preparation (Figure 7); bushfire readiness on the day (Figure 8); general knowledge of bushfires (Figure 9); awareness of predicted fire danger weather (Figure 10); and awareness of approaching fire (Figure 11). The horizontal length of the box surrounding the dot (mean rating) shows the spread of ratings for the interviewees in each group as the standard deviation of the ratings: that is, about two-thirds of the ratings fall within a box. Below each figure, an example of a high-rating and an example of a low rating have been provided; the number in brackets at the end of each quote is the source-interview code number.

Preparation long term

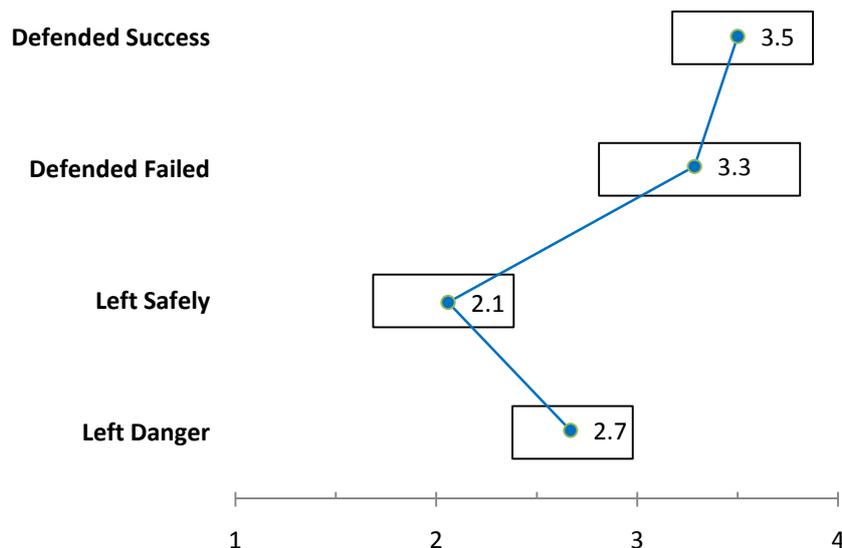


Figure 7: Preparation long term by outcome (1=low; 4=high)

High: Preparation – we have been preparing for this for the last 10 years. It began when we sited the house in the right place, we then built it of appropriate material. it was built of stone. We had then an appropriate fire fighting kit and emergency watering systems and all that sort of stuff. Lots and lots of extra hoses and extra buckets and mops and miners' lamps, which we wore on our heads, most of this was at the suggestion of the CFA (# 016)

Low: I thought we'd be safe up here actually. I thought no bushfire will come here, would have been a fire break around town but it was only up there fortunately. No, I did nothing at all, really. (# 046)

Figure 7 suggests that those who attempted to defend their home generally had undertaken more preparation of their property compared with those who left. However, there is little evidence of a meaningful difference in level of preparation between those who were successful and those who failed.

Readiness on the day

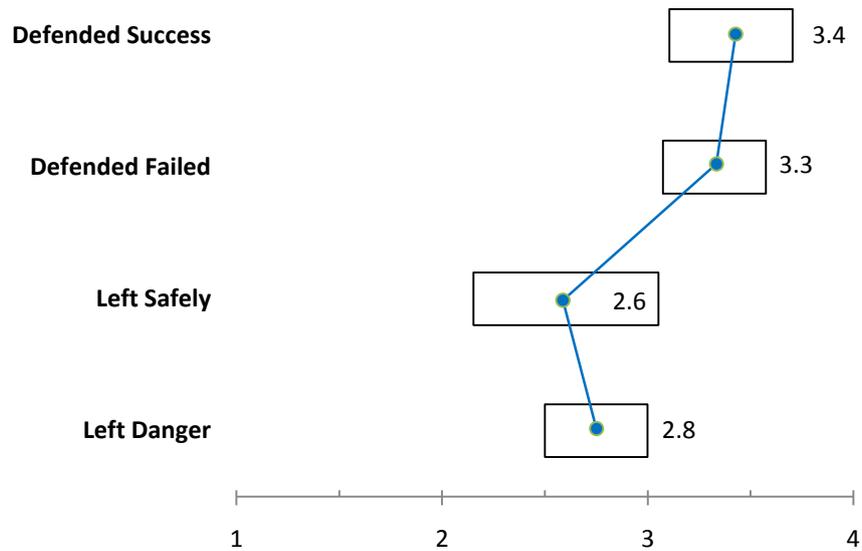


Figure 8: Readiness on the day by outcome (1=low; 4=high)

High: ... we took the bags off the dust extractor systems because we thought if there was a fire they would blow in on the mat, emptied all of that and then after lunch we sat in the office out there, in the air conditioning, with the computer on on the CFA website and the ABC on and mapped the fires as we heard of them and then on the 3:00 o'clock news we heard there was a fire in Murrindindi. I went out the front and they were hosing the roof of the shed and the whole courtyard of the shed out there, so I was out the front hosing the ivy, which is brilliant stuff, because it held the water. I had already laid out clothes for us for the day, cotton clothing and goggles and I had put woollen blankets on the floor in the bathroom but when it was on, I went and filled the bath up too, and I threw the blankets in the bath. (# 044)

Low: ... that's when I noticed a big like cloud coming from where...I'd say North West. But on that direction you would think mm this is not really coming here, hopefully it's just going away and so you go this is not really for us but it looks serious, we better do something. So I start raking more leaves at the front of the gallery, where the direction where the fire should come...would come. So we did a bit of cleaning; the gutters were clean, and the garden was pretty clean really and not much dry leaves. (# 034)

Similar to the indications concerning long term preparation for bushfire, Figure 8 suggests that those who attempted to defend their home generally had undertaken more on-the-day preparation of their property compared with those who left. However, again, there is little evidence of a meaningful difference in level of on-the-day preparation between those who defended successfully and those who failed.

Knowledge of fire (general)

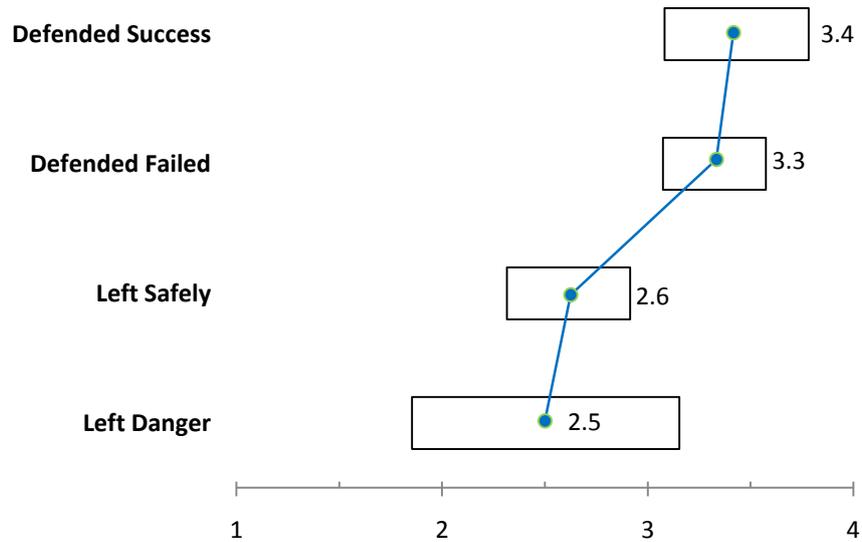


Figure 9: Knowledge of fire (general) by outcome (1=low; 4=high)

High: I used to work years ago for the DSE. I contracted but I'd been in a lot of bush fires, lived in the country and just learned stuff and been at bush fires and done burns, so I knew what to expect to a certain extent, but I never expected that. Nobody else did either. (# 001)

Low: Well, we did a couple of years beforehand endeavour to arrange to have a lady from the CFA at Seymour, which was [name removed] somebody. I can't remember her name. She was coming to talk to small groups of neighbours and ... probably if she had have come ...Some reason why she couldn't come. So that, we never, ever had that. We were going to have just a few people along here with the meeting with her and it would have been to discuss if the fire came, what would we do to maybe help each other, and so we had never done that. (# 041)

Figure 9 suggests that those who attempted to defend their home generally had more bushfire-related knowledge compared with those who left. However, there is little evidence of a meaningful difference in level of knowledge between those who were successful and those whose attempts at defence failed.

Awareness of fire danger weather

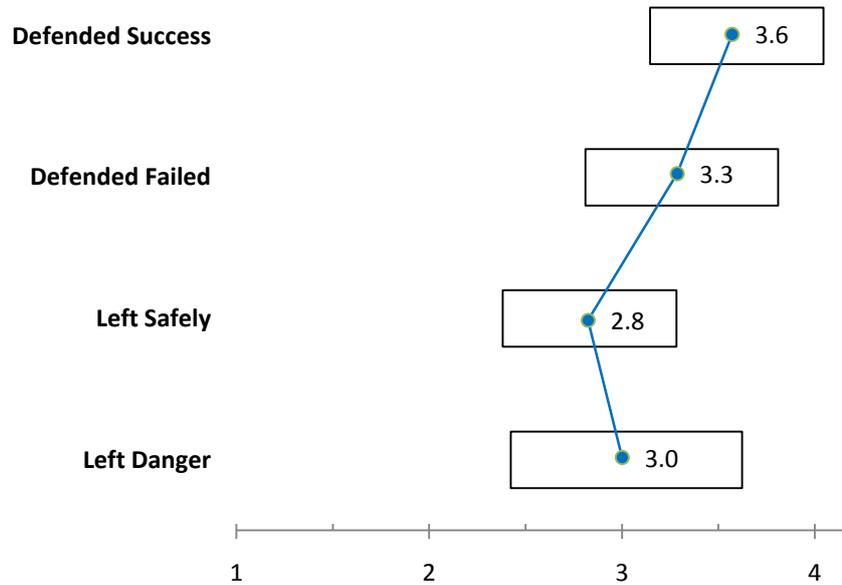


Figure 10: Awareness of fire danger weather by outcome (1=low; 4=high)

High: I knew the day before it, that they were saying it was gonna be a bad day, so it worried me – really concerned me, actually, so much so that Leigh had a load of pulp on. On the Friday he loaded up, and told him I didn't want it here – that's 40 tonne of wood sitting there, and I said I don't think you should.” (# 007)

Low: We were all sitting at home. My neighbour here next door came over...I wasn't quite expecting what happened. I was expecting some fires and stuff around, maybe, but didn't think there'd be any problems at all, actually. (# 007)

Those who attempted to defend were, perhaps, somewhat more aware of the dangers posed by the predicted extreme fire weather compared with those who left safely.

Awareness of approaching fire

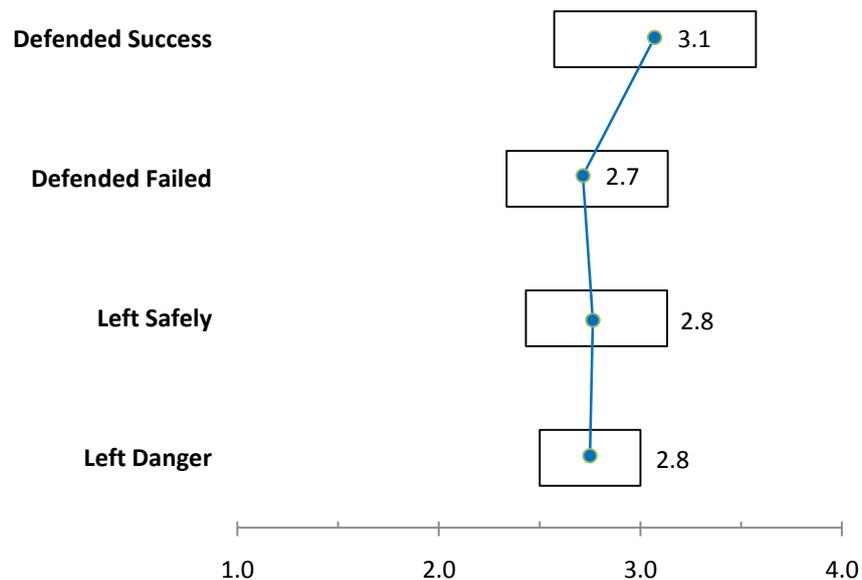


Figure 11: Awareness of approaching fire by outcome (1=low; 4=high)

High: I saw some smoke to the north-west, quite some distance away. I checked that out on the CFA website and it identified that there was a Murrindindi Mill fire, looked up the Murrindindi Mill on the map and looked at the direction from that, and ascertained that that was definitely – the smoke that I was seeing was definitely coming from Murrindindi Mill. I looked at the distance from that, and it was over 20km from here. (# 043)

Low: Actually, I was asleep in there. I had the little air – well water cooler thing going and at 4:00 my son and his girlfriend came up and said there's a fire. I said, oh yeah, what fire? A small fire? I said what do you mean?. He said a bushfire. So we came outside the back door there and we looked up at Mt Gordon here and there was a huge massive plume of smoke up there. (# 0046)

The small apparent differences among the four action/outcome groups are probably not meaningful: overall, there appears to have been a moderate level of awareness of a fire threat (without this awareness necessarily being personalised and acted upon).

Summary: Actions, Intentions, Threat Level, Preparation and Awareness

As shown in Figure 4 above, a majority of those interviewed had a fire plan (43/51 = 84%). However, less than half implemented their plan (20/43 = 47%), although 13 of the 14 (93%) interviewees whose plan was to leave early were absent from their property when the fire struck, for a range of reasons.. For the majority of those who were at home on the day, their initial decision made under the threat of impending bushfire threat was acted upon successfully (28/42 = 67%). The remainder (14/42 = 33%) were forced to make a second decision; for seven (17%) their decision sequence ended in taking last-resort shelter.

The severity of threat levels experienced varied greatly. For the majority of those who attempted to defend their home, threat level ranged from “Serious” to “Extreme”. Not surprisingly, attempting to defend and failing exposed those interviewed to the highest levels of threat. Leaving at the last minute involved threat levels comparable to defending successfully (Figure 6).

Generally, compared with interviewees who left without attempting to defend their homes, those who attempted defend: (a) had made greater long-term preparation for defence;(b) had undertaken more preparation on the day; (c) evidenced greater knowledge of bushfires; and (d) were somewhat more aware of

the dangers posed by the predicted extreme fire weather. However, there were no meaningful differences on (a)—(d) between those who defended successfully and those whose attempt to defend failed.

Decision Process Factors

As in the previous section, the information has been organised according to outcome: Defended Successfully (N = 14); Attempted to Defend: Failed (N = 7); Left Late Safely (N = 17); and Left Late: Danger (N = 4). Because of the small numbers in the categories, no statistical tests of the significance of apparent difference among the four outcome groups have been attempted. Instead, the findings have been presented graphically so as to display trends. In Figures 12 through 24, each vertical bar shows the percentage of interviewees in each outcome group whose transcript contained evidence of the decision process element in question. Below each figure, an example of a statement which evidenced the decision process element is reproduced; the number in brackets at the end of the statement is the source-interview transcript number.

Overall, or General, Decision Process Elements

Prior commitment to plan

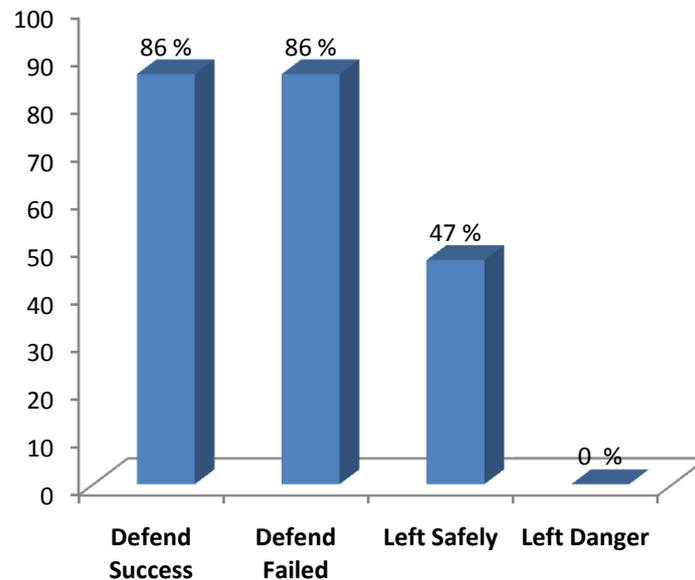


Figure 12: Commitment to plan, coding frequency (percent) by outcome (1=low; 4=high)

Then I looked east towards Marysville and found that the top end of Granton was on fire as well. So, I came back in and said to Grace – because our plan was that she was going and I was staying. She left, packed a bit of gear, took the dog, and left. Went into Alexandra, went towards Alexandra, went through Marysville first. Then I got a beanie on and a jumper on and got the pump going. We've got a pump and 7000 litre water pump. (# 037B)

Those who intended to defend their home reported a stronger link between commitment to their plan and their actions, compared with those who left before the impact of the fire.

Trigger

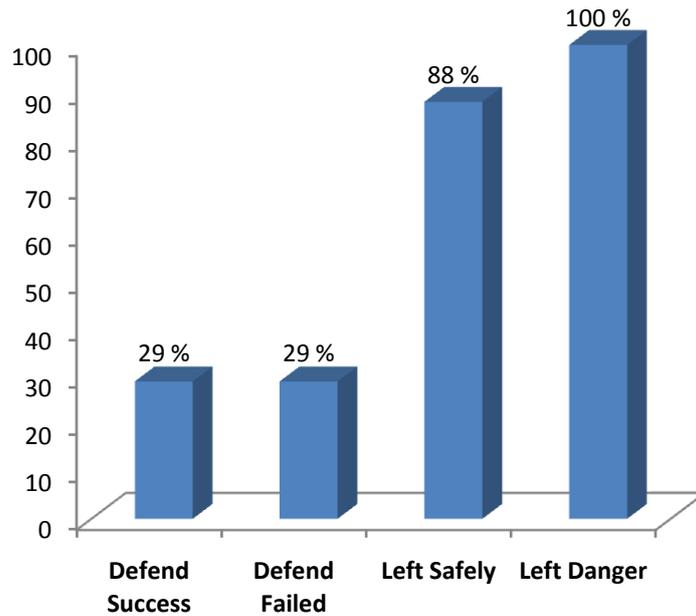


Figure 13: Specific trigger for action, coding frequency (percent) by outcome

It was way over, but the back of the house started burning because of the intensity of the heat. This joint exploded, so I thought it's time to go. (# 010)

A specific development in the emerging threat situation, or “trigger” was reported as a more important determinant of leaving in the face of bushfire threat, compared with those who defended.

Expectations disconfirmed: ‘Collapse of sense-making’

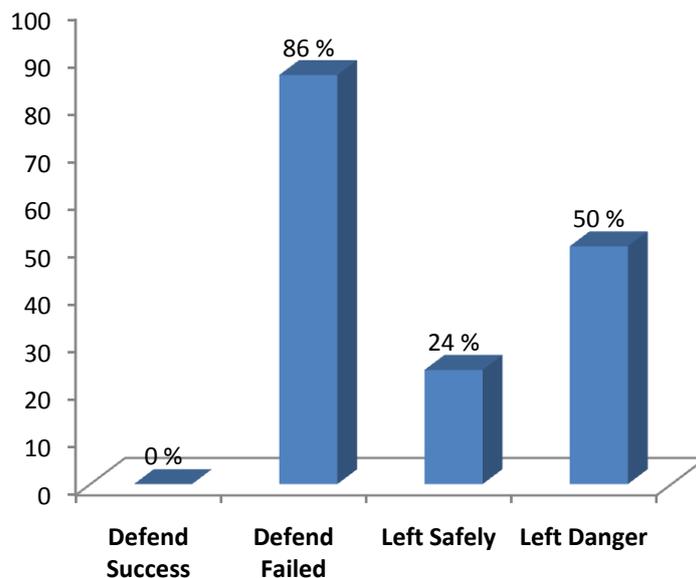


Figure 14: Collapse of sense-making, coding frequency (percent) by outcome

I was at home and I thought, oh yeah, the bushfire's coming so no problems. So I got all everything set up and got everything set up for a small bushfire. Once it came over that hill, mate, I'm out of there. So I bolted – I think I came down this road here, which is Darwin Street and I couldn't see anything, so I ran into the

gutter a few times. Next thing, you know, I couldn't find where I was going. There might have been people walking, but the smoke was so thick and the flames were coming over that hill that I was just lost. This street, I've been driving up and down this street for 12 years or more and I just couldn't do it, mate. (# 011)

The experience of expectations about fire behaviour, threat, and potential survivability being dramatically disconfirmed [Wieck's (1993) "collapse of sense-making"] was an important contributor to decision making and action for many of those whose attempts to defend failed, and for many of those who left at the last minute.

Time/No alternative

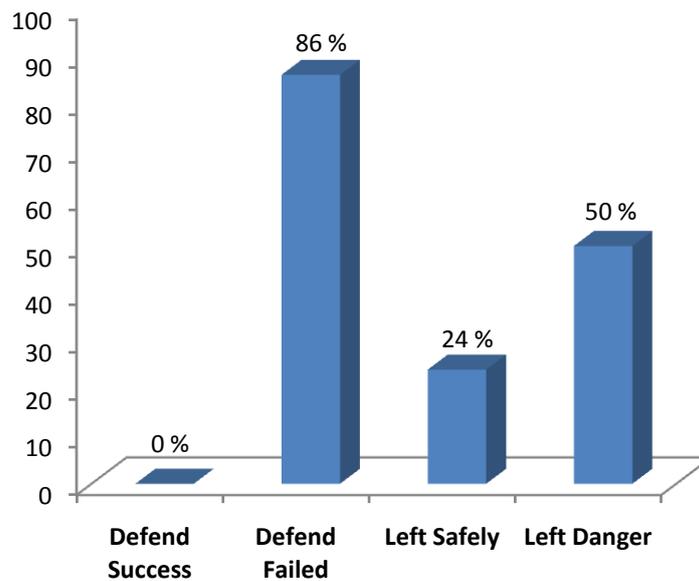


Figure 14: Time/No alternative, coding frequency (percent) by outcome

The bush was just boom. So quick it came towards me that I didn't have much time really so I managed to grab some of the works in my kiln and things like that. So we saved little, but never what we thought the time that we'd have, because the fire was coming from both angles. (# 034)

The majority of those who were unsuccessful in their attempts to defend, and half of those who fled at the last minute, reported that their decisions and actions were driven largely by the speed of attack of the fire (coupled with the absence of useful information/warnings). This created a sense that they had no alternative course of action: attempt to defend; flee at the last minute.

Potential Specific Survival Enhancing Decision Process Elements

Down-regulate fear/anxiety/stress

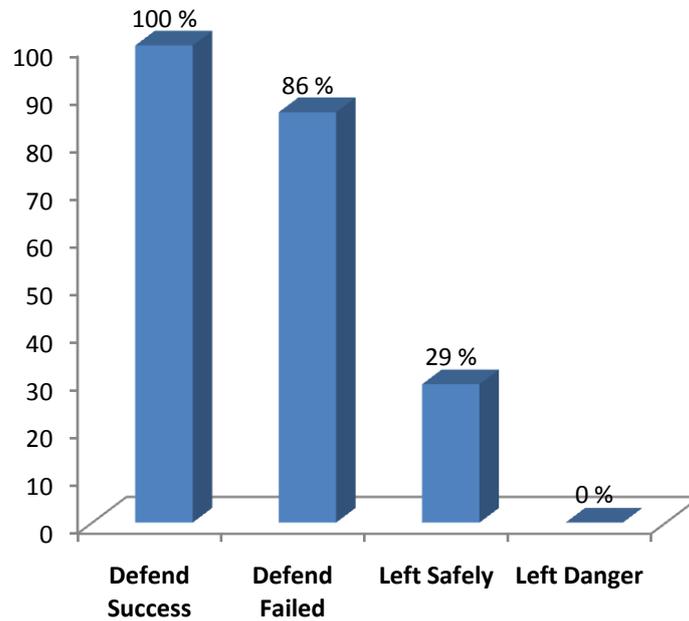


Figure 15: Down-regulate fear/anxiety/stress, coding frequency (percent) by outcome

..I suppose I was a little bit nervous. But David wasn't panicking, and so my kids weren't panicking and I wasn't particularly panicking. It was just, okay, this is what we have to do now. We're not very flusterry people. (# 006)

Perhaps Figure 15 speaks for itself: being in a bushfire situation is scary. Probably, survival is determined to some degree by being able to regulate the intensity of fear/anxiety so as to be able to continue engaging in survival-enhancing activities.

Maintain attentional focus

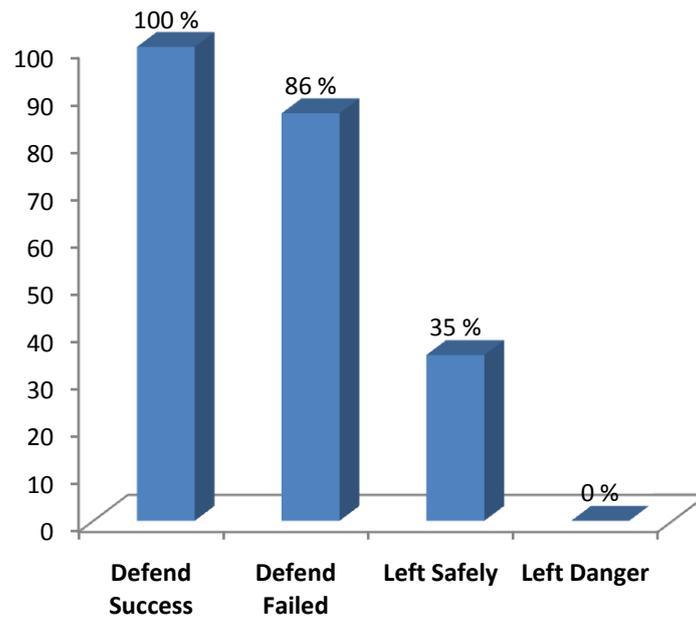


Figure 16: Maintain attentional focus, coding frequency (percent) by outcome

Yeah that's right and then it was just down to business. You're too busy to be frightened. Flat chat. As I say, if I could stop this section burning we had a chance. (# 019)

Inspection of the content of the interviews suggests that there are two aspects to maintaining attentional focus while under bushfire threat. The first is the necessity of concentrating on effective performance of survival-enhancing actions. The second is that this concentration also serves as a means of down-regulating fear/anxiety (Figure 15) so that survival-enhancing actions remain the highest priority.

Action-survival link

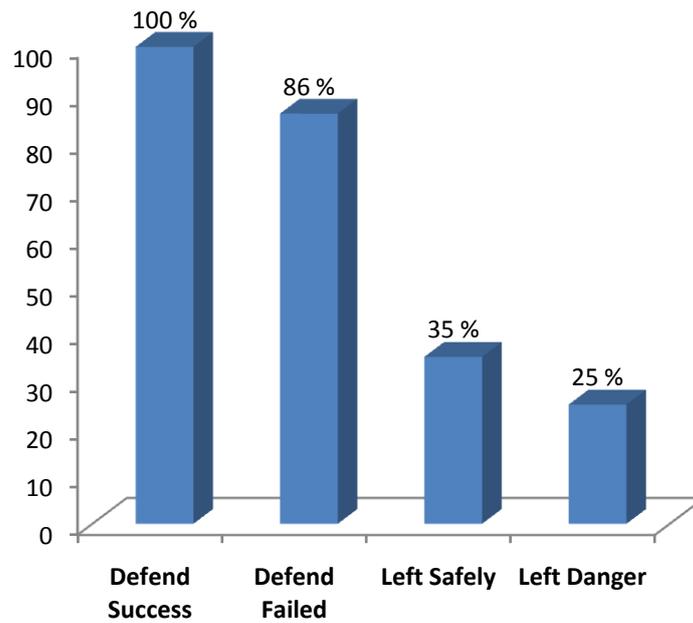


Figure 17: Maintain action-survival link, coding frequency (percent) by outcome

I come down here and she said 'come in here' and I said 'no, come on, get out' and we come out. I had the vehicles facing the right way. This one was usually in the garage over there but I'd got it out and facing the right way... I just drove them out. Drove one out to where it was already burnt and then I came back and got the other one and drove it out. Just as well they had diesel in them, they might have blew up. And then we just put a couple of hours in over there and I wasn't happy with that because I didn't know what the situation with the trees were and then we drove round here again and I drove them back around here and we put the night in here. It was as simple as that really. (# 021)

For those who attempted to defend, survival-enhancing actions were of two kinds. First, actions aimed at protecting aspects of the house and/or the firefighting infrastructure—water supply, pump. Second, actions aimed at immediate self-protection from embers, flames, radiant heat, and smoke. For those who left, survival-enhancing actions involved avoiding potential hazards while driving in the bushfire-affected environment, mostly avoiding obstacles such as fallen tree branches, gate posts, fences in spite of smoke-reduced visibility.

Information/communication

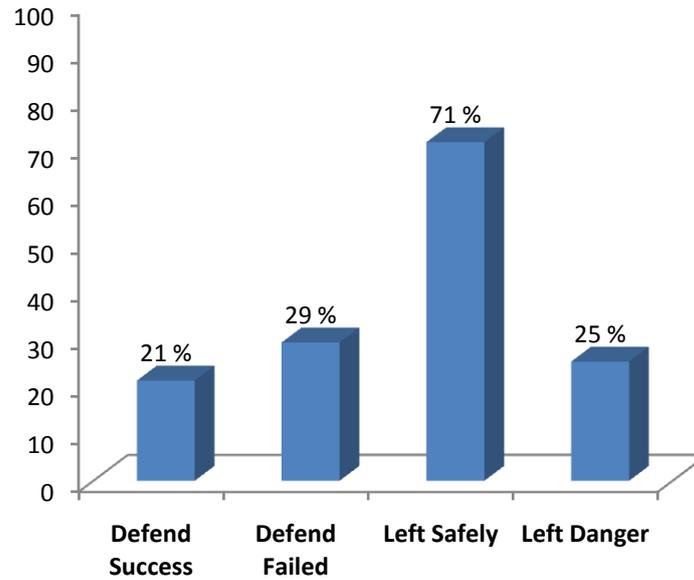


Figure 18: Information/communication, coding frequency (percent) by outcome

it's like all from that 3-5:30 time was all like a blur. But it was afternoon and then I went driving onto the highway. Then, up here, where the CFA thing is. I went up there, one unmanned truck there. Fire coming over the hill, they are like crazy and went into [name removed] – who's the lieutenant of the CFA and she had the map up, and for the first time somebody said fires are here, here, here, here, here, you've got less than whatever, do your thing now. (# 028)

Awareness of new information about the developing threat as the fire approached, especially from a 'trusted' person (family member, friend, or neighbour with 'expert' knowledge), communicated face-to-face or via the telephone was a key factor for most of those who chose to leave before the impact of the fire. In most instances, the interviewee reported being in a state of uncertainty and indecision about what, if any, action to take and the information crystallised an intention to take a particular action.

Social support/assistance

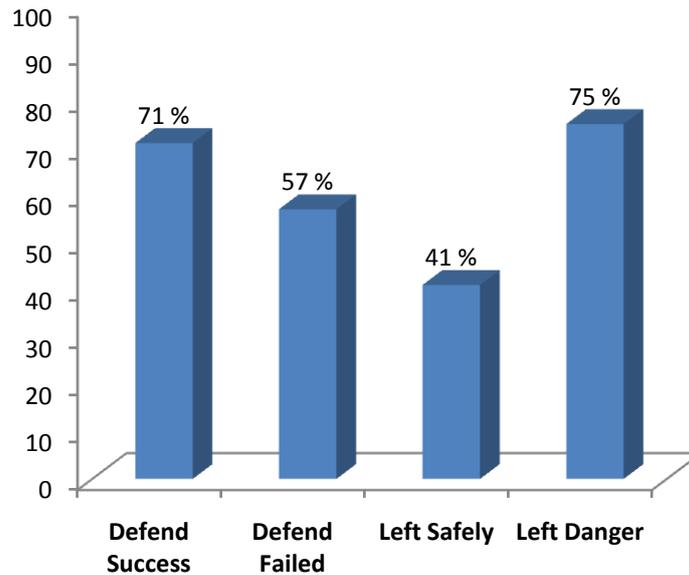


Figure 19: Social support/assistance, coding frequency (percent) by outcome

I then rang my next door neighbour and said it's serious, come down. He walked down very quickly, found me near the main street, and said go to the house of Mr and Mrs [K____] and stay with them. I will see if I can smash the garage with a crow bar to get the car out. He walked back to the property, smashed the rear window, managed to open the garage door, and drove out with my vehicle. He didn't have a vehicle, so it was the only vehicle we could escape in. If it wasn't for the vehicle, we would not be alive. (# 032)

The importance of “others” in deciding upon a course of action in the face of impending bushfire threat, and carrying it out, was striking. The social support/assistance was of four main kinds: (a) direct physical help (as in the example above); (b) reducing the workload demands on individuals in the course of property defence; (c) more effective monitoring of the situation and detection of emerging threats; and (d) social facilitation/reassurance/maintaining morale in the face of danger and/or fatigue.

Outcome efficacy

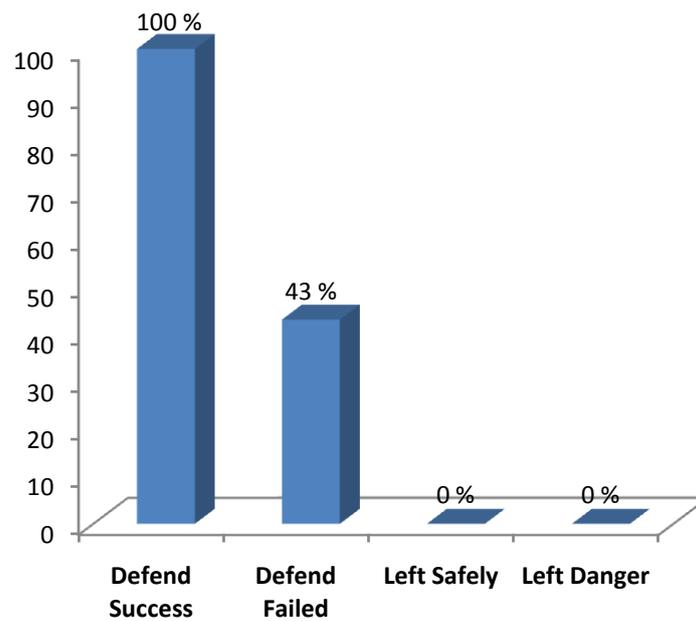


Figure 20: Outcome efficacy, coding frequency (percent) by outcome

Well we didn't have enough time to leave at all. I knew that. As soon as I seen, when we got back to the mill, I re-evaluated it and I thought, because Sue said, let's get out of here, and I said, well we can't, it's too late. Because I didn't know where it was going to be or which way it was going. However I still felt pretty confident that we would be okay where we were. As it turned out, well the plan worked, but only just. (# 027)

For those who attempted to defend, belief that their intended actions would be effective in protecting the property ('outcome efficacy') was an important determinant of decisions taken and actions implemented for all those whose defence was successful. The likely influence of hindsight must be acknowledged: all 14 knew that their efforts had been successful and their houses had been saved. Attribution theory (Weiner, 1985) predicts that following success, people will tend to make internal attributions of the causes of their success (e. g., good preparation, good plan, well-directed effort) rather than external attributions (e. g., shift in wind direction, low fuel load because of the drought).

Fewer than half of those whose attempts at defence were unsuccessful expressed confidence that their initial intended actions would be effective. Of the seven interviewees who attempted to defend and failed, two did not plan to defend, they did so because they believed they had no choice. The likely influence of hindsight must be acknowledged: all seven knew that their efforts had failed and their houses had been destroyed. Attribution theory (Weiner, 1985) predicts that following failure, people will tend to make external attributions of the causes of failures (e. g., severity of the fire, strength of the wind, lack of water, equipment failure) rather than internal attributions (e. g., inadequate preparations or defensive efforts).

Personal efficacy

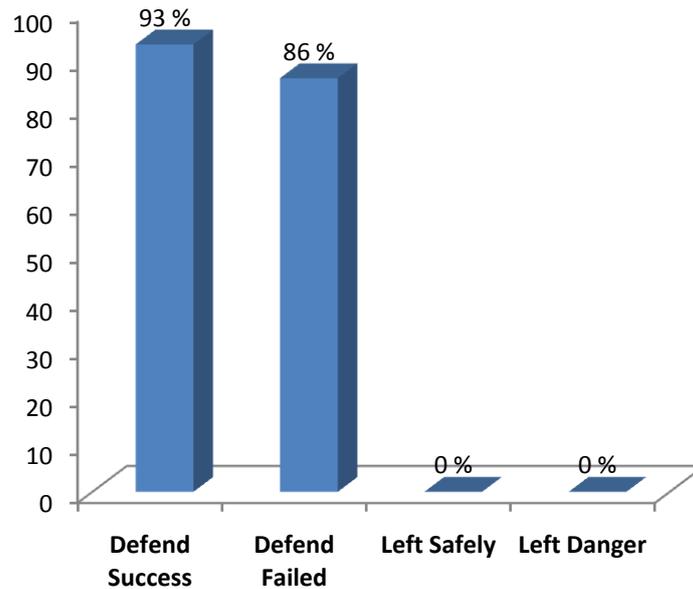


Figure 21: Personal efficacy, coding frequency (percent) by outcome

The only thing I would do differently is try and make sure that there is many people here, but you can't, you can't, as far as preparation and everything else, no I don't think there is anything more we could have done. We were as prepared as we could be. (# 044)

For those who defended successfully, beliefs that they were equal to the demands of the tasks involved in defence (personal efficacy) were an important determinant of defence-related decisions and outcomes. For those whose attempts were unsuccessful, beliefs that they were equal to the tasks involved in surviving in spite of losing the house were important determinants of their survival-related decisions and actions.

Responsibility for others

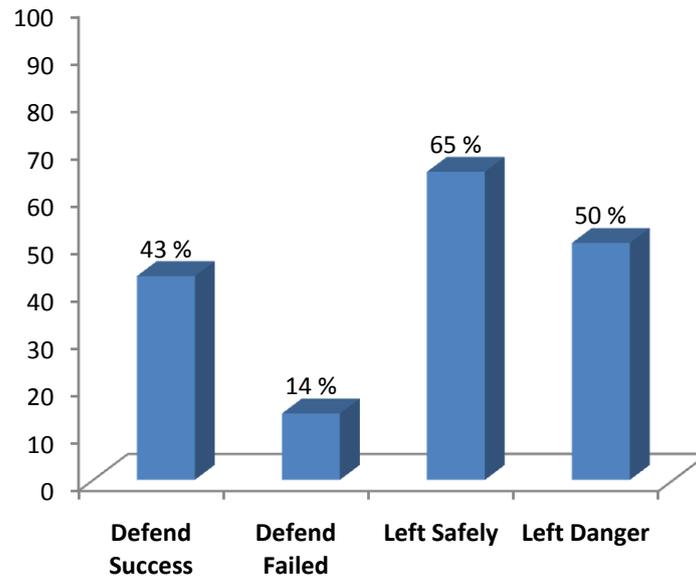


Figure 22: Responsibility for others, coding frequency (percent) by outcome

Look if the circumstances were exactly the same as far as the business was concerned there was nothing more we could have done. We kept them (motel guests) together so that I knew where they were all the time, the couple that had decided to go wandering, the fact that we were able to keep them altogether. I had one couple who were getting really edgy and wanted to leave and I just asked them to stay a bit longer until I was really sure about my information. And I was glad about that because we did direct them to Alex and were making it very clear, don't go do the spur. Now once they drove out my driveway, what they did I've got no idea... But I know that I was keeping them together, I was finding out the right information and I sent them to the right place, couldn't have done anything any different to that. (# 053)

For some of those who attempted to defend, responsibility for dependent family members influenced decisions and actions positively; mostly via motivation to maintain sustained maximum effort in continuing survival-related activities. For many of those who left, feelings of responsibility for the well-being of family members was a powerful factor in the decision to actually abandon the property and possessions and leave.

Potential Specific Risk Amplifying Decision Process Elements

Panic/fear/anxiety

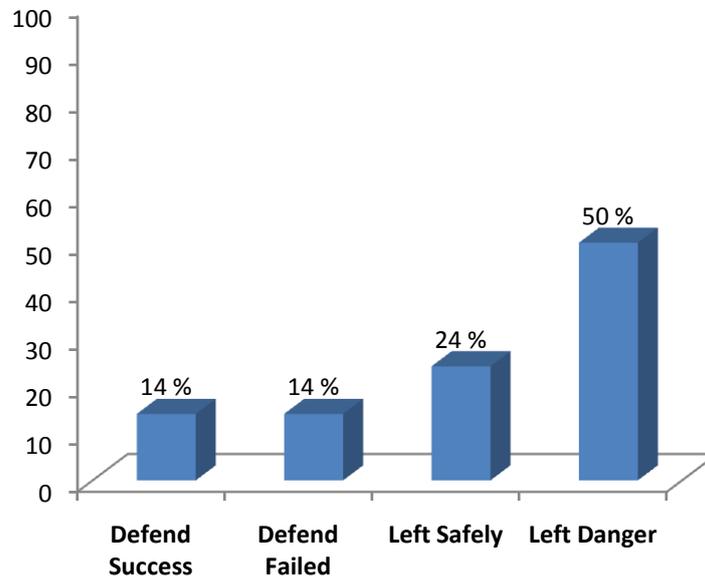


Figure 23: Panic/fear/anxiety, coding frequency (percent) by outcome

Oh, I probably would have stayed anyway, but when it really hit there was a stage there when I felt, oh, I should go, and I looked over there and my car was on fire anyway so there was no help. Soon as I'd run out of water, that's when I really worried, because you've got nothing, mate, you know. Scary. I was in Cyclone Tracey and it was worse than that (# 023)

An appreciable number of those interviewed described experiencing feelings of panic/fear/anxiety without mentioning self-control endeavours. Most of these were reported by people who left at the last minute, and were associated with anticipatory fears of possible hazards such as fallen trees, fire blocking roads, and poor visibility due to smoke.

Lose attentional control

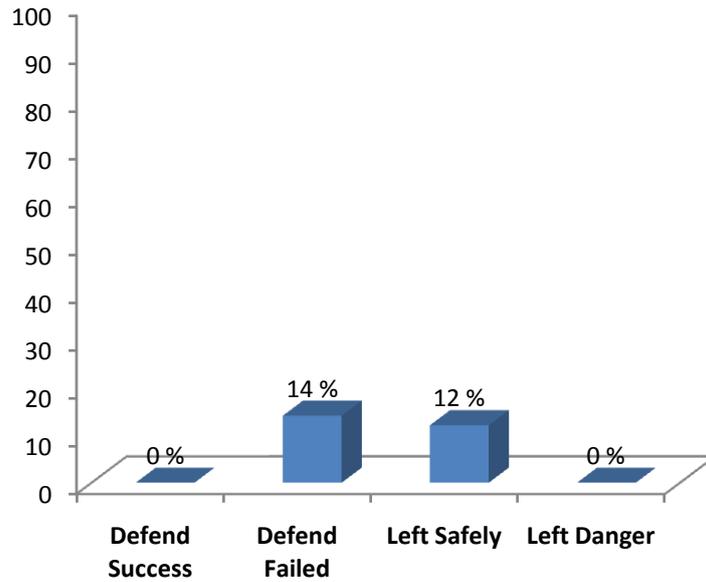


Figure 24: Lose attentional control, coding frequency (percent) by outcome

Oh I forgot my bag and everything and just ran, grabbed the dog and ran outside. And the guy from the fire brigade – I run outside and the guys from the fire brigade ran towards my house just to get me out, because Rosemary told them I’m still here in the house.

There were few reported instances of loss of attentional control. One involved distraction from the task at hand by a particularly salient feature of the environment, namely a neighbour’s house catching fire.

Actions not linked to survival

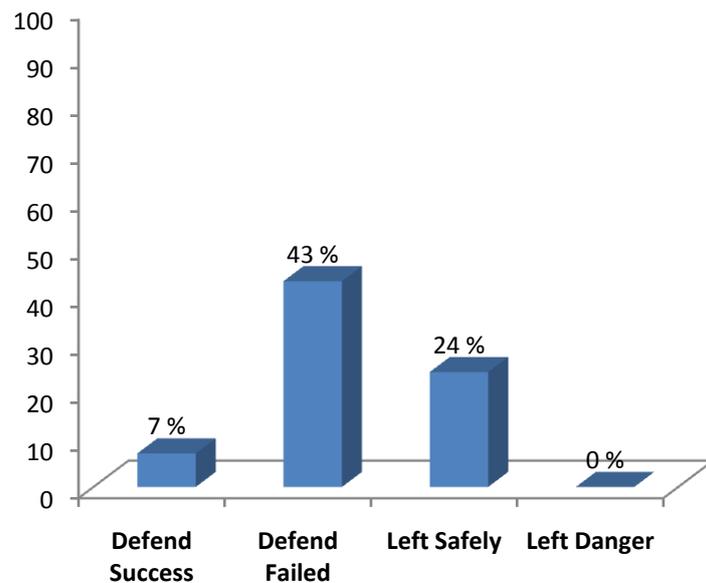


Figure 25: Actions not linked to survival, coding frequency (percent) by outcome

Next thing, I get a phone call, we were in there making sandwiches because I knew the fire brigade and that would need them if they were fighting fires. So we just keep making sandwiches. Had a couple of ladies

helping. I had a couple of girls crying because their husbands are out fighting the fire and they didn't know what was going on. Then when she rang back after five she said get them all evacuated to Alexandra. (# 015)

Three of those whose attempts at defence were unsuccessful described behaving in ways that exposed them to hazard unnecessarily, such as trying to save pets or possessions. About a quarter of those who left without attempting to defend described wasting time unnecessarily on activities which delayed them from leaving—as in the example above.

Defective or absent communication

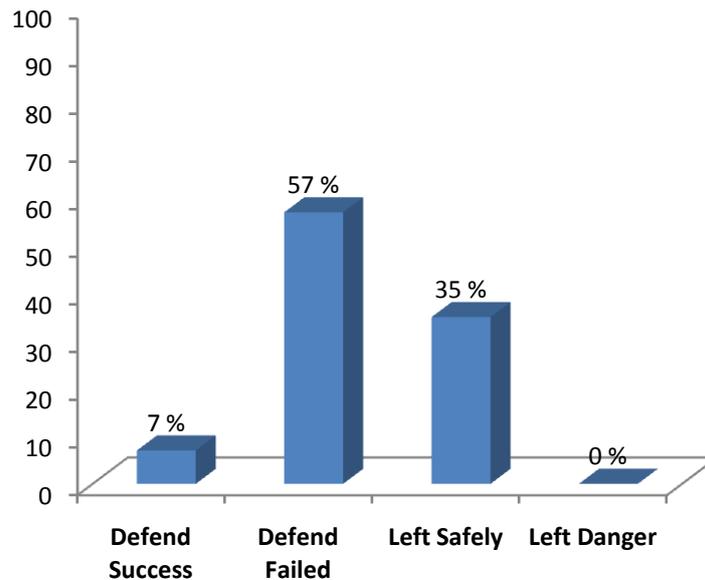


Figure 26: Absent or defective communication, coding frequency (percent) by outcome

It's just a case where I was being told to go here, to go there, to do this, it's safe, it's not safe, it's on fire, it's not on fire, Narbethong is flat, Buxton's gone, it's coming in from Buxton, and your head just spins from all these different people telling you all the different stories. I reckon a lot of the problems would have, especially the Cumberland, a lot of the people were going back towards the Cumberland because they were told it was safe, and in fact it wasn't. And when they decided to evacuate the Cumberland, they all went to the footy oval and people were still turning up at the Cumberland and finding it empty. (# 029)

A significant number of those interviewed described their decisions and actions as having been influenced by lack of information, or by information which was out of date or incorrect—such as in the example above where several Marysville residents described conflicting information about places of refuge.

Lack of social support/assistance

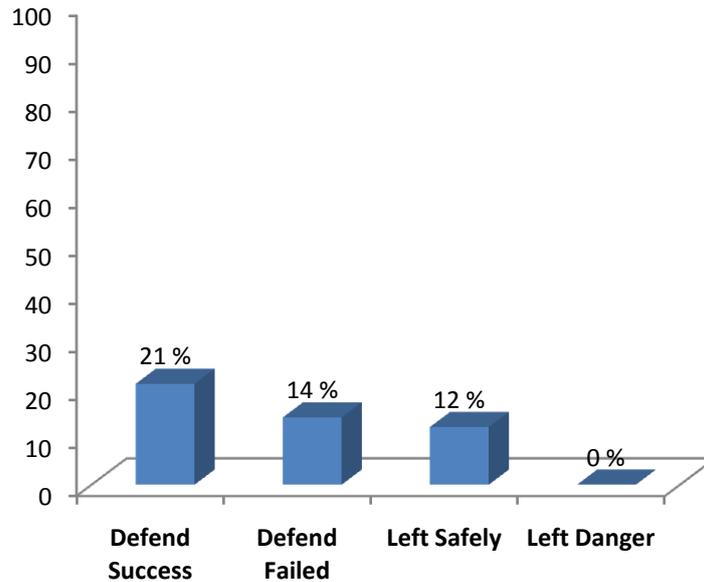


Figure 27: Lack of social support/assistance, coding frequency (percent) by outcome

I only just lived across from the CFA and there was no point me going over there and asking questions because there wasn't anybody there. There was nobody and being surrounded by holiday houses, it's not like you've got other neighbours that you go and say well have you heard something or do you know something or swap information. There was nobody except just this one chap and his wife and they left soon after speaking ... (# 013)

Several people described their decisions and actions as having been influenced by being alone and/or isolated. For those who attempted to defend, this meant that they had to contend with a high workload. For those who left, it involved a lack of confirmation about the nature of the situation and the actions required.

Lack of outcome efficacy

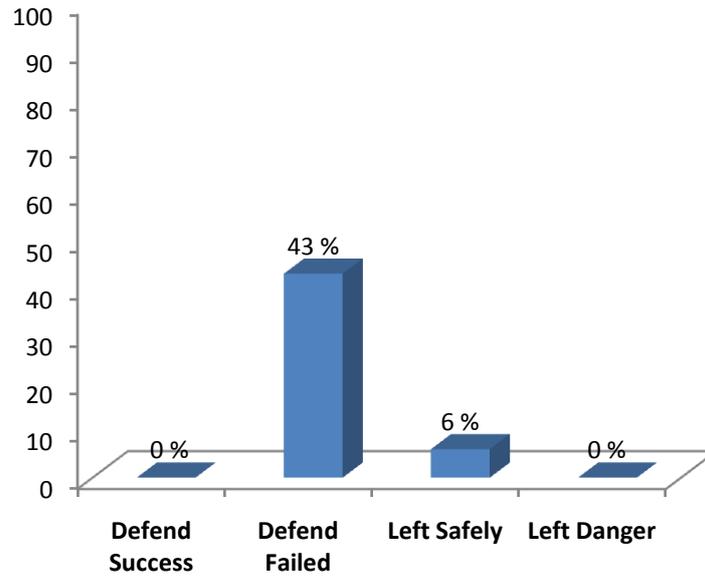


Figure 28: Lack of outcome efficacy, coding frequency (percent) by outcome

And in the meantime embers are shooting. I can see them coming and I think, oh this is – I honestly straight away thought that sound of that thing, we're going to get killed. Tony said he didn't feel like that, but I did. That will definitely just bowl you over and you've got no hope. There's no way I would have thought this would be saved, to come and stay here and I'd be right.. (049)

Four of those whose attempts at defence were unsuccessful spoke of the demoralising impact of realising that their efforts to protect the house were failing.

Lack of personal efficacy

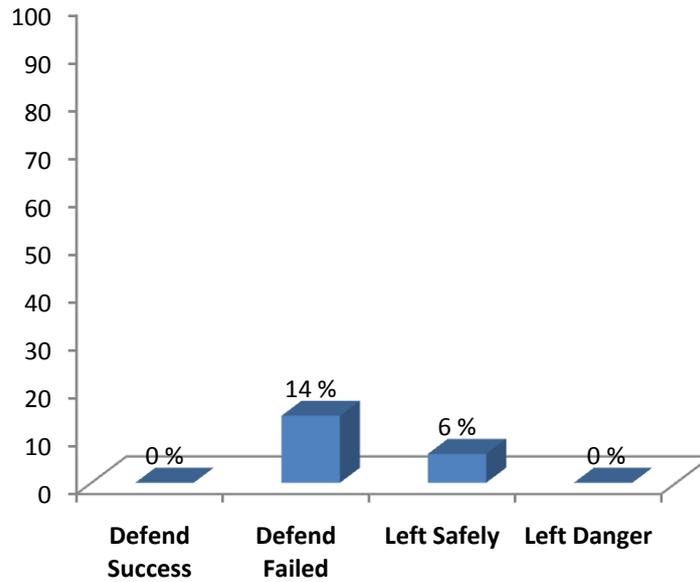


Figure 29: Lack of personal efficacy, coding frequency (percent) by outcome

Yeah, the day of the fire [they] told me what to do. Take the door mats in, close everything, and pack a bag with the documents and put it behind the front door. Get a bucket ready for after to put the fires out and I did all that. But the fire was so aggressive, all of a sudden all the windows exploded in my house and black smoke came in and I couldn't breathe any more, so I had to go out. (# 042)

The above comment was made by one of those whose attempts to defend failed.

Dependents (elderly, children, disabled)

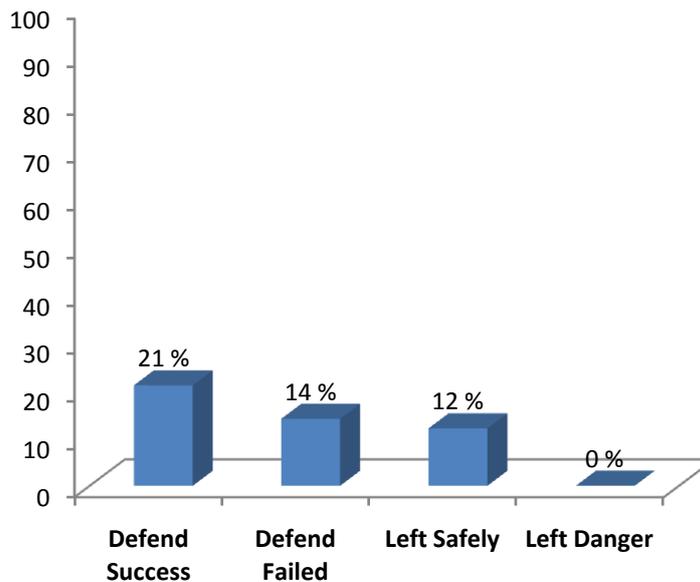


Figure 30: Dependents (elderly, children, disabled), coding frequency (percent) by outcome

No, my wife and my young fellow who is in a wheelchair. We had him to worry about as well.” (# 21)

While there were some reports of the positive, motivating effects of responsibility for others as determinants of decisions and actions (see Figure 23), other reports indicated the presence of dependent family members could have a negative effect on survival-related decision making and actions: as a source of additional anxiety, and as a distraction from necessary immediate survival-enhancing actions (see also Table 3).

Other Issues Potentially Related to Outcomes

Surprise/lack of time

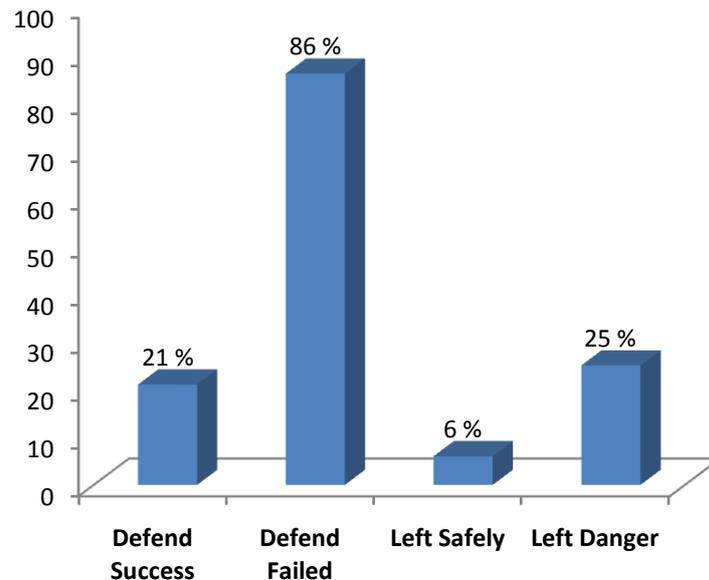


Figure 31: Surprise/lack of time, coding frequency (percent) by outcome

That's another thing. We got a phone call from an old girl, my wife's friend down in the town and she said they're being evacuated and that was the first warning we got. In fact there was no warning apart from that. (# 021)

Lack of water

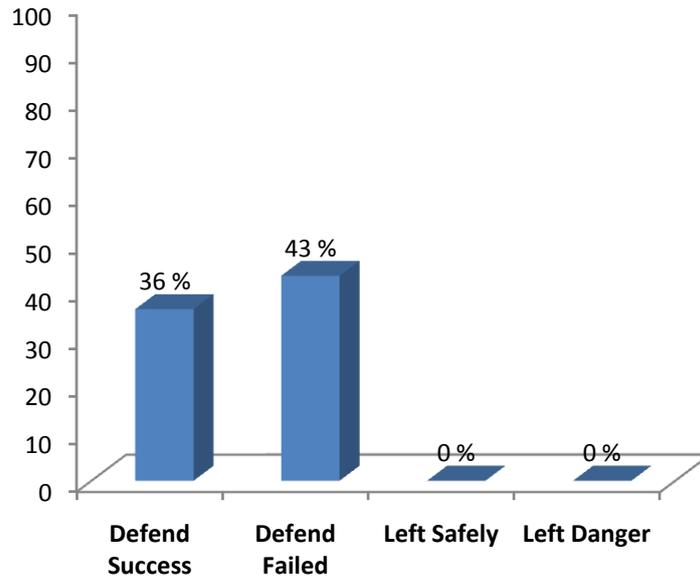


Figure 32: Lack of water, coding frequency (percent) by outcome

---So then you didn't have water from the tap?
 Yeah, and they already started here. I don't know when did they come here. They start to get water from the spa.
 ---Right, so using the spa to bucket water.
 Yeah. (# 041)

Equipment failure

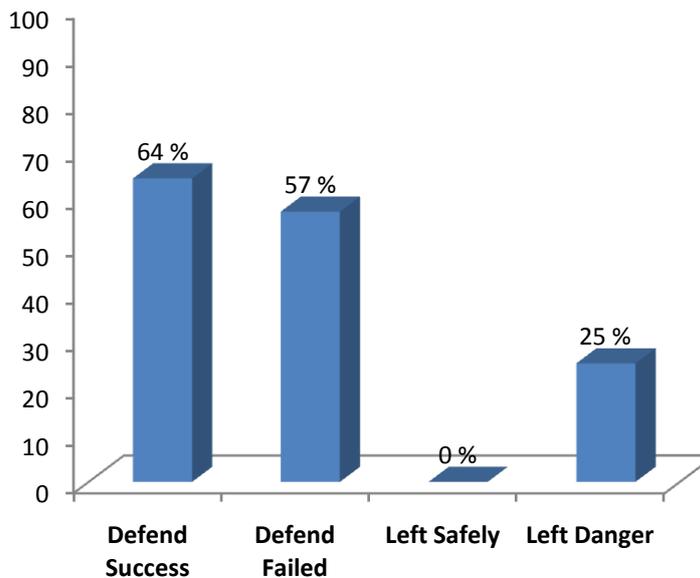


Figure 33: Equipment failure, coding frequency (percent) by outcome

Oh, well, the fire came. I was fighting it. I had my generator and I've got a bore over there. So I had water and a reel, but at the critical moment there was a lack of oxygen so the generator stopped, and by the time I

got back to it, it was too late because the hose had caught on fire and melted the pole and my reel....Yeah. And that was virtually it. I lost my shed because I couldn't get any water on it. (# 023)

Building vulnerability

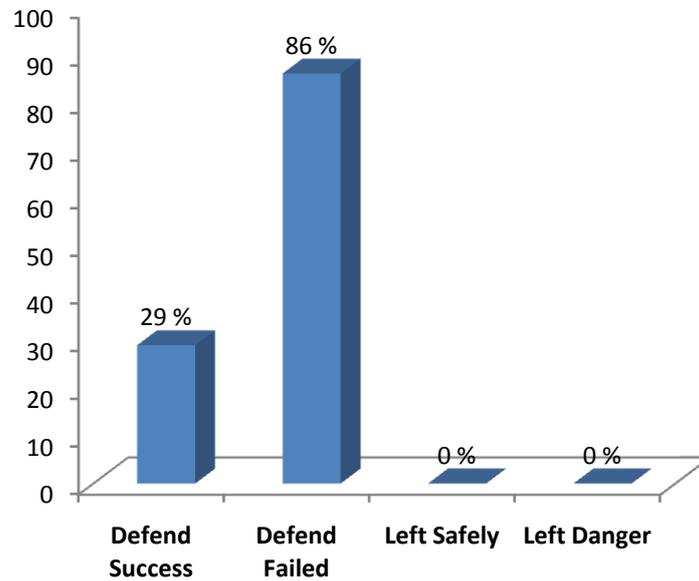


Figure 34: Building vulnerability, coding frequency (percent) by outcome

So I went back around the front, underneath the house kept catching fire, I was hosing it with the garden hose with a strong nozzle, so I thought the power of that would have been enough, but I could not put it out....It is just timber base boards, barge boards with gaps between and they're old and rotten anyway. (# 044)

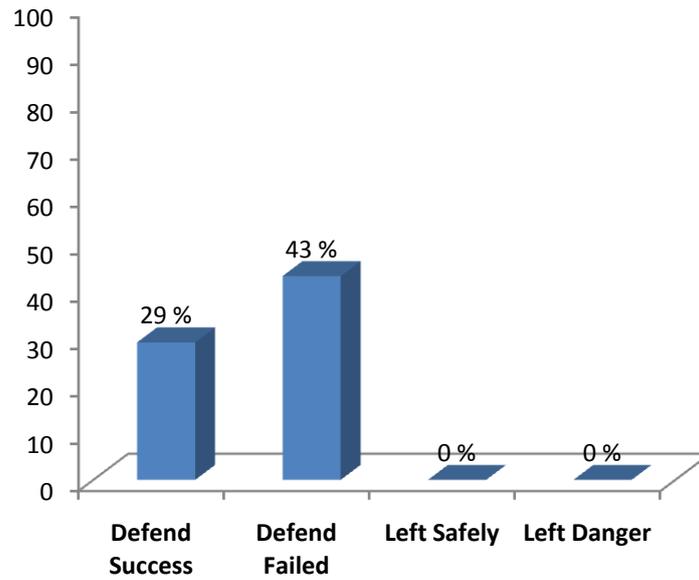
Injury/fatigue/stress

Figure 35: Injury/fatigue/stress, coding frequency (percent) by outcome

And Darren had to chop his way through more trees that had fallen across the road. He hit himself in the foot with the axe, which was quite bad. So I hopped in the car again and we drove to that clearing where the gravel patch is and we sat there for at least a couple of hours. We saw our house burn down and all the others exploding into flame. (040)

Egress blocked

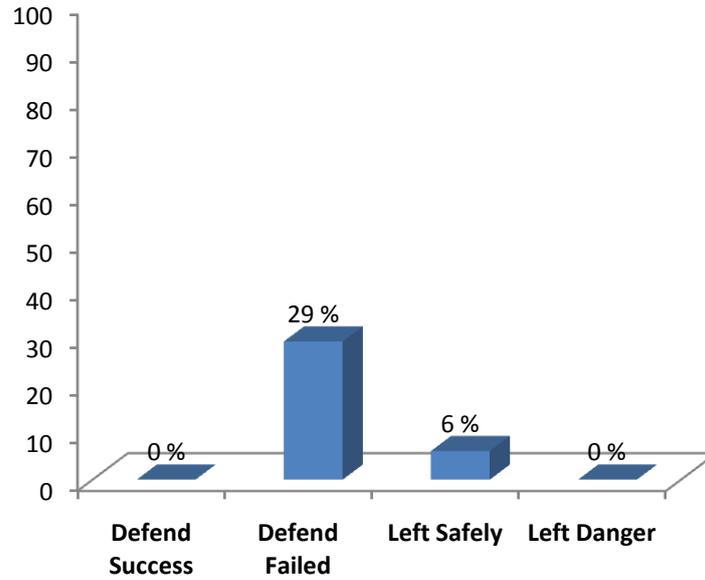


Figure 36: Egress blocked, coding frequency (percent) by outcome

Well, as I said earlier, a few people had come. And one group had, I don't know if this of any interest to you, but one group said, we're not staying, we're going. And I said, no, it's too late to get in your car. Anyway they jumped in the car and went up the road one way, then they went up the road the other way and then they came back. And they said, we can't get out, it's all on fire." (# 027)

Section II: 2009 Victorian Bushfires Royal Commission Lay Witness Accounts

Introduction

Sixteen lay witnesses appeared before the Victorian Bushfire Royal Commission to give evidence concerning the Murrindindi Fire complex. Of the 16, six described successful home defence, and four described unsuccessful attempts at home defence. A further four witnesses described leaving late without encountering significant danger, one of whom took last resort shelter in the Gallipoli Park lake, near the oval. One witness was not present on the day--by accident as distinct from leaving early by choice. For the purpose of the analysis, we will only consider the evidence of those 15 witnesses who were present in Marysville on 7 February 2009.

The 15 statements (“exhibits”) submitted by the witnesses, together with the transcripts of their cross-examinations, were read and coded using the same procedures adopted for the Bushfire CRC Taskforce interviews described Section I of this report. The aim of this analysis was to provide a comparison, using a different data set, with the information extracted from the 51 transcripts of the interviews conducted by members of the Bushfire Research Taskforce. The two data sets were generated by different recruitment methods: As described earlier, the Taskforce interviews were conducted on a more-or-less random basis of who was present on properties when a Taskforce team was in the area. The Royal Commission lay witnesses were selected by Council Assisting the Royal Commission on the basis of submissions made by members of the public to the Royal Commission: none of the lay witnesses selected had chosen to not be present on the day of the fire because of the predicted high fire danger weather. The methods of eliciting information also differed. The Taskforce interviews were conducted using the Interview Guide at Appendix A. The witness statements were written and provided a largely chronological account of events prior to and on 7 February 2009. The hearing transcripts were mostly repetitions of the main points of the written statements (exhibits) with some additional information provided by witnesses by way of clarification in response to questioning by Council Assisting.

Because of the small size of the Royal Commission (RC) lay witness data set ($n = 15$) it was not meaningful to undertake a detailed comparison of groups based on actions and outcomes, as was done with the Taskforce transcripts. What we have done is to make broad comparisons between the information provided by the lay witness accounts with that provided by the Taskforce interviewees, noting consistencies and inconsistencies. The results of these comparisons between the two data sets follow.

Results and Discussion

Actions, Intentions and Outcomes on 7 February 2009

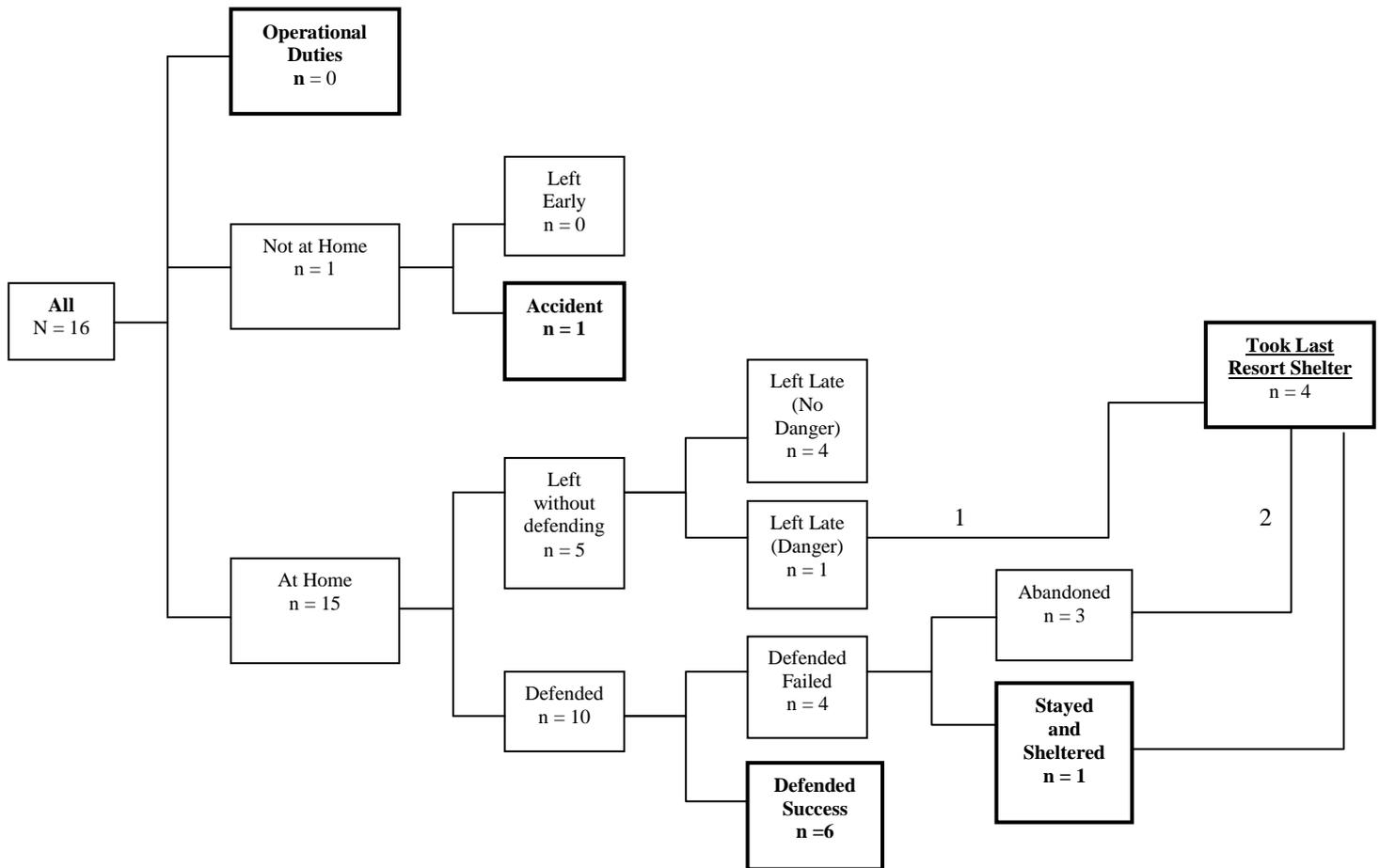


Figure 37: Path diagram showing the decisions and actions of survivors of the Murrindindi Fire who appeared as lay witnesses at the Royal Commission.

1

In comparison with the Taskforce interview data set, there were fewer RC lay witnesses who were not at home on 7 February (presumably, the RC was more interested in accounts of people who were present in their communities on the day). Of the 15 lay witnesses who were present on the day, one-third left without defending, while two-thirds attempted to defend their homes. In the Taskforce data set, half of the interviewees left their homes without defending, and half attempted to defend. Of the RC lay witnesses who left without defending, 25% experienced some danger while evacuating (Taskforce data set: 24%). Of the RC lay witnesses who attempted to defend their homes, 60% did so successfully (Taskforce data set: 66%); 25% of RC lay witnesses reported seeking last resort shelter (Taskforce data set: 14%). Overall, the actions and outcomes of the two groups of survivors were broadly similar.

Intended Actions

Figure 38 below sets out the intentions and actions of the 15 RC lay witnesses. Generally speaking, the distribution of intended actions was similar across the two data sets, with approximately twice as many households planning to ‘stay and defend’.

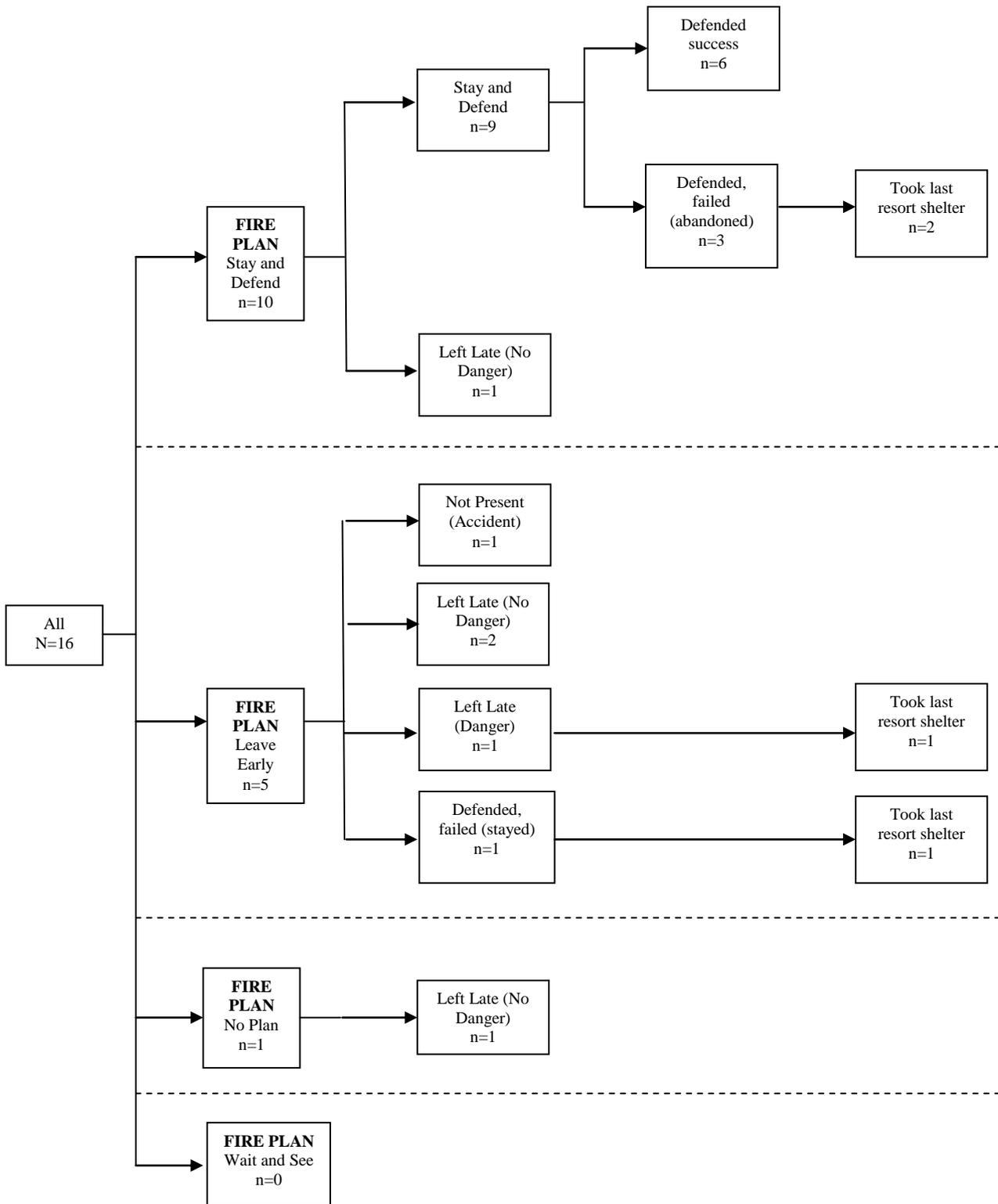


Figure 38: Path diagram of outcomes on Feb 7th as a function of intended actions for the Royal Commission lay witness testimonies (Murrindindi)

One (6%) RC lay witness reported having no fire plan, five (10%) taskforce interview respondents reported having no fire plan.

The RC Lay Witnesses: Gender and Age

Table 2 summarises the information about the RC lay witnesses in each of the outcome groups.

Table 2: Gender and Age of RC Lay Witnesses, by Actions and Outcomes

<i>Outcome group</i>	<i>Males</i>			<i>Females</i>		
	<i>n</i>	<i>%</i>	<i>Mean Age</i>	<i>n</i>	<i>%</i>	<i>Mean Age</i>
Defended Successfully	5	83	57	1	17	59
Defended - Unsuccessful	4	100	50	0	0	--
Left – No Danger	2	50	45	2	50	64
Left – Danger	1	100	40	0	0	--
Not present – Decision	0	0	--	0	0	--
Not present – ‘Accident’	0	0	--	1	100	59

The pattern of decisions and actions taken by the 12 male and 4 female RC lay witnesses resembled those of the Taskforce interviewees (Table 1) to the extent that 90% of those who attempted to defend were male. However, of the four RC lay witnesses who left safely half were male (Table 1: 35%). Overall, the lay witnesses were somewhat younger than the Taskforce interviewees.

Survivor Threat Scale Ratings

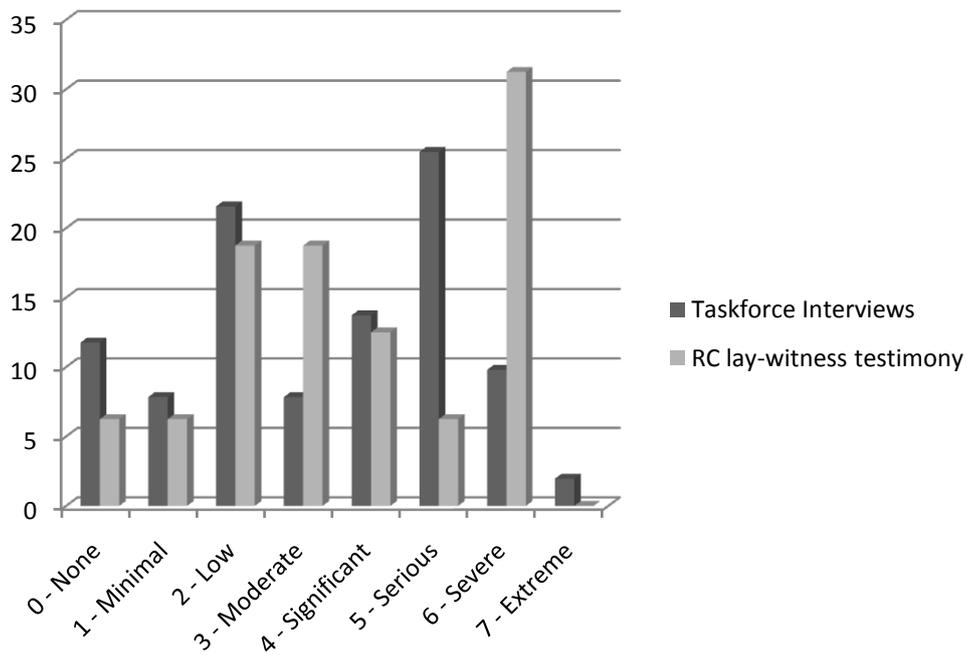


Figure 39: Percentage Distribution of Survivor Threat Rating Scale (STRS) scores for the Bushfire Taskforce interviewees and Royal Commission lay-witness testimony

It can be seen from Figure 39 that relatively more of the RC lay witnesses (31%) experienced “Severe” threat compared with the Taskforce interviewees (9%), while 25% of the Taskforce interviewees experienced “Serious” threat (RC lay witnesses: 6%). It is likely that the RC was particularly interested in hearing from survivors who were exposed to severe danger during the fire.

Long term preparation

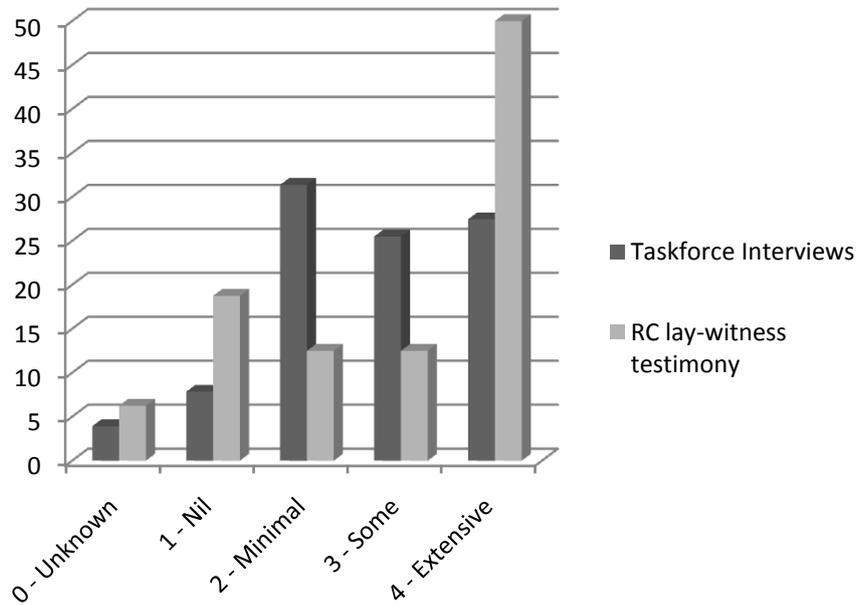


Figure 40: Distribution of Long-term preparation scores for the Bushfire Taskforce interviewees and Royal Commission lay-witness testimony

Compared with the Taskforce interviewees, the RC lay witness accounts reported somewhat greater proportions of both **extensive** long term preparation (50% versus 27%) and **no** long term preparation (19% versus 8%), thus presenting more of an “all or none” approach to long term bushfire preparation. In contrast, the Taskforce interviewees describe a somewhat more even spread of levels of long-term preparation.

Readiness on the day

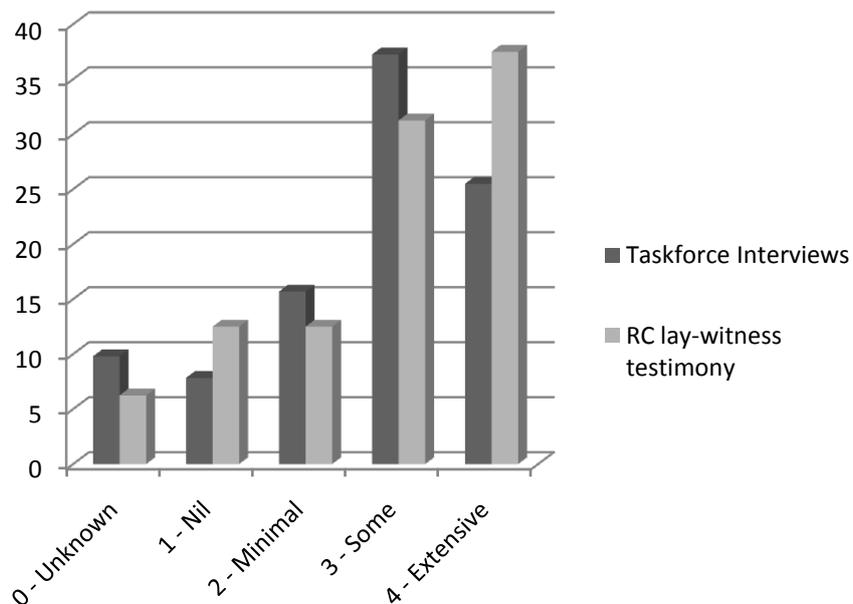


Figure 41: Distribution of Readiness on the day scores for the Bushfire Taskforce interviewees and Royal Commission lay-witness testimony

Unlike long term preparation, the distributions of ratings of readiness on the day were reasonably similar for the two groups. For both, approximately 25% undertook ‘minimal’ or ‘no’ preparations on the day.

Knowledge of fire

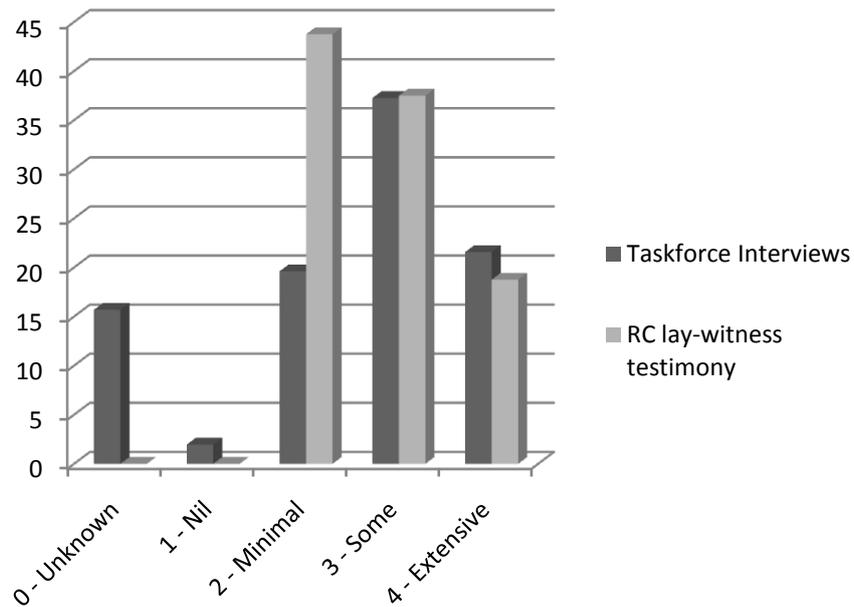


Figure42: Distribution of knowledge of fire scores for the Bushfire Taskforce interviewees and Royal Commission lay-witness testimony

The distribution of results for knowledge of fire was somewhat similar across data sets. In both, it was most common for interviewees/witnesses to have ‘minimal’ or ‘some’ knowledge of fire. In both data sets approximately 1 in 5 (20%) had extensive knowledge of fire (i.e. had training or experience, or had undertaken extensive reading about fire).

Awareness of fire danger weather:

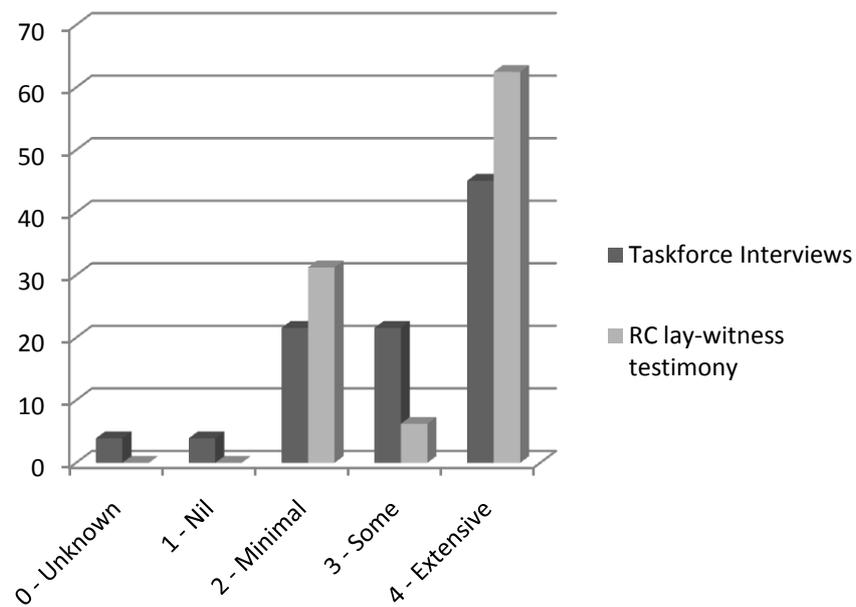


Figure 43: Distribution of Awareness of fire danger weather scores for the Bushfire Taskforce interviewees and Royal Commission lay-witness testimony

The distribution of results for awareness of fire danger weather are broadly similar across data sets. However, again we see the RC lay-witnesses tending towards the extremes. There were very few people in both data sets who reported no awareness of the potential for serious fires on the day of 7 February 2009.

Expected official warning?

The findings across both data sets were similar: about half those in each group expected to receive an official warning of an approaching fire.

Awareness of approaching fire

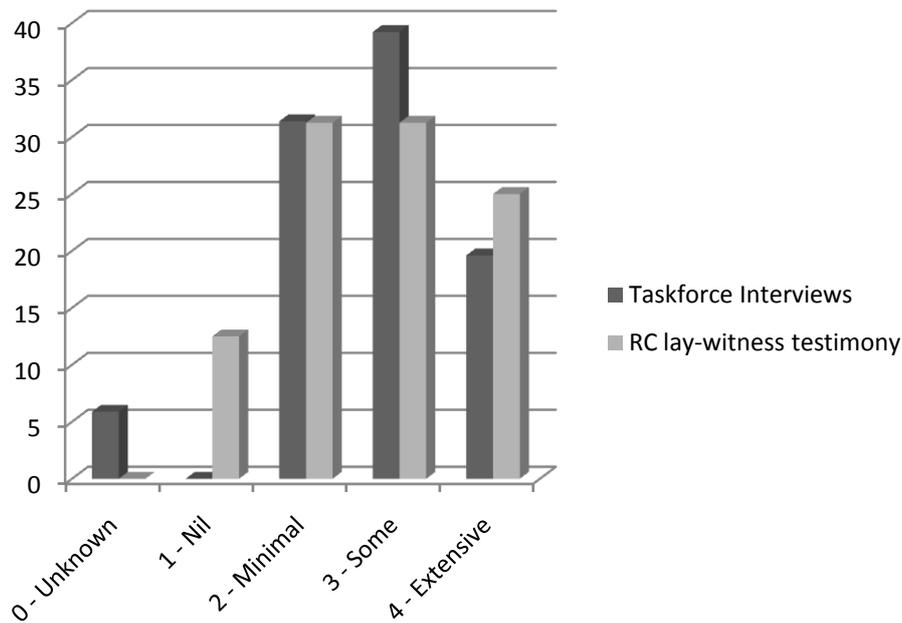


Figure 44: Distribution of Awareness of approaching fire scores for the Bushfire Taskforce interviewees and Royal Commission lay-witness testimony

As can be seen in Figure 44, the distribution of ratings of awareness of the approaching fire were somewhat similar across the two data sets, although 12% of the RC lay witnesses reported having no awareness of the approaching fire.

Outcomes: Defended Successfully

A total of six lay witnesses presented evidence to the Royal Commission about their successful home defence in the Murrindindi fire complex.

Mostly, both RC lay witnesses and Taskforce interviewees who defended successfully had planned to stay and defend (the one exception being a Taskforce interviewee who had no fire plan but defended successfully). All six RC witnesses had training or bushfire experience. Conversely, only four of the 14 bushfire taskforce interviewees who defended successfully had bushfire experience or training. The RC lay witnesses and the Taskforce interviewees reported similar levels of long-term preparation; readiness on the day; awareness of the fire weather danger for the day; and knowledge of the approaching fire on the day

All six of the RC lay witnesses reported a high level of commitment to defending. Two out of the six spoke about environmental cues, such as observing the smoke column, being a definitive trigger for engaging their fire plan. Two lay witnesses reported having back up plans if their house defence was unsuccessful. One of these plans involved sheltering in a culvert, and the other lay witness had mapped out an escape route to some cleared ground.

The ability to down-regulate fear, anxiety or stress, to maintain attentional focus, and actions being linked to survival were reported by four of the six RC lay witnesses. Both outcome and personal efficacy were reported to be important factors in four of the six lay witness accounts. The importance of social support and/or assistance was reported by four of the six lay witnesses.

Outcome: Attempted to Defend, Failed

Four of the sixteen RC lay witnesses presented evidence to the Royal Commission about an unsuccessful attempt at home defence. Of the four, three had planned to stay and defend, the other had intended to leave early. While the numbers involved for both groups—RC lay witnesses and taskforce interviewees—are small (four and seven), they appeared to be similar in levels of long-term preparation; preparation on the day; awareness of fire danger weather; and awareness of the approaching fire. The average Bushfire Threat Level for both groups was “Severe” (6.0)—attempting to defend and failing seems to be a very hazardous circumstance.

Similar to the accounts given by Taskforce interviewees, all four RC lay witnesses cited at least one of: (a) lack of water,(b) equipment failure, or (c) building vulnerability as a key issue in the failure of their home defence.

Outcome: Left Late– No danger

Four of the sixteen RC lay witnesses presented evidence to the Royal Commission about leaving late without experiencing any significant danger. Two had planned to leave early, one had planned to stay and defend the property, while the other witness had no fire plan. Two of the four lay witnesses talked about specific triggers for leaving when they did: one described leaving following the advice of neighbours; the other cited the noise of the fire as the trigger to leave. [Only one RC lay witness described leaving late and experiencing significant danger].

Overall

Comparisons of the data from the 51 Taskforce interviews with those from the 15 RC lay witness accounts generally suggest that the experiences of both groups were similar. This indicates the potential usefulness of the complete RC lay witness data set as a basis for comparison with the findings from the Taskforce interviews.

Section III: Bushfires Royal Commission: Deaths on 7 February 2009 Resulting From the Murrindindi Fire

The Bushfires Royal Commission heard evidence concerning fatalities resulting from the Murrindindi Fire on six hearing days: 4, 5, 6 November; 30 November; and 1 and 2 December, 2009. Evidence was presented about 40 fatalities, 38 of which occurred on 7 February 2009. The other two fatalities occurred later: One was an 80 year old woman who died on 11 February 2009 of a heart attack believed to have been caused, at least in part, by the stress of being evacuated from a Marysville nursing home on 7 February. The other was an ACT Rural Fire Service volunteer who was killed by a falling tree on 17 February while engaged in firefighting operations. These latter two fatalities have not been considered here.

The relevant transcripts from the Bushfires Royal Commission were examined, together with information from the Victorian Bushfires Royal Commission's Final Report (2010), and the results have been summarised in Table 3 below. Of the 38 deaths on 7 February 2009 during the Murrindindi Fire, 30 (79%) occurred in or beside a house or other structure; 7 (18%) occurred in or near a vehicle; one (3%) occurred in the open. The number of deaths at each location varied from one to three. Seven (18%) of those who died were aged 70 years or more; three were aged 15 years or less; one was wheelchair-bound. One had a psychiatric disability. One was socially reclusive. Fourteen bodies were found in small confined spaces: bathrooms, toilet, cool room.

Of the 28 deaths associated with houses or other structures, 15 (54%) did not, apparently, intend to defend the house. Most intended to leave but were unable to do so by the speed of advance of the fire, in combination with the absence of information/warnings about the location, direction, and severity of the fire. The intentions of four of the deceased are unknown. There is evidence that 11 (29%) of those who perished intended to defend their house. Of these, one was elderly and had an injured back; one was aged 15 years; while five had made only limited preparations for active defence. Using strict criteria of (a) independent water supply and pump; and (b) roof sprinklers with copper piping, only one of the 16 houses where people died could be regarded as well prepared for defence against a severe bushfire.

There are indications that stress/anxiety may have played a role, possibly through impaired judgement and decision making, in four of the deaths associated with houses (see right-hand column of Table 3). Other psychological factors identified which possibly contributed to deaths were: passive acceptance of risk (both elderly males); false beliefs about the bushfire threat; false beliefs about bushfire survival, and social reclusiveness. On the basis of hindsight, unwarranted outcome- and/or self-efficacy about preparation and defence against the fire may have played a role in five of the fatalities.

Of the seven deaths associated with vehicles, six were tourists. Evidence presented to the Royal Commission suggested that they were unaware of, or indifferent to, the fire weather danger and unfamiliar with the area. The seventh was an elderly resident who appears to have delayed unduly before attempting to leave—presumably, in part, because of a lack of information about the approaching fire. The person whose body was found in the open lived alone and apparently did not have strong social ties with neighbours.

In Table 3, under **Active Defence?** “No indications” means that fire investigators were unable to find any evidence of active defence. However, it may be that the fire simply destroyed any such evidence.

Table 3: Murrindindi Fire Fatalities On 7 February 2009**1. Associated With Houses or Other Structures**

Victims	Preparation	Active Defense?	Circumstances	Psychological Factors?
M (85); F (80), M (53)- disabled, (pp. 10620-10641).	Minimal.	No indications	Attempted to leave in car, egress blocked by fallen tree. Sheltered passively in house. Bodies in ruins. May have survived if had sheltered in the car.	No information.
M (80), (pp. 10723-10734)	Nil	No indications	Refused to leave with wife. Sat in chair on verandah. Body in driveway, near vehicle, dead dog chained to vehicle.	"I built this house, mate and I'm staying". (p. 10733) [Passive acceptance of risk].
F (37), (pp. 10734-10748)	Nil	No indications	Did not answer door, nor respond to name being called. Remains found in bath.	Evidence from GP: "...Melissa suffered from an anxiety disorder...it may have been a contributing factor to her unfortunate death...(the) anxiety disorder would have been heightened significantly and may affected her normal thought processes". (p. 10741) [anxiety/stress]
F (44); M (14); M (13) (pp. 10775-10798)	Nil	No indications	Intended to leave. Were endeavouring to leave in a vehicle at the last moment as the fire impacted. Bodies found in outdoor spa.	No information.
M (55); F (70) (pp. 12326-12347)	Limited, water containers	No indications	Intended to leave if a fire threatened. F in poor health. Bodies in bathroom.	No information.
M (64) (pp. 12466-12483)	Nil	No indications	Had no fire plan. Phoned partner for advice. On the advice, sheltered passively. Body found in bath.	"He said, 'There seems to be a bushfire...it is very dark and smoky. What should I do?' I said '...get down to the oval, and if you don't think you've got time, go into the bathroom, fill the bath with water and get into the bath and take the dog with you". (p. 12469) [False beliefs about bushfire survival]
F (63) (pp. 12522-12543)	N/A	N/A	Probably unaware of fire danger--was left behind when all the other staff were evacuated by bus from the Mountain Lodge drug rehabilitation centre.	No information.
M (68); F (66); F (73) (pp. 12483-12521)	N/A	N/A	Left house, intended to shelter at the Cumberland Hotel. Bodies found in upstairs toilet. Carbon monoxide a likely contributing cause of death.	Daughter of F (73) about a phone call: "Although I felt she was scared, she was still thinking rationally and I was reassured by this". (p. 12514)

(M (36); F (28) (pp. 10706-10722)	Nil	No indications	Intentions not known. M dead in bathroom. F body On road 460m from house. F was 8.5 months pregnant.	"I only spoke to her for less than a minute. Nicole was panicked...she said "I have to go. I have to go. I have to go and save my house". (p. 10716) [anxiety/stress]
M (35); M (49) (pp. 12386-12410)	Uncertain: roof sprinklers, pump, creek water. However, equipment not connected.	No indications	Intentions not known. Bodies found in cool room	"I rang Geoff back...He was panicking, talking in a high-pitched voice and very fast. It was hard to understand what he was saying". (p. 12403) [anxiety/stress]
M (83) (pp. 10685-10706)	Limited. Drums of water, hoses	No indications	Widower. Intended to defend, body in bedroom en suite	".A few days before...Dad took a fall and injured his lower back restricting his mobility". (p. 10694) "They will have to prise me out of here". (p. 10690) "I'm going down with the ship". (p. 10690) [passive acceptance of risk]
M (52) (pp. 12455-12464)	Limited: hose, bucket, mop, water in sinks.	Not reported	Intended to defend. Body in ruins. Few details	"Appeared unaware of the ferocity of the fire". (p. 12462) "Kevin said something like ' I don't know what you are worried about...". "When Kevin left, Sue said to me' He laughed at us". (p. 12461) [false beliefs about bushfire threat]
F (44); M (15) (pp. 10751-10775)	Limited, drums of water and a hose.	No indications	Intended to defend. Fuel around house. Bodies in bathroom.	"I rang the Fiske's on my mobile...I sensed that Dalton was very nervous...and I tried to reassure him...was very nervous on the phone". (pp.10770) [anxiety/stress]
M (63) (pp. 12369-12385)	Some: water in containers; towels; clothing; water in roof gutters.	No indications	Intended to defend. Body in kitchen.	"Ken was completely calm and matter of fact about it all" (p. 12378)
M (62); F (69) (pp. 12412-12432)	Some: water tanks; hoses; sprinklers, plastic pipes; NO pump.	Not reported	Intended to defend. Prepared Bodies in en-suite	"I arrived about 3.30...Marlene was very cool, calm, and collected. The situation, as it was then, did not seem to faze her at all". (pp.12427)
M (62)& F (60) (2009 VBRC 2010, pp. 314-315)	Extensive: sprinkler system; copper pipes; pump; plastic tanks.	Not reported	Intended to defend. Well prepared. Bodies in ruins. Driveway blocked by fallen tree.	"I rang..She answered the phone and sounded stressed. She ...cut me off and said 'I can't talk, the fire's coming up the hill. ...all the sprinklers (are) on". (p. 10655) ['normal' anxiety/stress under the circumstances]

M (44) & F (39) (2009 VBRC, 2010, p. 317)	Limited: filled bath and wheelie bins, but relied on town power and water.	Not reported	Intended to defend. M body 6m from ruin. F body in bathroom	“Kirstie wasn’t that enthusiastic...but there was no way she would leave Isak there alone. (p. 317) [‘normal’ anxiety/stress under the circumstances]
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Associated with Vehicles

Victims

Circumstances

M (26); M (28)
(pp. 10657-10666)

Asian students studying in Melbourne. Visiting the area. Had been swimming. Apparently were attempting to escape the fire in their vehicle. Bodies found in the vehicle. Area heavily treed. Low visibility (smoke) may have contributed. There was a cleared area some 200m further along the road.

M (40); F (40)
(pp. 10666-10683)

Tourists booked to stay at the Crossways Inn. Drove to go for a swim in a river. Bodies: F 28m north of burned out car; M 115m north of car. Apparently trying to make their way on foot to a cleared area. Phone call from mobile at 8.45 pm: “...I ascertained that Julie was with her friend James, that they were in Julie’s car and that they were surrounded by fire” (p. 10677). Fire Investigator: “It may have been a better option for the deceased to take cover inside the car and to exit the car once the fire front had passed” (p. 10682).

F (81)
(pp. 10799-10810)

Burned out vehicle found on wrong side of the road, with driver’s side door against an embankment. Body in driver’s seat. Daughter: “Mum’s fire plan was that she was always going to leave the house in case of fire...” (p. 10804). “When I called mum at that stage (4.36 pm) she was still pretty calm. She never really panicked anyway” (p. 10806). “I last spoke to mum about quarter to 7. She wasn’t leaving yet, but she had everything ready to do when it was time to leave”. (p. 10807).

M (51); F (51)
(pp. 12347-12368)

Tourists intending to go camping near a river. Bodies in the front of the burned out vehicle. Car had done a U-turn because the road was blocked by fallen trees. The car had struck a large tree branch on the road.

Other

Victims

Circumstances

F (66)
(pp. 12449-12455)

Body found on the verge of the Maroondah Highway, Narbethong, some 500 m from the home of the deceased. “I spoke to the lady there. ...I said ‘there is a fire coming...’and she replied ‘Yes, I’ll be OK. She then shut the door. I knew the lady there to be fairly reclusive (pp12452-12453). “At this time Grace appeared at the driver door of my ute and she said ‘What should I do?’ I said ‘Go to Pete’s its defendable” (p.12453). “I came across someone in the middle of the road...She came to the driver door I said “get in, if you want to..she then went to the passenger door but I could not get it open....She was fairly hysterical by then ...I then got out of the ute to go and get her. The visibility was terrible. I looked for her...but could not find her. She must have walked away from the ute” (p. 12454). [social reclusiveness]

General Discussion

Note that there are two previously published reports which analysed experiences of those who survived the Murrindindi Fire. The first is the general survey of human behaviour and community safety associated with the 7 February 2009 fires reported by Whittaker et al. (2009). The second is the integrated study report on Marysville by Tibbits (2009). While some overlap is inevitable, the following discussion is intended to add to these accounts, not to simply repeat what has been reported previously. The discussion is based mostly on the analyses of the transcripts of the Taskforce interviews, but was supplemented where appropriate by incorporating information from RC lay witness accounts, and from evidence to the RC concerning the Murrindindi Fire fatalities.

The conclusions must be regarded as tentative, since they are based on data from:

- one (13%) of eight major fires.
- 51 (9%) of approximately 600 Taskforce interview transcripts.
- 16 (16%) of approximately 100 RC lay-witness statements.
- 38 (22%) of 171 fatalities.

Planning and preparation

The evidence indicates wide differences among residents in their amount of planning and preparation. Householders living on farming properties around Narbethong and Buxton described much greater planning and preparation for bushfires. Among residents of the Marysville township, level of preparation was generally low. Most residents apparently intended to defend their property if a fire came. However, their anticipated level of risk was low. Few residents believed that the township would be seriously threatened since it had never come under attack in the past. For most, it seems that, to the extent they thought about defending their homes against bushfire, the kind of fire anticipated would involve small flames, and moderate ember attack, and would be able to be managed with basic household equipment: hoses running off the town water supply, buckets and mops. Preparation mostly involved keeping fuel loads low around the house and making sure roof gutters were clean.

A few residents, however, were well-prepared; but they were the exceptions. Most of these had taken advantage of information provided by CFA. Several had attended CFA community meetings. Some had firefighting experience. Most of those residents who did, in fact, stay and endeavour to defend their home were well prepared, although some were reliant on town water and mains power.

At a *community* (as distinct from individual household) level, there was little evidence of planning or preparation. The main indication of this lack was the widespread uncertainty and confusion among Marysville residents about the location of possible assembly points for evacuation, and places of shelter in case of bushfire. Three different locations were spoken of: the Cumberland Hotel; Gallipoli Park; and the Marysville District Golf and Bowls Club. Many residents seeking information or refuge went initially to the Cumberland Hotel, only to find it deserted. The Hotel was subsequently destroyed. Three elderly people who went there to shelter perished. However, the local SES had prepared a list of vulnerable residents (frail elderly, disabled) and all these were evacuated safely to Alexandra before the fire struck.

As indicated previously, Marysville was a tourism centre. On the day of the fire, there were many tourists present in and around the town (day visitors, campers, and guests in accommodation) despite the extreme fire weather danger predictions and warnings broadcast over the preceding five days. Six tourists died in or near three vehicles on roads around Marysville. Taskforce interviewees who owned/managed accommodation of various types described their difficulties in finding out information about the fire in order to inform and advise their guests. Fortunately, all guests either left early on the day, or were evacuated safely.

Awareness of fire danger

There was a high level of awareness of the fact that extreme fire danger weather had been forecast for Saturday, 7 February. Those five participants living on farming properties personalised and acted upon this, and most were alert for warnings and signs of a fire and were in a state of readiness to defend if a fire threatened. Few residents of Marysville personalised the warnings and took survival-enhancing actions. This was partly because of the widespread belief that the town was unlikely ever to be threatened, and partly because in the early part of the day the temperature was not extreme and the winds were moderate.

The outbreak of a fire at Murrindindi was reported on ABC Radio 774 and the local radio station UGFM. However, there was no mention of Marysville being threatened until after the fire had struck. As indicated earlier, mains power was lost at about 1715, so at that time residents lost internet, radio, and fixed-line telephone communication. Few residents had prepared for such an eventuality by having a battery-powered portable radio.

There was a high level of awareness that there was a fire somewhere. Smoke was plainly visible in the late afternoon. However, many residents thought that this was from the Bunyip or Kilmore fires, news of which had been broadcast earlier on the radio and listed on the CFA and DSE web sites. The picture which emerges is one of gradual increase in general awareness of threat and level of concern, coupled with uncertainty, confusion, and indecision. Among Marysville residents, there was considerable communication via telephone (until power was lost) and mobile phone involving family members, friends and neighbours. Information and advice from neighbours who were involved with CFA, SES, or DSE was given high credence, and was acted upon by many. For some, this information from 'experts' was the trigger to leave.

It seems that local police, CFA, and SES personnel did become aware, via radio and mobile phone communication, of the developing threat: particularly the fact that fire had impacted on Narbethong to the south west. This realisation prompted the evacuation of some residents by police from Gallipoli Park at 1645, and the word-of-mouth advice to some other residents to leave. However, many residents did not know about this escalating level of threat.

For many residents, the physical evidence of a rapidly approaching fire (smoke, flames, embers) was the trigger to actually leave or to begin last-minute preparation for defence. Probably the key factor associated with avoidable loss of life on the day in and around Marysville was the absence of specific information about the location and severity of the fire in the hour preceding the impact of the main fire front. In the absence of this information, the experiences of most people were dominated by uncertainty and confusion, and this undermined survival-related decision making and decisive action.

Those who stayed and defended.

Most of those interviewed who stayed and defended were men (71%). For most (but not all), it seems that the main factor in choosing to stay and defend on the day was an earlier decision to commit to this course of action as their bushfire plan. Following from this had come long-term preparation, presumably at some cost, both *financial* (tanks, piping, pump, gutter guards, etc), and *personal* in the form of physical effort and foregone recreational/social/business opportunities. This seems to have been associated with acquisition of knowledge about fire behaviour and fire safety. On the day, there were last-minute preparations, and a high level of awareness of risk and alertness. It is likely that all these factors fostered a high level of outcome efficacy (a belief that the measures would be effective) and personal efficacy (a belief that the measures could be implemented). It should be noted, however, that three of the 21 Taskforce interviewees who attempted to defend had not planned to do so: all three were taken unawares by the speed of the fire and decided that it would be unsafe to leave and so were ‘forced’ to stay and defend—two were not successful.

All but one (of the 21) described having to (a) control their fear/anxiety/stress at some point during the defence; and (b) effortfully maintain their focus of attention on immediate threats from the environment and continuing with survival-related actions, in the face of competing distractions.

Many described the positive contribution made by other people present who supported their defence and survival efforts.

Most of those who attempted to defend (successfully or unsuccessfully) described failures of equipment: pumps stopping, water tanks and pipes melting, hoses burning. About one-third described being hampered by lack of water. About one-third described being hampered by fatigue, stress, or injury.

A little less than one-third reported a specific “trigger event” initiating a crucial decision to take an action: mostly the sudden emergence of a serious threat.

Those whose efforts were successful—as distinct from those whose efforts failed—were more likely to comment on some aspect of the structure or surrounds which enhanced building survivability. They were also more likely to comment positively on the motivating effects of feeling responsible for the wellbeing of others—on the property, or elsewhere.

All but one of those whose efforts were not successful spoke of the destructive impact on their survival-related endeavours of their *expectations* about fire behaviour, or equipment performance, or building safety being dramatically **dis**-confirmed (‘collapse of sensemaking’). All but one blamed lack of time to make last-minute preparations as contributing to the loss of their home. All but one blamed a specific vulnerable feature of their home as contributing to its loss. Four of the seven blamed a lack of information about the fire as contributing to the loss of the house. The likely role of hindsight bias effects should be kept in mind.

Overall, there was no evidence that amount of preparation was linked to whether or not a building was defended successfully or was destroyed. Most houses had at least one, often unsuspected, point of vulnerability (in siting, design, construction, landscaping, maintenance,

or combinations). Under the conditions of the day--lack of warning, strong wind, intense ember attack--the fire 'exploited' these vulnerabilities. If the occupant(s) could extinguish fires beginning at these points of vulnerability the building was saved; if not, it was lost. In many instances, at least one important component of a defence system failed: petrol driven pumps stopped because of fuel vaporization; pump or engine fittings melted or burned; plastic piping and tanks melted; hoses burned. In some instances, the ultimate 'decider' was the presence or absence of immediately usable water at a critical time during the attack. Unpalatable though it may be, the data suggest that the success or otherwise of attempts to defend a house in Marysville and environs under the severe fire conditions of 7 February 2009 was determined to some extent by random chance factors. If so, this strengthens the case for householders intending to defend to have an alternative plan for survival if their house is lost.

There was a link between the number of defenders and likelihood of success, provided that all the defenders were physically and psychologically capable of the required efforts. The presence of very dependent persons was a liability. It is likely that this is because of: (a) diversion of a defender's attentional resources away from the task of protecting the property to monitoring the safety of the dependent person(s); (b) diversion of time and effort away from protecting the property; and, (c) reduced effectiveness of judgement and decision making as a consequence of increased psychological stress because of anxiety about the safety of the dependent person(s).

Those who left as the fire approached

In contrast to those interviewed who stayed and defended, the majority of those who left safely were women (65%). Compared with those who stayed to defend, fewer of those who left (47%) were influenced by prior commitment to a plan to do so. Leaving was more likely to be associated with not having a firm plan, or on the day adopting a 'wait and see' approach. For many, a feeling of responsibility for dependent children or other family members was a major factor in the decision to actually leave, rather than to continue in a state of indecision. For most, the decision to leave resulted from a specific trigger event: the sight of flames, smoke, or embers; or information or advice about danger posed by the fire. Two thirds of those who left safely attributed the decision, in large part, to advice or information from family members or trusted neighbours. Telephone conversations with family members played a major role for many in the decision to leave.

For half of those who left at the last minute, and a quarter of those who left in safety, the trigger involved resulted in a dramatic disconfirmation of their expectations about the level of threat posed by the fire: smoke, flames, embers, wind. For half of those who left at the last minute, and a quarter of those who left safely, the apparent imminent threat posed by the fire, associated with the absence of information and warnings, precipitated a decision to leave immediately rather than carry out any property protection or attempt to save possessions. About one third reported that lack of information about the fire jeopardised their safety. About one third described having to think carefully about how they left: initial direction, destination, and route to safety. Many of those who left at the last minute were assisted to do so by neighbours. About one-third of those who left safely described having to (a) control feelings of anxiety; and (b) concentrate on their driving in spite of distractions so as to remain vigilant and avoid obstacles.

Conclusions

There were two aims: First to investigate community members' plans, decisions and actions in relation to the Murrindindi Fire. Second, to develop data analysis procedures to apply subsequently to: (i) the complete data set of 608 Taskforce interview transcripts; (ii) the complete data set of approximately 100 Royal Commission lay witness statements; (iii) the evidence presented to the Royal Commission concerning the 173 fatalities resulting from the 7 February 2009 Victorian bushfires. Sections I, II, and III described the findings from the analyses of the three data sets. A list of 10 suggested lessons about community members' bushfire safety-related decision making derived from the analyses follows. In relation to the second aim, the procedures developed appear to be suitable to apply to the three data sets.

Ten important lessons about community members' decision making and actions in the face of imminent bushfire threat:

1. Lack of accurate, timely, specific, and personally-relevant information about the fire threat undermines sound survival-related decision making. Uncertainty is a major threat to survival.
2. Communities influence decision making by individual members via shared, normative, beliefs about bushfire risk. If a majority of community members believe that their community is not at risk, most individuals will be psychologically unready to make sound survival-related decisions under imminent bushfire threat.
3. Advice and information from particular 'others' will be a major determinant of an individual's decision making—the more so under conditions of uncertainty. Information and advice from close family members, and from people perceived to have bushfire-related expertise (firefighter, SES, police) will be extremely influential.
4. What others are observed to be doing is an important determinant of an individual's decision making. People are social beings and take their cues about what to do by noting what others are doing in a given situation—especially a situation characterised by uncertainty.
5. Under imminent bushfire threat decision making and action is gendered. Men are more likely to stay and defend their property; women are more likely to leave—especially if they have strong feelings of responsibility for the physical **or** psychological wellbeing of other family members.
6. Commitment to a bushfire plan may be a path to disaster—especially a plan to stay and defend. Better that any plan is conditional upon specific conditions being met before being implemented, and has fall-back options.
7. The legendary 'Murphy' was an optimist with regards to bushfires. All involved should be warned to expect and be ready for something really important going seriously wrong at the worst possible time with potentially fatal consequences. Thorough rehearsal and practice of intended actions may offer some protection.

8. Some individuals should not be in a situation where they are at risk of bushfire attack: people under 18, those aged 70 or more, those with disabilities or other impairments—physical, social, psychological.

9. In *extremis*, an individual's ability to: (a) down-regulate negative emotions like fear and anxiety; (b) maintain an attentional focus on emerging threats from the environment; and (c) keep actions coupled tightly to surviving in a potentially lethal environment will largely determine survival.

10. For a variety of complex reasons, some individuals will choose to act in ways that jeopardise their safety, and the safety of others.

End Note

1. Personal Communication: T. Hayes (CFA Executive Manager, Fire Planning Systems) – See McLennan (2010), page 4.

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APPENDICES

Appendix A: **Bushfires Research Taskforce Human Behaviour and Community Safety Interviewer Guidelines**

Note: these are a guide only. The participant is likely to answer many of the questions without being prompted.

Before the interview

- Introduce self
- Introduce research
- Provide ethics statement
- Stress independence from agencies and government
- Explain purpose
- Confidentiality
- Contact details
- Further research
- Obtain consent
- If consent is obtained, proceed with the interview

Interview questions and prompts

Starting question

- Tell me what happened to you during the fire

During the discussion prompt for:

Preparation

- How did you prepare? (timeframe)
- How well-prepared did you feel?
- Did you have a plan? Had you made a decision to stay or leave?

Information and warnings

- When and how did you first become aware about the fire?
- When did you realise your fire would impact your property?
- Did you receive a warning? Where from? When? How long before the fire? (formal and informal)

Response

- What did you do (Stay, protect property, shelter in place, wait and see, leave early, leave late)? Why?
- What did other household members do? Why?
- Who was there? What were they doing?
- Did you get any help? Did you help anyone? Did you see anyone else?
- What did you do after the fire front passed (e.g. stay, return)

Leaving

- When did you leave?
- Do you think you left early enough?
- What was your trigger for leaving?

- Where did you go?
- How did you get there?
- When did you return?

Future

- Is there anything you would do differently?
- What could help the wider community respond to bushfires?

Thank participant.

Appendix B: **Human Behaviour Project – nVivo Memo Template**

1. a. Coder Initials: _____ b. Interview Code #: _____ c. Date Coded: _____

d. Length of Interview: _____

2. Interview (address): _____

3. Fire Complex: Bunyip, Churchill, Kilmore East, Bendigo
Horsham Beechworth, Murrindindi, N. Warren (Lynbrook)

4. Household composition on the Day: _____

5. Interviewee (1): Role: _____ (2): Role: _____

Gender: _____ Gender: _____
Age: _____yrs Age: _____yrs

6. Status on Feb 7th: **CFA/DSE/SES/Parks/Other - On Operational Duty on Day**

stayed) abandoned)	<u>Not at home:</u>	Not present (decision)	
		Not present (accident)	
	<u>At Home:</u>	<u>Left:</u>	<u>Stayed:</u>
		Left early	Defended (success)
	Left late (no danger)	Defended (failed,	
	Left late (danger)	Defended (failed,	
	Took last resort shelter around home	Shelter passively	

7. Notes: _____

8. Plan/Intended Action: Leave Early Stay and Defend Wait and See No Plan
 Unclear Different (h/w)

9. Training/Experience: Yes No Unclear

10. Insurance?: Yes No Under Unclear

11. Survivor Threat Rating Scale (see overleaf) (1-7): _____

12. Interview Quality: Bad Standard Excellent

Appendix C: Human Behaviour Project - Coding Sheet # 2

A. Preparation long term

0. ? or N/A	1. Nil	2. Minimal (tidied up), or (formed intent to leave)	3. Some (up to 2 of column 4) (up to 2 of column 4)	4. Extensive (a) alt. water source, (b) building maintenance, (c) alt. power, (d) sprinklers, (e) clothing, (f) implements, or (a) had evacuation plan (b) packed up documents before day, (c) had thought about when to leave and where to go
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B. Readiness on the day

0. ? or N/A	1. Nil	2. Minimal (e.g. tidied up), or (thought about packing valuables)	3. Some (e.g. clean gutter), or (had a few items packed)	4. Extensive (a) test equipment, (b) fill vessels with water, (c) lay out clothing, or (a) bags packed by door (b) pets ready to go (c) readied car for leaving (d) readied other people (e) considered where to go
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C. Knowledge of fire

0. ? or N/A	1. Nil	2. Minimal (e.g. media)	3. Some (meetings)	4. Extensive (a) training, (b) practice, (c) reading
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D. Awareness of fire danger weather

0. ? or N/A	1. Nil	2. Minimal	3. Some	4. High
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E. Expected SPECIFIC (Official) warning?

0. ?	1. Yes	2. No
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F. Awareness of approaching fire

0. ? or N/A	1. Nil	2. Minimal	3. Some	4. High
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G. Decision Process Factors

Overall:

- Commitment to plan: _____
- Trigger: _____
- Expectations disconfirmed
(collapse of sensemaking)
- Time/No alternative
- Other

Potential Survival-enhancing:

- Down-regulate fear/anxiety/stress
- Maintain attentional focus
- Action-survival link
- Information/communication
- Social support/assistance
- Outcome efficacy
- Personal efficacy
- Responsibility for others
- Other

Potential Risk-amplifying:

- Panic/fear/anxiety
- Lose attentional control
- Actions not linked to survival
- Absence/defective information/communication
- Lack of social support/assistance
- Lack of outcome efficacy
- Lack of personal efficacy
(incl. Waiting for instructions)
- Dependents (elderly, children, disabled)
- Other

H. Key Issues potentially related to outcomes?

- | | |
|---------------------------|--------------------|
| a. Surprise/lack of time | f. Egress blocked |
| b. Lack of water | g. Vehicle failure |
| c. Equipment failure | h. Other |
| d. Building vulnerability | |
| e. Injury/fatigue/stress | |

I. Do anything differently next time?

? 1. Yes 2. No

Notes: _____

J. Sense of Community/bond with neighbours ? 1. Low 2. Moderate 3. High (Fireguard, history of cooperation)

K. Attachment to Place (home/natural environment) ? 1. Low 2. Moderate 3. High
("never leave")

Appendix D: **February 7 “Black Saturday”: Bushfire Threat Rating Scale**

Scale Level	Qualitative Description	Behavioural Indicators	Notes
LEVEL 7	Extreme threat to life: odds were about even for surviving vs perishing	Interviewee injured or otherwise seriously affected physically; companion(s) in the incident perished or were injured or were otherwise seriously affected physically	Injury NOT necessary if other factors indicate an extreme threat
LEVEL 6	Severe threat to life; any significant worsening of the situation might well have lead to death or serious injury	Interviewee (and companions) were not injured (or only minor) but: the house they were defending was destroyed and they had to seek shelter; or the vehicle in which they were escaping/sheltering sustained fire related damage or other impact damage.	House may have survived with severe damage
LEVEL 5	Serious threat to life: failure of a vital aspect of the defence, shelter, or escape procedure or “system” might well have lead to injury or death	The house being defended suffered some damage; the vehicle in which they were travelling had to drive through flames and/or dodge debris	Unexpected problems had to be solved— pump stopped
LEVEL 4	Significant threat to life: a sudden change in the situation might well have resulted exposure to threat of physical injury: change in wind direction, increase in ember storm intensity, surprise ignition of a fuel source as an emerging threat.	The house had to be actively defended, flames had to be extinguished; the vehicle had to be moved away from a heat source; the conditions were extremely hot while sheltering	
LEVEL 3	Moderate threat	Had to remain vigilant that the house was not impacted by fire or embers, had to shelter for up to half an hour in a vehicle from radiant heat, embers, smoke	Default for “left late, in danger”
LEVEL 2	Low threat	Saw smoke within 2 km, saw flames, observed embers falling.	Default for “left late, no danger”.
LEVEL 1	Minimal threat	Saw smoke in the distance; relocated to a safe place with no danger; was aware of fires in the general area.	Default for “left early”.
LEVEL 0	No threat	Not present on the day	

Note: Pre-existing medical/physical conditions may modify assignment of a threat level, as may psychological (as distinct from physical) impacts of the fire.