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Disaster Research For Mitigation and Preparation – The 2009 Victorian Bushfires

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Community Decision Making Under Stress

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I am grateful to Lyndsey Wright, Research Manager Bushfire Cooperative Research Centre, for her assistance in preparing in this presentation. I was a member of the Bushfires Research Taskforce and participated in data analysis and preparation of several of the reports arising. However, the views I express in this presentation are mine, and do not necessarily reflect the views of any of the agencies and organisations associated with the Taskforce.

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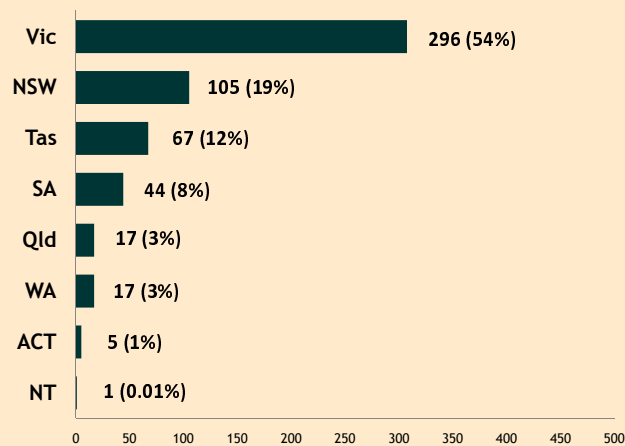


Australia's "Gang of Four" Top Natural Hazards

1. Tropical Cyclones
2. Severe Storms
3. Floods
4. Bushfires (wildfires)
---least costly in \$, most deadly in lives

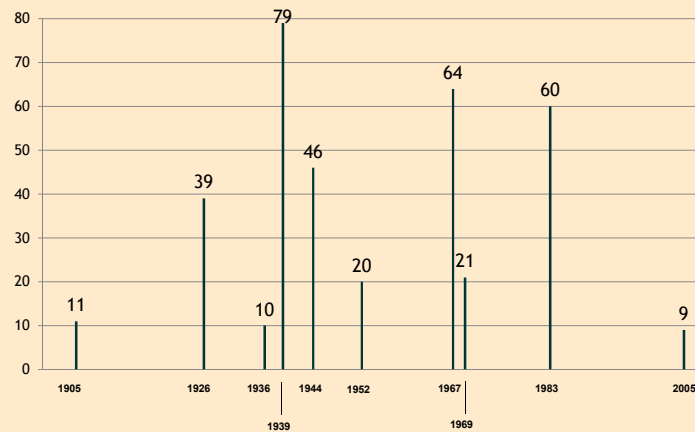


552 civilian bushfire deaths across Australia, 1900 - 2008: Most in the South-East



[Source: Haynes et al, 2008]

Civilian Deaths in Major Fires/seasons 1900-2008



10 fires/seasons accounted for $359/552 = 65\%$ of deaths

[Source: Haynes et al, 2008]



Herald Sun

Friday, February 6, 2009

'Worst ever' fire risk threatens Vic

The Victorian Premier John Brumby says tomorrow's weather forecast poses the greatest fire danger in the state's history and people should be prepared.

"Tomorrow we're going to have unbelievably high temperatures and we're also going to have unbelievably high winds," he said. We've gone through now a couple of months across the state where there's been basically no rain since mid-December. We've got a state that is just tinder dry".

Fire authorities say conditions are the driest they have been since the Ash Wednesday Bushfires in 1983.



7th February 2009: Black Saturday



Aftermath: more than 2,000 homes destroyed





Aftermath: 173 deaths



A major research response initiative

1. Saturday 7 February: Fires occur
2. Monday 9 February: Lead researchers and industry leaders meet; interstate research teams despatched
3. Thursday 11 February: First research teams go to fire-affected communities
(Murrindindi Fire still burning)



Task

Focus: The collection of time-critical data that could be destroyed through the passage of time or the impact of weather.

Three Key Research Areas:

1. Fire behaviour
2. Buildings, and land use planning
3. Human behaviour & community safety
---"integrated studies"
Initially 6, ultimately 8, fire complexes



Managing the research response

1. Crews in the field over 8 weeks - up to 50 researchers at any given time.
2. Buildings and Human Behaviour researchers combined: crew = 2 X buildings + 1 h-b. Fire behaviour teams independent.
3. ICS basis:
field: Sector Commander; Crew Leader
HQ: IC; Operations; Planning: Logistics



Task Force crews - Strathewen Sector



Issues & Constraints

1. Time pressures.
2. Legal & ethical requirements.
3. The 2009 Victorian Bushfires Royal Commission began working 16 February.
4. Agency liaison and in-kind financial and resources contributions
5. Safety - physical and psychological
6. Data management & integrity
7. Analysis and reporting



Multi-disciplinary researcher crews



Data

--A total of more 1,800 person-days generated:

1. Building features/vegetation profiles of more than 2,000 properties (survived, damaged, destroyed); together with:
2. Fire-behaviour indicators (leaf-freeze, crowning, scorching, impact damage).
3. Approximately 600 interviews with survivors, recorded digitally and transcribed.
4. More than 21,000 photographs.



Subsequently:

1. A mail survey of approximately 6,000 residences in the fire-affected communities (Dr Joshua Whittaker - RMIT).
2. An investigation of the circumstances associated with the 171 deaths caused directly by the 7 February fires (Professor John Handmer-RMIT; Dr Saffron O'Neil - University of Melbourne; Mr Damien Killalea - Tasmania Fire Service)



Research 'products' to date:

1. Interim Report - Human Behaviour & Community Safety.
2. Final Report - Fire Behaviour, Building and Land Use Planning, Human Behaviour & Community Safety, Integrated Studies of Selected Communities (Strathewen, Pine Ridge Road Kinglake West, Reserve Road Kinglake, Marysville).
3. Final Report - Household Mail Survey.
4. Final Report - Review of Fatalities.
5. Report - Use of Informal Places of Shelter and Last Resort on 7 February 2009.
6. Report - "Deep Survival" on Black Saturday.



“Big Picture Learnings” from the research endeavour

1. Fire behaviour under Black Saturday conditions is qualitatively different in many ways from that of “normal bushfires”.
2. House survivability under Black Saturday fire conditions is much more problematic than under “normal” bushfire attack—by an order of magnitude.
3. Despite major efforts by fire agencies and local governments, community bushfire safety endeavours proved to have been, at best, only modestly effective overall.



“Big Picture Learnings” ABOUT the research endeavour (from a researcher’s perspective)

1. It was hugely resource-intensive, and the effort had to be sustained over a period of 3 months. For agencies, the BCRC, AFAC, and other participating organisations, other work suffered.
2. Time pressures were such that there was little opportunity for planning and proactivity: mostly it was catch-up, patch-up, react, make-do.
3. For the human behaviour and community safety aspect, there were not enough people available with training and experience in effective interviewing in the field.



Key human behaviour and community safety learnings (1).

1. A disconnect between fire weather danger warnings and perceived need for decisions and actions.
2. A low level of understanding of the specifics of building vulnerability to severe ember attack.
3. A low-level of understanding of potential weak links in most plans to defend, need for fall-back options.
4. Uncertainty is the enemy of survival-enhancing decision making: misleading information is worse than NO information---example: the naming of fires by location of origin.
5. Households living in residential streets, are as at-risk as those in isolated dwellings.



Key human behaviour and community safety learnings (2).

6. Leaving on a day of predicted high/extreme/catastrophic fire danger weather is “costly” for many.
7. A low level of understanding of the **specifics** of the threats to life posed by a bushfire.
8. There may be superficial agreement among family members about a fire plan, but conflict can emerge under imminent bushfire threat.
9. A vehicle, under the right circumstances, saves lives.
10. Risk is neither random nor evenly spread: the elderly, disabled/impaired/ill, isolated, visitors, new arrivals and children, are more likely to die in a bushfire.



“Research Adoption” A Contrarian View!

Major risk? Collision between the adoption and how people actually think and act. The need for ‘trade-offs’.

Illustration: The strange case of the Munich taxi drivers: ‘risk homeostasis’, pushing the envelope, transfer of responsibility.

1. The “Catastrophic” level of fire risk? (Possibility: Extreme and High will be more likely to be ignored).
2. High-technology personalised warning systems? (Possibility: Many will come to rely on these and be less vigilant).