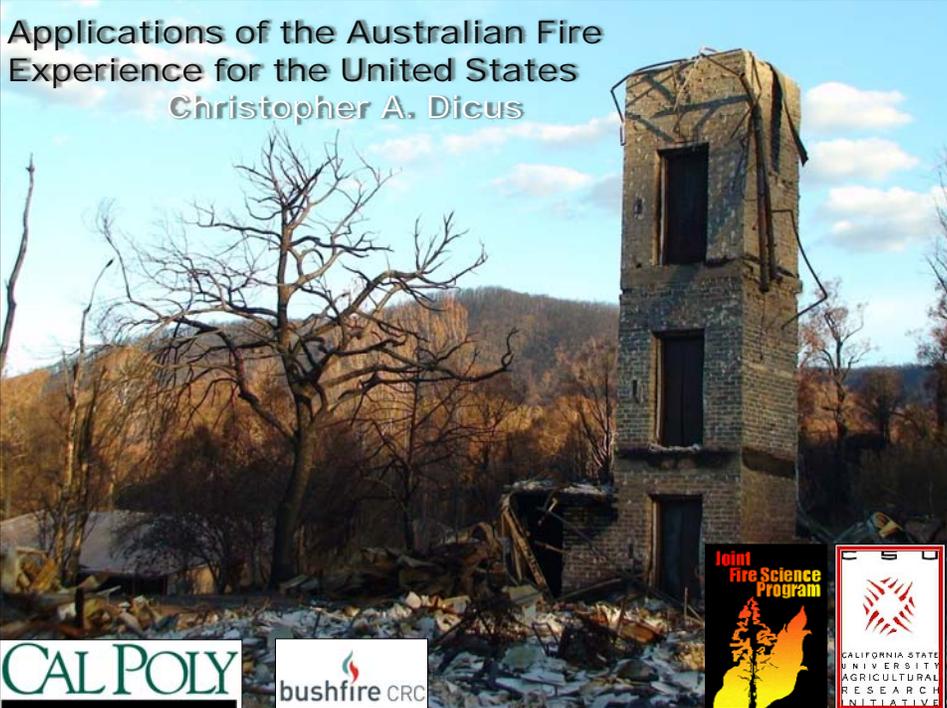


Applications of the Australian Fire Experience for the United States
Christopher A. Dicus



CAL POLY **bushfire CRC** **Joint Fire Science Program** **CALIFORNIA STATE UNIVERSITY AGRICULTURAL RESEARCH INITIATIVE**

Primary elements...



1. Zoo's gone wild...

- When bad fires happen to good people



2. If I ran the zoo...

- How Oz manages fire (and how I'd change it)

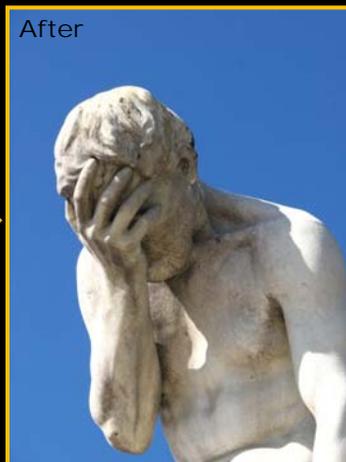
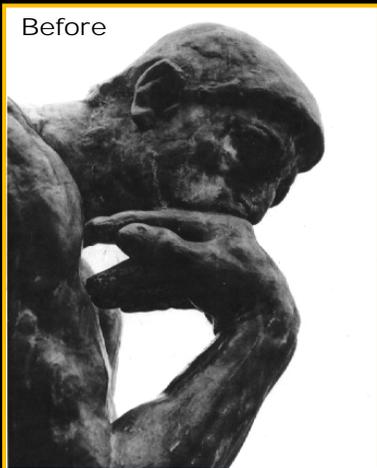


3. Monkeys in the zoo

- Would Aussie approach work in U.S.A.???

Challenged my paradigms...

- Leave EARLY or...
- PREPARE, Stay, and Defend



California dreamin'...

- Build it and they will burn (2003)



California dreamin'...

- Build it and they will burn (2007)



Put another town on the barbie...









♪ I've seen fire... I've seen rain... ♪

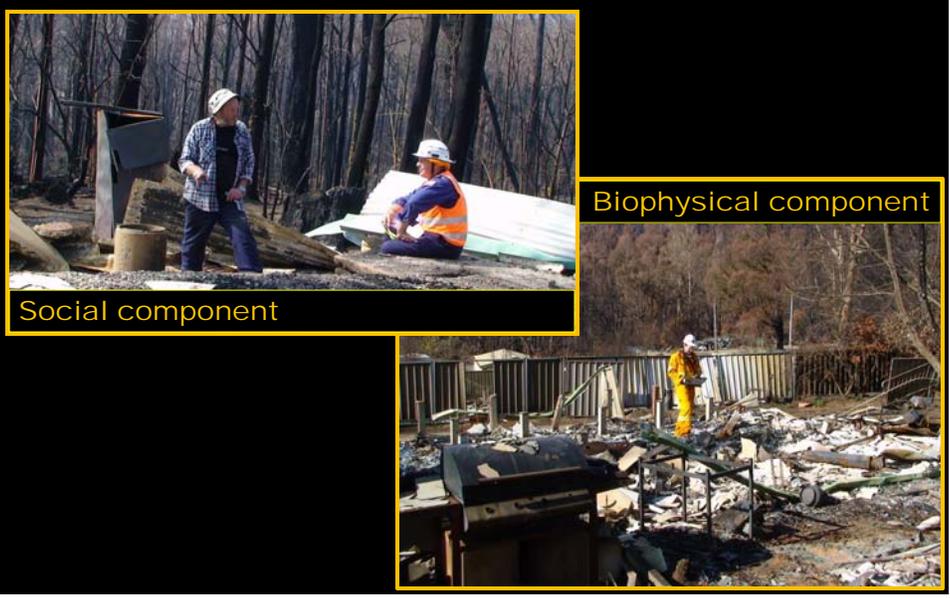
- More damaging Queensland & New South Wales floods mostly overlooked



Better late than never...

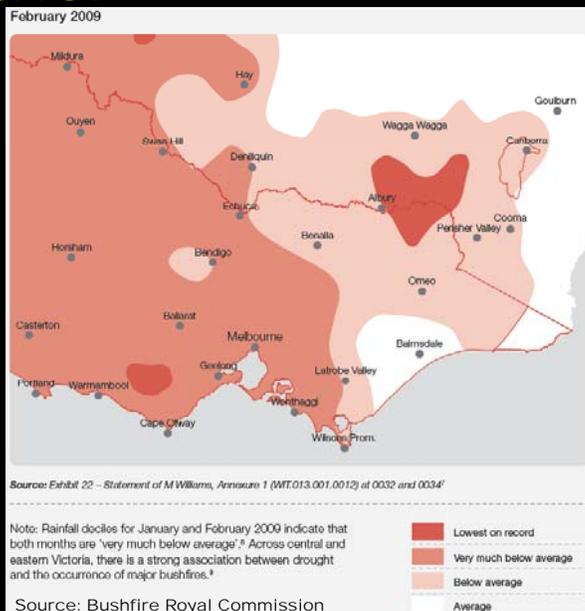


Bushfire Cooperative Research Centre Taskforce



Weather

- Worst Drought on record
- 12 years of protracted drought

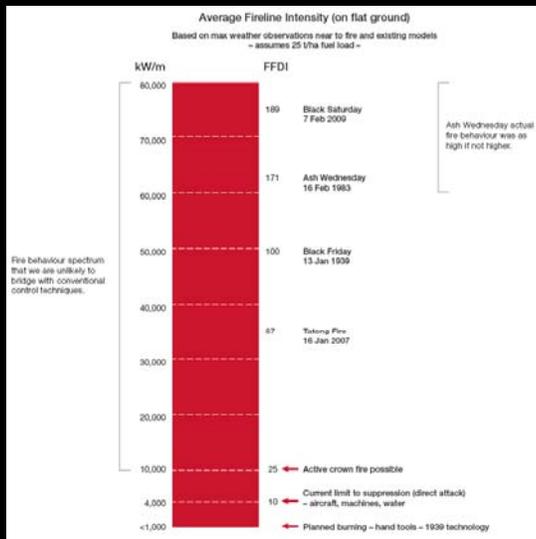


Weather

- Worst heat on record
- Temps > 110°F for a week
- 120°F on day of fire
- RH < 10%
- Warped train tracks stranded 10's of 1000's
- Parrots (and me) left gasping for air



Weather



- McArthur Forest Fire Danger Rating

- Avg. Bad day

- = 12-25

- 1939 Black Friday

- = 100

- 2009 Black Saturday

- >200

Be afraid!

- Mass warnings go out day before fires
 - "If you are planning to go, don't."
 - "If you live in affected areas, get out... now."
 - Warnings to my own students
- Communities take wait and see approach
 - Most didn't feel it applied to them



Weather

- Armageddon Hits
- NW winds bake land
- Dry cold front switches to SW
- Pyrocumulus clouds problematic
 - Many fire fronts with chaotic behavior

National Meteorological Oceanographic Centre
 11:00am EDT Saturday 7 February 2009

Source: Bushfire Royal Commission

Warnings lacking

- Many oblivious to fires
 - Seeking heat relief
- Informal clues
 - Smoke
 - Burning sticks falling into swimming pool
- Problems
 - ABC warnings inconsistent, confusing, and outdated
 - No reverse 000
 - Websites overwhelmed
 - Communications destroyed by fires

Photo: ABC

"We needed more. My dead neighbors, my dead friends, we needed more information."

- Marysville CFA received text 30 minutes before
- Bemoan lack of simple siren

Who's on first???



- No one in charge
 - CFA fights with Melbourne Municipal?
 - DSE lights backfires without CFA knowing?
 - Police act independent of CFA?

- Residents flee to sports oval
- Hero cops lead convoy out
- Some safely spend night in oval

Pandemonium





Too late!!!

- 22 die evacuating
- Countless others make it out at last second
 - Hero cops aplenty
 - Some simply walk to local sports oval
- Residents are to Leave EARLY!!!
 - No warnings, though



Parrot that left early



Car that didn't

Too late!!!

- Many waited to see "just how bad it was going to be"
 - Many unlikely to change
- Common triggers?
 - Roar of fire
 - Ember storm
 - "Parrots started falling out of the sky"

Defending their own...

- Residents are to PREPARE, Stay, & Defend
 - Most prepared for *response* (and needlessly die)
 - 1/3 surveyed had received *ZERO* info about how to prepare

Successful defense by 76-year-old



Photo: The Age

Defending their own...

- Breakdowns in preparation...



Defending their own...

- Breakdowns in preparation...





Defending their own...

- Breakdowns in preparation...

Heat melts underground water access



Defending their own...

- Breakdowns in preparation...

Corrugated iron roof with exterior sprinklers fails (no thought of gaps)



Defending their own...

- Breakdowns in preparation...

Adjacent vegetation ignites structure



Defending their own...

- Breakdowns in preparation...

Embers ignite wood deck (several extinguished embers in ashtray)



Defending their own...

- Breakdowns in preparation...

Melted skylights cause metal building to burn from inside



Defending their own...

- Breakdowns in preparation...

Wooden fences act like wick leading to home



Defending their own...

- How do you prepare home for freight train???
- How do you prepare mentally???

Train wins 99.9999% of time



"...there was nothing – nothing at all could prepare you for what actually happened on that day and how intense that fire come in."



The aftermath...

- Long wait to clean-up due to crime scene
 - Searching for bodies



The aftermath...

- Long wait to clean-up due to crime scene
 - Residents kept out for long time



The aftermath...

- Basic infrastructure destroyed



The aftermath...

- Basic infrastructure destroyed



The aftermath...

- Local economy devastated



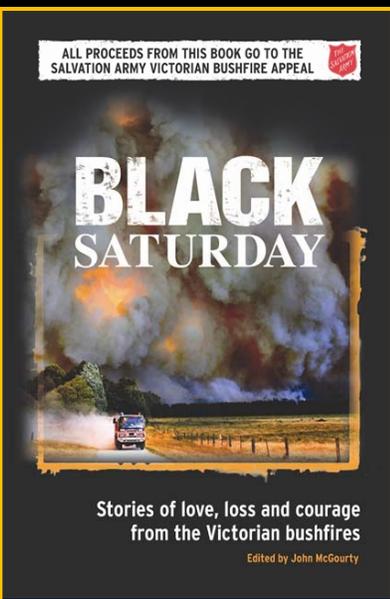
The aftermath...

- Secondary threats





The aftermath...



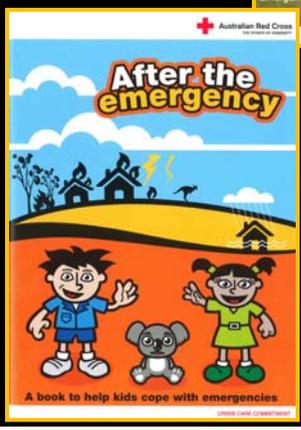
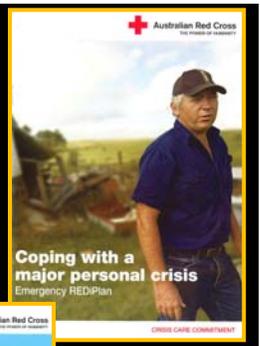
Plenty to help the masses



Recovery • Socioeconomic



Little to help individuals



The aftermath...

- Living with "What if"...

Where there is HOPE, there is LOVE.
Where there is LOVE, there is LIFE.
Where there is LIFE, there is ... MARYSVILLE



The aftermath... Personal reflections

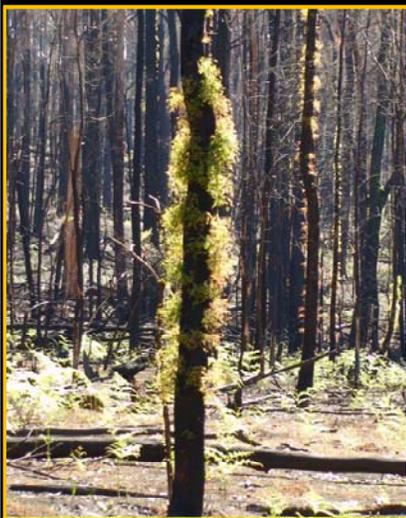






Fires are necessary, fire disasters are not...

How Australia runs the fire management zoo...



Eucalyptus sprouting, Victoria

Former dining room



Need holistic approach



Breakdowns at
all levels on
Black Saturday

- Before the fire
 - Prevention
 - Mitigation
 - Preparation
- During the fire
 - ~~Response~~
 - Agencies
 - Residents
- After the fire
 - Recovery
 - Biophysical
 - Socioeconomic



Prevention • Education via mass media

ABC Radio interview



A photograph of two men in a radio studio. They are both wearing headphones and are seated at a desk with microphones and computer monitors. The man on the left is speaking into a microphone, while the man on the right is listening. The background features a red wall with the ABC logo.

Prevention • Educational pamphlets

Smokey Koala



A collage of educational pamphlets. On the left is the 'Juvenile Fire Lighter Intervention Program' (JFLIP) pamphlet, which features a photo of a family and the text 'Helping families solve the problem of child fire lighting'. In the center are three pamphlets: 'Living through a bushfire', 'Bushfire restrictions', and 'Preparing for bushfires'. On the right is a larger pamphlet titled 'GUIDELINES FOR DEVELOPMENT IN BUSHFIRE PRONE AREAS OF TASMANIA' with a photo of a fire and the text 'LIVING WITH FIRE IN TASMANIA'.



Prevention • Education (active)

Bushfire Blitz, South Australia

Think crazy sign guy...

Prevention • Education (active)



Community Fire Safe, South Australia

Prevention • Education (active)



"Firey" Women, South Australia

Prevention



Prevention



An angry local yells abuse as an alleged arsonist is driven from the Morwell police station yesterday afternoon. Photo: Pat Scala

"They want to hang him," a Gippsland policeman said.

- New "Extinguish Arson" Campaign
 - Rewards via Crime Stoppers
 - Civil and criminal liability
- Arsonists charged with mass murder
 - Likely safer in jail

Prevention



Cause of 2 fires in 3 years at Cal Poly

- Eliminate ignition sources
 - Power lines
 - Rubbish burning
- Make fuels less receptive
 - Roadsides sometimes cleared or irrigated (rare)

Prevention

- Activities restricted dependant on conditions



Click here for current fire bans >



Click here for current fire permits >

Subject to Environmental Regulations and Local Government By-Laws						
	electric BBQ	gas BBQ	incinerator	campfires	burning heaps	burning land
at all times	✓	✓	✓	✓	✓	✓
fire permits	✓	✓	✓ If cleared around for 3 metres	✓ If cleared around for 3 metres	⊘ If exceeding 1 cubic metre	⊘
total fire bans	✓ If cleared around for 3 metres	✓ If cleared around for 3 metres	⊘	⊘	⊘	⊘

Mitigation: Fuels Management



A land of extremes...

Stupid bogans wanna
pave the world, mate!

Dang greens like bushes
more than people!



Head scratcher...

- Greens largely HATED fire
 - (even in fire-dependant ecosystems)



• Mitigation: Fuels Management

- Public agencies try to be good neighbors



•Mitigation: Fuels Management

- Public agencies try to be good neighbors

Snug Tiers, Tasmania



•Mitigation: Fuels Management

- Aussie vegetation burns...



SW National Park, Tasmania

•Mitigation: Fuels Management

- Aussie vegetation burns... a lot...



•Mitigation: Fuels Management

- A different approach down under...

A photograph showing two firefighters in full yellow protective gear standing in a landscape that has been severely affected by a fire. The ground is covered in charred, blackened vegetation and ash. The firefighters are looking towards the horizon where a line of trees is visible under a hazy sky.

•Mitigation: Fuels Management

- Irony in Victoria...
 - Deviant lawbreaker later seen as hero
 - "Pyro" fireys later blamed for not enough fire
- Fuel treatments do NOTHING for individual structures



Dr. Meredith Henderson
SA Dept. Environment & Heritage



Fuel reduction in Adelaide, SA

•Mitigation: Fuels Management

- Landscaping-level more important
 - If you live in the bush, know that it burns



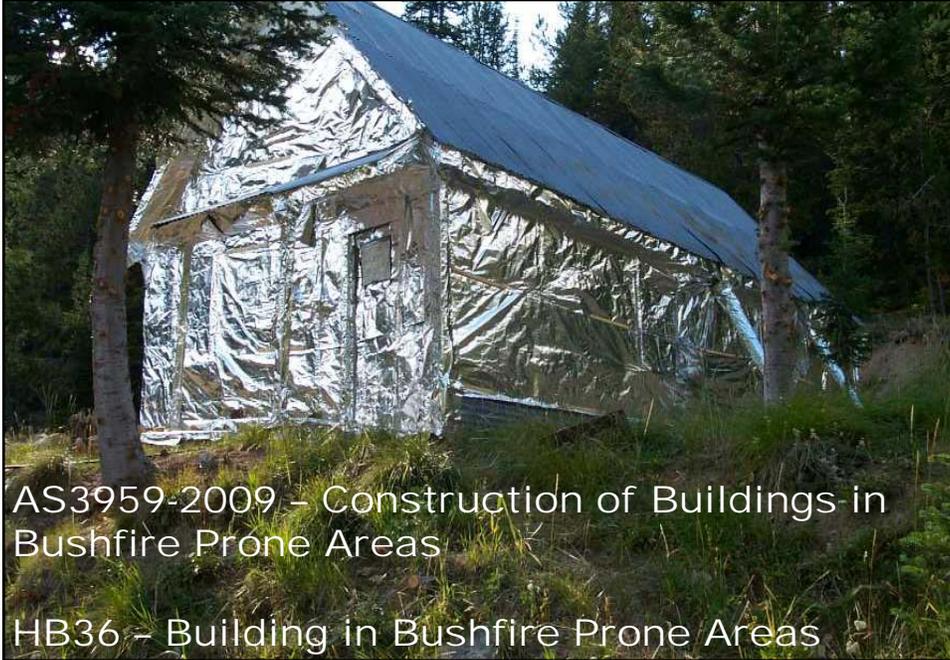
•Mitigation: Fuels Management



•Mitigation: Fuels Management

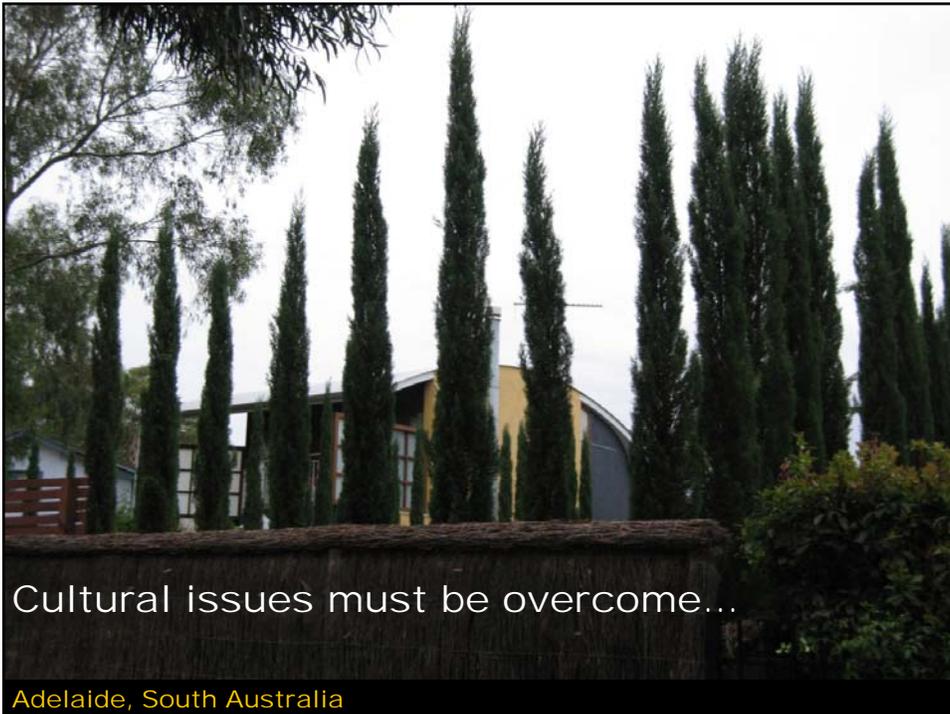


Construction standards



AS3959-2009 - Construction of Buildings in Bushfire Prone Areas

HB36 - Building in Bushfire Prone Areas

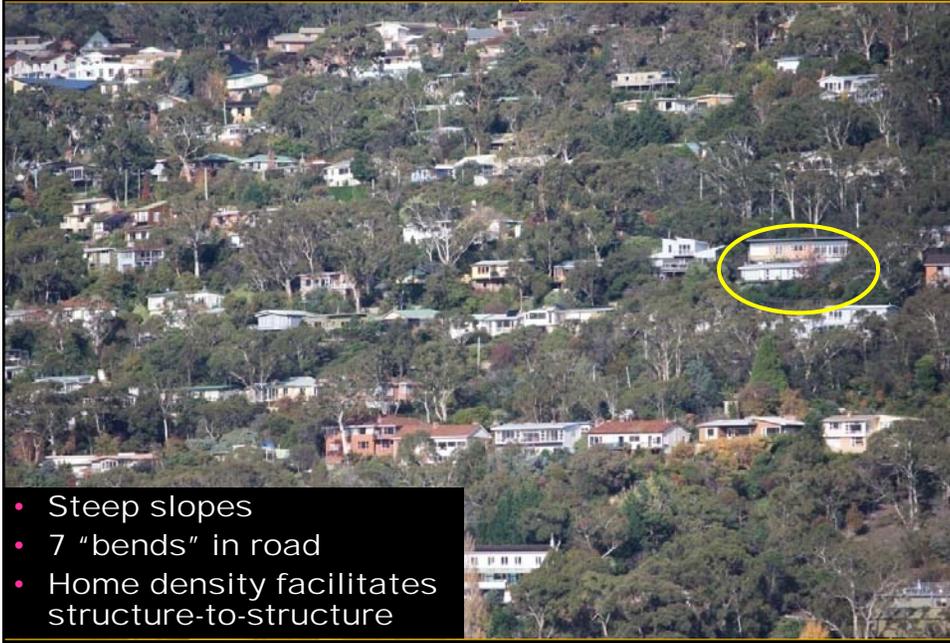


Cultural issues must be overcome...

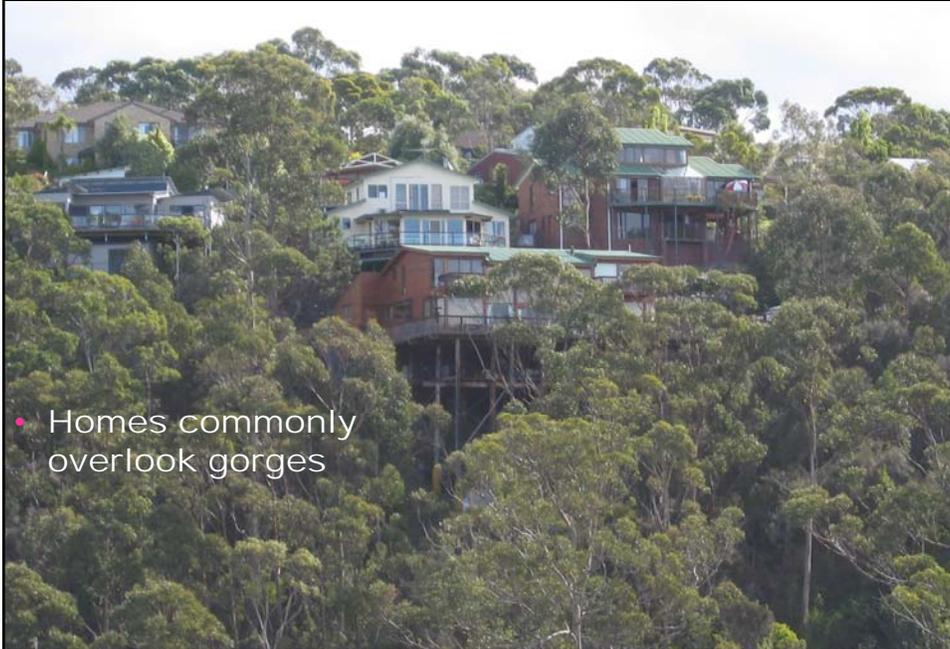
Adelaide, South Australia

Land Use Planning

My home in Hobart, Tasmania



Land Use Planning



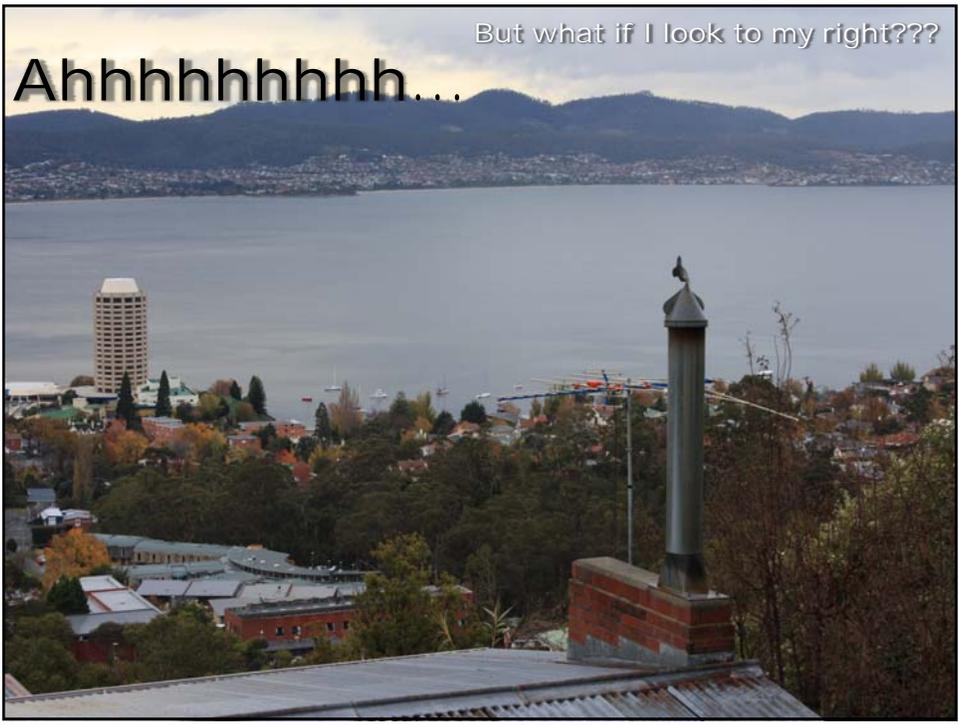
Land Use Planning

A photograph showing a white and green Scania bus stuck on a very narrow asphalt road. The bus is wedged between a large tree trunk on the left and a white post on the right. The road is flanked by dense greenery and trees.

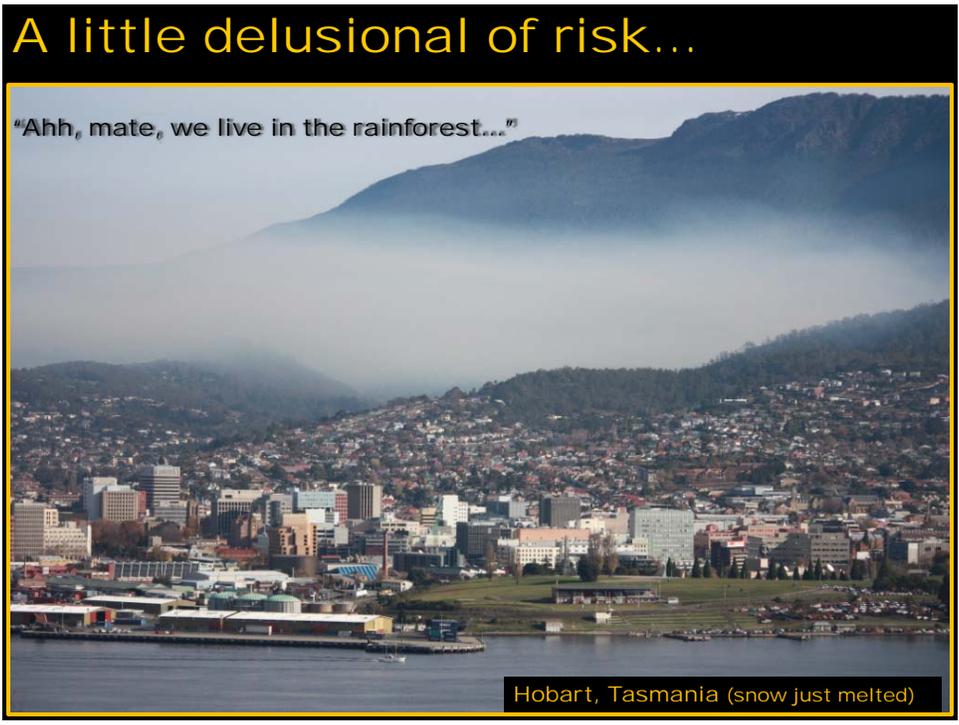
- Roads BAD
 - Crazy narrow
 - Crazy windy
 - Crazy scary
- 2 fires in last 10 years spook residents
 - (but not enough)
- Why live there?

But what if I look to my right???

Ahhhhhhhhhh...

A wide-angle photograph taken from an elevated position, looking down over a residential area towards a large body of water and distant mountains. In the foreground, a brick chimney with a metal cap is visible. The town below has various buildings, including a prominent tall apartment building. The water is calm, and the sky is overcast.

Ahhhhhhhhhh...



A little delusional of risk...



A little delusional of risk...





Preparation

- Volunteer brigades with few drills
- Residents *expected* to have bushfire plan
 - Some just plain bad



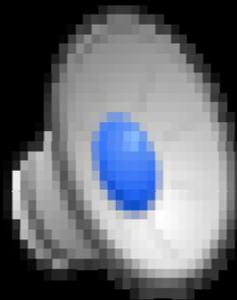
Dr. Jenny Scott

Preparation: Fire Bunkers

- All the new range
- Several survived in home-made concrete/steel bunkers
- All report being terrified and nearly fainting from smoke



An advertisement...



Preparation: Fire Bunkers



- 7 died in bunkers
 - CO poisoning
 - Roof collapse
- Oz desperately trying to regulate

"It is critical that bunkers are not seen or used as a simple solution to living in bushfire prone areas..."

"... if personal fire refuges are to be used by individuals they should only be seen as options of last resort."

Preparation



- ▶ Infrastructure
 - Water
 - Communications
 - ICS

Preparation

- Daily hazard notification
 - They didn't know in Marysville???
 - Boggled many a fire-person's head



Response



Photo: Herald & Weekly Times

- Need better agency coordination
- Must better warn citizens of impending fire
 - Better mass media
 - Reverse 000
 - Sirens
- Must improve information transfer
 - Larger bandwidth
 - Up-to-date info
 - Redundancy in communications

New Aussie thoughts...

PREPARE. ACT. SURVIVE.
NATIONAL FRAMEWORK FOR SCALED ADVICE AND WARNINGS TO THE COMMUNITY

PRINCIPLES:

- Fires impact people and communities, therefore this framework errs on the side of public safety as its primary consideration
- A fire can threaten suddenly and without warning
- People living in high risk areas need to be prepared to take protective action at any time

FIRE DANGER PERIOD – SEASONAL FORECAST

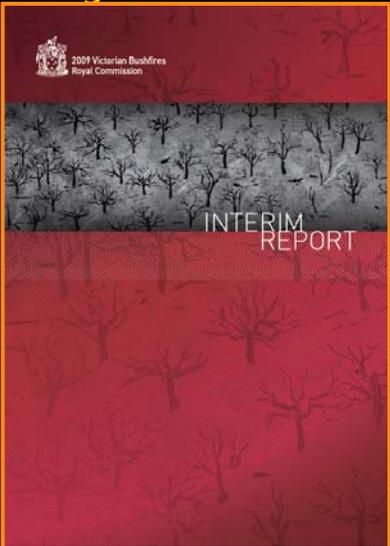
Preparedness Messages – Initiated by Bureau of Meteorology with Fire Agency Advice Response Messages – Initiated by Fire Agencies with Bureau of Meteorology Advice

FIRE BEHAVIOUR PREDICTIONS	IMPACT ASSESSMENT	CALL TO ACTION	FIRE DANGER RATING		Actual FDI calculations on the day along with the fire location and behaviour will dictate which level of message will be used	TRIGGER POINTS – for messaging when a fire starts				
			Category	Fire Danger Index		<2 hrs	2-6 hrs	6-24 hrs	24 hrs Plus	
The projected FDI along with the erratic nature of fire, the energy released and levels of area burnt are the main factors that have been used to differentiate between fire danger rating levels. Volatility of fire Flame Height Speed of spreading Ability to Suppress	The predicted wind levels combined with the application of the building code AS3959 have been used to describe the potential danger at each rating level. Expected life and asset loss House survivability points (comes as a place of safety)	The fire behaviour and impact assessment along with the ability to suppress a fire has been incorporated into the specific instructions and directions to the community.	CATASTROPHIC (CODE RED)	100+	if, for example, on a catastrophic forecast a fire starts in a location where there are no people or property threatened then an emergency warning would not be necessary.	EMERGENCY WARNING SEWS	WATCH AND ACT	ADVICE		
			CYBERNETIC	85-98						
			SEVERE	50-74						
			VERY HIGH	25-49						
			HIGH	12-24						
LOW-MODERATE	0-11									

NOTE: Detailed descriptors and messages underpin this framework.

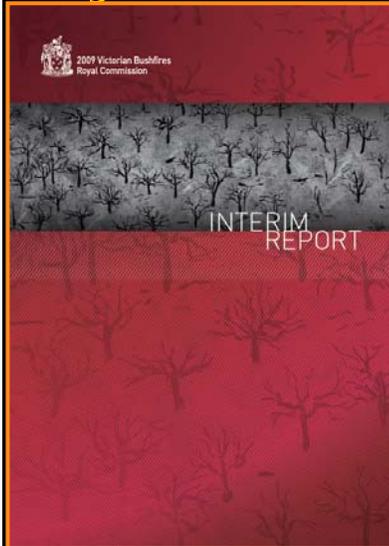
As Agreed at the Australian Emergency Management Committee - 4 September 2009 – VERSION 5.1

Recommendations from Royal Commission (Abridged)



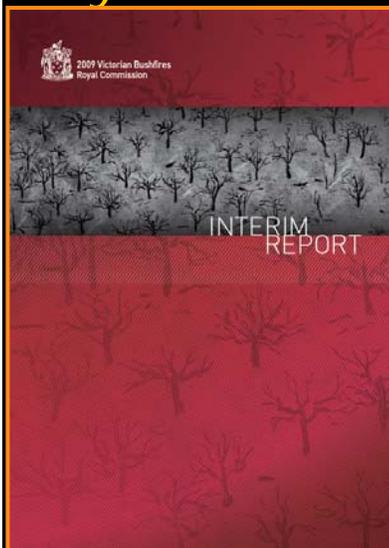
- Better warning systems
 - Avoid euphemisms
 - Specific severity, location, direction, timing
 - New Fire Severity Scale
 - Think Hurricanes
 - Sirens
 - Reverse 000 or texts

Recommendations from Royal Commission (Abridged)



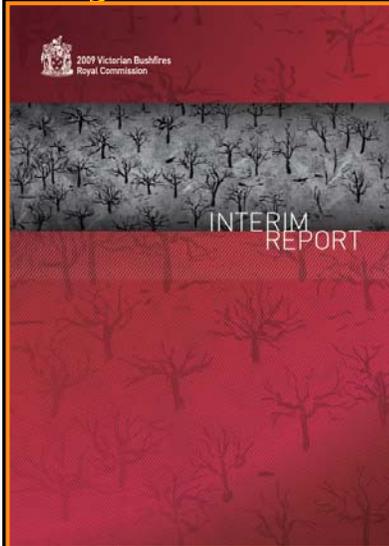
- Better Relocation
 - “Relocation” instead of “evacuation” when potential extreme
 - Indicate location of designated emergency relief centres
 - CFA to recommend relocation based on defensibility and vulnerability

Recommendations from Royal Commission (Abridged)



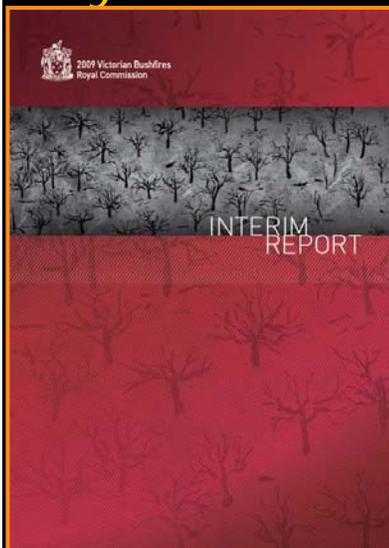
- Stay or go
 - Convey that not all homes are defensible
 - “There could be psychological impacts of staying”
 - “Indivisable for children to be present during the defence of properties”
 - CFA to advise on defensibility

Recommendations from Royal Commission (Abridged)



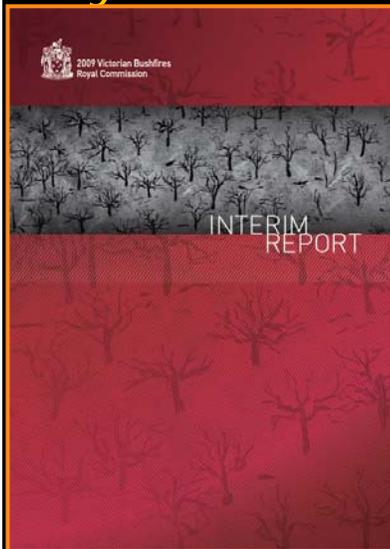
- Risk and Refuge
 - Identify, establish, and advertise "designated community fire refuges and neighborhood safer places"
 - CFA, where possible, should provide assistance in their defense

Recommendations from Royal Commission (Abridged)



- Incident Management
 - Ensure that Incident Control Centres are properly staffed for immediate operation on high fire risk days
 - "the most experienced, qualified and competent person is appointed as IC for each fire, irrespective of the point of ignition."

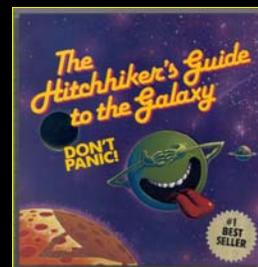
Recommendations from Royal Commission (Abridged)



- Emergency Management
 - Review guidelines for the operation of road blocks
 - Returning residents
 - Relief and aid delivery
 - Essential services crews
 - If you make roadblock, then you have to issue a warning to residents
 - Telecommunications provide better "surge capacity" during extreme events

Human beings, who are almost unique in having the ability to learn from the experience of others, are also remarkable for their apparent disinclination to do so.

-- Douglas Adams, 1952 - 2001



Hobart, Tasmania 2006



