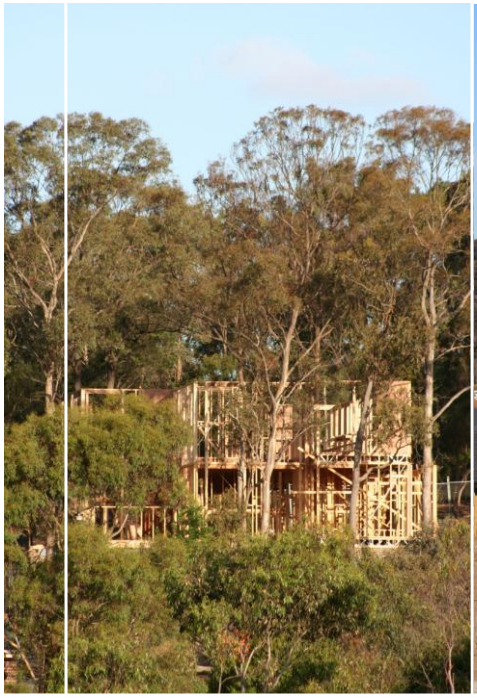
bushfire CRC



PLANNING AND BUSHFIRE RISK IN A CHANGING CLIMATE

FINAL REPORT FOR THE URBAN AND REGIONAL PLANNING SYSTEMS PROJECT

Barbara Norman, Jessica K. Weir, Kate Sullivan and Jacqui Lavis

University of Canberra

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Trees, homes and risk at the rural/urban interface.
Photo at left by the Bushfire CRC.
Photo at right by Jessica Weir.

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The Project Team at the University of Canberra:
Professor Barbara Norman – Chief Investigator
Dr Jessica K Weir – Senior Research Fellow (2012/2013)
Dr Kate Sullivan – Senior Research Fellow (2011/2012)
Adjunct Professor Jacqui Lavis – Research Fellow (2011/2012)

Table of contents

Glossary

APZ	asset protection zones
BAL	Bushfire Attack Level (Victoria)
BMO	Bushfire Management Overlay (Victoria)
CFA	Country Fire Authority
CPD	continuing professional development
COAG	Council of Australian Governments
DPCD	Victorian Department of Planning and Community Development
EMA	Emergency Management Authority
IPCC	Intergovernmental Panel on Climate Change
NCCARF	National Climate Change Adaptation Research Facility
NEMC	National Emergency Management Committee
NSW RFS	New South Wales Rural Fire Service
PIA	Planning Institute of Australia
PBP NSW	Planning Bushfire Protection NSW
RBPAs	Regional Bushfire Planning Assessments
UN	United Nations
VRBC	Victorian Royal Bushfire Commission
WMO	Wildfire Management Overlay (Victoria)

ABSTRACT

Planning and bushfire risk in a changing climate

This report presents the research findings on planning and fire risk as one component of a three-year research project “to identify legal, urban and regional planning and policy and administrative structures and processes to enhance integration of fire and emergency management imperative across policy sectors, agencies and portfolios, that is mainstreaming”.

The focus of this report by the University of Canberra is on the role of urban and regional planning in relation to fire risk and emergency management. The research approach included a significant literature review, including the major fire inquiries within Australia, and focus groups in four jurisdictions (ACT, NSW, Victoria and NT). Capacity building through education is also considered. In addition, several presentations have been made to end-users during the course of this research to obtain very valuable feedback. This included a panel discussion with the Planning Institute of Australia involving leading professionals at the National Planning Conference 2013, Canberra.

The outcome of the research is a deeper understanding on the contribution of urban and regional planning to managing fire risk throughout Australia. Differing perceptions of fire and various planning responses by States and Territories provide a rich policy environment for the emergency management sector to work with. Added to this complexity are expanding urban areas from Darwin to Melbourne and the challenges of continuing urban development in Australian coastal regions that are already experiencing environmental change and predictions of an even hotter environment and an increased potential for fire risk. A key finding that emerges is the need for a more integrated approach to planning for fire risk that better connects planners with emergency management and those involved in assessing risk.

EXECUTIVE SUMMARY

State of knowledge

The connection between urban and regional planning and bushfire risk management has been increasingly highlighted in sixteen major bushfire inquiries from 1939 to 2011. Despite this there has been relatively minor research into the contribution of urban and regional planning to minimising risk and the connection between planning and emergency management on the ground. This report seeks to make a contribution to the state of knowledge and to assist policy development in planning and emergency services in order to better manage urban development in bushfire prone areas. Better understanding the connection and contribution through education is also considered as an important gap in capacity building and for responding to concerns in recent major bushfire inquiries.

Approach

Planning and bushfire risk in a changing climate examines the role of urban and regional planning in relation to managing bushfire risk in Australia. A team at the University of Canberra comprising Professor Barbara Norman (CI), Dr Jessica Weir, Dr Kate Sullivan and Adjunct Professor Jacqui Lavis has undertaken the research.

The research approach has included a significant literature review including the major fire inquiries within Australia, the undertaking of focus groups in four jurisdictions (ACT, NSW, Victoria and NT) and a review of education and training in this field. The research spans a significant part of Australia with focus group discussions in Canberra, the south coast of NSW, the Mornington Peninsula and Darwin.

In addition, several presentations have been made to end-users during the course of this research to obtain very valuable feedback. This included a panel discussion with the Planning Institute of Australia with leading professionals at the National Planning Conference 2013, Canberra.

Research findings

The outcome of the research is a deeper understanding on the contribution of urban and regional planning to managing fire risk throughout Australia. Differing perceptions of fire and various planning responses by States and Territories provide a rich policy environment for the emergency management sector to work with. Added to this complexity are expanding urban areas from Darwin to Melbourne and the challenges of continuing urban development in Australian coastal regions that are already experiencing environmental change and predictions of an even hotter environment and an increased potential for fire risk. A key finding that emerges is the need for a more integrated approach to planning for fire risk that better connects planners with emergency management and those involved in assessing risk.

Following is a summary of the key research findings drawn from the bushfire inquiries, wider literature, focus group discussion and liaison with professional bodies on possible education and capacity building opportunities:

The key research findings

Finding 1
Urban growth and the projected impacts of climate change will potentially expose more people to risk. Spatial planning can provide a significant means of risk reduction and adaptation, by influencing the type and location of development.
Finding 2
The 16 major Australian bushfire Inquiry reports, from 1939 to 2011, have gradually outlined a crucial role for spatial planning in managing bushfire risk at the rural/urban interface. However, they have tended to view the practice of planning in a relatively limited way and have arguably not fully appreciated its broader strategic potential.
Finding 3
Spatial planning can enable the risks associated with land use and development at the rural/urban interface to be assessed across a much broader range of considerations. At the rural and regional scale, it can link climate change adaptation, disaster risk management and social equity to help build community resilience.
Finding 4
Collaborative spatial planning processes can provide a platform for exploring shared responsibility and sustainability within rural/urban interface communities including relevant community groups, volunteers, expert advisory groups, researchers and professionals.
Finding 5
Future visioning of disaster risk and climate change impacts at the regional scale through modelling a range of socioeconomic, climate and risk scenarios offers a useful framework for engaging rural/urban interface communities in possible futures for their regions. In this regard, there continues to be a critical need to translate spatial planning theory into practice—to 'bridge the gap'.
Finding 6
The capacity for planners to be responsive to bushfire risk is constrained or facilitated by the perceptions of bushfire risk held by these decision makers as well as in the community, including how bushfire risk is appreciated and understood in relation to other priorities. Decision makers still find it very hard to say 'no' to development and as a consequence we continue to build and rebuild in bushfire prone areas.
Finding 7
The key themes emerging across the four focus groups were risk, governance and management. The focus groups revealed that rather than planners and the fire authorities being at odds over bushfire risk, they are both grappling with responsibly addressing a risk whose sway and effects extends far beyond their job description.
Finding 8
Planning for bushfire risk is an emerging field. Education modules should be organised under the four phases of comprehensive emergency management—mitigation, preparedness, responses and recovery—and also consider the adaptation planning continuum of protect, retreat, adapt and abandon.
Finding 9
A compelling case is emerging for a national on-line education program that provides context for State based vocational style training on planning for bushfire risk management.
Finding 10
Partnerships between institutions and collaboration between academics, professional and communities will be critical in better understanding and communicating environmental risks to coastal communities in the future.

Conclusion

Recent extreme fire events and subsequent bushfire inquiries have continued to highlight the risk to urban and regional communities. This research has identified that the relationship with bushfire and perceptions of risk varies across the Australian landscapes. Experience on the Mornington Peninsula is different from residents of Darwin. However, as the urban edge of Darwin expands with new urban development, some of the urban periphery risks of the south are now being managed in the north.

The research also indicates while some progress is being made by stakeholders to work more effectively together on urban and regional planning and managing fire risk, there remains a gap between the urgency of this issue highlighted in the major national bushfire inquiries and action on the ground. As highlighted above, decision makers still find it very hard to say 'no' to development and as a consequence we continue to build and rebuild in bushfire prone areas.

Capacity building and education more broadly, for better connecting urban and regional planning and emergency management, emerges as a priority that includes the four phases of comprehensive emergency management—mitigation, preparedness, responses and recovery—and also needs to consider the adaptation planning continuum of protect, retreat, adapt and abandon. This will need to have flexibility to respect the range of circumstances across different landscapes and communities.

In summary, this research has identified the importance of: better understanding the links between planning and bushfire risk; recognising the differences in risk perception influenced by history, landscape and experience; implementing effective planning and development controls; and providing appropriate education and training.

These four factors are the key dimensions to integrating urban and regional planning with bushfire risk and emergency management in a changing environment.

1. Introduction

The sixteen major bushfire inquiries from 1939 to 2011 have increasingly highlighted the role of urban and regional planning in bushfire risk and emergency management. During that time Australian cities and settlements have developed, expanding the urban edge and exposure to high fire risk areas. This research project examines the challenges presented today.

The research report comprises these four sections:

- Chapter 2 is a comprehensive review of the 16 bushfire inquiries from 1939 to 2011 and relevant wider literature to identify the key issues, challenges and opportunities in relation to urban and regional planning and bushfire risk and emergency management.
- Chapter 3 is a report on and analysis of four focus groups across four different jurisdictions—the NT, NSW, ACT and Victoria—to gain an understanding of the professionals involved in planning and emergency management on the ground.
- Chapter 4 is a special case study discussing bushfire in coastal environments to highlight an emerging issue with coastal urbanisation in sensitive coastal environments.
- Chapter 5 is a review of education and capacity building in relation to the role of urban and regional planning in better managing bushfire risk and to assist identifying possible pathways forward.

The report is informed by a mix of methodologies including a significant literature review, focus group discussions throughout Australia, and a review of emerging risks in the context of climate change with a focus on urban development in high-risk coastal landscapes.

House surrounded by vegetation, Mornington Peninsula, Victoria.
Credit: Jessica K. Weir

The following chapters provide an insight into the critical challenge of better linking land use decisions with the operations and management of bushfire risk in Australia. Some of the continuing challenges and barriers to effectively managing development the Australian landscape are discussed, concluding with some directions for future policy and research development.

2. The role of spatial planning in bushfire risk management

Key words: spatial planning; rural/urban interface; climate change; disaster risk; bushfire/wildfire; planning policy; planning theory; environmental history

Barbara Norman & Kate Sullivan

This chapter outlines and discusses the role of spatial planning in relation to bushfire risk management. The succession of bushfire inquiries over the last 100 years increasingly highlights the important role of land use planning in minimising bushfire risk to urban communities. More recent research has pointed to the importance of planning in contributing to building more resilient communities particularly in the context of climate change (Climate Commission, 2011; Climate Council 2013).

> *Spatial planning is designed to "bring together and integrate policies for the development and use of land with other policies and programmes which influence the nature of places and how they function". Spatial planning goes beyond traditional land-use planning. It facilitates and promotes sustainable and inclusive patterns of urban and rural development. Rather than operating through a narrow technical perspective, spatial planning should actively involve all members of society because everyone has a stake in the places in which they live, work and play.*
>
> (University College London & Deloitte, 2007)

The first section considers three interrelated challenges facing spatial planning: urban growth, climate change and disaster risk. Urban growth and the projected impacts of climate change will potentially expose more people to risk. Spatial planning can provide a significant means of risk reduction and adaptation, by influencing the type and location of development.

The second section examines 16 major Australian bushfire inquiry reports, from 1939 to 2011 in relation to land use planning. The analysis of these reports points to a significant shift in focus towards spatial planning—a 'planning turn'—from the 1980s onwards. These reports have, over time, gradually outlined a crucial role for spatial planning in managing bushfire risk at the rural/urban interface. However, they have tended to view the practice of planning in a relatively limited way and have arguably not fully appreciated its broader strategic potential.

The third section concludes that, by working across spatial scales and levels of government, and reflecting a cross-sectoral, trans-disciplinary and collaborative approach, spatial planning can enable the risks associated with land use and development at the rural/urban interface to be assessed across a much broader range of considerations. At the rural and regional scale, it can link climate change adaptation, disaster risk management and social equity to build help community resilience. It can support socioeconomic and climate scenario planning that

addresses regional risk profiles and the socioeconomic complexities of the rural/urban interface. The emphasis here is also on the critical importance of engagement, participation and collaboration. In this way, collaborative spatial planning processes can provide a platform for exploring shared responsibility and sustainability within rural/urban interface communities.

2.1 Spatial planning, risk management and climate change

Twenty-first century planning is often characterised as facing twin challenges—urban growth and climate change. As a recent UN-Habitat report has noted, the "effects of urbanization and climate change are converging in dangerous ways that seriously threaten the world's environmental, economic and social stability" (UN Habitat, 2011, vi). However, a third challenge should arguably be added here—disaster risk. Urban growth can increase disaster risk that is projected to be further exacerbated by climate change. An integrated approach to these three areas is critical, and spatial planning is well placed to manage many of the drivers and impacts of urban growth, climate change and disaster risk.

Snug Cove looking across Two Fold Bay to Balawan (Mt Imlay), NSW with a large and looming cloud of smoke over the Bay emanating from a fire at the base of the Mountain. This was a controlled burn but it illustrates a scene that one would not want to see from a wild fire.
Credit: John Reid

Integration of spatial planning, bushfire risk and emergency management has been identified as a policy priority in Australia (COAG, 2002; Ellis et al., 2004; Handmer, 2003). However, this matter has broader international relevance—not only because bushfire risk, exacerbated by climate change, will be increasingly significant for a number of countries but also because many of the issues involved in planning for bushfire risk are critical in planning for disaster risk more generally. Emergency management (also referred to here as disaster risk management) generally takes a 'all-hazards' approach—that is, governments do not use a separate set of management arrangements for different types of disasters (Cabinet Office, 2011; NEMC, 2011; US Department of Homeland Security, 2008). Such an approach is

further underpinned by the concept of resilience—the ability of a community or system to adapt to change and absorb disturbances while retaining an acceptable level of structure and function (IPCC, 2007).

Disaster resilience policies place an increased emphasis on disaster preparedness and a whole-of-society approach, based on a recognition by governments that achieving increased disaster resilience is "a shared responsibility across the whole of society" (NEMC, 2011, 3) and that a disaster resilient community works together, using local resources and expertise, to "help themselves in an emergency, in a way that complements the response of the emergency services" (Cabinet Office, 2011, 11). A spatial planning focus on bushfire risk, based on an 'all-hazards' approach, can therefore reveal significant issues for disaster risk management more broadly that are relevant in both Australian and international contexts.

With urban growth, increasing numbers of people in Australia are living in rural/urban interface communities, in suburbs and rural sub-divisions in close proximity to bushland, with a greater population potentially being exposed to bushfire risk. Over 3.3 million people—25 per cent of Australia's metropolitan population—currently live in 24 fast-growing local government areas on the edge of Australia's major cities, with this population predicted to grow to 4.5 million by 2021 (McGuirk and Argent, 2011). Further, the population has continued to grow in 'tree-change' and 'sea-change' areas (McGuirk and Argent, 2011), reflecting an Australian trend of 'nature-led' migration to rural and coastal locations, many of which are located in rural/urban interface areas. Urban development patterns therefore need to be managed so that they are not a driver of vulnerability to climate change and disaster risk.

One issue of critical importance is that planning policies do not increase the number of people and assets exposed to bushfire risk at the rural/urban interface. Another issue concerns the contribution of socioeconomic factors to increased vulnerability to disaster risk. Commentators have pointed to the lower socioeconomic profile and locational disadvantage of some Australian urban fringe and rural/urban interface communities (Gleeson, 2010; McDougall and Maharaj, 2011). Planning policies therefore need to ensure equitable access for such communities to local employment opportunities, efficient public transport, social infrastructure and services to address possible areas of socioeconomic disadvantage and, in turn, increase the resilience of such communities to bushfire and other disaster risks. Equitable and spatially sensitive provision of infrastructure and services is fundamental to building the resilience and sustainability of interface and rural communities, as well as urban communities. In this context, 'regional spatial planning', combined with local planning approaches, may offer a more inclusive policy approach.

2.2 The emergence of planning in the Australian bushfire inquiries

Over nearly 100 years there has been a succession of bushfire inquiries that have recommended that more attention be placed on land use planning as a prevention

measure for managing fire risk particularly on the 'urban edge' of expanding settlements.

The major Australian government, parliamentary, coronial and royal commission bushfire inquiry reports trace the emergence of spatial planning as a key issue in bushfire risk management and points to a significant 'planning turn'—i.e., a shift in focus towards planning—from the 1980s. This planning turn can be attributed to a major shift in thinking about disaster risk and resilience around the same time. Previous studies of the bushfire inquiry literature (Goode et al., 2011; Kanowski et al., 2005; Petris, 1996; Richardson, 2009) have not analysed emerging themes over time or specifically focused on spatial planning issues. An analysis of 16 major bushfire inquiry reports is undertaken here, starting with a 1939 Royal Commission report (Stretton) and ending with a 2011 report into a series of Western Australian bushfires (Keelty). Bushfire inquiry reports are of course written for different purposes, with different objectives and intents (political, legal, coronial).

The first major bushfire inquiry was conducted in 1939 (Stretton) as a result of bushfires in the state of Victoria of that year which resulted in 71 deaths and the loss of over 650 properties. This Inquiry was significant not only because it resulted in the first major report on bushfires but also because, at this early point, it clearly recognised the need to mainstream bushfire risk management across policy sectors, including the planning sector, and resolve conflicting policy objectives. The report noted a lack of policy integration between the departments concerned with "land utilisation control" as one of the causes of the bushfire:

> *"[I]t has already been shown by example that the absence of any method of co-ordinating the interests and duties of public departments … has been a contributory cause"—and concluded that a "committee of experts chosen from the several public departments would do much by their advice to reconcile the conflicting claims and duties of various departments at present interested in forest lands" (Stretton, 1939, 11, 20).*

A further reference to planning in the 1939 report is also interesting, with the report observing that "townships have been allowed to be encroached upon by scrub" (Stretton, 1939, 13). It would take a few more decades to reach the more complex understanding that townships had also been allowed to encroach upon the scrub.

The next major bushfire inquiries were not until the 1960s, with the 1961 Western Australian report (Rodger) following the loss of over 130 homes and the 1967 Tasmanian report (Chambers and Brettingham-Moore) following the loss of 62 lives and over 1400 homes. The Rodger report referred to the importance of vegetation management by private landholders, including maintaining protection zones (defendable space) around private lands and buildings. This issue was to become of increasing concern, with recent inquiry reports calling for vegetation management and maintenance to be linked to planning approvals and development controls in designated high bushfire risk areas (Ellis et al., 2004; Teague et al., 2010c).

Planning can help to reduce the risk of a particular settlement through planning permits and specific siting requirements regarding proximity to vegetation and defendable space around properties. However, the key point here is that the

conditions required at the time of planning approval need to be maintained by property owners for continued bushfire risk management. Adequate resourcing of local government to monitor for compliance and enforce such requirements then becomes a further issue (Teague et al., 2010c).

The 1967 Tasmanian report noted two issues that would be of significant concern in future bushfire inquiry reports: the expansion of the rural/urban interface and the fact that major bushfires could enter far into the suburbs, well beyond the urban edge—the "extent of the 1967 extreme fire conditions was more widespread than usual" because of the "pushing out of suburbs and towns into grasslands and the timbered hills", and not only were "buildings on the fringes of urban development destroyed but fires burnt in high density suburbs" (Chambers and Brettingham-Moore, 1967, 18, 22). The 1977 Victorian bushfire Inquiry (Barber, 1977) followed as a result of four deaths and the loss of over 100 properties. The report touched on a series of issues critical to modern spatial planning in terms of managing urban growth and modelling different risk scenarios—population projections, demographics and settlement patterns. The report is notable in registering a demographic shift of people away from rural areas and into cities: "at least since the early part of this century, what has been called the 'drift to the city' has almost come to be regarded as permanent and inevitable. The rural population has steadily declined" (Barber, 1977, 169).

The next major inquiries followed the 1983 bushfires that resulted in 47 deaths and the loss of over 2000 properties across Victoria, and 28 deaths and the loss of over 380 homes in South Australia. Two 1984 reports (House of Representatives 1984; Miller et al.) signal the beginnings of a 'planning turn'—a focus on spatial planning as having a significant contribution to make in managing bushfire risk. The House of Representatives report made the salient point that "broad area control burning programs will not provide protection to urban areas in severe fire weather" (1984, 21), thus reflecting the important realisation that controlled burning for bushfire hazard reduction, while reducing risk, cannot remove risk altogether. This triggered an awareness of the need to consider other risk reduction mechanisms, such as spatial planning. The report called for integration of spatial planning and bushfire risk management—"land use management which incorporates fire protection measures could significantly reduce the impact of bushfires and should be given higher priority" (1984, 21). The report further noted that community protection involves "more than fire prevention and suppression"—it also involves "incorporating fire safety measures into building construction and siting guidelines, coupled with land use control and disaster planning" (House of Representatives, 1984, 21).

The Great Dividing Range, Shoalhaven
Credit: Jessica K. Weir

Importantly, the two 1984 reports (House of Representatives; Miller et al., 1984) also focused on the importance of settlement location and design, and pointed to a comprehensive range of planning and development controls to reduce bushfire risk. Later reports have also discussed such measures, including land-use zoning and sub-division design; restrictions on minimum lot size and sub-division of bush blocks; siting and aspect issues for dwellings (avoiding steep slopes, ridgelines and heavy vegetated areas); minimum defendable space requirements; appropriately zoned evacuation areas; and designated community safer areas, buffer zones and fire abatement areas. Other measures include infrastructure planning for reliable water supply for emergency use; underground cabling for electricity supply (failure of electricity assets has resulted in a number of bushfires); access and evacuation routes for residents and fire ground response; and siting of roads for firebreaks. A further issue raised in the 1984 House of Representatives report was the need to combine planning and development approval processes with improved vegetation and bushfire mapping and zoning approaches, to identify high bushfire risk areas and high biodiversity areas—noting the need to map and zone for other hazards at the same time, to gain a full understanding of the risk profile of any given area. The 2010 Victorian Bushfire Royal Commission report also focused on this issue, particularly in terms of integrating mapping requirements under planning and building systems.

It is considered that such planning responses need to be continually updated to reflect the latest scientific and technical knowledge and also take into account other risk hazards and potential climate change impacts. These planning measures have been critical in reducing bushfire risk—without such measures, bushfire risk management becomes solely reliant on increased construction standards and hazard reduction burning. However, such measures should also not encourage new development, or intensification of existing residential land use, in areas of unacceptably high bushfire risk. Planning approaches also need to factor in the risk

that such disaster mitigation devices might fail under catastrophic bushfire conditions, pointing to the importance of the concept of shared responsibility and drawing on a mix of risk reduction strategies, modelled on a range of socioeconomic and climate scenarios (Muller and Li, 2010; Norman and Sullivan, 2011).

While major bushfires across South Australia and Victoria in 1983 ushered in a new appreciation of the need to integrate spatial planning and bushfire risk management, the New South Wales 1993-94 bushfires, which resulted in four deaths and the loss of over 200 homes, signalled the beginnings of a more complex conceptualisation of the notion of risk, and therefore of planning for risk, as well as a need to consider bushfire risk as part of a broader, 'all-hazards' approach. A 1994 New South Wales parliamentary report flagged the issue of bushfire risk and "landuse decisions, development planning and the responsibilities of property owners" as requiring "a great deal of further attention" and recommended this be examined in greater depth in a broader-based inquiry on natural disasters (NSW Legislative Assembly, 1994, 56). Against that background, an Australian parliamentary Inquiry into disaster management in that same year noted the need for "a more comprehensive and integrated approach to emergency management", focused not solely on response but on "other critical areas of emergency management—preparedness planning, prevention/mitigation, training and recovery" (Senate Standing Committee, 1994, xi).

This shift in focus to preparedness, prevention and risk management would ultimately direct greater attention to spatial planning. A series of bushfire inquiry reports followed major bushfires in 2001-02 and 2003. A 2002 New South Wales parliamentary report on the Sydney 2001-02 bushfires, which resulted in the loss of over 100 homes, pointed to inconsistencies among local councils in their approach to specifying bushfire protection measures within planning instruments (NSW Joint Select Committee 2002, 12). This was also to emerge as a major issue in the 2010 Victorian Bushfire Royal Commission report.

The Australian Capital Territory Inquiry reports into the 2003 Canberra bushfires (Doogan, 2006; McLeod, 2003) are of particular interest in terms of spatial planning and bushfire risk for the rural/urban interface. The Canberra bushfires resulted in four deaths and the loss of over 480 homes. This level of property loss occurred in the suburban environment of Australia's national capital—also frequently referred to as 'the Bush Capital'. As a modern planned city, Canberra has perhaps seen more integration of spatial planning and bushfire risk. Urban development is not permitted on its bushfire vulnerable hills and ridges, and it has a clearly defined suburban edge rather than the scattered urban fringe found in many other cities. Large parts of the city and suburbs are also surrounded by open spaces (grazing properties, golf courses and playing fields), operating as fire abatement zones. However, while these measures lowered the risk, they arguably gave a false sense of security.

The risk still remained relatively high because of the close proximity of bushland on the urban edge—nearly 50 per cent of the Australian Capital Territory, where Canberra is located, is designated as bushland national park (National Parks, 2011)—and the Canberra suburb layout of numerous nature corridors, linked to

nature parks. As the 2003 report noted, the large tracts of cleared land around Canberra appeared to present “a low fire risk to much of urban Canberra”, and “the fact that no urban houses had been lost to bushfire since 1952 had given rise to a belief that the houses of suburban Canberra were not vulnerable to bushfire” (McLeod, 2003, 172). The report concluded that “the Canberra community had not been sufficiently well prepared to understand the nature of the bushfire risk that exists as a consequence of the siting of the city in a bushland setting” (McLeod, 2003, v). The cleared spaces of grassland around Canberra could still carry a bushfire and they connected the suburban nature corridors with the nature parks and national parks surrounding the city. The penetration of bushfire far into the suburbs and the vulnerability of urban landscapes were therefore much greater than had been anticipated (Doogan, 2006).

Two other inquiries were conducted as a result of the bushfires in Canberra and the Victorian region over 2002-03. The 2003 House of Representatives Select Committee Inquiry explored a number of planning and development controls to reduce bushfire risk, while the 2003 Victorian Inquiry (Esplin et al.) highlighted the need for improved planning arrangements for the private/public land interface.

A significant national inquiry into bushfires was undertaken in 2004, under the auspices of the Council of Australian Governments (Ellis et al., 2004). It followed an influential 2002 report on natural disaster management in Australia (COAG), with this being the first report to explicitly recommend mainstreaming of emergency management across policy sectors and emphasise that land-use planning had a major contribution to make in reducing disaster risk. It further recommended that all state and territories introduce planning legislation governing development in areas subject to significant risk of bushfire and other hazards. These key recommendations were subsequently supported by the 2004 Inquiry report (Ellis et al., 2004), a major focus of which was planning for bushfire risk at the rural/urban interface, and the changing nature of land use and settlement patterns. The report noted that, as cities and other settlements “continue to expand into bushland areas across Australia and as small-acreage estates continue to develop, the potential impact of bushfires grows” (Ellis et al., 2004, 9). It drew attention to the increasing length of the urban perimeter as major cities expand and the “increasing complexity of the urban-bushland interface”—the convoluted pattern of subdivision, where rural blocks with dwellings and suburban subdivisions are interspersed with bushland reserves (Ellis et al., 2004, 123). The increasing bushfire risk at the rural/urban interface was also a major theme of the Victorian Bushfire Royal Commission report. Significantly, the Commission highlighted two key spatial planning mechanisms to manage urban growth and land fragmentation in high bushfire risk areas—urban growth boundaries for capital cities and regional settlement policies to manage urban growth in regional cities and towns (Teague, 2010c). Of particular concern to the Commission was the proliferation of small rural lots in fragmented subdivisions around major cities and towns (Teague et al., 2010b).

Earlier bushfire inquiry reports had also reflected on “the increasing popularity of semi-rural developments and subdivisions in bushland areas” (House of Representatives, 1984, 24) and the “large numbers of people living in areas adjacent to bushfire prone parklands, forests and reserves” (NSW Joint Select

Committee, 2002, 61). Management of public land reserves was the focus of a 2008 report (Victorian Parliamentary Environment and Natural Resources Committee), with this issue having broader relevance to spatial planning.

This leads into a discussion of the more recent bushfire inquiry reports—the Victorian Bushfire Royal Commission Inquiry into the 2009 Victorian bushfires (Teague et al, 2010a), the 2009 Australian Parliament bushfires Inquiry (Senate Select Committee) and the Inquiry into the 2011 Western Australian bushfires (Keelty).

The Victorian Bushfire Royal Commission report represents the most comprehensive inquiry into Australian bushfires to date, and planning was a major focus of the report. The Inquiry followed the deaths of 173 people and loss of over 2130 homes in the 2009 Victorian bushfires. Significant aspects of this report have already been discussed, but a further critical theme was the need to restrict development in areas of unacceptably high bushfire risk. The Commission concluded that there are "some areas where the bushfire risk is so high that development should be restricted" (Teague et al., 2010a, 13). Existing and new developments in high-risk bushfire areas raise different issues for spatial planning. The Commission observed that, because planning systems operate prospectively, they have limited capacity to deal with past decisions for existing developments in high bushfire risk areas. Accordingly, it recommended that the State Government "implement a retreat and resettlement strategy for existing developments in areas of unacceptably high bushfire risk, including a scheme for non-compulsory acquisition by the State of land in these areas" (Teague et al., 2011c, 252). Such an approach is potentially legally complex in balancing individual freedoms and the rights of property-holders with reducing unreasonable levels of risk, but it could be an increasingly important planning strategy in the context of climate change and disaster risk management.

New developments raise specific issues for strategic and statutory planning, development approval processes, and resourcing, capacity building and legal liabilities of local government. The Victorian Commission concluded that planning schemes could make a more significant contribution to new developments by setting conditions that would reduce risk in bushfire prone areas and substantially restrict development in areas of highest risk. Importantly, it called for the criteria identifying where new development should be prevented to factor in the "potential effects of climate change on the bushfire hazard in the area" (Teague et al., 2011c, 226). Refusing approval for proposed new developments in areas of extremely high bushfire risk raises issues about possible litigation. The problem of some local councils in high bushfire risk areas not adopting bushfire risk planning controls in their planning schemes was raised as a major issue by the Commission. It recommended that state planning provisions be amended to require a specific bushfire policy in the local planning framework of every council in high bushfire risk areas, based on a model approach to ensure consistency (Teague et al., 2011c). The 2011 Western Australian bushfire Inquiry report noted "a reluctance from some local governments to declare bushfire prone areas" for liability and financial reasons and also that no legislative power existed to enforce planning guidelines for reducing bushfire risk (Keelty, 2011, 35). It therefore recommended that these

planning guidelines be given legislative effect and the responsibility for declaring bushfire prone areas be transferred from local to state government level.

Another issue discussed by the Victorian Bushfire Royal Commission concerned the need to integrate planning and building processes (Teague et al., 2010c). While not discussed further here, an integrated planning and building framework is critical for bushfire risk and emergency management. The Commission also looked at the issue of balancing biodiversity and bushfire risk in the planning system. It noted that "it is not possible to allow people to live safely without clearing land around dwellings and beyond" and recommended that state planning provisions be amended to require that, when assessing a permit to remove native vegetation around an existing dwelling, authorities "take into account fire hazard" and "give weight to fire protection purposes" (Teague et al., 2010c, 230, 245). However, new developments should only proceed where bushfire risk can be "reduced to an acceptable level on a continuing basis—without unacceptable biodiversity costs" (Teague et al., 2010c, 230). Again, these matters are directly relevant to policy integration of bushfire risk management in the weighting given to different sectoral policy objectives.

A further significant aspect of the Commission's report was its focus on the needs of vulnerable communities living in high bushfire risk areas. Relevant concerns here include planning for vulnerable communities, the socioeconomic profile of rural/urban interface communities and social equity issues. Vulnerable communities in high bushfire risk areas include children, the frail aged, and people with a disability and mobility difficulties—and could also include economically disadvantaged individuals (who may have inadequate resources to carry out property maintenance) and people from non-English-speaking backgrounds (who may have communication issues). The Commission observed that 44 per cent of people who died as a result of the 2009 Victorian bushfires could be classified as vulnerable (Teague et al., 2010b). The 2009 Australian Parliament Inquiry report (Senate Select Committee, 2009) similarly noted the importance of infrastructure planning for vulnerable communities. It called for an assessment of high-risk communities to be incorporated into planning regulations and for developments such as schools, hospitals and aged care facilities to be excluded from areas of high bushfire risk where evacuation would be difficult.

Being bushfire prepared: Mrs. Jean Downing, Shoreham, Victoria
Credit: Barbara Norman

The final report discussed here, the Western Australian Inquiry into the 2011 Perth bushfires, followed the loss of over 70 homes across the region. This report is particularly significant in signalling an urgent need to plan for climate change: "recognition should be given to the changes in climate that might require a new approach to prevention against bushfires … there must be a limit to the time that it has taken for governments at the State and Local level to act upon the reality of climate change and reflect this reality in town planning and building approvals" (Keelty, 2011, 11-12). Clearly, planning for bushfire and disaster risk in the context of climate change remains a critical issue, requiring further research and policy attention.

The above analysis of major bushfire inquiries since 1929 provides an insight into the quiet but increasing recognition of the role that spatial planning can play in mitigating current risk and importantly minimising future risk of bushfire to human settlement and communities. The following draws on this analysis and discusses some of the implications for the broader contribution of planning to disaster resilience.

2.3 The contribution of planning to disaster resilience

The Australian bushfire inquiry literature points to a range of spatial planning initiatives that are significant in managing bushfire risk, including climate change planning strategies; planning linked to settlement patterns and demographics; planning and development controls related to settlement location and design; planning policies for the rural/urban interface; resourcing and capacity building for local government planning; and varying planning approaches for existing and new developments in high-risk locations, including 'no-go' areas, and retreat and

resettlement strategies. It also emphasises the need for combined planning and development approval processes linked to improved mapping and zoning approaches to identify areas of high risk and high biodiversity; planning approvals and development controls linked to vegetation management regimes; balancing biodiversity and bushfire risk in the planning system; and planning that takes into account socio-spatial issues, including vulnerable communities living in high-risk areas.

The Australian academic literature on planning and bushfire risk reflects many of the issues discussed in these reports. However, there are emerging signs of exploration of broader issues, such as the role of planning in promoting placemaking, liveable communities and sustainable urban design that factors in bushfire risk (Cohen, 2003; Odger et al., 2003), and the planning implications of the socioeconomic complexity of rural/urban interface populations and individual understandings of bushfire risk (Cottrell and King, 2007; Whittaker et al., 2012), including gendered dimensions (Eriksen et al., 2010). Urban governance, and economic and political issues that impact on the integration of planning and bushfire risk have also been discussed (Buxton and Haynes, 2009; Buxton et al., 2011, Gillen, 2005), as has a regional approach to settlement planning (Buxton, 2010; Kelly, 2010) and the broader role of planning in influencing land-use decisions across sectors (March and Henry, 2007).

Recent academic analysis of issues relating to planning and bushfire risk in the United States, Canada and Europe also reflects an increasing focus on the importance of policy integration in this area. American scholarly research has discussed a range of planning strategies for managing wildfire risk at the wildland-urban interface, including planning at the local government level (Harris et al., 2011; Muller & Schulte, 2011); place attachment and the socio-spatial profile of the wildland-urban interface and how this might affect planning for wildfire risk (Bihari and Ryan, 2012; Paveglio et al., 2009); and expansion of the wildland-urban interface (Hammer et al., 2009; Theobald and Romme, 2007). Similarly, recent research on forest fire risk in the urban-rural interface in Mediterranean areas has focused on planning, zoning, growth management and appropriate patterns of land use (Galiana-Martin et al., 2011, 152).

Working across spatial scales and levels of government, and reflecting a cross-sectoral, interdisciplinary and collaborative approach, spatial planning can enable the risks associated with land use and development to be assessed across a much broader range of considerations—with a particular focus on the rural/urban interface and regional scale. These include adaptive planning approaches at appropriate spatial scales, based on combined socioeconomic and climate scenarios, to respond to disaster and climate risk. Spatial planning can also manage the uncertainties associated with climate hazards and the opportunity costs of precautionary responses (Norman and Sullivan, 2011).

Spatial planning can therefore play an important role in linking climate change adaptation and disaster risk management, particularly at regional scales, and encouraging efficient and equitable climate adaptation. Spatial planning can also promote socio-spatial equity and wellbeing, address planning issues concerning

vulnerable communities and build community resilience in the context of disaster and climate risk. It has a role in infrastructure planning and a range of sectoral policies (transport, housing, energy, health) in managing urban growth and promoting liveable communities and sustainable urban design that factor in disaster and climate risk (Norman, 2010). It can support regional approaches to settlement planning that address regional risk profiles and the socioeconomic complexities of the rural/urban interface. Further, spatial planning interacts with contemporary institutional developments, political-economic structures and shifts in the concept of governance to encourage more flexible urban governance structures and promote decisions that emerge from inclusive dialogue, emphasising the importance of participative, locally informed approaches. It can build shared responsibility, encourage shared learning and, through collaborative planning processes, increase engagement and improve disaster resilience and climate change policy integration. Spatial planning also seeks to progress sustainability goals. The issue of sustainability is fundamental to spatial planning and managing the impacts of urban growth, climate change and disaster risk.

Spatial planning is therefore well placed to progress policy integration of disaster risk management in the context of climate change. That said, spatial planning should not set its goals too far from its ground of influence—it needs to be pragmatic about its scope of influence, given the range of actors involved and the economic, institutional and political power structures regulating planning and development that may "work against the current of planning ambition" (Gleeson, 2011). However, while this means that we may need to contain our expectations about the transformative role of spatial planning, pragmatism about the limits of spatial planning is not the same as going along with the status quo. Contemporary spatial planning is being "revisited" and "reinvented" (Todes, 2011, 115) to play new roles in promoting social equity, liveability, resilience and sustainability. The emphasis here is on the critical importance of engagement, participation, dialogue and collaboration (Bernstein, 1983, 2010; Habermas, 1984, 1987) and an ethical commitment to ensuring all stakeholders have a voice (Bernstein, 1991).

In conclusion, the Australian bushfire inquiry reports tell the story of a broader role for spatial planning—relevant in both Australian and international contexts—in managing disaster risk, building climate and disaster resilience, and progressing sustainability goals. Future visioning of disaster risk and climate change impacts at the regional scale through modelling a range of socioeconomic, climate and risk scenarios offers useful frameworks for engaging rural/urban interface communities in possible futures for their regions. In this regard, there continues to be a critical need to translate spatial planning theory into practice—to "bridge the gap" (Albrechts, 2006, 1487) between ideas of spatial planning and how transformative spatial planning projects in this area might be delivered on the ground.

References

Albrechts, L., 2006. Bridge the gap: from spatial planning to strategic projects. European Planning Studies 14 (10), 1487–1500.

Barber, E., 1977. Report of the Board of Inquiry into the Occurrence of Bush and Grass Fires in Victoria. Government Printer, Melbourne.

Bernstein, R.J., 1983. Beyond Objectivism and Relativism: Science, Hermeneutics, and Praxis. Blackwell, Oxford.

Bernstein, R.J., 1991. The New Constellation: The Ethical-Political Horizons of Modernity/ Postmodernity. Polity Press, Cambridge.

Bernstein, R.J., 2010. The Pragmatic Turn. Polity, Cambridge.

Bihari, M., Ryan, R., 2012. Influence of social capital on community preparedness for wildfires. Landscape and Urban Planning 106 (3), 253-261.

Buxton, M., 2010. Bushfire threat and regional settlement: a new planning dark age? Planning News 36 (8), 11–13.

Buxton, M., Haynes, R., 2009. To plan or perish: preventative planning for bushfire risk. Planning News 35 (11), 8–11.

Buxton, M., Haynes, R., Mercer, D., Butt, D., 2011. Vulnerability to bushfire risk at Melbourne's urban fringe: the failure of regulatory land use planning. Geographical Research 49 (1), 1–12.

Cabinet Office, 2011. Strategic National Framework on Community Resilience. UK Government, London.

Chambers, D., Brettingham-Moore, C., 1967. The Bush Fire Disaster of 7th February, 1967: Report and Summary of Evidence, Tasmania. Government Printer, Hobart.

Climate Commission, 2011. The Critical Decade: Climate Science, Risks and Responses. Commonwealth of Australia, Canberra.

Climate Council of Australia Ltd, 2013. Climate Change and the Australian Bushfire Threat by Professor Lesley Hughes and Professor Will Steffen (Climate Council).

Cottrell, A., King, D., 2007. Planning for more bushfires: implications of urban growth and climate change. Queensland Planner 47 (4), 23–26.

COAG, 2002. Natural Disasters in Australia: Reforming Mitigation, Relief and Recovery Arrangements, (Council of Australian Governments High Level Officials' Group, Commonwealth of Australia, Canberra.

Doogan, M., 2006. The Canberra Firestorm: Inquests and Inquiry into Four Deaths and Four Fires between 8 and 18 January 2003, Vol. 1. ACT Coroners Court, Canberra.

Ellis, S., Kanowski, P., Whelan, R., 2004. National Inquiry on Bushfire Mitigation and Management Council of Australian Governments. Commonwealth of Australia, Canberra.

Eriksen, C., Gill, N., Head, L., 2010. The gendered dimensions of bushfire in changing rural landscapes in Australia. Journal of Rural Studies 26, 332-342.

Esplin, B., Gill, M., Enright, N., 2003. Report of the Inquiry into the 2002-2003 Victorian Bushfires. Victorian Government, Melbourne.

Galiana-Martin, L., Herrero, G., Solana, J., 2011. A wildland-urban typology for forest fire risk management in Mediterranean areas. Landscape Research 36 (2), 151–171.

Gillen, M., 2005. Urban vulnerability in Sydney: policy and institutional ambiguities in bushfire protection. Urban Policy and Research 23 (4), 465–476.

Gleeson, B., 2010. Lifeboat Cities. UNSW Press, Sydney.

Gleeson, B., 2011. 'Make no little plans': anatomy of planning ambition and prospect. Geographical Research.

Goode, N., Spencer, C., Archer, F., McArdle, D., Salmon, P., McClure, R., 2011. Review of Recent Australian Disaster Inquiries. Monash University, Melbourne.

Habermas, J., 1984. The Theory of Communicative Action: Reason and the Rationalisation of Society. Vol 1. McCarthy, T. (Trans.). Boston: Beacon Press.

Habermas, J., 1987. The Philosophical Discourse of Modernity: Twelve Lectures. Lawrence, F. (Trans.). Cambridge, Mass: MIT Press.

Handmer, J., 2003. Institutions and bushfires: fragmentation, reliance and ambiguity. In: Cary, G., Lindenmayer, D., Dovers, S. (Eds). Australia Burning: Fire Ecology, Policy and Management Issues. CSIRO Publishing, Collingwood.

Harris, L., McGee, T., McFarlane, B., 2011. Implementation of wildfire risk management by local governments in Alberta, Canada. Journal of Environmental Planning and Management 54 (4), 457–475.

House of Representatives Standing Committee on Environment and Conservation, 1984. Bushfires and the Australian Environment. Commonwealth of Australia, Canberra.

Intergovernmental Panel on Climate Change, 2007. Climate Change 2007—Impacts, Adaptation and Vulnerability: Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Parry, M., Canziani, O., Palutikof, J., van der Linden, P., Hanson, C. (Eds). Cambridge University Press, Cambridge.

Kanowski, P., Whelan, R., Ellis, S., 2005. Inquiries following the 2002-2003 Australian bushfires: common themes and future directions for Australian bushfire mitigation and management. Australian Forestry 68 (2), 76–86.

Keelty, M., 2011. A Shared Responsibility: the Report of the Perth Hills Bushfire—February 2011 Review. Government of Western Australia, Perth.

Kelly, K., 2010. PIA policy response to the Victorian bushfires of February 2009. Australian Planner 47 (1), 48–51.

March, A., Henry, S., 2007. A better future from imagining the worst: land use planning and training responses to natural disasters. Australian Journal of Emergency Management 22 (3), 17–22.

McDougall, A., Maharaj V., 2011. Closing gaps on the urban fringe of Australian capital cities: an investment worth making. Australian Planner 48 (3), 131–140.

McGuirk, P., Argent N., 2011. Population growth and change: implications for Australia's cities and regions. Geographical Research 49 (3), 317–335.

McLeod, R., 2003. Inquiry into the Operational Response to the January 2003 Bushfires in the ACT. ACT Government, Canberra.

Miller, S., Carter, W., Stephens, R., 1984. Report of the Bushfire Review Committee on Bushfire Disaster Preparedness and Response in Victoria, Australia, following the Ash Wednesday Fires of 16 February 1983. Government Printer, Melbourne.

Muller, B., Li, Y., 2010. Regional governance and hazard information: the role of co-ordinated risk assessment and regional spatial accounting in wildfire hazard mitigation. Journal of Environmental Planning and Management 53 (1), 1–21.

Muller, B., Schulte, S., 2011. Governing wildfire risks: what shapes county hazard mitigation programs? Journal of Planning Education and Research 31 (3), 60–73.

NEMC, 2011. National Strategy for Disaster Resilience: Building Our Nation's Resilience to Disasters, National Emergency Management Committee, Council of Australian Governments, Canberra.

National Parks Association of the ACT, 2011. Namadgi: A National Park for the National Capital. National Parks Association of the ACT, Canberra.

Norman B., 2010. A Low Carbon and Resilient Urban Future: an Integrated Approach to Planning for Climate Change Department of Climate Change and Energy Efficiency. Commonwealth of Australia, Canberra.

Norman, B., Sullivan, K., 2011. Planning for risk and uncertainty: new approaches for managing urban growth. Paper presented at the Australasian Fire and Emergency Service Authorities Council and Bushfire Cooperative Research Centres Conference 2011, Sydney.

http://knowledgeweb.afac.com.au/conference/day3/presentations/Planning_for_Risk_and_Uncertainty_New_approaches_to_managing_urban_growth (accessed May 2012).

New South Wales Joint Select Committee on Bushfires, 2002. Report on the Inquiry into the 2001-2002 Bushfires. NSW Parliament, Sydney.

New South Wales Legislative Assembly, 1994. Report of the Select Committee on Bushfires. Parliament of NSW, Sydney.

Odger, B., Ryan, M., Wells, K., 2003. Forests, trees, people and fire. Australian Planner 40 (4), 37–38.

Paveglio, T., Jakes, P., Carroll, M., Williams, D., 2009. Understanding social complexity within the wildland-urban interface: a new species of human habitation? Environmental Management 43, 1085–1095.

Petris, S., 1996. A Review of All State and Federal Reports on Major Conflagrations in Australia During the Period 1939-1994. Emergency Management Australia, Canberra.

Richardson, R., 2009. A Survey of Bushfire Report and Inquiry Findings: South Australia, Victoria and the Australian Capital Territory. Research paper 13. South Australian Parliament Research Library, Adelaide.

Rodger, G., 1961. Report of the Royal Commission Appointed to Enquire into and Report upon the Bush Fires of December 1960 and January, February and March 1961 in Western Australia, Perth. Government Printer, Perth.

Senate Select Committee on Agriculture and Related Industries, 2009. The Incidence and Severity of Bushfires across Australia. Commonwealth of Australia, Canberra.

Senate Standing Committee on Industry, Science, Technology, Transport, Communications and Infrastructure, 1994. Disaster Management. Parliament of the Commonwealth of Australia, Canberra.

Simeonova, V., van der Valk, A., 2009. The need for a communicative approach to improve environmental policy integration in urban land use planning. Journal of Planning Literature 23 (3), 241–261.

Stretton, L., 1939. Royal Commission to Inquire into the Causes of and Measures Taken to Prevent the Bush Fires of January, 1939, and to Protect Life and Property. Government Printer, Melbourne.

Teague, B., McLeod, R., Pascoe, S., 2010a. Victorian Bushfire Royal Commission: Final Report—Summary. State of Victoria, Melbourne.

Teague, B., McLeod, R., Pascoe, S., 2010b. Victorian Bushfire Royal Commission: Fire Preparation, Response and Recovery—Final Report Vol. 2, pt 1. State of Victoria, Melbourne.

Teague, B., McLeod, R., Pascoe, S., 2010c. Victorian Bushfire Royal Commission: Fire Preparation, Response and Recovery—Final Report Vol. 2, pt 2. State of Victoria, Melbourne.

Teague, B., McLeod, R., Pascoe, S., 2010d. Victorian Bushfire Royal Commission: the Fires and the Fire-Related Deaths—Final Report. State of Victoria, Melbourne.

Theobald, D., Romme, W., 2007. Expansion of the US wildland-urban interface. Landscape and Urban Planning 83 (4), 340-354.

Todes, A., 2011. Reinventing planning: critical reflections. Urban Forum 22, 115–133.

UN-Habitat, 2011. Cities and Climate Change: Global Report on Human Settlements 2011. United Nations Human Settlement Programme. Earthscan, London.

United States Department of Homeland Security, 2008. National Response Framework. FEMA, Washington, DC.

University College London & Deloitte, 2007. *Shaping and Delivering Tomorrow's Places: Effective Practice in Spatial Planning , Report, findings and recommendations*, report prepared for RTPI, CLG, GLA and Joseph Rowntree Foundation, London

Whittaker, J., Handmer, J., Mercer, D., 2012. Vulnerability to bushfires in rural Australia: a case study from East Gippsland. Victoria Journal of Rural Studies, 28 (2), 161–173.

3. Planning for Australia's bushfire risk: experiences from four jurisdictions

Key words: bushfire aware planning; bushfire risk; disaster risk; bushfire/wildfire; urban and regional planning; urban-bush interface

Jessica Weir

At its heart, planning is about how decisions we make today can have positive outcomes for our settlement into the future. In many of Australia's high bushfire risk jurisdictions, planners and fire authorities have developed substantial laws and guidelines for reducing bushfire risk, as part of the broad trend of 'mainstreaming' bushfire risk responsibility across diverse government sectors (Eburn and Jackman, 2011; Handmer and Dovers, 2013). This chapter reports on four focus group discussions held between fire authorities, planners, and other public officials engaged with the intersection of bushfire risk and planning in four jurisdictions: the Australian Capital Territory (ACT); the Northern Territory (NT); New South Wales (NSW); and, Victoria. The chapter begins with a discussion on bushfire risk in Australia, followed by the contribution of the planning profession (section 3.2). Section 3.3 explains the methodology used in the research. Section 3.4 presents the results, leading to the chapter's discussion and conclusion.

3.1 Australia's bushfire risk

Bushfire risk is much more than fire occurrence and behaviour, it is a melding of natural and social values and phenomena. This complexity is widely articulated in the emergency management sector, which identifies that bushfire risk arises out of the combination of the hazard (the bushfire prone landscape which is both physically and socially defined and created); what is considered at risk (usually, people, property, and ecological communities); and, the vulnerability or resilience of those considerations to the hazard (how they are affected by the hazard). For example, the Federal Government's Emergency Management Australia writes:

> *In emergency risk management, risk is used to describe the likelihood of harmful consequences arising from the interaction of hazards, communities and the environment. A hazard is the source of risk, while the community and environment contribute the elements that are at risk; that is, are vulnerable. Vulnerability is the balance between susceptibility (the level to which a particular hazard event will affect a community or environment) and resilience (the ability of a community or environment to recover from the impact of a hazard event).* (EMA, 2002, 12).

Australian fire management legislation emphasises the protection of people and property as those values considered at risk, with environmental values becoming increasingly recognised.[1] The effect of bushfires on these values is often described in physical terms (see Stephenson, 2010) but there are many other impacts

[1] For example, the *Environmental Planning and Assessment Act 1979* (NSW), s.79BA; *Fire and Emergency Act* (NT), long title, ss.4, 5.

including emotional suffering for families and individuals, community distress, reduced quality of life, and political situations (EMA, 2002, 5; Hughes and Mercer, 2009, 125).

In Australia, bushfire occurrence is most prevalent on the northern monsoonal savannahs, where annual grass growth can support continental scale fires of low intensity, however the bushfire risk is considered lower because there are less lives and properties at risk (Russell-Smith et al., 2009, 5, 14; Ellis, Kanowski and Whelan, 2004, 12). Bushfire risk is considered greatest in the southeast mountainous forests, where less widespread bushfires occur close to, and transgress, residential, industrial and farming communities. Within these high risk areas, different people will have different levels and perceptions of risk. For example, the owners of insured holiday homes are less worried about bushfires than farmers whose homes are also their work place, with responsibilities for many other lives including livestock (Whittaker et al., 2012, 166, 177). Children, the elderly and fire sensitive ecological communities have particular vulnerabilities to the hazard and thus a higher risk.

Establishing the bushfire risk for particular people, places, seasons and years is challenging. The dynamism of fire occurrence and behaviour is difficult to predict and model, and bushfires often occur outside of landscapes classified as 'bushfire prone' although, there are certain characteristics of bushfire prone lands that clearly identify them as high risk. Further, bushfire risk is always changing. It is responsive to and interacts with vegetation growth, land use changes, climate shifts, economic development, societal values, new laws and policies and so on (Cary et al., 2012, 149). The situation is only becoming more complicated with growing peri-urban complexity, pressure on marginal land use, and predictions of more high intensity fires because of the effect of climate change and the spread of fire weeds (Hughes and Steffen 2013; Setterfield et al., 2010; Lucas et al., 2007). Estimations of bushfire risk for individuals living in high risk areas indicate that the annual probability of their home being affected is very slight, although this risk increases as time passes (McAneney et al., 2009, 2821). However, for local authorities with planning responsibilities for bushfire prone communities, the annual probability of a bushfire event within their jurisdiction is much greater. They must necessarily engage with the dynamic complexity of planning for bushfire risk.

3.2 Planning for bushfire risk

The link between planning and reducing our bushfire risk is immediately obvious, and was a particular focus in the Victorian Bushfire Royal Commission that followed the horrific events of Black Saturday 2009 (Teague et al., 2009). Planners have an instrumental role in how we live in the landscape, and thus how we live with the hazard. Planners draft land use plans for governments and then regulate those plans. However, decision making rests with the authorities, whether that is a local council or shire, a specific authority or the Minister (EMA, 2002, 2). Critically, the capacity for planners to be responsive to bushfire risk is constrained or facilitated by the perceptions of bushfire risk held by these decision makers, as well as in the

community, including how bushfire risk is appreciated and understood in relation to other priorities.

Planning can be simplified as occurring through three methods: strategic planning, which identifies and describes the issue; statutory planning, which creates the structures for practice; and, the implementation and interpretation of the strategies and structures. The strategic plan creates a vision of the future, and then reinterprets and redefines the priorities of the present so as to meet that future (Kornberger, 2012, 85). This is where bushfire risk is evaluated and included in the plan, or not, and the direction of the response is set. Statutory planning regulates land use and development in line with the strategic plan. Statutory planning includes legislation, regulations, codes and guides. The statutory planner uses this framework to implement and interpret planning decisions, such as assessing development applications for subdivisions and individual dwellings. Engagement with the community occurs as part of social planning, which is responsive to the people who live and work in the local area, their activities and priorities (NSW DLG, 2002).

Within these planning methods, planners have different strategies, controls and treatments to reduce bushfire risk and its impact. These are summarised as:

- the formal zoning and mapping of places as high risk on both private and public lands, and management prescriptions for these places, including fire trails and fuel reduction
- site specific requirements for buildings in zoned bushfire risk areas, including construction, design and materials, siting and aspect, minimum defendable space, fuel reduction and ongoing maintenance of the protection zone
- settlement and subdivision design to support emergency services and reduce bushfire risk. For example, perimeter roads to provide access for emergency service vehicles, space for defensive operations, and additional asset protection (‘setback’ from the bush), and the provision of water access points for fire fighting activities
- strategically locating settlements and subdivisions in relation to high bushfire risk vegetation and topography. For example, placing development in a cluster to reduce the urban edge and avoid developing on more hazardous sites (Paterson, 2007, 54)
- minimising peri-urban areas through restricting minimum lot size and subdivision of bush blocks, and
- community engagement and education in the preparation and delivery of bushfire plans.

However, there is no simple straight-forward link between strategy, plan and implementation. Planning is a vast undertaking that occurs simultaneously through multiple different institutions, actors, jurisdictions and processes, with different objectives being pursued that may be complementary or contradictory. Governments, businesses, communities, interest groups, individuals and others work with this system to achieve planning outcomes that suit their priorities. Governments and the legislature have the source of power for planning

interventions, but they have to produce the right mix of policies and incentives to encourage desirable development, as well as responsibly manage the ongoing regulation of that development (Gurran, 2011, 37-38). The public has legal rights to be consulted, can object to planning decisions, and is supported by the common law tradition of protecting individual property rights (Hughes and Mercer, 2009, 125-6; Kelly, 2010, 49). Controversially, planning authorities commonly require financial contributions from developers as part of the development application process, and depend on this money for public infrastructure as well as to administer the planning system (Gurran, 2011, 40). Whilst planning is ostensibly a technical professional, with much attention focused on the managerial expertise needed to regulate land use and settlement, the role of planners is much more nuanced and politically engaged. The planning profession can be influenced by those in positions of powers, to produce outcomes that are counter to civil society (Gleeson, 2012).

Within the constraints and opportunities that they do have, planners are also regularly overwhelmed by the challenge of balancing diverse and dynamic factors such as demographic, economic, social, political and ecological relationships. For planners, bushfire risk is evaluated against many other concerns, including infrastructure, transport, amenity, sustainability, biodiversity, community services and cohesion, and so on. Planners receive pressure from developers, landowners, politicians and others to include or exclude matters in planning strategy, or to make exemptions to planning restrictions in development applications (Bihari et al., 2012, 4). Local authorities are subject to re-election and thus find it politically difficult to enforce and regulate unpopular plans (Troy and Kennedy, 2007, 8; Bihari et al., 2012, 10). If bushfire risk is not perceived as a risk by the community and government, in the immediate or longer term, it is unlikely for bushfire aware planning to be prioritised in strategy and regulation. Undesirable outcomes are also a result of bad decisions and failures in the system. For example, planning regulations are weakened when what is intended as a one-off exemption becomes a precedent for the new normal. The difference between the best planning to reduce bushfire risk and the development that does occur arises out of this constant interaction between different agendas, incremental decision making, the inertia of the status quo, and the complexity of pursuing comprehensive objectives. Properties will always continue to be built in high wildfire risk localities and peri-urban areas (Hughes and Mercer, 2009, 126; Buxton et al., 2011, 7; Stephens and Collins, 2007, 34). In Canberra, the new subdivision of Molonglo (photo below) was facilitated by the January 2003 fire storm that destroyed the former resident pine plantation.

Molonglo Subdivision, Australian Capital Territory
Credit: Jessica K Weir

Planners can now find support in emerging leading practice that much more clearly articulates the link between planning, risk and emergency management, and which embraces the challenge of integrating knowledge and practice across risk, uncertainty and environmental issues. Australia's National Strategy for Disaster Resilience has reframed natural hazards management around the broad concept of 'disaster resilient communities' (COAG, 2011). Disaster resilient communities function well under stress, are successfully adapted, self-reliant and have social capacity (COAG, 2011, 5). This approach requires strategic planning to be integrated with emergency management planning so that risks and their treatment can be considered across the social, built, economic and natural environments (COAG, 2011, 3). This national strategy further broadens bushfire risk out to be part of an all-hazards approach—floods, landslides, cyclones, hailstorms and so on—as single hazard plans fail to incorporate cascading impacts (EMA, 2002, 25; Paterson, 2007, 60). For example, bushfires can result in an increase in landslides and flood risk because of their effect on vegetation (EMA, 2002, 25), and prescribed burning of riparian vegetation to reduce bushfire risk may effect stream erosion and increase flood risk.

Leading practice situates bushfire aware planning within the goals of sustainability as part of societal recognition of the integration of environmental issues across diverse issues and sectors. Support for ecological health, natural processes and systems can be part of supporting landscapes to be resilient in reducing risk from hazards (Paterson, 2007, 62; EMA, 2002, 18). Support for the socio-economic health of rural communities is key to their capacity to manage bushfire risk (Whittaker et al., 2012, 172). From the United States, Paterson advocates for "smart safe growth"—the integration of risk, planning and sustainability to enable the identification of diverse but matching goals (2007, 45, 54). For example, development can be steered away from high hazard lands through the use of conservation monies to purchase such lands, and thereby meeting other community objectives—open space preservation, recreation, environmental protection as well as hazard reduction (Paterson, 2007, 54). If goals such as sustainability and risk

management are treated separately, the pursuit of one can have adverse outcomes for the other (2007, 60 citing Burby 2005). Paterson argues that hazard mitigation should be seen as a central part of sustaining the local economy, rather than a restriction on economic development (2007, 54).

An integrated planning and risk framework is essential because planning and risk are embedded in each other. Planning is regularly identified by public officials, the community, and inquiries as both cause of, and solution to, bushfire risk (Bosomworth, 2011, 144; Ellis et al., 2004, 79; Bihari et al., 2012, 4). In considering these interests, planners must navigate science and politics, democracy and expertise, as part of their role in the governance of how we choose to live (Kornberger, 2012).

3.3 Methodology

This section explores the relationship between planning and bushfire risk by drawing on the experiences of public officials responsible for bushfire aware planning through focus group research. Four focus groups were convened between August and December 2012 by the University of Canberra, as part of a larger project on "Mainstreaming Fire and Emergency Management across Legal and Policy Sectors", for the Bushfire Cooperative Research Centre. Each focus group presented a different jurisdictional and landscape context.

Focus groups are a qualitative research methodology that brings together a group of people to discuss a topic for one or two hours, usually in a semi-structured facilitated format with set questions as a starting point. Focus groups enable:

- in-depth group discussion between participants who have either a shared concern, or a shared experience
- facilitated discussion on a topic with one or more moderators, and
- interaction between participants to explore and clarify points of view between each other (Liamputtong, 2011, 5).

This group discussion takes the focus away from the researcher. In the intra-group interaction, "accounts are articulated, censured, opposed, and changed through [the] social interaction", reflecting "peer communication and group norms"' (Kitzinger, 2005, 58). However, the group setting can also mean that some participants may dominate, that others may conform, and that personal information is not revealed (Liamputtong, 2011, 8).

For this project, the main focus group participants were the fire authorities and planners from local and regional organisations, however also represented were foresters, a weeds manager, parks, and occasionally officials involved in climate change, sustainability and economic development at the state/territory level. Public officials were selected for both their expertise and their professional role, and individuals were identified through advice given by industry partners at each location (listed below), as well as consultation with the local municipal authorities. The focus groups were limited to 14 participants. To manage the research scope, elected officials, the community and the private sector were excluded.

Each focus group was situated in a different jurisdiction and landscape context:

- The first focus group was held in the Australian Capital Territory (ACT) in partnership with the ACT Rural Fire Service, and considered the new residential subdivision of Molonglo. Molonglo is on the bushfire prone western edge of Canberra, adjacent to national parks and mountains.
- The second focus group was held in the Northern Territory (NT) in partnership with Bushfires NT and considered the issues facing the Litchfield Shire Council area, which includes the growing complexity of peri-urban Darwin. Here, marked wet and dry seasons facilitate annual fuel growth on the monsoonal savannah woodlands, as well as water logged lands.
- The third focus group was held in New South Wales (NSW) in partnership with the NSW Rural Fire Service, and considered the two neighbouring shires of Shoalhaven and Eurobodalla. This is a mountainous coastal area in southern NSW, with steep forested slopes leading to flat coastal floodplains.
- The fourth focus group was held on the Mornington Peninsula, Victoria, in partnership with the Victorian Country Fire Authority. This narrow coastal peninsula on the edge of Melbourne has a complex urban-bush landscape with coastal towns and rural land use.

The four focus group locations provided a diversity of bushfire risk experiences and regulatory schemes, and the opportunity to compare experiences in the different risk contexts of northern and south eastern Australia and across diverse landscapes. The ACT, NSW and Victoria all have detailed regulatory schemes for bushfire risk and planning, with accompanying guides for community and government use (NSWRSF, 2006b; ACT Government, 2009a; ACT Government, 2009b; ACT Government, 2009c; CFA, 2012). The Northern Territory has a less prescriptive bushfire and planning risk scheme, with brief legislative provisions and a short guide on landholder responsibilities (CFA, 2012), but no comprehensive law, policy or other direction on the integration of bushfire risk and planning.

In each of these four locations the focus group participants were asked the same six questions about integrating bushfire risk into urban and regional planning, and these were: what are we doing well; what are we not doing well; why—what are the barriers to doing better; is integrating bushfire risk into urban and regional planning important; what is the influence of climate change on this work; and, what are your priorities for this research project? Participants made their contributions anonymously, albeit in front of their colleagues.

Planning was described to the focus group participants as ‘urban and regional planning’ and as including ‘land use planning’ in relation to bushfire risk. This encompasses the diverse planning methods of strategic and statutory planning and its implementation. Discussion in the focus groups usually kept to these planning topics, however the discussion would flow into other related issues, and planning was sometimes interpreted more as general planning, rather than the responsibilities of the planning profession, by some of the public officials.

It is worth noting that each focus group had its own distinct dynamic. For example, in Litchfield Shire Council, the discussion was very energetic and participants expressed the value of taking time out to meet with each other and establish collaborative networks. Whereas in the ACT, the participants had already met over 100 times to discuss planning for Molonglo, although afterwards many participants commented that it was cathartic to talk more broadly and without having an agenda to push.

The results from the focus groups were summarised under each question and then compared and analysed across the four jurisdictions to draw out the key issues and themes. The results are grouped under three interrelated themes: biosocial risk context, governance, and management. In all focus groups bushfire risk was acknowledged as a very serious matter. It was the question of how to manage this risk in urban and regional planning, particularly the effectiveness of the methods employed and the pressure of other objectives, which revealed the complexity of the issues faced across the different focus groups.

3.3.1 Focus Group results

Biosocial risk context

A dominant theme across the focus groups was the prevalence of different perceptions of risk held, and how this fundamentally affected the work of the agencies. For example:

> *Our first challenge that we've had is just simply saying, "Bushfire is a constraint on land use planning." If you don't buy into that, you're not going to buy into any of the responses. … [It's been] a massive step change in the last two or three years.*
> Focus Group participant, Mornington Peninsula, 14 December 2012

> *Planning for a long time has said "you don't build on flood affected land"…. Whereas [with] bushfires, we haven't got that same mentality or view in the community. With bushfires, we are expected to prevent the risk or manage the risk.*
> Focus Group participant, Shoalhaven-Eurobodalla, 8 November 2012

> *There are risks not just in terms of the physical fire exposure, it's the ecological values that are present.*
> Focus Group participant, Molonglo, 16 August 2012

> *Our level of concern about the risk isn't keeping pace with the changes in that population and the way that area is being developed. So while we're getting a lot more people and there's a move to smaller blocks and a higher density, the associated concern, about the risk of fire in those areas, isn't there.*
> Focus Group participant, Litchfield Shire Council, 19 October 2012

In each risk and regulatory context, participants grappled with this fundamental issue of how to live with and value bushfire risk, and regularly brought the wider

social-environmental context into the discussion. Planners often played a pro-active role in this, bringing in other risks or priorities that they are required to consider.

The different concerns of planners and fire authorities were evident in the Litchfield Shire Council focus group, when the fire authorities discussed the bushfire risk consequences of new urban growth settlements being placed in previously semi-rural areas.

Litchfield Shire, Northern Territory
Credit: Jessica K Weir

For the fire authorities, fire risk and its mitigation had been understood and managed in terms of five acre and 20 acre holdings, which allowed for considerable flexibility in the placement of hazard reduction burns and fire breaks, however the introduction of smaller blocks is forcing a change in this practice, whilst also increasing the lives and properties at risk. In addition, this urban growth challenge is occurring at the same time as bushfire intensity is increasing from the spread of African fire weeds such as Gamba grass. Gamba grass can grow up to four metres high, and has a dense fuel bed that generates far greater heat and smoke intensity compared with native grasses that grow about 50 centimetres in height (Setterfield et al., 2010). In subdivision design, the areas reserved for vegetation usually coincide with water logged lands, often following water courses, and when they become infested with fire weeds they become high risk areas that are difficult to access and manage. As one participant evocatively described it:

> *Every single development has got a wick into it.*
> Focus Group participant, Litchfield Shire Council, 19 October 2012

Speaking from the viewpoint of subdivision planning, this participant described how the risk evolved:

> *We used to try and exclude wet areas, particularly for the reason of conserving biodiversity and making sure that people still had access to pretty recreational areas. What's happening … is that they are the first which are*

infiltrated by invasive grasses such as Gamba grass and Mission grass. … So a lot of [the] original biodiversity values have now already been lost. While they might have been a good idea at the time, when the subdivision plan initially went through, that can change very rapidly just over a number of years, say, three or four, with the introduction of invasive grasses.
Focus Group participant, Litchfield Shire Council, 19 October 2012

After the focus group, the fire authorities shared maps that document the extensive annual prevalence of fire within the Shire, to further illustrate their discussion on how dramatically this risk landscape will be affected by the combination of spreading fire weeds and new subdivisions. The growing complexity of this risk landscape, fuelled annually by grass growth, was clearly being expressed as of great concern for the work practices and responsibilities of the fire authorities. However, toward the end of the focus group discussion, one of the planners explained how the emphasis of the planning design was on ensuring the sustainability of freshwater sources in Litchfield Shire. The urban design was intended to reduce the reliance on bore water and increase the use of town water, as they explained:

We have to look at smaller blocks to limit water usage in just spraying it on the gardens, which is problematic. The Territorians won't give up their gardens easy, especially in Litchfield area where you've got a bore hole and you can use it as you want to. But the aquifer is very, very dynamic … [and] consists of intrusion of salt water in the dry months and the more you extract, the more that salty, briny water intrudes into the aquifer and it can only go up to a point where after that, that's the no-return point. If we allow too much extraction, it will actually damage the whole aquifer, and that's what we want to prevent. So we're looking at smaller lots as part of that whole process to start to bring in more town water …
Focus Group participant, Litchfield Shire Council, 19 October 2012

The landward migration of the saltwater-freshwater interface is a pressing issue that fundamentally threatens settlement in coastal areas, including this one (Ivkovik, 2013). Here, the aquifer is replenished in the wet season, but groundwater levels drop dramatically in the dry season when freshwater demand also increases, and this facilitates the infiltration of seawater. Groundwater levels in the dry have been declining for many years and this is predicted to continue with current and future development and climate trends (Ivkovik, 2013, 1, 52), whilst seawater levels are rising because of ice loss from glaciers, ice caps and ice sheets, and the thermal expansion of sea water with higher global temperatures.

In the focus group, the planner followed on his point about the aquifer with the other planning objectives considered in the urban design, including some of the issues the fire authorities raised about how sparse settlement patterns and commuter populations affected emergency volunteer capacity:

We're not going to just go and do the whole of Litchfield in smaller lots but in specific areas to protect the larger lots and the lifestyle in the rest of

Litchfield, but that immediately also means more services, more work-related things that goes into Litchfield. People will live there and be able to work there, because we're looking at all these rural activity centre nodes with an economic catchment around them to promote job opportunities. And that could mean that people will be there in serving the fire, the fire trucks and things, but it will also lessen the usage of water extraction direct out of the aquifer. But it will put greater pressure on the two dams that are serving Darwin.
Focus Group participant, Litchfield Shire Council, 19 October 2012

The planner was establishing the importance and validity of their decision making process, even though one of the effects is a more complex bushfire risk mitigation landscape. They revealed the multiplicity of decisions and their consequences, including how planning decisions are imperfect, and how they necessarily have to be responsive to regional, national and global change.

The dynamic risk environment was a central issue for the Mornington Peninsula focus group, with the emphasis on what people in the community are thinking and doing. Mornington Peninsula is a popular holiday destination for nearby Melbourne and participants were worried about how peak bushfire days coincide with peak visitors in the summer—increasing the numbers of people at risk at the same time as placing pressure on key infrastructure required to protect them. Mornington Peninsula is a hilly rural-urban integrated landscape, with multiple tourist destinations dispersed along narrow tree lined country roads, including a popular chairlift that carries people through bushland to Mornington's highest peak.

Forested road, Mornington Peninsula, Victoria
Credit: Jessica K Weir

This context offers numerous challenges for tourism operators faced with a bushfire:

With your winery in the beautiful bushland setting, what are you going to do if there's a fire down the road? What advice are you going to give to the 200

guests at your venue, how they can exit a site? Where are they going to go? What sort of warnings? … The chairlift people said that on a code red day, they'll have the facility closed. It still doesn't stop people going into the summit and looking around.
Focus Group participant, Mornington Peninsula, 14 December 2012

The focus group noted that local authorities were constrained from better responding to these seasonal dynamics, because their planning and budget allocations are based on census data collected in August. The census data does not reflect the possible doubling or trebling of the local population in summer, and is inadequate for considering the seasonal risk needs for road, water and other infrastructure.

The risk concerns of the Mornington Peninsula focus group are profoundly influenced by the tragic events of Black Saturday. In January 2009, catastrophic fires burnt through 430,000 hectares of land to the northeast of Melbourne. As a result, 173 people died and 5000 people were injured, over one million animals died, and 2029 homes and 61 commercial premises were lost (Teague et al 2009; RSPCA, 2009, 22). A Royal Commission was held and the State Government accepted all of its recommendations, including strong state-wide strategic, policy, and legal responses.

The focus group participants, meeting a few years after the Black Saturday events, discussed how both the tragic fires and the state-wide risk adverse response affected their work, as one participant said:

Initially, we looked at hazards and risks and we did it on a map of the peninsula, and we just drew a big circle right around the whole peninsula essentially. And I think that was really, really poor in that regard, but it was knee jerk [reaction] from the Royal Commission. Since then, we've been able to refine that based on what we know … to more of a reality as opposed to a perceived risk …
Focus Group participant, Mornington Peninsula, 14 December 2012

The tension between being able to assess the risk and give people at risk the appropriate advice was constantly returned to, as in this exchange:

A: *Sometimes the message is too generic. There's been a lot of ads and a lot of media at the moment around prepare your block and bushfire safety and all the rest of it, and it's every community is at risk if you live anywhere near a park, a tree, a blade of grass. … And what we're finding down the peninsula is that you've got people in areas that are probably not that much of a high risk who … they fear the risk. Complete paranoia.*

B: *And it's not resulting in any action. It's resulting in finger pointing… But, either way, I think we're scared of saying that, aren't we? We're scared of getting off generic message because then we play in that subjective space and we're worried about - we don't ever want to tell anyone any more, "no, you'll be fine where you are"...*
Focus Group participants, Mornington Peninsula, 14 December 2012

Presumably the term “subjective space” is used here to describe a warning message that goes into more detail on what the specifics of the actual risk might be, rather than the current generic bushfire risk message. The problem with generic messages is that they can also support community ambivalence:

> *We keep saying it’s going to be the worst season ... They see us as crying wolf. Every year, people try to emphasise the fire risk. And the public get sick of hearing it and they say, “You say it every year.” And it lessens the impact when there really is a bad year.*
> Focus Group participant, Mornington Peninsula, 14 December 2012

However, delivering more specific risk warnings is difficult because the consequences for incorrect advice can be life threatening for those at risk. There are also professional and institutional consequences that arise out of the cycles of inquiry and blame that follow destructive bushfire events (Ellis et al., 2004). Further, being specific about the risk is very difficult. Bushfire risk is influenced by factors that constantly change, including temperature, wind direction, and vegetation growth. Indeed, the areas mapped as bushfire prone and the areas where bushfires occur, are not always the same place—for example, many bushfires start in paddocks, heavy with spring growth that has dried off in summer, that do not meet the terrain, slope and vegetation matrix that renders them zoned as bushfire prone areas by planning regulations.

Governance

Governance concerns, particularly law, policy and regulation, formed the bulk of the participant responses, with distinctly different contexts between northern and south east Australia. Participants in the Litchfield Shire Council focus group appreciated their less prescribed regulatory scheme for the flexibility it offered in their decision-making. Focus group participants from the south eastern jurisdictions both appreciated and grappled with their multi-layered regulatory context, which includes numerous comprehensive supporting documents and guidelines. In all focus groups, the public officials described how their governance roles involved strategising to find solutions for integrating planning objectives with bushfire risk, including: the strategic location of settlement and subdivisions, access roads, space for additional asset protection, formal zoning for asset protection activities, site specific requirements for houses, and community engagement. The reoccurring intersection of bushfire and environmental issues was raised in each focus group.

The Molonglo focus group discussed at length the governance issues for this subdivision, which is on the western fire prone edge of Canberra, adjacent to the forested lands of the Snowy Mountains. The subdivision was created after the tragic January 2003 bushfires, in which four people perished and 588 homes were lost, and the pine forests were destroyed where Molonglo is now located.

The Molonglo subdivision has a unique planning regime as the ACT has only two tiers of government and is the sole land holder of Molonglo with lands leased out to other parties. Thus, as one focus group participant put it, it is easier to integrate and coordinate across issues, without answering to a multiplicity of different land owners and other authorities, and that this should facilitate better outcomes. Indeed, the

ACT government agencies are formally required to regularly meet and collaborate to reduce inefficiencies, as one fire authority focus group participant said:

> *[N]o-one can go off on a complete tangent … whereas in other jurisdictions … parties can withdraw from the process and then just use their legislative authority to say yay or nay at the end of the process, but we're required to stay with it.*
> Focus Group participant, Molonglo, 16 August 2012

The focus group also discussed how the regulatory and strategic context provided valuable guidance, as this participant said:

> *[W]hen things get tight because of competing priorities or finances in the implementation stage, we have this strategic overlay to fall back on to help us work through what did we really set out to achieve*
> Focus Group participant, Molonglo, 16 August 2012

Indeed, there are multiple layers of regulation and guidance for planning for bushfire risk—strategic plans, maps, guidance on specific sites, and so on—similar to the Victorian and New South Wales jurisdictions. This governance context includes interactions with environmental policy, legislation, and regulations, as well as a very active and informed community who have strong third-party appeal rights to planning decisions. Focus group participants spoke repeatedly about Molonglo's exhaustive subdivision planning process, much of which centred on balancing three objectives: maximising housing supply and affordability, meeting ecological responsibilities, and minimising bushfire risk.

Fuel reduction activity, Australian Capital Territory
Credit: Jessica K Weir

The planning work involved comprehensive mapping of bushfire risk and ecological values, including consultations with the community, bringing much knowledge to support decisions:

> *The more we drilled down, the more detail we find; the boundaries just keep changing. And it was only the really detailed work in the last three*

years that has given us a fairly confident fix on where the environmental zoning boundaries really lie.
Focus Group participant, Molonglo, 16 August 2012

Even so, such preparatory work is challenged by the inherent dynamism in the environmental and social landscape. In Molonglo, these matters are greatly affected by whether farmers graze their paddocks, and the presence or absence of drought. There was particular frustration over efforts to protect a very rare species of lizard that, independent of what the regulators were attempting to do, could and would chose to relocate its habitat.

Initially, it was perceived that the planning process for Molonglo would be fairly straightforward, as it was thought that the site had few environmental values:

The irony is the fires kind of created the area, in terms of it would have burnt out the old pine forests and made what was very generally low quality ecologically land suitable, available for an environment where they're very constrained with all sorts of particularly environmental constraints all over the place.
Focus Group participant, Molonglo, 16 August 2012

However, the focus group discussed how the detailed environmental research about the site reduced the design options. One participant noted that amendments had reduced Molonglo to two-thirds of its original size and with a lengthier perimeter—thereby compromising both housing and bushfire risk objectives. Amendments to the original design were necessary because it had a poor understanding of the approach of Federal and Territory environmental protection laws (pers. comm. Andrew Mackenzie).

Planning for Molonglo occurs within the urban design context of Canberra whereby the characteristics of the 'bush capital' are "accorded the highest priority" when making decisions about planning and values (strategy 2.16, ACTPLA, 2008). Thus, the urban-bush interface is dispersed throughout the suburbs. Within Molonglo, the focus group listed their planning elements that addressed bushfire risk and sometimes also matched with environmental priorities, such as the provision of water storage ponds along the river corridor. In the broader planning context, when a fire official explicitly asked the focus group why a new subdivision was placed on a known fire path, a planning official responded by simply saying it was in the strategic plan. In doing so, they avoided engaging with the politics of this decision made by higher authorities, including avoiding discussing the advantages and disadvantages of the Molonglo site, thereby keeping the discussion framed within the subdivision context that the officials were working with.

The Shoalhaven-Eurobodalla focus group discussed their issues for this narrow fertile coastal strip which includes ecological communities, agricultural lands, and desirable residential locations. Again, the governance of bushfire risk and environmental values was a key issue for the focus group, and considered very much within the context of ongoing development pressures. The group discussed how strategic planning can find ways to match bushfire risk with environmental

objectives, whereas incremental development can compromise both. Development is extending along narrow fingers into the bushfire prone foothills of the Great Dividing Range, in part to avoid the rich coastal agricultural valleys and floodplains. This is raising issues for both environmental values and bushfire risk, requiring a more strategic response, as one participant said:

> *With minimal pressure for population growth, we're pretty much driven to put people in areas where it's currently treed, which means clearing. … So everything's compromised, your bushfire's still comprised, your biodiversity's comprised. The whole lot. So my view would be we need to take a step back and start taking a more of a landscape approach …. why not say, "Well, look that area – we've made the assessment – as a community we've decided that area's going to be sacrificed." And then jam as much [development] in there as we can…*
> Focus Group participant, Shoalhaven-Eurobodalla, 8 November 2012

The strategy to 'sacrifice' one area for development and then 'offset' it with another area elsewhere for conservation is possible under New South Wales planning instruments. However, participants raised the difficulty of choosing whose land gains the development windfall, and whether it is okay to offset development on private land with conservation on public lands? The planners did report on an example where they researched and worked through these issues so as to take such a strategic approach, but it was rejected by the council reluctant to reserve *any* land from development.

The bushfire season coincides with the tourist season, Mossy Point, New South Wales
Credit: Jessica K Weir

Developing land is a key activity of local authorities and is encouraged by State governments, with both levels of government concerned about generating income and being re-elected. The focus group discussion took place at the same time as a major push by the NSW State government to overhaul planning legislation to facilitate development:

> *Politically, with the state, there's a big push for more houses to stimulate the economy, get jobs, make housing more affordable.*
> Focus Group participant, Shoalhaven-Eurobodalla, 8 November 2012

And:

> *[The] state government is pushing councils to plan for new land release … makes it more difficult to be more stringent with some of the fire legislation, or makes those conflicts possibly harder to deal with in the future.*
> Focus Group participant, Shoalhaven-Eurobodalla, 8 November 2012

In addition to limitations with the strategy of offsetting land, difficulties with managing the intersection of bushfire and environmental legislation priorities were clearly evident within subdivision planning. Both the planners and the fire authorities noted that developers who had set aside land to protect riparian zones and accommodate threatened species legislation, were caught out when they failed to also consider bushfire risk. When bushfire risk was identified as requiring fuel reduction management on these ecologically sensitive lands, the development application as a whole was undermined. One planner blamed the bushfire legislation for this problem, but was corrected by other focus group participants who identified the problem as the failure to include bushfire risk at an earlier stage of subdivision development.

As bushfire risk becomes increasingly addressed up front, developers can argue against reserving areas for nature because it increases the bushfire risk for people and property. This is clearly not the intent of the bushfire legislation, indeed the *Rural Fires Act 1997* (NSW) includes the principles of ecological sustainable development as part of fire prevention and suppression (s.3), although 2002 amendments exempted bushfire hazard reduction from environmental priorities under this and other legislation (Montoya, 2010, 7).

Urban density was another option brought up by the focus group as something that could limit both bushfire risk and ecological consequences. However, the community continues to expect the amenity of the bush lifestyle:

> *Ideally you would just increase urban density, but we live in a coastal environment and … the reason people come down here is to have their coastal lifestyle and they actually don't want to live in little blocks or in an urbanised area, they want a perfect quiet hectare parcel … and they want it in a ribbon style development.*
> Focus Group participant, Shoalhaven-Eurobodalla, 8 November 2012

Ribbon-style development, whereby properties are dotted alongside a road, maximises the exposure of these developments to the hazard in these rural and forested lands, and is counter to the bushfire aware planning guidelines that prioritise the minimisation of a settlement's perimeter.

Management

Specific management treatments were usually brought up by focus group participants in the context of governance issues, with discussion held on logistical difficulties, the effectiveness of certain methods, funding issues, and the role of new information and technologies. Much of the discussion was focused on the management of bushfire protection zones or asset protection zones (APZ)—which is a buffer zone between the bushfire hazard and the building, and is managed to

reduce fuel loads whilst also providing a workable area for people to protect the property (for example, NSWRFS 2006b, 10).

In the Litchfield Shire focus group, discussion centred on the logistics of conducting bushfire risk mitigation activities in protection zones—usually the waterlogged nature reserves that are immediately adjacent to development. The participants discussed how access could be improved by building rock roads, or purchasing mulchers on skid steers, although both are expensive measures. One participant identified how the practical issues they were facing arose out of the different legislative requirements for subdivisions and in land use rezoning:

> *There* are *areas that have to be kept natural and that's not necessarily in the area that you would like them to be because that's where, two years later, you say there should be a firebreak and then all these conflicts start…*
> Focus Group participant, Litchfield Shire Council, 19 October 2012

This management conflict was highlighted in this exchange between two fire officials:

> *A: In the planning schemes, firebreaks need to go around the perimeter of the property. We then have the land clearing guidelines which say that wet and waterlogged soil should not be cleared or disturbed in any way – and they come into conflict with each other. ..*
>
> *B: The simple answer to that is we have the priority, because your planning is done when you buy the block. As soon as that's done, planning's finished and you've got an annual firebreak inspection.*
> Focus Group participants, Litchfield Shire Council, 19 October 2012

In addition to relegating planning to the development and subdivision stage, this comment highlights how managing the risk shifts over time as the responsibilities of different authorities change, although such changed responsibility is not always desirable. Local authorities are really grappling with the challenge of managing these areas with the rapid spread of fire weeds. From their perspective, a greater sharing of responsibility would be preferable:

> *Whilst people may do fire mitigation on their own blocks, you've got this tract of land which turns into a wick and will take a fire well into a subdivision, whereas the planning is generally to do the burns around the outside to protect it and you stop these wicks coming in then. So a much better model, if the legislation stays the same, is probably to incorporate some of those wetter tracts of land into the block owner so the individual has a little bit of wetland to manage but the Shire isn't left [with it].*
> Focus Group participant, Litchfield Shire Council, 19 October 2012

The inclusion of land areas as bushfire protection zones within subdivision and property plans is a priority in the regulatory regimes in south-east Australia, as this ensures the risk management remains with the property holder and is not transferred to neighbouring landholders (for example, RFSNSW 2006a, 1). Whilst guidelines establish preferred practice, exemptions under limited circumstances are allowed. The Shoalhaven-Eurobodalla focus group discussed how this was a point of contention with developers who wish to maximise their economic return and shift

the bushfire protection measures onto council lands adjacent to their development or subdivision application.

Another challenge to the management of these zones is the retrospective application of bushfire legislation to existing or 'legacy' development, as well as to subdivisions and developments that have received approval but are yet to be built. A planner from the Shoalhaven-Eurobodalla focus group spoke about a subdivision that was approved in the 1990s but was only now being developed. This subdivision had made allowances to protect riparian vegetation, but the land for housing is now mapped as an APZ:

> *[W]e've done the right thing in terms of trying to protect the riparian corridors and all that, but you've now got riparian corridors hard up against the backyard of a 700 square metre block and you can't get your APZs in so you've got dwellings which are now fire/flame zone.*
> Focus Group participant, Shoalhaven-Eurobodalla, 8 November 2012

Without the APZ space, other bushfire risk treatments are required on the buildings to comply with the guidelines (NSWRFS, 2006b). For this particular subdivision, the blocks of land are currently for sale for $120,000 and the planners have been advised that an extra $80,000 in building costs is required, greatly affecting housing affordability.

There is perhaps more potential to match bushfire and ecological priorities with new development proposals, and this is happening on the Mornington Peninsula, where addressing bushfire risk in bushfire prone areas is now a mandatory part of planning:

> *In the past, fire was too hard, conservation was too hard in terms of trying to balance the two out. But, now, because it's become quite pointed, there's a much better understanding of each department within council's role of how they plan that space between balancing bushfire and conservation and trying to come to practical solutions.*
> Focus Group participant, Mornington Peninsula, 14 December 2012

For example, with respect to the siting of buildings on large properties:

> *More often than not, there's actually an alignment between bushfire and conservation. … The most appropriate location [of the house] for bushfire [risk] is the most appropriate location from an ecological point of view as well because it's usually the most disturbed part of the site.*
> Focus Group participant, Mornington Peninsula, 14 December 2012

The focus group participants also identified the bushfire hazard reduction activity of slashing weed growth as having win-win outcomes for both ecological and bushfire risk objectives.

Overall, there was also a strong demand for much more information to help understand the complexity of the management issues being faced. The development of new technologies and methods, including computer mapping, aerial photographs, and the in-house expertise to use them, was referred to by several of the focus group participants as potentially supporting better decisions. These

responses were sometimes brought up after our question about what participants would like to see coming out of this research project. For example, in the Molonglo focus group one participant offered that:

> *[A] decision support system [is] needed … or a scenario plan, if right at the beginning of any of this you could throw in all your layers and, it's obviously a GIS [Geographic Information Systems] exercise, but start playing with [it] … I know it's absolute crystal gazing but some way of actually balancing the trade-offs and the objectives and the land management objectives with the social-economic. If that's the sort of modelling exercise that you could assist with planning,*
> Focus Group participant, Molonglo, 16 August 2012

This was countered by another focus group participant who noted that there are important value judgements in such decisions that cannot be modelled. The first participant responded by clarifying that it was a decision-support tool to help have the discussion. Similarly, in the Shoalhaven-Eurobodalla focus group, one participant wanted an economic model to compare the values of agricultural land, environmental land, and so on, but couldn't see it happening in reality. Together with other participants, the discussion identified that modelling only goes so far, and as the process involves producing a list of hierarchies it is a political matter.

3.4 Planning as 'solution' for bushfire risk

The experiences raised by the focus group participants provide a unique insight to the potential of planning as a 'solution' for bushfire risk. The validity of bushfire risk as an important concern was never questioned, but the limitations of planning to address this risk, and the constraints of other influences, remained constant.

In Victoria in 2011, the State government introduced a new planning regime that, for the first time in Australia, made it a legal requirement to address bushfire risk as part of planning. The limitations of what planning can and cannot do were clearly evident in the December 2012 discussions amongst the Mornington Peninsula focus group. The focus group participants had found that their systematic engagement with planning has been very productive, as reported above, but the participants also very clearly found that planning regulations were being expected to do too much of the 'heavy lifting'. For the local planning officials participating in the focus group, much of their planning work intervenes at just one part of the process—the development application or subdivision design. It is one point in time, and on one point on the map. This regulation does not address the legacy development that preceded it, although it influences the shape of future legacy development. This planning regulation also does not extend to what is going on next door, thereby rendering its worth meaningless, and difficult to argue for, if the neighbour is not managing their risk. As one participant said:

> *I don't think residents understand when … the planning provisions are saying you need to treat your land in a particular way. "But my land stops there and I'm looking over the boundary and there's another person who*

owns that land, whether it be a private land or a public land manager, and that risk isn't being treated already. … There's already other people living in this street and I'm the last one to come in, and I've either got to build to an extremely high level, or I actually can't build at all."
Mornington Peninsula, Focus Group participant, 14 December 2012

The Shoalhaven-Eurobodalla focus group discussed how the relevance of their work was constrained by the scale at which it was being conducted. With respect to the comprehensive guidelines Planning for Bushfire Protection (NSWRFS 2006b), one participant gave this example:

[Consider] five to ten thousand people in a completely new settlement that was surrounded by national park, now it would actually comply with PBP, because PBP is looking more at that next layer down than at the actual subdivision stage and it could comply. But when you looked at it strategically … why would you put people there?
Focus Group participant, Shoalhaven-Eurobodalla, 8 November 2012

The temporary relevance of planning decisions was identified as another limitation by the Molonglo Focus group:

I think people have too high an expectation that the planning process will deliver a very, very clear and unambiguous outcome, but it's only unambiguous through a very small point in time whilst ever it captures the views and the values of the people who have been consulted at that time, which means there's never the perfect solution.
Focus Group participant, Molonglo, 16 August 2012

Indeed, the relevance of bushfire risk itself to Molonglo itself is dramatically affected if and when another subdivision gets built even further west in the ACT or NSW.

The focus groups all emphasised that there were many matters that planning could not achieve without better community engagement and support, as also identified in the broader policy push around Shared Responsibility and Disaster Resilient Communities (COAG, 2011). For example, compliance was a reoccurring issue raised in each focus group, and participants noted that new residents may be unaware of the bushfire risk zoning of their home and the prescribed management treatments they are required to undertake. This is particularly important given how ecological consciousness amongst the community has increased bushfire risk in settled areas. Speaking about a coastal town on the other side of Melbourne, a participant from the Mornington Peninsula focus group noted that:

When the fire came down in 1983, Ash Wednesday, it went through [to] the recent edge of Lorne. If you look at the photographs prior to that fire, most of Lorne was big open … typical Aussie backyards of the 50s. And you look at it now, it has continuous canopy cover from the Ottways.
Mornington Peninsula, Focus Group participant, 14 December 2012

Another Mornington Peninsula focus group participant argued that more social planning was needed because bushfire risk mitigation is:

[S]till focused on the development side of the land use equation, and doesn't really address the use issue. … the thinking is still about how far buildings should be from vegetation, but not about how uses are managed

and how people are evacuated, or how they're told where to get out of a locality or where they can shelter and those sort of things. Because when there's a fire on these roads, all you need is one fallen tree and you can't get out.
Focus Group participant, Mornington Peninsula, 14 December 2012

Indeed, the Mornington Peninsula participants reported that the importance of the mandatory planning provisions has led to some expectations in the community that bushfire risk was being adequately addressed. Instead, the focus group discussion emphasised that the mandatory provisions revealed where the influence of planning began and ended. As this participant said:

We're using planning to fix the problem, rather than saying, 'Let's address the hazard.' And then when we want to develop, planning will make sure development is appropriate. We're not addressing the hazard until a planning application has come in.
Mornington Peninsula, Focus Group participant, 14 December 2012

Returning to the definition of bushfire risk, the hazard is the bushfire prone landscape which is both physically and socially defined and created. This includes the influence of climate change. Most jurisdictions had guidelines in place about climate change, although the acceptability of climate change as an influence varied according to the political leadership of state and territory governments. In the Litchfield Shire focus group, participants reported predictions that the wet season would be shorter and more intense and the dry season longer, thereby extending the seasonality of bushfire risk whilst also reducing the mitigation window for fuel reduction burning. In the Mornington Peninsula focus group the fire authorities detailed how they had established flexible processes around catastrophic fire risk that are responsive to extreme conditions irrespective of how they arise. Central to this is the 'primacy of life' principle that emphasises protecting lives over property, and is unseating the practice of staying and defending, as part of the re-framing of what is being considered at risk.

The legacy of Black Saturday, as well as other recent tragic and catastrophic fires, is seeing a change in our social norms whereby the language of bushfire risk mitigation includes recognition of the limits of human influence:

We're doing this for 80% of the people for 80% of the time sort of situation, aren't we? Nothing we do is going to satisfy those catastrophic Black Saturday days and I think we need the public and ourselves to admit that.
Focus Group participant, Shoalhaven-Eurobodalla, 8 November 2012

Fundamentally, attitudes and practices about bushfire risk need to become better understood across the four jurisdictions. The periodic presence of bushfire in south-eastern Australia, and the annual low intensity fires in the north, both produced particular complacencies about bushfire risk. In the north, fire practices and fire risk understandings need to rapidly change with the spread of invasive weeds. In the south-east, fire risk needs to become more integrated into everyday perspectives:

We need to get away from what I would call a Europeanised view of the landscape where we see fire as an evil and unusual thing that threatens from time to time and we don't worry about it unless it's a critical time. We really need people to understand that fire is essential and integral … part of the Australian landscape. But the general community don't think that way at all. They think it's an unusual and a catastrophic event that is not typical of our landscape. … And, sometimes, I think the fire services have contributed to that, and all of us.
Mornington Peninsula, Focus Group participant, 14 December 2012

3.4 Conclusion

The potential of bushfire aware planning fundamentally rests on how risk is perceived and prioritised in society, including the influence of dynamic factors such as climate change, seasonal change, and destructive bushfire events. The focus groups revealed how many other matters come to bear at critical points when there are opportunities to mitigate bushfire risk through planning. These are very complex challenges across time and place are occurring at multiple scales, with different people and institutions holding different risks and responsibilities. The focus group results revealed that expecting planning to be a straightforward technical managerial solution to 'self-evident' problems, such as bushfire risk, is unrealistic (Gleeson, 2012). Planning is a professional expertise, but it is one that is steeped in the influence of socio-cultural values and norms, power structures, and their interplay with the landscape. Responding to our bushfire risk requires more than planning 'solutions'; it requires an examination of how we want to live with fire in Australia.

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References

ACT Government, 2009a. Strategic Bushfire Management Plan for the Act: Version 2, Canberra.

ACT Government, 2009b. Strategic Bushfire Management Plan for the Act: Factors Contributing to Bushfire Risk, Supporting Information Part 1, Canberra.

ACT Government, 2009c. Strategic Bushfire Management Plan for the Act: Bushfire Policy and Management Framework, Supporting Information Part 2, Canberra.

ACTPLA (ACT Planning and Land Authority) 2008. The Territory Plan.

Bihari et al., 2012. Understanding the Role of Planners in Wildfire Preparedness and Mitigation, *ISRN Forestry*, (2012):1-12.

Bosomworth, K. Adaptive governance in fire management: Exploring the role of bureaucrats in reflexive learning, PhD Thesis, RMIT University.

Buxton, M., Haynes, R., Mercer, D. and Butt, A., 2011. Vulnerability to Bushfire Risk at Melbourne's Urban Fringe: The Failure of Regulatory Land Use Planning, *Geographical Research*, 49(1): 1-12.

Cary, G.J., Bradstock, R.A., Gill, A.M., Williams, R.J., 2012. Global change and fire regimes in Australia. In Bradstock, R. A., Gill, A. M. and Williams, R. J. (eds.), *Flammable Australia: Fire regimes, biodiversity and ecosystems in a changing world.* pp. 149–169, CSIRO Publishing, Melbourne.

CFA (Country Fire Authority), 2013. Planning for Bushfire Victoria: Guidelines for Meeting Victoria's Bushfire Planning Requirements, CFA, Melbourne.

COAG 2011*, National strategy for disaster resilience: building our nation's resilience to disasters, Council of Australian Governments, Canberra, ACT.*

Eburn, M. and Jackman B., 2011. Mainstreaming fire and emergency management into law, *Environmental and Planning Law Journal*, 28: 59-76.

Ellis, S., Kanowski, P. and Whelan, R., 2004. National Inquiry into Bushfire Mitigation and Management, Council of Australian Governments, 31 March 2004, Commonwealth of Australia.

EMA (Emergency Management Australia) 2002. Planning Safer Communities: Land Use Planning for Natural Hazards, Australian Emergency Management Series: Approaches to Emergency Management, Emergency Management Australia.

Gleeson, B., 2012. 'Make No Little Plans': Anatomy of Planning Ambition and Prospect, *Geographical Research*, 50(3): 242-255.

Gurran, N. (2011). *Australian urban land use planning - Principles, systems and practice*. Sydney, Australia: Sydney University Press.Handmer, J. and Dovers, S., 2013. *Handbook of Disaster Policies and Institutions: Improving emergency management and climate change adaptation*, Earthscan from Routledge, New York.

Hughes, R. and Mercer, D., 2009. Planning to Reduce Risk: The Wildfire Management Overlay in Victoria, Australia, *Geographical Research*¸47(2): 124-141.

Hughes, L. and Steffen, W., 2013. *Be Prepared: Climate Change and the Australian Bushfire Threat, Climate Council of Australia.*

Ivkovic, K.M., Dixon-Jain, P., Marshall, S.K., Sundaram, B., Clarke, J.D.A., Wallace, L., and Werner, A.D., 2013. *A national-scale vulnerability assessment of seawater intrusion: Literature review, data review, and method development*. Record 2013/03. Geoscience Australia, Canberra, and National Centre for Groundwater Research and Training, Adelaide.

Kelly, K., 2010. PIA Policy Response to the Victorian Bushfires of February 2009, *Australian Planner,* 47(1): 48-51.

Kitzinger, J., 2005. 'Focus Group Research: using group dynamics to explore perceptions, experiences and understandings', in Holloway I. (ed.) *Qualitative* Research *in Health Care*, Maidenhead, Open University Press, pp.56-61.

Kornberger, M. 2012. Governing the City: From Planning to Urban Strategy*, Theory, Culture & Society*, 29:84-106.

Liamputtong, P., 2011. *Focus group methodology: Principles and practice.* Sage Publications, London.

Lucas, C, Hennessy, K, Mills, G and J Bathols, 2007. Bushfire Weather in Southeast Australia: Recent Trends and Projected Climate Change Impacts, Report for The Climate Institute of Australia, CSIRO and Bushfire CRC.

McAneney, J., Chen, K. and Pitman, A. 2009. 100-years of Australian bushfire property losses: Is the risk significant and is it increasing? *Journal of Environmental Management* 90: 2819-2822.

McLennan, B.J. and Handmer, J.H., 2013. Sharing responsibility in Australian disaster management, RMIT University & Bushfire CRC, Melbourne.

Montoya, D. 2010. Bushfires in NSW: An Update, NSW Parliamentary Library Briefing Paper No 10/10.

NSW DLG (NSW Department of Local Government) 2002. Social and Community Planning and Reporting Guidelines, NSW DLG.

NSWRFS (NSW Rural Fire Service) 2006a. Guideline: Bush Fire Prone Land Mapping, New South Wales Rural Fire Service.

NSWRFS 2006b. Planning for Bush Fire Protection, New South Wales Rural Fire Service.

Paterson, R.G.. 2007. 'Wildfire Hazard Mitigation as 'safe' Smart Growth', in Troy, A and R.G. Kennedy (eds) *Living on the Edge*, Advances in the Economics of Environmental Resources, Volume , Emerald Group Publishing, pp.43-71.

RSPCA, 2009. Victoria Annual Report, RSPCA.

Russell-Smith, J., Whitehead, P., Cooke, P.and Yates, C., 2009. Challenges and opportunities for fire management in fire-prone northern Australia, chapter in *Culture, Ecology and Economy of Savanna Fire Management in Northern Australia: Rekindling the Wurrk Tradition*, Russell-Smith, J., Whitehead, P. J. and Cooke, P. (eds.), CSIRO Publications, Melbourne.

Setterfield, S. A., Rossiter, N. A., Assoc Prof Hutley, L. B., Douglas, M. M. and Williams, R. J., 2010. Turning up the heat: the impacts of Andropogon gayanus (gamba grass) invasion on fire behaviour in northern Australian savannas *Diversity and Distributions* 16 854–861.

Stephens, S.L and Collins, B.M., 2007. 'Fire Policy in the Urban-wildland Interface in the United States: What are the Issues and Possible Solutions?', chapter in Troy, A and R.G. Kennedy (eds) *Living on the Edge*, Advances in the Economics of Environmental Resources, Volume , Emerald Group Publishing, pp.33-42.

Stephenson, S. 2010. Impacts Framework for Natural Disasters and Fire Emergencies, Bushfire CRC and RMIT University.

Teague, B., McLeod, R., Pascoe, S., 2010. '2009 Victorian Bushfires Royal Commission: final report.', State of Victoria, Melbourne.

Troy, A. and Kennedy, R. G., 2007. 'Introduction: Finding Solutions to the Urban-Wildland Fire Problem in a Changing World', chapter in Troy, A. and Kennedy, R. G. (eds) *Living on the Edge*, Advances in the Economics of Environmental Resources, Volume , Emerald Group Publishing, pp.1-12.

Whittaker J., Handmer J., Mercer D. 2012. Vulnerability to bushfires in rural Australia: A case study from East Gippsland, Victoria. *Journal of Rural Studies*.

4. Special issue: bushfire, coasts and climate change

Key words: coastal urbanisation; bushfire prone zones; climate change impact; climate change risks and uncertainty; adaptation principles

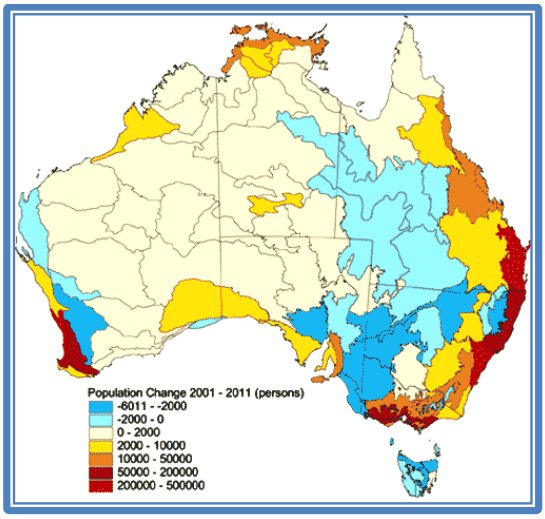
Barbara Norman

4.1 Coasts and bushfires

Fire activity is not new to the coast in Australia with coastal communities already experiencing extreme events. Chapter 2 has clearly outlined the series of Bushfire Inquiries over the last nearly 100 years detailing large loss of life in coastal regions. The summer of 2013/2014 is no exception with significant fires in Western Australia, South Australia, Victoria and NSW.

During the 21st century there are two significant factors that are adding to the probability of bushfires and the impact on coastal communities—coastal urbanisation and the impact of climate change. The purpose of this chapter is to discuss the increasing issue of fire in Australian coastal environments and some of the implications of the projected impacts of climate change for coastal communities.

Over 85 per cent of the Australian population lives within 50km of the coastline (see Map 1). The extent of coastal urbanisation continues to impact the coastal environment and with that brings increasing exposure of coastal communities to bushfire risk.



Map 1 Coastal urbanisation in Australia 2011

2006 State of the Environment Report

With the continuing expansion of cities and major non-metropolitan regional centres predominantly on the coast (Department of Infrastructure and Transport, 2013), the potential impact of fire on human settlement results from the physical spread of urban development into bushfire prone areas. Population increases are

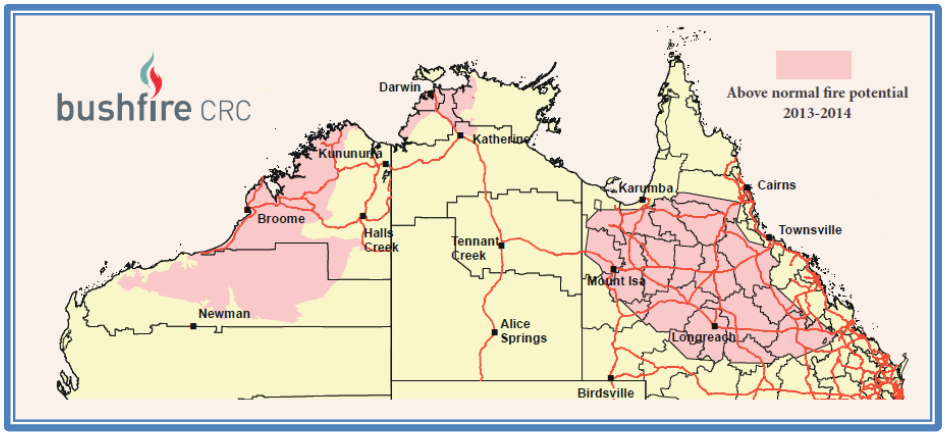
predominantly in the coastal zone, including coastal regional growth areas such as the Sunshine Coast and Wollongong.

Coastal urban growth, Wollongong
Credit: John Reid

Alongside coastal urbanisation, the projections of climate change indicate a warmer and, in some places a drier environment, particularly in southeast and southwest Australia, further adding to the potential for bushfire. The southeast region of Australia is particularly vulnerable to fire with risks expected to increase with climate change. The 2013 Climate Council report on bushfires concluded that "extreme fire weather has increased over the last 30 years in southeast Australia" and that "the fire season is becoming longer, reducing the opportunities for hazard reduction burning" (Climate Council 2013, Key Findings):

> "*In the future, southeast Australia is very likely to experience an increased number of days with extreme fire danger"* (Climate Council, 42)

Northern coastal Australia is also at risk with large grass fires and expanding urban settlements. As discussed in Chapter 3, fire in northern Australia has been very much part of the landscape and often seen as part of the environmental management regime. The seasonal outlook by the NT Fire Service indicates that fire continues to be a significant concern (Map 2, Bushfire CRC, 2013). This is particularly so with the more recent urban expansion of Darwin with an increasing area on the coastal urban periphery.



Map 2. Northern Australia Seasonal Bushfire Outlook

Northern Australia Seasonal Bushfire Outlook 2013, Fire Note, Issue 113, Bushfire CRC, July 2013

The focus group held in Darwin (Chapter 3) highlighted the emerging issue of an expanding urban area in Darwin that is posing new problems of fire risk with gamba grass. This has been identified separately by the Bushfire CRC in its 2013 Northern Australia seasonal Bushfire Outlook:

> *There is one area identified as above average for fire potential in the NT. The north west Top End, extending around the greater Darwin peri-urban area and into the Vernon and Arufura Fire Control Regions, has had a continued trend of increasing density an range of gamba grass* (Bushfire CRC 2013, 3).

In summary, continuing urban development in Australian coastal regions, also experiencing environmental change including warmer environments, is increasing the potential of bushfire risk to coastal communities.

4.2 Climate change risks and uncertainty

The impact of climate change is affecting our coastal environments with sea level rise, coastal storms, heat waves and with that the increasing risk for bushfire. The heat does not directly lead to fire but does contribute to creating an environment more conducive to fire. As a recent report by the Climate Council on 'Heatwaves' states:

> *Overall, increasing heatwaves are likely contributing to greater bushfire activity. Around the world, regions with increasing numbers of heatwave days are also experiencing more bushfire activity. Alaska, Canada, western USA, Spain, Russia and southeast Australia all show increased bushfire activity and have also recorded increases in the number of heatwave days* (Climate Council, 2014, 40).

The location and design of coastal development and infrastructure is a key consideration in planning for a changing coastal environment. There has been significant recent research by CSIRO and the Bushfire CRC (Blanchi et al., 2013) into the impact of major fires on human settlements. The influence of planning regulation and policy is also significantly raised in the most recent major bushfire inquiries as discussed earlier (Chapters 2 and 3). In response, public policy considerations are turning towards climate change adaptation with consideration of a range of policy actions and adaptation tools. These include options ranging from developing smart infrastructure solutions with more localised energy and water distribution to increase local resilience and new planning regulations for siting and dwelling design (for example bushfire overlays). The process of community engagement and local decision-making is also seen as important as the physical design solutions (Norman et al., 2013).

Coastal bushland and development, Batemans Bay
Credit: Jessica K Weir

The possibility of not rebuilding in some high-risk area remains a challenge to manage. Expectations of the right to rebuild remain strong in the community and already the planning regulations introduced after the 2009 Victorian bushfire are being revised downwards (Longbottom, 2013). Climate change adaptation responses in high-risk coastal areas will also come with potential budgetary consequences as well as change for the community. The challenge remains to find an acceptable pathway forward for affected communities.

The more recent NCCARF research into coastal adaptation, including fire, storms and sea level rise has emphasised that the regulatory and governance framework for decision-making is important. This looked at the range of risks facing coastal communities in the context of climate change. *Building resilient coastal communities and ecosystems* (NCCARF, 2013) made three key points in relation to coastal adaptation to climate change:

- “consistent guidance from state and federal government on how coastal

zones should be managed, with legislative support that links land-use planning, conservation and hazard protection. This includes clear guidance on the circumstances under which development should not be approved

- systems that provide local governments with the authority to ensure compliance, and

- time and investment in knowledge, capacity and resources to transition local governments successfully to this new paradigm" (NCCARF 2013, 1).

The above emphasises the importance of consistent advice from government supported by compliance assurance at the local level and evidence-based knowledge for continuing review of application and effectiveness. The research in this project indicates that some steps forward have been made at all levels of government but there is still a significant shortfall in terms of an overall coordinated approach to bushfire and planning across Australia.

In summary, coastal communities are already experiencing extreme weather events. The projections for the future are that coastal environments, particularly in the southeast and southwest, will be warmer and drier and more liable to bushfire risk. Increasing coastal urban development in areas is exacerbating that risk. The bushfire inquiries and subsequent research stress the increasingly important role of land use planning in mitigating that risk through attention to location, urban design and landscape. Finally, the NCCARF research places emphasis on the importance of appropriate governance arrangements including a consistent and coordinated approach and support for local government action on the ground.

4.3 Planning responses and ways forward

Coastal planning in Australia considers many factors in making decisions on coastal urban development, related infrastructure development and foreshore activity. There have been over 25 national inquiries into coastal planning and management over the last 50 years. The most recent national Parliamentary Inquiry into coasts and climate change—*Managing our coastal zone in a changing climate: the time to act is now* (2009) recommended that:

> *To further enhance Australia's disaster mitigation, preparedness, response and recovery arrangements in the event of possible major coastal disasters, the Committee recommends that the Australian Government establish a grants program, the Coastal Natural Disaster Mitigation Program, to fund natural disaster mitigation projects in the Australian coastal* zone. (Parliament of Australia, 2009).

The focus of the above Parliamentary Inquiry was predominantly on impacts from coasts and oceans on land (sea level rise, storms, extreme events). More recently there has been research into coastal adaptation to climate change including fire risk (NCCARF, 2014; Norman et al., 2013). While there has been significant research

and reviews with policy recommendations, implementation of new planning rules for fire risk in coastal areas has been more challenging as outlined below.

Firstly, there is an urban hierarchy of coastal communities ranging from towns to villages to hamlets. Policy responses to risk management will differ between communities depending on size, location and coastal landscape. This local and regional variation needs to be considered in developing any overall national response to bushfire management (Gurran et al., 2013).

Secondly, regional collaboration has also been identified as a key strategy to better plan for complex issues facing local government including climate adaptation. This has been confirmed in this research report. There are few and intermittent funding sources available to support ongoing voluntary regional collaboration. In this respect, it is suggested that strategies to facilitate regional collaboration need to be supported in both the short and the long term for community based integrated regional planning.

Thirdly, principles of long-term coastal adaptation for the impacts of climate change need to be considered. A directly relevant concurrent investigation *South East Coastal Adaptation* (SECA) (Norman et al., 2013) independently investigated coastal adaptation futures for seven coastal townships in the far south coast of NSW and East Gippsland Victoria. This research covered one of the focus group locations for the bushfire research—the Batemans Bay/Eurobodalla area. In its findings the SECA report proposed seven principles for coastal adaptation that placed significant emphasis on the process of decision-making and incremental change outlined below. The key message is that the *process* of decision-making is fundamental to successfully adapting to change (environmental, social and economic), that is the outcomes on the ground.

South East Coastal Adaptation Principles

Principle 1
An integrated approach should be adopted for sustainable regional and local planning (social, economic, environmental and cultural). The approach should consider the catchment–to coast–to marine continuum and the different levels of government and stakeholders involved in planning and implementation.
Principle 2
The precautionary principle to decision making should be applied to the location of new and redeveloped urban settlement and infrastructure and other relevant decisions, particularly where environmental risk currently or potentially exists. Open space should be a key consideration to allow for adaptation (coastal retreat, heat absorption, green infrastructure).
Principle 3
Risk management approaches should be incorporated into local and regional strategies for coastal settlements responding to climate and environmental change including progressive learning from experience to ensure adaptability. This should be underpinned by the best science on climate change, socio-economic trends and an understanding of local community circumstances.
Principle 4
Appropriate forums should be established at the regional level to enable collaboration across institutions at the local and regional level. Governance mechanisms that facilitate intergovernmental agreement on policy directions (shared vision) and integration of policy decisions (implementation) are fundamental to coastal adaptation. This aligns with the findings of the recommendations of the House of Representatives report – *Managing our coastal zone in a changing climate: the time to act is now.*
Principle 5
There should be an ongoing process of community engagement. This needs to be informed by the latest science, in developing and regularly reviewing coastal urban plans to gain community support, and where possible support by all levels of government and across government agencies.
Principle 6
The skills and knowledge of regional and local communities should be connected by relevant organisations to provide a foundation for long-term research, co-production of knowledge and monitoring of coastal urban futures. Regional communities and practitioners could engage on a periodic basis with Australia's leading scientific research organisations to discuss the most up-to-date scientific knowledge on the risks of climate change and its implications for adaptation strategies.
Principle 7
A process of continuous monitoring, evaluation and reporting of adaptation actions should be implemented to ensure 'learning by doing' and to avoid past mistakes. The impacts of climate change on the coastal environment will require more attention to evaluating impacts of adaptation measures over time.

Source: *South East Coastal Adaptation* (SECA), 2013

Finally, the process of communicating that change in engaging the community is also critical as illustrated in a recent project on the NSW south coast (Eden) using the creative arts to communicate the impacts of climate change (Reid, J., 2013). In this project the artists of the Field Studies program at the Australian National University explored the above seven principles of the SECA project and presented an art exhibition illustrating possible coastal urban futures in the context of climate change. The learning from this is that partnerships between institutions and

collaboration between academics, professional and communities will be critical in better understanding and communicating environmental risks to coastal communities in the future. This unique partnership between the researchers of the SECA project and the artists received the 2014 cutting edge research award by the Planning Institute of Australia.

Artists' involvement in communicating climate change risks in coastal environments
Credit: Cathy Pirrie

4.4 Conclusion

In summary, bushfire is an increasingly important element of risk to be managed in Australian coastal environments. The climate change projections indicate that coastal environments particularly in the SE and SW of Australia will become hotter and drier, increasing the potential for bushfire risk. At that same time these areas are experiencing increasing urban development. The combined effect is greater exposure for coastal communities to bushfire risk. The above discussion highlights the risks, discusses some of the coastal adaptation principles emerging from recent research and identifies that the decision making process and community engagement will be critical to finding local and in some cases, more collaborative regional solutions to managing urban development in bushfire prone coastal environments.

References

Blanchi R., Leonard J., Haynes K., Opie K., James M., Kilinc M., Dimer de Oliveira F., Van den Honert R., 2012. *Life and house loss database description and analysis*, CSIRO, Bushfire CRC report to the Attorney-General's Department, CSIRO EP-129645.

Bushfire CRC, 2013. Northern Australia Seasonal Bushfire Outlook 2013, Fire Note, Issue 113, Bushfire CRC, Melbourne.

Department of Infrastructure and Transport, 2013. *State of Australian Cities 2013*, Australian Government, Canberra.

Hughes, L. and Steffen, W., 2013. *Climate Change and the Australian Bushfire Threat*, Climate Council of Australia, Sydney.

Longbottom, J., 2013. *Landowners welcome State Government changes to controversial bushfire building laws*, ABC News accessed 5 March 2014 at http://www.abc.net.au/news/2013-12-17/government-changes-controversial-bushfire-building-laws/5162736, 17 December 2013.

NCCARF, 2013. *Building resilient coastal communities and ecosystems*, Policy Guidance Brief 1, NCCARF, Gold Coast.

Norman, B., Steffen, W., Webb, R., Capon, A., Maher, W., Woodroffe, C., Rogers, K., Tanton, R., Vidyattama, Y., Lavis, J, Sinclair, H. and Weir, B., 2013. *South East Coastal Adaptation (SECA): Coastal urban climate futures in SE Australia from Wollongong to Lakes Entrance*, National Climate Change Adaptation Research Facility, Gold Coast, 130 pp.

Parliament of Australia, 2009. Managing our coastal zone in a changing climate: the time to act is now: the time to act is now, House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts, Parliament of Australia, Canberra.

Reid, J., 2013. *Now and When, Contemplating Climates on the South East Coast*, Environment Studio Program, School of Art, ANU, Canberra.

Steffen, W., Hughes, L., and Perkins, S., 2014. *Heatwaves: hotter, longer, more often,* Climate Council of Australia, Sydney.

5 Education and training for better integration of bushfire risk management

Key words: education, professional practice, adaptive planning, planning for bushfire risk, education modules

Jacqui Lavis

Education and training have emerged in this research as a key priority and mechanism for improved policy development and decision-making involving planning and emergency management professionals. This includes tertiary education opportunities and ongoing professional development. Providing such ongoing support to practitioners on the ground will be even more important in the future as the risks potentially escalate with the impacts of climate change.

This chapter reviews policy and practice in integrated risk management with specific attention to bushfires, as part of developing themes for urban and regional planning education in this field. The role of planners in the four phases of comprehensive emergency management—mitigation, preparedness, response and recovery—is discussed, as are the associated education and training needs for each phase. The discussion considers effective professional practice and more fundamental shifts in approach. Specific attention is given to spatial planning as an adaptive planning mechanism that is used at the appropriate spatial scales, based on combined socioeconomic and climate scenarios, necessary to respond to disaster and climate risk, with a particular focus on the rural/urban interface and regional scale (Norman and Sullivan, 2011). The contribution of planners to 'pragmatic response' is also covered.

5.1 Planning for bushfire risk—an emerging field

Planning for bushfire risk is an emerging field. The extent to which jurisdictions have integrated bushfire risk as a constraint for development varies and is largely determined by the extent of recent exposure to natural disasters. The Victorian Royal Bushfires Commission (VBRC), for example, recommended that the State "amend the Victoria Planning Provisions relating to bushfire to ensure that the provisions give priority to the protection of human life' and 'adopt a clear objective of substantially restricting development in the areas of highest bushfire risk" (Teague et al., 2009).

Groenhart et al. (2012) found that in the past:

> *Urban planners have relied heavily on fire agencies to provide advice and to make decisions, rather than using statutory mechanisms in a complementary manner.*

They also found that:

> *A place-based planning approach to bushfire ensures that risks associated with a given place and planning proposals are explicitly considered. Planning should consider the particularities of bushfire risk on sites in their context (Schwab et al, 2005), at various geographic scales, and over longer timeframes such as those required to consider fully disaster risks (Alexander, 1999).*

In response to the VRBC recommendations, the Victorian Government developed a Bushfire Integrated Planning and Building Framework to "strengthen the consideration of bushfire at different stages of the planning process and better integrate the planning and building systems" (Victorian Government, 2011a). The principal changes introduced by the Framework are:

- a new emphasis on the priority of protecting human life in building and planning decision-making, and
- the application of the precautionary principle to development in areas at most risk from bushfire.

The Victorian Department of Planning and Community Development (DPCD) web site[2] states that State planning policy for bushfires:

- provides a framework for hazard identification and risk assessments in the planning system
- ensures that bushfire considerations are taken into account in strategic settlement planning through the Regional Bushfire Planning Assessment, which provides a high-level analysis of bushfire hazard
- provides direction to planning authorities for implementing bushfire matters in a planning scheme, and
- provides development control strategies for areas affected by the bushfire hazard.

Thus future growth (determined by the visioning process of strategic planning) and the regulation of growth (given effect through statutory planning controls) are considered in concert. The Victorian reforms have much in common with the integration of bushfire risk and planning in other States and Territories (for example, PBP NSW, SBMP ACT), but they do have distinct features including the mandatory consideration of bushfire risk in subdivision submissions and development applications, as well as the 'buy back and retreat' scheme to address the legacy of previous planning decisions (discussed further below).

The focus on integrating bushfire risk with planning is generating greater demand for professionals with appropriate expertise. The 2009 Victorian Bushfire Royal Commission pointed to a gap in planning education and training for bushfire risk and recommended that the state:

> *initiate the development of education and training options to improve understanding of bushfire risk management in the building and planning*

[2] http://www.dpcd.vic.gov.au/planning/plansandpolicies/bushfire-planning-and-building-resource/planningprovisions accessed 25th April 2013

> *regimes by providing regular training and guidance material to planning and building practitioners and helping a suitable tertiary institution design and implement a course on bushfire planning and design in Victoria* (Teague et al., 2010, 35).

The submission of the Planning Institute of Australia (PIA), the national body representing planning professionals, to the Inquiry noted the need for "training and education of those within the planning profession to recognise and appropriately assess bushfire risks" (PIA, 2009b, 3; see also Witherby, 2003).

In response, a new education course was convened in Melbourne, and there are also several professional development opportunities in this field (for details on both see 5.3).

Section 5.4 proposes that any education modules should be organised under the four phases of comprehensive emergency management—mitigation, preparedness, responses and recovery—and also consider the adaptation planning continuum of protect, retreat, adapt and abandon.

This is followed with a discussion on the role of spatial planning, and ideas for course content drawing on a model for climate change adaptation, which proposed the above continuum concept—protect, retreat, adapt, abandon—that is equally applicable to bushfire risk.

Suggested options for a course approach for university departments and professional bodies are at Section 5.5.

5.2 Spatial planning—an adaptive planning mechanism for managing bushfire risk

Spatial planning is a key instrument for establishing long-term, sustainable frameworks for social, territorial and economic development both within and between countries. Its primary role is to enhance the integration between sectors such as housing, transport, energy and industry, and to improve national and local systems of urban and rural development, also taking into account environmental considerations (United Nations, 2008). Spatial planning must therefore encapsulate risk based scenarios with strategic and statutory planning articulating land use based responses.

The role of strategic planning and the flexibility of statutory controls to adapt to changing circumstances have been examined from the perspectives of case studies and combined socioeconomic and climate scenarios. An area of attention has been the questions that arise in relation to risk and disaster management scenarios that might impact on high value food production areas and how planning might mitigate or respond to that risk.

Norman and Sullivan (2011) identified the need for a particular focus on the rural/urban interface and regional scale. Buxton (2010) states that the pattern of existing small lots has led to incremental, unplanned, ad-hoc dwelling construction

throughout the rural areas of peri-urban councils, typical of business-as-usual reactive policy practice. The growth of regional town centres is also an emerging issue in relation to fire risk. In the absence of a change to current policy and practice, many thousands more people will build on existing small lots and newly subdivided lots in potentially dangerous locations in the peri-urban area. The responsibility of planners to minimise risk to communities from large scale disasters in such locations needs to be reinforced.

Weir (2012) notes that there are certain core strategies, controls and treatments that planners use to address bushfire risk, and reduce its impact, including:

- the formal zoning and mapping of places as high risk on both private and public lands, and management prescriptions for these places, including fire trails and fuel reduction
- site specific requirements for buildings in zoned bushfire risk areas, including construction design and materials, siting and aspect, minimum defendable space, fuel reduction and ongoing maintenance of the protection zone
- settlement and subdivision design to support emergency services and reduce bushfire risk. For example, perimeter roads to provide access for emergency service vehicles, space for defensive operations, and additional asset protection ('setback' from the bush); and the provision of water access points for fire fighting activities
- strategically locating settlements and subdivisions in relation to high bushfire risk vegetation and topography. For example, placing development in a cluster to reduce the urban edge and avoid developing on more hazardous sites (Paterson 2007, 54)
- minimising risk in peri-urban areas through restricting minimum lot size and subdivision of bush blocks, and
- community engagement and education in the preparation and delivery of bushfire plans.

In preparing this report, consideration was given to the adaptation planning options based on a continuum—protect, retreat, adapt and abandon—outlined in the first pass national assessment of Climate Change Risks to Australia's Coast (Department of Climate Change, 2009). The concept is equally applicable to bushfire prone areas and is an underlying part of the themes and content that this report proposes be addressed in the education modules (Section 5.5). Summarised here are the adaptation elements considered of most importance to bushfire planning education.

Protect

Bushfire education modules associated with the 'protect' element of transformative adaptation planning need to have as discussion points in the education modules topics such as the need to:

- understand the value of prescribed burning regimes protecting housing/bush land interface rather than prescribed burns being at remote locations
- ensure the enhancement of safety and awareness of evacuation routes, and

- embed community awareness of fire weather warnings of Severe, Extreme and Catastrophic (Code Red in Victoria) including the need for a written Bushfire Survival Plan, and understanding of the implications for personal safety.

It is important to acknowledge that whilst the idea of Bushfire Survival Plans has intuitive appeal for bushfire risk management, post-bushfire social science research indicates a wide gap between householder intentions and actions (O'Neill and Handmer, 2012).

A survey in a high bushfire risk area found 60 per cent of people indicated they would leave early if a Code Red bushfire danger day was predicted, in line with agency advice. However, following a Code Red day, surveys indicated less than two per cent of people had actually left (Whittaker and Handmer, 2010). This is consistent with the fatality dataset, which contained evidence for bushfire plans not accounting for everyday weekend activities (a birthday party), ill-formed intentions in bushfire-plans (no definite shelter destination, or trigger to leave) and exceptional circumstances preventing evacuation (a frail elderly relative ill on the day and unable to move).

Peoples' daily lives are complex and these situations—far from being exceptions—reflect the everyday lived experiences of people living in bushfire prone areas likely to experience several severe bushfire alerts each year.

Retreat

Bushfire education modules associated with the 'retreat' element of transformative adaptation planning need to have as discussion points in the education modules topics such as the need to consider:

- the potential for buyback and resettlement in a similar community setting with greater fire protection potential, and
- that the mapping of urban capable land can be inconsistent with bushfire risk mapping, and that such constraint mapping is not currently applied consistently across each local government jurisdiction.

Urban capable land should correlate with risk assessment but responses that reduce or remove land areas (rezoning or exclusionary zones) from the urban capable land bank will create compensatory problems for local authorities.

Adapt

O'Neill and Handmer (2012) suggest that transformative adaptation in managing bushfire risk could begin by focusing on the following four areas. These need to be considered as discussion points in planning education.

Diminish the hazard

- Fire hazard could be reduced through preventing initial ignition (altering electrical power distribution systems to reduce the risk of fire ignition from arcing cables during extreme fire danger days; psychological work on arson prevention) and through fuel reduction. Some locations could probably be

modified to bring them out of the unacceptable category of bushfire risk (for example, by grading slopes around properties, vegetation management and improving bushfire-safe access).

Reduce the exposure of infrastructure and buildings

- This might include avoiding very high hazard areas for vulnerable uses (e.g., no housing at the top of steep, north facing, forested ridges) and continuing to improve building standards to make houses safer in extreme conditions).

Reduce the vulnerability of people

- This could be addressed through agencies taking more responsibility for vulnerability reduction, especially by acknowledging and addressing individual vulnerabilities (e.g., accepting the lived realities of elderly and disabled people living in bushfire prone areas and supporting the development of bushfire plans which take their needs into account); and engaging communities and other stakeholders in the development of bushfire planning and management, to support long-term resilience for those living in bushfire prone areas through formal bushfire safety training, including mental preparedness training.

Increase the adaptive capacity of institutions

- Institutional change needs to occur not only through mechanisms such as insurance (e.g., insurers requiring risk reduction measures as a precondition for cover) but also in changing ways of thinking within institutions in situations of very high bushfire risk. Examples of good practice include the Tasmania Fire Service policy of focusing on the protection of lives and critical infrastructure—allowing the fire to 'come to the fire fighters' strategically located to protect settlements, rather than become 'stranded' in remote settings.

Abandon

Bushfire education modules associated with the 'abandon' element of adaptation planning need to have as discussion points topics such as compulsory acquisition of property and return to public land with appropriate land management regimes.

A land acquisition program implemented by the Hamer and Cain governments in the Dandenong Ranges in the 1970s and 1980s is an example of a successful property acquisition scheme. That program saw the government purchase thousands of fire-prone blocks from private owners over an extended period. A development covenant prohibited building and required land owners to sell to the Government. Blocks identified for acquisition under the Dandenong Ranges scheme were valued as if a house could be built on the land.

5.3 Current bushfire education and professional development options

Melbourne University has a Postgraduate Diploma/Certificate course in Bushfire Planning and Management at its Creswick Campus (Department of Forest and Ecosystem Science). It is an intensive unit based on lectures (24 hours) and practical work delivered in a two-week teaching block (36 hours). The focus is on Victorian fire ecology in response to the Royal Commissions findings. The diploma provides students with the opportunity to study specialised bushfire science, ecology and management subjects and one of two subjects on community engagement for natural resource management. The program meets the need to equip existing natural resource management professionals with best practice skills in managing and responding to fire risk in forest ecosystems. It covers:

- bushfire planning and management, including management of biodiversity, ecosystem processes and the implications of climate change for bushfire risk mitigation, and
- bushfire knowledge from building planning and regulation (Planning Stream) through to fire management and landscape-level considerations (Management Stream).

Initial subjects offered in 2013 were foundation subjects in Bushfire and Climate (the fundamentals of forest fire behaviour and the factors affecting it including fuels, weather, topography, fire scale and climatic conditions) and Bushfire Planning and Management (the fundamentals of setting and achieving bushfire management objectives for ecological and fire protection purposes in natural ecosystems) with progressively detailed subjects offered in subsequent years.

The Bushfire Planning Stream aims to:

- develop knowledge, skills, understanding and competence in the area of bushfire science and building and planning design to mitigate bushfire risk
- develop a thorough approach to bushfire planning assessments theory and practice through an understanding of conceptual planning and building issues and knowledge of the environmental, regulatory and policy drivers that influence building and planning in fire-prone areas of Australia, and
- develop risk management strategies including knowledge of emergency risk management arrangements and bushfire safety policies that influence the planning of new development and the necessary considerations and actions in response to bushfire threats.

The Bushfire Management Stream aims to:

- develop a thorough approach to bushfire management theory and practice through an understanding of the biological, environmental and social drivers of forest fire management in Australia and internationally.

Currently, the course does not cover the challenges of settlement, the role of risk management in spatial planning in bushfire prone areas or the mechanisms of land use planning (statutory and strategic) which are the tool kits for adaptation.

PLANET

PLANET (PLAnning NETwork) is a professional development and training program designed for planning professionals and other users of Victoria's planning system. As part of the 2014 PLANET training and development program, a short course is run twice a year on *Preparing and assessing a Bushfire Management Statement*".[3]

This course provides an introduction to the Bushfire Management Overlay with a focus on the preparation and assessment of a Bushfire Management Statement using various case studies relating to dwellings. It is designed for local government planners, referral authorities and planning consultants .

It has these learning outcomes:

- better understanding the Bushfire Management Overlay and how it contributes to community resilience to bushfire
- understanding the information required to prepare a Bushfire Management Statement, including the site assessment used to determine defendable space, and
- having an ability to prepare or assess a Bushfire Management Statement.

For school students, additional Curriculum materials have been developed for Bushfire Education[4] in concert with AusVELS (the Australian Curriculum F–10 for English, Mathematics, History and Science within the curriculum framework first developed for the Victorian Essential Learning Standards (VELS)). AusVELS uses an eleven level structure to reflect the design of the new Australian Curriculum whilst retaining Victorian priorities and approaches to teaching and learning.

Bushfire education

The Bushfire Education website provides online teaching and learning resources to support the provision of bushfire education for learners from the early years to year 10. The resource was developed for the Victorian Government in response to Recommendation 6 in the Final Report of the 2009 Victorian Bushfires Royal Commission. The website has been developed by Education Services Australia on behalf of VCAA. The project has been supported by VCAA's Bushfire Education Working Party, consisting of representatives from the Department of Education and Early Childhood Development, and the Country Fire Authority.

The Geography Teachers Association of Victoria has developed a free resource schools and other *educational* institutions to support Victorian Essential Learning Standards Levels 5 and 6 in studies of the human environment and society.[5]

[3] http://www.dpcd.vic.gov.au/planning/theplanningsystem/PLANET/planet-2014-calendar/preparing-and-assessing-a-bushfire-management-statement

[4] http://www.bushfireeducation.vic.edu.au/

[5] http://www.gtav.asn.au/CMS200/files/cms_files/Bushfires_final_txt_LR.pdf

The status of this resource in relation to AusVELS is unclear.

Other specialised courses

Other specialised courses are limited to 'one off' professional development opportunities. One such option is Development and Building in Bushfire Prone Areas delivered as a short course at the UTS Centre for Local Government within the University of Technology, Sydney. The five-day program aims to enhance understanding and skills for assessing bushfire attack levels and controlling development and building in bushfire prone areas and has a NSW legislative focus. This course provides building (surveyors and assessors), planning and development professionals, particularly those working in local government and private practice, with the necessary skills and understanding to apply the relevant requirements of the *Building Regulations 2006*, *Building Code of Australia, AS 3959: Construction in Bushfire Prone Areas* and *Planning and Environment Act 1987*.

The course is described as being of value to planners, building surveyors, subdivision engineers, bushfire control personnel, architects and others responsible for the design and control of development and buildings.

The Tasmanian Fire Service has introduced the Chief Officer's Scheme for the Accreditation of Bushfire Hazard Practitioners (2014).[6] The scheme will ensure that the community has access to practitioners with the appropriate training and skills to help people safely develop and live in bushfire prone areas.

The School of Global Studies, Social Science and Planning at RMIT University (2009) developed a generic, one semester, post-graduate level module[7] "Planning and Evaluation for Community Safety Initiatives in Bushfire-Vulnerable Areas" described as follows:

> *the module introduces students to basic concepts in relation to risk and methods for assessing risk, community development and related concepts such as vulnerability, capacity, preparedness, resilience and participation.*

However, this module does not address spatial planning or development assessment decision making.

The University of Western Sydney offers a Graduate Certificate in Bushfire Protection,[8] recognised by the Fire Protection Association (FPA) Australia as a qualification for accreditation under the Bushfire Planning and Design scheme. Applicants must have prior tertiary level qualifications in engineering, building, building surveying, architecture, urban studies, local government or public sector

[6] http://www.fire.tas.gov.au/userfiles/stuartp/file/BuildingForBushfire/ChiefOfficersSchemeForTheAccreditationOfBushfirePractitioners_v_1.pdf Accessed 1 June 2014

[7] http://www.bushfirecrc.com/higher-education/community-safety/pgc_genmodule.html Accessed 1 June 2014

[8] http://www.uws.edu.au/future-students/postgraduate/postgraduate/postgraduate_courses/engineering_and_built_environment_courses/gc_bushfire_protection/admission_and_unit_information_-_graduate_certificate_in_bushfire_protection Accessed 14 June 2014

management, planning, natural resource management, emergency management, science, land-use planning or environmental studies.

The course has modules in Bushfire Behaviour, Bushfire Fighting, Fire Technology and Engineering Principles, Building in Bushfire Prone Areas and Planning and Development Control.

In 2014, FPA Australia has recognised the need for national level responses to education and training through the creation of a new organisational department called Engagement and Education, creating a single point of contact for all education, events and state and territory engagement information.

A desktop review for Continuing Professional Development options on bushfire issues found only limited offerings with the most recent being:

- Civil and Structural Branch, Engineers Australia Canberra Division convened a one day work shop in October 2012 on bushfire safety and bushfire protection measures, conducted by academic experts
- Building Designers Association Victoria CPD Seminar, 5 March 2012, “Design for Bushfire Prone Areas”, and
- the NSW Division of the Australian Property Institute and the Spatial Industries Business Association co-hosted a seminar on natural disasters in June 2011, focusing on access to high definition, accurate and current mapping data, crucial to a range of stakeholders such as insurers, financiers, property professionals, developers, infrastructure companies, local councils, state and federal government agencies, planners, utility organisations, transport and emergency management bodies. Spatial data is at the core of decision-making around natural disasters from floods to bush fires.

The limited and highly specialised nature of the education offerings suggests an unfulfilled market need for bushfire risk management related to professional development training for planners, building surveyors and assessors, engineers, emergency services personnel, architects, building designers and landscape architects. Real estate and property development professionals are also potential bushfire education ‘consumers’.

Bearing in mind that market demand is likely to be highest amongst those already employed in related fields, the availability and convenience of course delivery will be instrumental in a decision to study. This suggests that education modules must have the following attributes:

- relevance to continuing professional needs (i.e., endorsed by relevant professional bodies as a prerequisite for ‘chartered’ status or as part of continuing professional development)
- flexible delivery (including online options), and
- cost effective and operationally efficient course development (nationally relevant curriculum with capacity to focus on more localised case studies).

5.4 Planning education themes for integrated risk management for bushfires

As discussed above, this report proposes that any education modules should be organised under the four phases of comprehensive emergency management—mitigation, preparedness, responses and recovery—and also consider the adaptation planning continuum of protect, retreat, adapt and abandon. Following is a discussion of the characteristics that are considered integral to each phase in any education modules.

Mitigation

Mitigation needs to focus on the need for planners to understand that a shift in emphasis from broad-scale fuel-reduction treatments to intensive fuel treatments close to houses will more effectively mitigate impacts from wildfires on houses.

The capability of planners to understand landscape scale and management practices needs to be integral to any education module.

Chen, K. et al., 2010, in the *Risk Frontiers Report* to the Insurance Council of Australia found that excluding the 2003 Canberra bushfires, 80-90 per cent of all fire destroyed buildings occurred within 100 metres of bushland, and 50 per cent of all destroyed buildings occurred less than 50 metres from bushland. These distances have implications for urban interface planning including management of asset protection zones. The integrated roles of architectural solutions, education of residents, enhanced community resilience and the availability of and community support for designation of community refuges and early evacuation strategies is analysed here as part of strategies to mitigate increasing risks to communities from wildfires.

Currently, rural dwelling construction and other development is inadequately related through policy and statutory planning provisions to remnant native vegetation. The importance of retaining remnant native vegetation for landscape, biodiversity, water and land protection and other reasons has been recognised through statutory planning across Australia for over 20 years. However, dwellings continue to be constructed close to remnant native vegetation. The approval of subdivisions of land containing significant native vegetation results in rising numbers of people being exposed to increased risk from fire, and the continuing degradation, reduction or eventually the elimination of remnant native vegetation.

Approaches that planners can adopt to find ‘compromises’ between conserving the residential amenity of bush living and ensuring defendable homes need to be considered.

Preparedness

The themes of scales of preparedness and response need to be examined in the education modules by investigating the potential for integrated land use planning, resource management and fire prevention policy as anticipatory planning and as a demonstration of planning system transformation.

The operation of the Bushfire Management Overlay,[9] regional bushfire planning assessments (RBPAs) (Vic) and Bushfire Risk Management Plans (NSW) that provide 'signals' to landowners and communities to expect and prepare for catastrophic events should be examined. This includes an acknowledgement that it may be possible to identify areas of unacceptable risk through understanding (CRC Victorian 2009 Bushfire Research Response Final Report, October 2009) that bushfire attack mechanisms now encompass the increased role of radiant heat and extreme wind gusts, size and distance of firebrand/ember activity, and increased time of fire front activity.

In the Victorian catastrophic bushfire 'Black Saturday 2009', more than half of the house ignitions occurred in areas not covered by the Wildfire Management Overlay—this suggests that a much broader understanding of community cognitive acceptance of states of risk, preparedness and action is required.

The role of planners as part of urban interface engagement needs to be included in an education module on preparedness. Evaluation of a Tasmanian Fire Service Community Development (Frandsen et. al., 2011) demonstrated that community engagement can directly promote bushfire preparedness behaviour. The role of planners may initially focus on micro scale explanations of the vegetation management practices as hazard reduction processes and advice on how to comply with Council's planning codes or by-laws. Emerging dialogue about rebuilding strategies and potential 'buy back' of areas of extreme hazard could provide useful contextual information on community understanding for future response strategies i.e., will prevailing community sentiment demand rebuilding 'rights' or a quick 'exit' strategy?

Risk Frontiers' *FireAUS* project aims to quantify bushfire risk for all addresses in Australia. It analyses spatial patterns of fire penetration into urban areas using data from major historical fires, and quantifies site-specific environmental attributes that may predispose properties to bushfire risk. From this, it shows that for the Greater Sydney region about 190,000 (or about 7 per cent) of all addresses may be at a relatively greater risk owing to their close proximity (within about 80 metres) to areas of extensive bushland. Results are detailed at two different spatial units: Local Government Areas and CRESTA (Catastrophe Risk Evaluation and Standardising Target Accumulations) zones as used by the insurance industry.

State and Territory planning systems are based on legislation that prescribes for bushfire planning to provide for the protection of human life and to minimise impacts on property from the threat of bushfire, while having due regard to development potential, on-site amenity and protection of the environment.

Planning regimes typically contain the following requirements regarding development assessment:

- the fire risk of inappropriately located or designed development must be considered in planning decision making

[9] http://www.dpcd.vic.gov.au/planning/plansandpolicies/bushfire-planning-and-building/bushfire-management-overlay - accessed 21 May 2014

- industrial developments should not be permitted in extreme fire hazard areas without permanent hazard level reduction measures being implemented, and
- in high and medium fire hazard areas, the use and development of land for more intensive purposes should not be permitted without assessment of the bush fire risk. Acceptable solutions for minimising the impact of fire, ensure that:
    - buildings are not located in highly vulnerable positions and are also sufficiently distant from areas of potentially hazardous fire behaviour
    - road layout and other access features combine both fire service access and resident safety
    - water supplies are sufficient for the fire services
    - the fire service response capability is adequate to meet the building and bush fire risk, and
    - provision for bushfire abatement zones is made, i.e., buffer zones between bush fire hazards and buildings, infrastructure and other types of development that might be affected by radiant heat, flames, ember and smoke attack.

Education modules should pay particular attention to the Victorian Planning Controls as a best practice example, informed by extensive research and community opinion. In November 2011, the State Government introduced new (and significantly changed) planning regulations in amendment VC83 relating to bushfire hazard, which resulted in changes to 17 planning scheme clauses. State policy at Clause 13 Environmental Risks is greatly changed, with a stronger emphasis on strategy, and a new focus on prioritising protection of human life, refusing unsuitable development (in terms of existing or creating bushfire risk) and building community resilience.

The new *Bushfire Management Overlay* (Clause 44.06) introduced an ability to add schedules to the overlay. This means areas with different hazards and different requirements can be identified, instead of there being universal application of the same 'rules'. There are also changes to *Environmental Significance, Vegetation Protection, Significant Landscape, Erosion Management* and *Salinity Management Overlays*, with schedules being introduced for the last two.

New provisions for *Bushfire Protection: Planning Requirements* and *Bushfire Protection: Exemptions* are inserted together with new subdivision and development requirements in bushfire-prone areas. Two new advisory notes are available (Advisory Note 33: *Community fire refuge and private bushfire shelter exemptions*, and Advisory Note 40: *Bushfire planning provisions*). There are also new practice notes: Practice Note 64 *Local Planning for Bushfire Protection* identifies what is needed for planning applications, and Practice Note 65 explains the *Bushfire Management Overlay and Bushfire Protection Planning Requirements.* A companion guide has also been provided for the new provisions (CFA, 2012).

At this stage, the existing *Wildfire Management Overlay* (WMO), which identifies risk areas based upon narrow criteria, is retained with the new VC83 planning provisions applying to it. The new *Bushfire Management Overlay* (BMO) goes

further than the WMO. The BMO is based on recently (2011) released Bushfire Hazard mapping, which identifies some 85 per cent of Victoria as being at risk, so the BMO is applied more extensively over larger areas than with the WMO. The WMO is being replaced in planning schemes over time with the Bushfire Management Overlays.

An additional feature of the BMO is that it comes with schedules, which allow differences in risk level, requirements and actions to be taken to be differentiated and included on separate schedules within the BMO overlay itself. A Bushfire Site Assessment is prepared to determine the requirements for defendable space and building construction associated with new development. Defendable space is an area of land around a building where vegetation is modified and managed to reduce the effects of flame contact and radiant heat associated with bushfire. Defendable space has an inner and outer zone that has different vegetation management requirements. Construction requirements are specified as Bushfire Attack Levels (BAL) as defined by AS 3959-2009 *Construction of Buildings in Bushfire Prone Areas* (AS 3959-2009). A BAL corresponds to a modelled level of bushfire exposure considering factors such as embers, flying debris, radiant heat, wind and exposure to flames. As a development's potential exposure to bushfire increases so does the BAL.

The 'old' WMO had no schedules and so the same standards apply universally. Within the new planning provisions, there are mandatory standards to be met for subdivision and development in bushfire prone areas. The provisions also recognise development may not be possible in all situations. These changes respond to the Bushfire Royal Commission recommendations, and affect most parts of the State.

Response

One key message throughout an education module on Response can be that built environment professionals who can be effectively involved in the response phase will need awareness of community vulnerabilities and an understanding of emergency management arrangements.

Desirably, roads will have been 'disaster proofed', i.e., straightened, widened, elevated and cleared of obstructions to ensure either that evacuees can get away quickly or that emergency vehicles can arrive in minimum time. Emergency scenarios should have identified critical nodes, being points in the urban system that are vitally important to operations in disaster, including hospitals, fire stations, emergency operations centres, assembly points and locations for recovery centres. Experiences during recent flood events in Queensland and the Victorian Bushfires of 2009 have shown that community sporting and showgrounds are highly effective assembly and recovery points. Planning for and enhancement of such facilities should have regard to this type of use.

Planners may be asked to contribute to or manage post-disaster damage assessments, frequently undertaken by aerial photography and remote sensing—understanding the needs of different agencies and private sector entities will be essential, together with a degree of technical understanding as to the most effective

techniques for assessing damage and the usefulness of such data in longer term fire research.

Recovery

The community expects unambiguous advice about rebuilding options but the need for prudent approaches needs to be one of the key issues discussed in an education module on Recovery.

Lamour-Reid (2012) states that one of the more contentious decisions of the Victorian Government after Black Saturday 2009 was the introduction of broad planning permit exemptions for the construction of replacement buildings. Amendment VC57, introduced in March 2009, exempted the rebuilding of dwellings and other buildings from all provisions of the planning scheme apart from the Heritage Overlay. Council 'authorisation' (rather than a planning permit) was required in cases where overlays identified hazards such as flooding or landslip. Just as contentiously, the amendment allowed for the removal, destruction or lopping of vegetation to enable the construction, use or maintenance of a building rebuilt in accordance with the new provision. The interim provisions substantially streamlined the approval process, with applicants merely required to prepare a site plan for approval by the local council. Apart from providing evidence that an equivalent building had been destroyed by the fire, the applicant was also required to make provision for water supply, waste water disposal, vehicle access and power supply.

5.5 Education and training module options

The above discussion highlights that training opportunities will need to span tertiary education and ongoing professional development for practitioners. These possible training opportunities will need to be actively supported by the professional organisations, including the Planning Institute of Australia that supports over 5000 planners across Australia. The involvement of bodies such as PIA during this research provides a platform for ongoing collaboration in future education development opportunities. Through a collaborative partnership, the development of a Mass Open Online Course in planning and bushfire risk is a distinct possibility.

The following table outlines potential education modules and delivery appropriate to professional development and in service training in a multi-disciplinary environment.

Options might include:

Education need and delivery mode	Student market
Certified Practising Planner—PIA On line interactive High level geographic information systems (GIS) capability required for module development	Planners and emergency management professionals seeking professional accreditation 4 days over one month accredited by the Planning Institute Australia
Other compatible professional modules with related professional bodies including built environment professionals On line interactive	Link with professional accreditation to be investigated with wider built environment professional bodies including Engineers Australia
In service training Supervised online in classroom setting Keynote speakers Professional workshops Site visits—Canberra region Could be 'franchised'—delivered nationally with 'local' case study material	Employees from Commonwealth State/Territory and local government (planners, land managers, environmental scientists—professional accreditation options) Intensive over 3 days
7 week intensive On line interactive + 2 'reflection' sessions + more emphasis on individual 'project development /case study'	Students in Masters Urban and Regional Planning or equivalent post graduate studies. Could also be packaged as stand-alone qualification as a graduate certificate in planning and disaster management

The development of education modules could be based on the following three components, designed to be delivered as part of a Continuing Professional Development program:

Component 1

- Understanding Fire in the Landscape (the peri-urban interface and rural communities)
- Spatial Data and Risk Assessment (Decision Support Tools)

Component 2

- Spatial Planning—risk related adaptation at urban, regional and local scales
- Community Behaviour and Expectations

Component 3

- Case Studies and Project Development.

Initial discussions have been held with the Planning Institute to ascertain interest. A follow up workshop is recommended with a wider range of professional bodies including Emergency Management Australia and the Bushfire and Natural Hazards CRC to further refine the above options. The themes and course content here are suggestions to develop this field further. The next steps could involve a course advisory committee and external quality assurance processes within the tertiary education sector together with accreditation of professional and vocational courses.

5.6 Conclusion

The provision of education on planning and bushfire risk is gradually developing with an increasing recognition of the benefits that can be obtained with a deeper understanding by professionals of the positives that appropriate urban and regional planning can contribute. The development of education for planning and fire risk has been surprisingly minor given the high level of attention given to these areas in recent bushfire inquiries. While there are some limited education and capacity-building offerings throughout Australia, there is not a consistent approach to training both planners and emergency management in the importance and contribution of land use planning to minimising bushfire risk and effectively engaging professionals and the local communities in that process.

The above discussion on options provides an outline of a pathway forward, focussing on education modules organised under the four phases of comprehensive emergency management—mitigation, preparedness, responses and recovery—and also considering the adaptation planning continuum of protect, retreat, adapt and abandon. Mainstreaming bushfire and planning modules will require support of the professional institutes who have been consulted during this research project. A longer-term advisory committee is recommended for implementation of mainstreaming across the relevant professions.

References

Alexander, D. E., 1999. *Natural Disasters, London, Kluwer.*

Buxton, M. & Haynes, R., 2010. Land Use Planning for Bushfire Protection – Evidence for the 2009 Victorian Bushfires Royal Commission.

Chen, K., McAneney, J. and Leigh, R., 2010. *CRESTA / ICA Risk Accumulation Zones: Validation and Refinement*, Risk Frontiers Report to the Insurance Council of Australia.

CFA (Country Fire Authority) 2013. Planning for Bushfire Victoria: Guidelines for Meeting Victoria's Bushfire Planning Requirements, CFA, Melbourne.

Frandsen M., Paton D., Sakariassen K., 2011. Fostering Community Bushfire Preparedness through engagement & empowerment, 26, Australian Journal of Emergency Management, 23-30.

Groenhart, L., March, A., Holland, M. 2012. Shifting Victoria's Emphasis in Urban Planning for Bushfire, Australian Journal of Emergency Management, 27 (4), 33-37.

Lamour-Reid, J., 2012. Planning on the Front Line: Black Saturday and its Aftermath – Paper for the Planning Institute of Australia National Congress 2012 .

O'Neill, S.J. and Handmer, J., 2012. Responding to bushfire risk: the need for transformative adaptation. Environmental Research Letters, 7.

RMIT University, 2009. Evaluating Bushfire Community Education Programs: Final Report - Bushfire CRC Project C7 School of Global Studies, Social Science and Planning http://www.bushfirecrc.com/higher-education/community-safety/pgc_genmodule.html Accessed 1 June 2014

Schwab, J., Meck, S. and Simone, J., 2005. *Planning for Wildfires. Planning Advisory Service Report. Chicago, American Planning Association.*

Sullivan, K. and Norman, B., 2011. Integrating Spatial Planning with Bushfire Risk and Emergency Management in the Context of Climate Change: Critical Literature Review—Stage 1, Urban and Regional Planning, University of Canberra.

Tasmania Fire Service 2014 Chief Officer's Scheme for the Accreditation of Bushfire Hazard Practitioners http://www.fire.tas.gov.au/userfiles/stuartp/file/BuildingForBushfire/ChiefOfficersSchemeForTheAccreditationOfBushfirePractitioners_v_1.pdf

Teague, B., McLeod, R., and Pascoe, S., 2009*. Victorian Bushfires Royal Commission Final Report. Melbourne: Parliament of Victoria.*

Teague B., McLeod R., Pascoe S., 2010a. Victorian Bushfire Royal Commission: Final Report—Summary, State of Victoria, Melbourne.

United Nations, 2008. Spatial Planning—Key Instrument for Development and Effective Governance: Economic Commission for Europe.

Planning Institute of Australia, 2009b, 2009b. Submission to the 2009 Victorian Bushfires Royal Commission.

Victorian Government, 2011a. *Planning and building for bushfire protection. Melbourne: Department of Planning and Community Development.*

Weir, J. K., 2012. Bushfire Aware Planning: Leading practice for Risk and Emergency Management, draft report for circulation, University of Canberra.

Witherby, A., 2003. "Bushfires and the education of planners" Australian Planner 40(4) 34 – 36.

6 Conclusion

Bushfire risk and emergency management should be integral to planning Australian cities, infrastructure and urban settlements. This is identified throughout the findings of sixteen major bushfire inquiries from 1939 to 2011. This research report outlines the findings of a review of the major bushfire investigations, relevant published literature and focus group discussions with end users in a range of landscape settings across Australia.

This research has identified the importance of better understanding:

- the links between planning and bushfire risk
- recognising the differences in risk perception influenced by history, landscape and experience
- implementing effective planning and development controls, and
- providing appropriate education and training.

These four factors are the key dimensions to integrating urban and regional planning with bushfire risk and emergency management in a changing environment.

The major research findings drawn from Chapters 2 to 5 are outlined below. These findings indicate that while we have a deeper understanding of the role of land use planning and fire risk and the role of decision makers and professionals in facilitating those connections, we still have a long way to go in achieving effective implementation.

A key message from this research, supported by a wider range of studies including the special case study on bushfire and coasts, is that the decision making process is critical to achieving a workable and sustainable solution on the ground. For example, we continue to approve urban development in areas of high fire risk, bringing with it very significant challenges to all stakeholders now and in the future. Finding solutions to such an intractable problem will require collaborations and partnerships between decision makers, professionals and affected communities.

6.1 Research findings

The outcome of the research is a deeper understanding on the contribution of urban and regional planning to managing fire risk throughout Australia. Differing perceptions of fire and various planning responses by States and Territories provide a rich policy environment for the emergency management sector to work with. Added to this complexity are expanding urban areas from Darwin to Melbourne and the challenges of continuing urban development in Australian coastal regions that are already experiencing environmental change and predictions of an even hotter environment and an increased potential for fire risk. A key finding that emerges is the need for a more integrated approach to planning for fire risk that better connects planners with emergency management and those involved in assessing risk.

Following is a summary of the key research findings drawn from the bushfire inquiries, wider literature, focus group discussion and liaison with professional bodies on possible education and capacity building opportunities.

The key research findings

Finding 1
Urban growth and the projected impacts of climate change will potentially expose more people to risk. Spatial planning can provide a significant means of risk reduction and adaptation, by influencing the type and location of development.
Finding 2
The 16 major Australian bushfire Inquiry reports, from 1939 to 2011, have gradually outlined a crucial role for spatial planning in managing bushfire risk at the rural/urban interface. However, they have tended to view the practice of planning in a relatively limited way and have arguably not fully appreciated its broader strategic potential.
Finding 3
Spatial planning can enable the risks associated with land use and development at the rural/urban interface to be assessed across a much broader range of considerations. At the rural and regional scale, it can link climate change adaptation, disaster risk management and social equity to help build community resilience.
Finding 4
Collaborative spatial planning processes can provide a platform for exploring shared responsibility and sustainability within rural/urban interface communities including relevant community groups, volunteers, expert advisory groups, researchers and professionals.
Finding 5
Future visioning of disaster risk and climate change impacts at the regional scale through modelling a range of socioeconomic, climate and risk scenarios offers a useful framework for engaging rural/urban interface communities in possible futures for their regions. In this regard, there continues to be a critical need to translate spatial planning theory into practice—to 'bridge the gap'.
Finding 6
The capacity for planners to be responsive to bushfire risk is constrained or facilitated by the perceptions of bushfire risk held by these decision makers as well as in the community, including how bushfire risk is appreciated and understood in relation to other priorities. Decision makers still find it very hard to say 'no' to development and as a consequence we continue to build and rebuild in bushfire prone areas.
Finding 7
The key themes emerging across the four focus groups were risk, governance and management. The focus groups revealed that rather than planners and the fire authorities being at odds over bushfire risk, they are both grappling with responsibly addressing a risk whose sway and effects extends far beyond their job description.
Finding 8
Planning for bushfire risk is an emerging field. Education modules should be organised under the four phases of comprehensive emergency management—mitigation, preparedness, responses and recovery—and also consider the adaptation planning continuum of protect, retreat, adapt and abandon.
Finding 9
A compelling case is emerging for a national on-line education program that provides context for State based vocational style training on planning for bushfire risk management.
Finding 10
Partnerships between institutions and collaboration between academics, professional and communities will be critical in better understanding and communicating environmental risks to coastal communities in the future.

In conclusion, this research has highlighted the key dimensions to integrating urban and regional planning with bushfire risk and emergency management in a changing environment.

The next steps may involve a closer examination of the interests involved in the decision making processes that lead to urban development decisions on the urban edge and in bushfire areas, together with a deeper understanding of the aspirations of affected communities. Only then may we find a pathway for implementing more sustainable solutions on the urban edge.