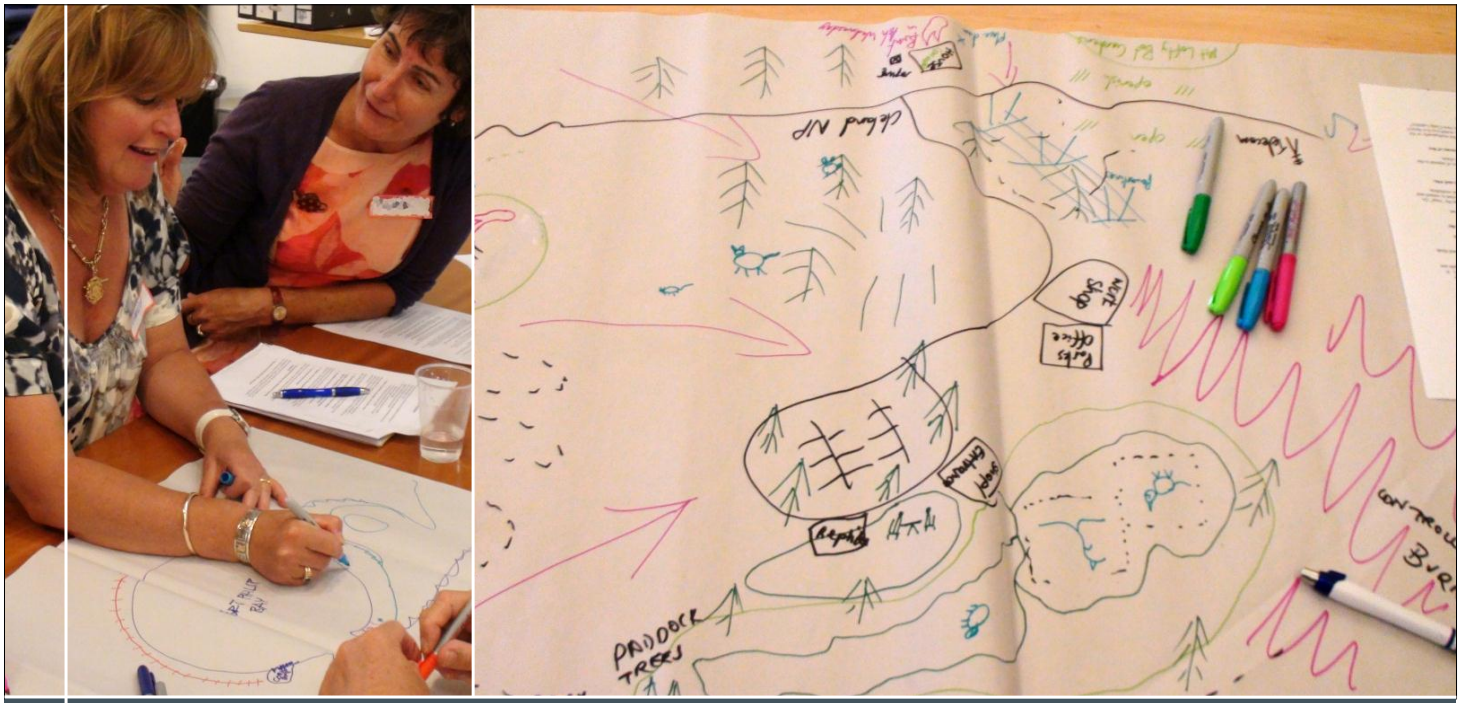
bushfire CRC



PUTTING 'IT' TOGETHER: MAPPING THE NARRATIVES OF BUSHFIRE AND PLACE IN TWO AUSTRALIAN LANDSCAPES

FINAL REPORT FOR THE SOCIAL CONSTRUCTION OF FUELS IN THE INTERFACE (PROJECT TWO)

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Cover:
Left - Participants at a place mapping workshop.
Right – A map showing the important features of built and natural landscape, including fire as part of the natural landscape.
All photos by the Bushfire CRC.

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'The greatest challenge in fire research is cultural'

Professor Tom Griffiths
(*Inside Story*, 16 February 2009)

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Executive Summary

The landscape means different things to different people and these 'social constructions' strongly influence what people value in landscapes and how they think about management. Community landscape values may not always correspond with the assets that fire management agencies prioritise for protection. This pilot research project aimed to (1) understand the underlying social and ecological values people associate with the landscape, and (2) investigate how understanding the interface between scientific-ecological and local-intuitive knowledge can contribute to fire management.

Taking a "place-mapping" approach, we interviewed residents in two contrasting Australian landscapes – the Adelaide Hills and the Southern Grampians. Research participants were asked to 'mud map' their social and ecological landscapes at local and regional scales. Key findings from the research were:

There is little evidence of an 'information deficit' about the risk of bushfire among residents. Many however expect to be taken surprised by fire (local ignition, low risk day) and therefore construct multiple fire plans to suit multiple scenarios.

Home-making practices (gardening, planting indigenous species, walking the landscape creating a home-territory) extend the sense of "home" into the landscape. Being at home during a fire is therefore about protecting values greater than the house. There is however a tension between homeowner responsibility for mitigation *before* a fire and lack of control *during* a fire.

The ways people order and prioritise their memory of fire is important. Memory may be a forward construct that helps people deal with future risk. Mapping as a method seems to trigger a memory response that helps people connect intuitive and rational ways of knowing about fire; they connect their social and ecological (biophysical) worlds in this process.

These findings should assist managers to assess the fire safety message and the findings support and create new ways to engage with local communities.

1. Introduction

Many communities lie next to or are surrounded by bushland (including Parks and State Forests). In some areas much of the remnant bushland is privately owned. Fires do not recognise boundaries, so fire and land management agencies and local communities need to work together to understand the values threatened and sustained by fire, and how best to manage them. Decisions about the use of fire for nature conservation and life and property protection are made more complex by issues such as the fragmentation of natural landscapes, pest plants and animals, and the proximity of urban and agricultural land to natural areas. How communities understand these issues and their relative importance has a large impact on what is perceived as a "hazard" and what is considered as valuable. Community landscape values may not always correspond with the assets that fire management agencies identify as being priorities for protection. Therefore, understanding more about the dynamics of how community norms and values are formed and expressed is an important starting point for an on-going conversation about fire management programs between communities and management agencies. This innovative project undertook preliminary research to explore these issues in a peri-urban landscape in the Adelaide Hills, and within an agricultural "mosaic" landscape in western Victoria. The first major question for research was:

- How do we understand the underlying socio-ecological values associated with the landscape in which we work and live?

Place theory – the processes by which people socially construct and form attachments to places – has informed the research design and methods. Place meanings are important but little understood components of place attachment (Stedman 2008). This study explored the formation of place meaning by taking the perspective of landscape sociology. Here, landscapes are understood to encompass physical and ecological attributes as well as social meanings made by people who live and work in them (eg. Meinig 1979). Samuels (1979) suggests that landscapes are 'written' by their inhabitants. The role of research therefore, is to understand how people shape, and are in turn shaped by landscapes in ways that affect their lives and management decisions within these places; and their interaction with fire in these landscapes. Prior bushfire research suggests that people's practices in relation to management and response to bushfire is strongly influenced by social and ecological memory

of place (Reid & Beilin *in press*). Building upon these research findings, the second major research question was:

- How can interfacing local knowledge of fire, biodiversity (nature/ecology) and place at a landscape scale and associated with particular places, assist in the public and private management of fire?

The research reported here was conducted as a case study of two contrasting fire-prone Australian landscapes – the peri-urban Adelaide Hills in South Australia and a rural landscape bordered by Grampians National Park in western Victoria. In-depth interviews (which involve participant "mapping" of their social and ecological understandings of places) were conducted with a total of 40 landholders across the two case study sites. The structure of the report follows. First, there is an overview of place theory and the construction of environmental values particularly as it relates to bushfire research. This is followed by a brief introduction to the social construction of landscape and how this influences thinking about bushfire in an Australian context. Third, we introduce the theoretical basis for "place mapping" as a research method. In the fourth section we describe the research method and the case study sites. The fifth and sixth sections are the results and discussion of findings, in relation to both specific outcomes about the social construction of bushfire and about place mapping's utility as a way of understanding the entangled interactions that assist land users and managers to negotiate their fire risk. We conclude with a summary of outcomes and a suggested future research agenda.

2. Background to study

2.1 Social research and place theory in a bushfire context

People perceive, experience, and engage with nature at the scale of landscapes. People make meaning through their experience of landscapes – for example, the everyday landscapes that we live and work in as well as the landscapes we visit for recreation. People attach meaning to places and objects in places. These meanings may be connected to their everyday practices in maintaining or creating landscapes. These practices represent ways of managing for their ideals and can be influenced by physical aspects of the landscape (for example old growth forests, mountain ranges, rivers) or by the meanings that places hold (for example, familiar childhood landscapes or somewhere that a significant life event happened).

There is a substantial and growing body of social research on public perceptions of and preparedness for bushfire, both at a household and community level. These studies highlight the importance local meaning and social context play in determining community support for agency management treatments such as fuel reduction, and in household or community actions taken to mitigate risk (McCaffrey *et. al.* 2013). In a USA based study, Nelson *et. al.* (2005) found that when considering fire risk mitigation, homeowners placed importance on:

- naturalness (leaving the landscape as nature intended);
- aesthetics (enjoying the visual landscape);
- wildlife (preserving nature to attract wildlife and diversity);
- recreation (sport, picnics etc. on private properties; close access to lakes or forests from home); and,
- privacy (vegetation that screens neighbouring properties; a sense of distance from other homes).

Place research has been used to inform among other things, public involvement in natural resource management, environmental perception, recreation conflicts and levels of environmental concern (Stedman 2008). At the same time, there has been far less attention paid to place meanings. Place meanings, or "what kind of place this is" are an important part of sense of place, but little is known about how they are produced and the part they play in forming place attachments (Stedman 2008, p.61). Increasingly, conflicts about natural resource management are found to be based on the meanings places hold for people rather than on place attachment. Competing place meanings are often deeply held and strongly

defended by differing groups, who may also manipulate place meanings in order to influence resource management outcomes (Cheng *et. al.* 2003, Stedman 2008, Kruger & Jakes 2003, Gill 1994). Therefore land and fire managers need to understand how the actions that they take influence the meanings made of places.

There are precedents for using place theory in bushfire research. Gill (1994) identified place meanings as an important factor in a conflict over bushfire management. In his case study, Gill found that the land management agency and the local community held different values for the landscape being managed. While the management agency saw themselves protecting conservation values, the local community valued traditional stewardship practices. This led to divergent ideas about the appropriate fire regime. More recently, Brenkert-Smith (2006) proposed that place related research into the relationships between homeowners and the environmental and social features of the places where they live could strengthen hazards and wildfire research. Her study of a wildland-urban interface (WUI) community in Colorado indicates that social aspects of place attachment such as community attachment, privacy and independence from regulation influenced respondents' choices of where to live and what fire mitigation actions they took. Brenkert-Smith also found that biophysical aspects of the landscape such as those that contribute to scenic beauty or recreational opportunities influenced attachment to place and the choice to live in the WUI. Gunderson and Watson (2007) investigated place meanings attached to the Bitterroot National Forest in Montana, and how fuel treatments interact with the relationships people have with the landscape. Many respondents in their study expressed strong attachment to the wilderness portion of the forest and the view that human management of fire was unnecessary – if left alone, natural fire regimes will take over. There was however, concern about how to manage "natural" fire at the interface between wilderness and non-wilderness. From a "place-meaning" perspective, one of the most interesting results from Gunderson and Watson's (2007) study was that people reported strong place meanings for parts of the landscape that they rarely, if ever, visited. Seldom visited places held meaning as watersheds (catchments), as part of social identity, for cultural significance, as potential opportunities for exploration and new experiences, for their intrinsic value and wildness, and for their aesthetic value. These findings suggest that "place" is created not only by direct human experience – places that people don't inhabit may also be important.

Kyle *et. al.* (2010) introduced the idea of "home attachment" as an umbrella term for the many different concepts that describe people's attachments to places or to objects (eg. place attachment, place dependence, place identity). These authors tested the hypothesis that greater attachment to home and community would lead to higher adoption of "firewise[1]" behaviours. They found that attachment to home was strongly predictive of firewise practices in the home and that community attachment predicted involvement in community-based activities. Whereas Kyle *et. al.* (2010) have used "home" as an umbrella term to embrace multiple aspects of place attachment, it is also widely held that "home" is a particularly significant kind of place (Easthope 2004). Home is associated with privacy, safety, familiarity and shelter (Reinders & van der Land 2008). It comprises more than just the physical house or the natural or built environment of a region. These objects or spaces become "home" when they are inscribed with meaning. As Ginsberg (1999 cited in Mallett 2004, p.83) puts it "our residence is where we live, but our home is how we live". The idea of "home" is not fixed or static – our processes of home-making are continuous (Mallett 2004). Easthope (2004 p.135) argues that by "understanding a person's connection with their home…we go some way towards understanding their social relations, their psychology and their emotions and we can begin to understand their 'lived experiences'". There is however, little literature investigating what happens when the process of home-making is interrupted by risk such as increasingly frequent or intense bushfires. We further explore how connectedness to home contributes to practices relating to bushfire and propose an expanded understanding of home that encompasses the wider landscape and the practices of home-making (Cloutier-Fisher & Harvey 2009, Flemsæter 2009).

2.2 The Social Construction of Landscape and Bushfire

All landscapes can have multiple layers of meaning that are open to interpretation through the array of lenses that people bring to them. Landscapes have different seasons, histories, purposes, and public and private symbolisms (Alexandra & Riddington 2007, Grieder & Garkovich 1994). Meinig (1979) asserts that if we are to change our landscapes (in our research, understood to be better adapted to living with bushfire) we first need to understand and change the ideas that have created and sustained them in the past. Furthermore as Lewis

[1] Based upon the USA's "Firewise Communities" education program which aims to educate homeowners about wildfire mitigation measures that can be incorporated into home design and landscape design.

(1979) argues, to fully understand the multiple meanings of landscapes it will also be useful to investigate the mechanics of the technology and communication used in their production. We argue that to better understand the relationships between people and bushfires we need to research the processes, social and biophysical through which the landscape is created and interpreted.

In the Australian context, Tom Griffiths (2002, p.384) has pointed to the different constructions of fire and vegetation apparent in witness statements to the 1939 Stretton Royal Commission into Victoria's Black Friday fires. He observed that there were many differing constructions of the landscape and of what constituted a 'fire':

> "One after another, witnesses testified to the use of fire and to changes in the forests since European settlement. They discussed the forest floor of the mountain ash country, what was 'litter', what was 'scrub' and what 'rubbish', what was 'dirty' and what 'clean' and how it came to be that way. The Royal Commission pursued these definitions...Did frequent fire eradicate rubbish or bring it on? And, anyway, 'what is the fire you would call a fire?' as one witness was asked. Is it anything that would throw up smoke, or a campfire or burning off or wildfire? What would denote 'carelessness' with fire – accidental ignition, thoughtlessness, arson, casual and selfish fire, systematic and wilful fire, burning at the wrong time of year, illegal burning at the right time of year?"

Similar observations could be made today about the multiple constructions of understorey vegetation – is it 'fuel', 'litter', 'habitat'? The question and its answer depend on who is asking and what their interest is in the landscape and its management. Attiwill and Adams (2012) for example, draw attention to the lack of consensus about fuel reduction burning between and within ecologists, the community and land management agencies. They attribute this partly to different conceptions of what is 'natural' in the Australian landscape. However, they also propose reasons why fuel loads are not controlled by fuel reduction burning. Their cited reasons reflect the many social meanings of fuel reduction burning across the Australian community. They include (but are not limited to) the idea that all fires are bad, that "controlled" fires can escape, that the smoke produced is bad, that burning makes ecosystems more flammable, and that there needs to be more research.

Goemans and Ballamingie (2013) demonstrated that differing social constructions of what constitutes ecologically sustainable management of an urban forest landscape influenced community compliance with fire mitigation strategies. These writers describe three broad constructs associated with the forest "forest as hazard", "forest as instrumentally valuable" and forest as intrinsically valuable" each of which influenced residents' support for, or opposition to, fire mitigation. They note that mitigation strategies that accentuate control over nature exacerbates residents' fear of natural areas and risk perceptions resulting in opposition to prescribed burning due to fear of uncontrolled fire.

Following the Black Saturday fires in 2009, Tom Griffiths (2009) commented on how, despite advances in the scientific understanding of fire ecology, Australians were still shocked by the ferocity of the February 7 bushfires. Griffiths urged a rethink of how bushfire is socially constructed, and we contend that this extends to risk associated with bushfire. Griffiths argues that the pursuit of national guidelines for managing fire blunts local knowledge of fire history and ecology. Instead of thinking of 'the bush' as an undifferentiated sameness we must "empower local residents and their knowledge of local ecologies" (p.3). Following on from Griffiths, we argue that to better understand the relationships between people and bushfires we need to situate bushfire as part of the everyday landscape. As Alkon and Traugot (2008) note, meanings about place are made as part of our everyday interaction with the landscape – we 'make place' in the course of doing everyday things.

In the next section we describe the theoretical basis for our research method 'place mapping' followed by a detailed account of research methods and a description of the case study sites.

2.3 Social and ecological 'place mapping'

2.3.1 Mapping as a research tool

Mapping has been used in multiple forms by land and fire management agencies and researchers. In this section we briefly discuss examples of how mapping has been used in the past. We also highlight the differences between these approaches and mapping as a methodological tool used within sociology and geography and propose a method for mapping the processes of place construction and recognition.

In Victoria, the Country Fire Authority (CFA) takes responsibility for maintaining the Victorian Fire Risk Register (VFRR). The VFRR is a mapping application that is used to plan for bushfire risk management. It is produced at the local government level by consultation between local Shire councils and other fire management agencies (for example, the State Government Department of Sustainability and Environment and Parks Victoria). The degree of community engagement in the process varies by council and may, for example, occur through consultation with local CFA volunteer Fire Brigades. The output of the VFRR is a "map" of risk that local councils use as part of their Integrated Fire Management Plans which are also subject to a process of community consultation (McCann, *pers. comm.* 2012). Similar processes are used in other Australian states; in fact the Victorian register was adapted from the New South Wales model.

Public Participation Geographic Information System (PPGIS) mapping has been proposed as a means of facilitating local community involvement in decision making about wildfire management (Morehouse *et. al.* 2010, Morehouse & O'Brien 2008). The Wildfire Alternatives (or WALTER) pilot project, based at the University of Arizona, used an internet based decision support system, known as Fire-Climate-Society (or FCS-1) to produce maps of values at risk of fire and of the geographical distribution of fire probability. Open access to the system was available and individuals could create their map of risk based upon local knowledge, for example, of weather patterns and of personal values about factors such as landscape or habitat for wildlife. However, as Morehouse and O'Brien (2008) acknowledge, critical analysis of the system would conclude that the existence of such a decision support tool is no guarantee of democratic involvement in decision making. The public would also need access to all of the knowledge necessary for full participation, be informed about decision making processes, and be empowered to participate. The solution therefore to the question of public participation is not simply a new technology, but remaking the social, political and power relations.

Cacciapaglia *et. al.* (2011) argue that place mapping is a potentially valuable method for integrating social and biophysical data. These authors describe research that used "place mapping" specifically to address landholder understanding of wildfire and fuels management in a wildland-urban interface landscape in Northern Montana. Like many "sense of place" studies, this research was focused on people's "special" places as well as on landscape-level meanings. While participants in this study created detailed and multiple maps of special

places, these were not the most important influence on their views about fire and fire management. Rather, the authors found that larger, landscape-scale narratives drove participants' views about fire and fuel treatments. Again, this suggests that research design needs to be flexible enough to allow respondents to create maps at multiple scales, and to capture the narratives that appear to be integral to the mapping process.

As an ethnographic research method, mapping is generally used to create illustrations that are then described through text or narrative. Powell (2010) makes the case for mapping as a way to understand the relationships between lived experience, community and place. For example, Powell describes a study in which participants (residents in a neighbourhood in Panama) were asked to draw a map defining their community – its extent and the regular routes people travelled within it. By overlaying these place-based maps onto the more traditional maps used by city planners, the researcher was able to juxtapose experience of place with more conventional notions of mapping spaces. A salient observation made during this study was the relationship between narrative and map making – participants often told stories as part of drawing their maps. From the perspective of research design, the significance of this point is that design must take account of capturing both the map and the narrative associated with it.

2.3.2 Mapping landscape and memory

The research methodologies described above suggest that there is considerable potential for place-based mapping to contribute to understanding of the complex problem of managing fire in the everyday landscapes. While Morehouse *et. al.* (2010) and Cacciapaglia *et. al.* (2011) focused on mapping values or sense of place associated with landscapes, Powell's (2010) work suggests that mapping can also be used to capture lived experience and narratives that are part of the social construction of landscapes. In this study we aim to extend this body of research by using place mapping as a visual research method that explores the links between place, narratives and memory. Riley (1992, p.19) argues that places become embedded in life's experiences not as physical aspects of environment but as 'setting' and part of memory. We propose that the physical act of mapping a landscape can be trigger to memory that helps to connect intuitive knowing with rational knowing. Our research method involves a multi-layered place mapping exercise by which participants can map their everyday experience of landscape at local and broader scales. Importantly, the mapping process is nested within the

context of an in-depth unstructured interview about the landscape, conducted ‘in place’ so that the narratives and maps are connected.

3. Research Methods

The research team for this project included A/Prof Ruth Beilin and Dr Karen Reid both of the University of Melbourne. Prior to the commencement of fieldwork, two additional researchers were recruited to participate in the Adelaide Hills case study. Damon Ezis (Fire Management Officer with lead end user agency Department of Environment, Water and Natural Resources, South Australia) and Tracey Brown (volunteer, The Hut Community Centre, Aldgate, South Australia) who had no prior experience with social research were trained by the University of Melbourne staff in the theory and practice of social research methods. They then carried out the recruitment of Adelaide Hills interviewees, conducted interviews and participated in the analysis of data. This unusual approach to university-based research was highly successful. The exchange of knowledge between an experienced fire manager, a local community member from the research site and the university personnel enhanced the capacity of all three organisations in relation to social research into bushfire in the landscape and highlights the possibilities of collaborative research between agencies and universities.

3.1 Selection of case study sites

This research project's purpose was to investigate the everyday practices of "place making" by people who live and work in fire-prone Australian landscapes. Therefore a case study approach is an appropriate research strategy (Yin 2003). Two demographically different case study sites were selected for the purpose of capturing some of the diversity of Australian landscapes. The sites were selected on the basis of demographics, land use, fire history, social coherence and fire management institutions. Specific criteria for selection are outlined below.

Demographic change

- peri-urban or urban fringe where residential suburbs encroach on "natural" landscapes or into former agricultural areas;
- "tree-change" or lifestyle blocks further out of the metropolitan area;
- aging farming population;

- increasing regional or service town populations where the in-migrants have little history within the wider landscape (eg. “tree-change” retirees, or people who have not grown up in the region).

Land use change or agricultural land abandonment

Different land management regimes will affect hydrological, ecological and social expectations of what the landscape should look like, and how it may be expected to respond with regard to bushfire or fire management. Salient features include:

- corporate aggregation of agricultural land (family enterprises and private companies);
- land associated with Crown reserves or parks;
- climate change associated with drought (eg. moving from dairying to row cropping).

Fire history

Potential sites needed to have a history of bushfire so that the influence of social and ecological memory of fire could be explored.

Diversity of land and fire management (local and centralised agencies)

- landcare groups;
- local government;
- state agencies;
- country fire services (central)
- local fire brigades
- informal or other social networks (eg. community fire guard)

3.2 Case Study Sites

3.2.1 Adelaide Hills South Australia

The Adelaide Hills is a peri-urban landscape on the fringe of the city of Adelaide, South Australia. Most of the Adelaide Hills district is considered to be at either high or medium fire risk and major fires occurred in:

- 1939 (including the townships of Crafers and Stirling);
- February 1980 (known locally as the “first” Ash Wednesday fires);
- February 1983 (Ash Wednesday)

- January 1995 (mostly bushland, no major building losses);
- January 1996 (bushland, farming land and one home lost);
- March 1998 (Tunkillo and Mypolonga) (Clarke *et. al.* 2005)

More recently, many participants spoke of a fire in 2007 that they referred to as the 'Mount Bold fire'.

Figure 1: The broad case study area in the Adelaide Hill, showing significant green spaces.

The total population of the Adelaide Hills as at the 2011 census was 38,628 (ABS 2013). While the overall population has been relatively stable, there is considerable turnover – over 25% of residents as at 2006 had moved into the area since 2001. The largest group of in-migrants is families with young children and the out-migrants are dominated by the 15-24 age-group. The majority of residents (82.7%) either own or are purchasing their homes (Adelaide Hills Council 2011).

To narrow the parameters of the research area, and in consultation with fire managers from council, we selected the town of Bridgewater as the focus of the study due to the perceived level of fire risk. After initial pilot interviews where the interlinked reality of these hill villages became clear, the focus was widened to include the towns of Aldgate, Stirling and Mylor reflecting the broader context of respondents 'local community'.

3.2.2 Southern Grampians Victoria

The Southern Grampians region in western Victoria was selected as an agricultural landscape where land and fire management is influenced by the presence of the Grampians National Park. Following consultation with the Southern Grampians Integrated Fire Management Planning Committee, the case study location was narrowed down to the communities of Cavendish and the Victoria Valley. 2011 Census data shows that Cavendish had a population of 374 and of this population 80% of employed residents are involved in sheep and cattle farming. There are no separate 2011 Census statistics for the small communities in the Victoria Valley, however the 2006 Census records a population of 195. Of this population 77% of those employed are within sheep and cattle farming.

Serious fires have been recorded in the region at least as far back as 1863. Some of the more significant occurred in:

- 1900 (homes, grass and wattlebark losses in the Victoria Valley);
- 1933 (strong winds drove a fire from the Murra Murra toward the community of Mirranatwa);
- 1939 (the "Black Friday" fires that affected Victoria and South Australia also impacted the Grampians); and
- 2006 (a fire in the Grampians National Park threatened Mirranatwa and the Victoria Valley for over a week but a wind change on the day it was predicted to impact saved the communities)

  (Field 2007).

In 2013, after this research was completed, a major bushfire threatened the communities of Mirranatwa and Victoria Valley (see *Figure 2*).

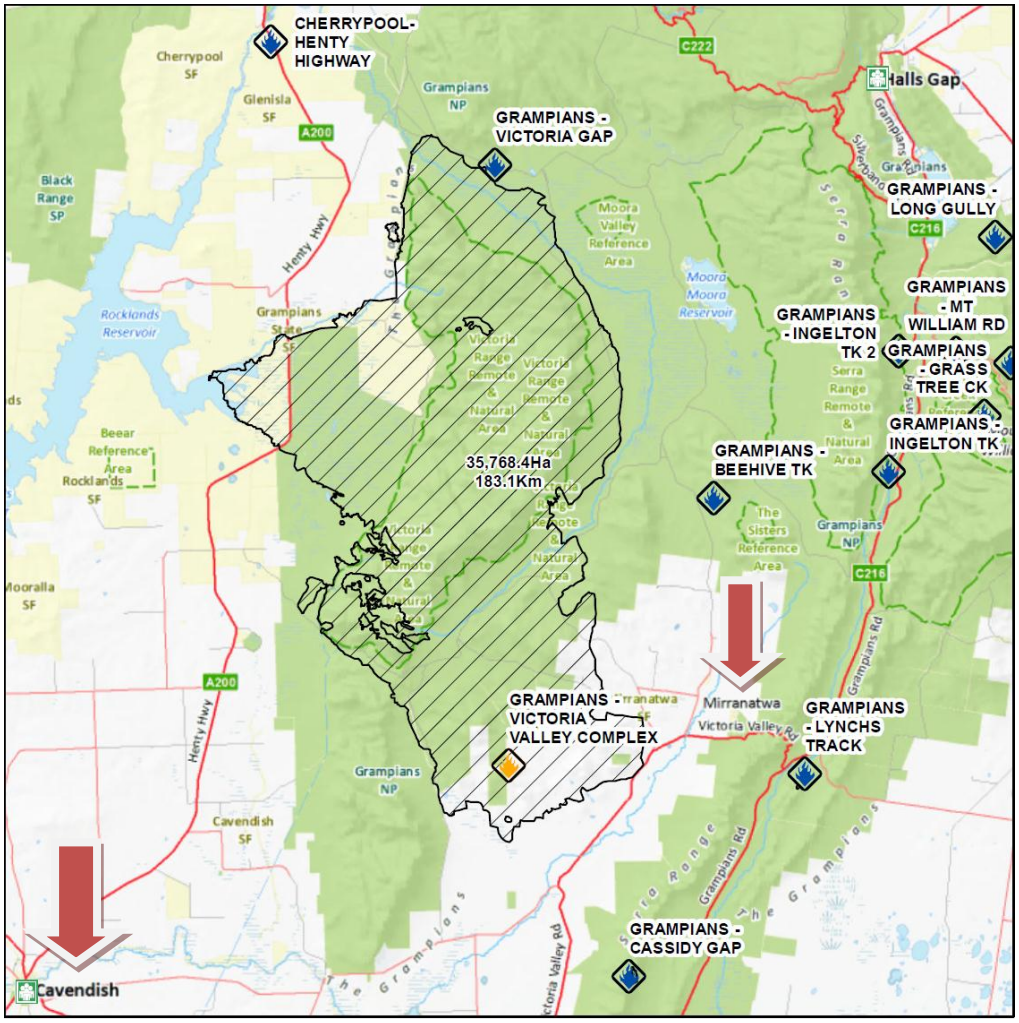

Figure 2: Map of Southern Grampians research site showing area burned in February 2013 (as at 26/2/2013) (Map from DSE (now DEPI) Fires Today Website http://www.dse.vic.gov.au/fire-and-other-emergencies/fires-today-incident-summary accessed 26/2/2013).

3.3 Recruitment and stratification of participation

In-depth place mapping interviews were conducted with a total of 40 landholders across the two case study sites (22 in Adelaide Hills, 18 in Grampians). Because of the relatively small size of the study, recruitment of participation within the case study sites was stratified to include a diversity of perspectives across:

- gender balance;
- households with dependants;
- length of residence;
- affiliation/non-affiliation with volunteer fire fighting organisations;

- affiliation/non-affiliation with 'Friends Of'/Landcare groups.

Adelaide Hills' participants were recruited by advertising posters in local shopping centres, on community noticeboards and an advertisement placed in the local Neighbourhood Watch newsletter distributed to all households in the study area.

In the Grampians region, names of potential participants were first provided by members of the local Municipal Fire Management Planning Committee. Following initial interviews participants were recruited via a purposive snowball method to achieve an appropriate demographic spread. Potential participants were approached directly by the researcher and invited to take part.

3.4 Data Collection and analysis

In a practical sense the data collection method involves a process of interviewing and mapping that takes the participant from the local to the regional (or regional to local) by asking the participant to 'mud map' their social and ecological world. Participants were provided with butcher's paper and coloured pens and asked to draw and describe their everyday activities over a typical week. Concurrent with the mapping process is an in-depth interview that probes the mapping choices being made by the participant. Research themes for the interviews were:

- Connection to this landscape?
  - understanding of landscape history (temporal and spatial)
  - social history within the landscape (life cycle in the landscape)

- Understanding of the local landscape?
  - what/who impacts the local landscape in relation to landscape management?
  - define their understanding of the 'system' (eg. Biodiversity/flora and fauna)
  - connection to ecology

- What are the significant places?
  - landscape stories
  - connect to the social

- Fire management practices
  - individual practices
  - knowledge of management agencies' practices

A set of pilot interviews were conducted in February 2012 at Bridgewater in the Adelaide Hills. In the pilot interviews, participants were provided with agency maps (from DEWNR) of varying scales and then asked to locate themselves at whatever scale was most meaningful to them. This method proved difficult for some participants. For example, participants unfamiliar with standard physical or road maps had difficulty orientating themselves. On the other hand, some participants found the standard maps constrained the story they had to tell and instead preferred to draw their 'place' on butcher's paper. See *Figure 3* below for an example of a map created during an interview.

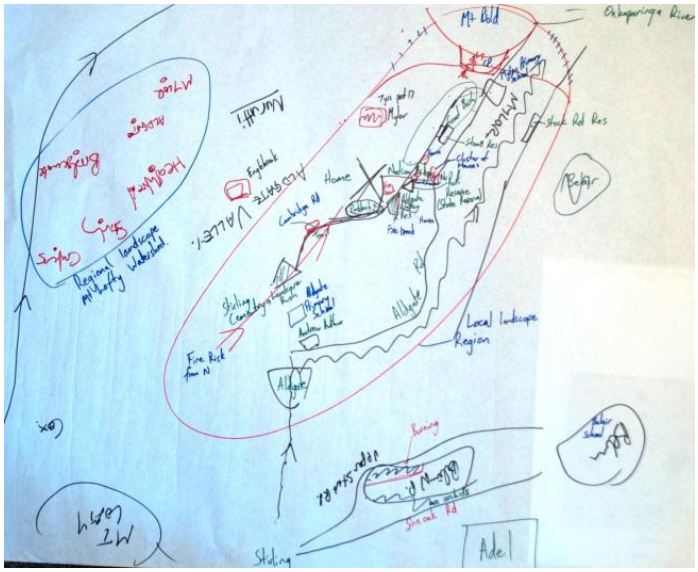

Figure 3 – Sample map generated in interview by a research participant in the Adelaide Hills.

Data took the form of maps and interview transcripts and was managed using Nvivo qualitative data software. Maps were scanned and loaded into Nvivo along with the interview transcripts.

Analysis was by thematic coding. This is an iterative process whereby emergent themes and patterns are identified and coded during repeated reading of the data (Hammersley & Atkinson 2007).

3.5 Road testing "place mapping"

One of the aims of the project was to test the concept of "place mapping" as a research method. In addition to using it in the case study interviews, a workshop involving engagement staff from the key end user agencies was conducted on 7 February 2013. The purpose of the workshop was to:

- allow agency staff to experience how different ways of knowing (or imagining) the landscape can emerge through mapping "place";
- reflect on how mapping could be used to create better understanding between (for example) land and fire managers and local residents
- reflect on the process of mapping -
    - what were the triggers to particular discussions or debates?
    - how were decisions made about what is in or out of the map?
    - how did 'imagined' places take shape on paper?
    - consider how mapping helps make the implicit process of meaning-making 'visible' to participants
- gather input from the engagement professionals to incorporate into future iterations of the method.

To do this, participants first formed small groups of 4-5 people. Because this exercise was conducted as part of a workshop rather than in an actual landscape the first part of the process was to select an "imagined" landscape (for example a sclerophyll forest or native grassland). Each group then negotiated what was to be included in the map while drawing on butchers' paper. Having created their map, each group was then asked to locate risk in the landscape, to consider the role of fire for ecological or fuel management, and to imagine how they would manage their fire practices as either a resident of the landscape or an agency operative. One team member was nominated to take notes about the processes of negotiation and report back to the workshop. This activity has subsequently been documented by the Bushfire CRC and a package of information is being prepared for use within agencies that may then use 'mapping' as one of their tools for community engagement.

4. Results

This study explored participants' understandings of bushfire within the context of their construction of the everyday landscape. In this section of the report we first present data that will help set the context by exploring people's connections to, and how they make meaning in, their landscapes. Second, we present results in relation to peoples' understanding of risk, the actions they take (or plan to take) in relation to that risk, and then situate those findings into the broader context of their connections to landscape – how they construct risk and what is at risk.

All participants are referred to by pseudonyms.

4.1 Constructing the everyday landscape

The connections that people experience with the physical landscape and the meanings that they make will inform the way they construct risk, including bushfire and other risks. In this section we report findings about the attributes of the landscape of greatest significance to participants and the practices through which they develop or express those connections.

A most consistent theme in the data is the connection to landscape that people make through observing and appreciating the flora and fauna, especially indigenous flora and fauna:

> *"…this year we've seen a male and a female [Scarlet Robin]…they're showing nesting behaviour and getting very territorial. Whereas other times we've just seen them on the edge of the territory when we were up in the paddock…so that's very exciting for us. We've set the GoPro camera up taking still shots of him flying in and doing his mad thing."*
> (Kathy – Adelaide Hills)

> *"I've been involved with the Park for 35 years and I will come up here to photograph orchids right throughout the season. I've got a collection of orchid slides, 45 different species of orchids flowering in the Park…"*
> (Jack – Adelaide Hills)

"…when I do bushcare work…you find say, a group of spider orchids and you weed …to clear them from invasion and…you put a marker…and the date I found them. And the next year you come back to check up…and you find there's more here…because I count them and this doubled the number and it's such a thrill to know that you have encouraged that native species to propagate…"
(Vera – Adelaide Hills)

"I was wandering through just over here and noticed some beautiful bright blue flowers. I'd never seen them before. Took some photos and I asked a botanist friend of ours what they are. She looked them up and said 'they're Tinsel Lillies, where did you get the photos, there are only I think 65 plants in existence…"
(William – Southern Grampians)

It is evident in this data that people have an appreciation for the birds and flora in their local area. But the value here is more than the mere presence of the species. Connection to landscape is produced through practice – the things people do to know the landscape such as monitoring, counting, collecting and naming. Kathy follows the habits of Scarlet Robins (*Petroica sp*.) over time and is now monitoring their behaviour with a camera. Similarly, Jack monitors native orchids by photographing them and he is building a collection of different species that he has observed and photographed. Vera also counts specimens of orchids and connects to the landscape by returning each year and to attribute increase in numbers to the weeding she does. William takes an active interest in documenting what he sees in the landscape but also in identifying and naming what he sees.

As previously noted, indigenous flora and fauna are very important to most participants in the study and remnant populations are given special attention.

"…there's 6 or 7 council reserves and 20 or 30 private properties that have got remnant veg[etation] on them and they've all been joined together in a single project…so our paddock even though it's only 3 acres is part of the bigger scheme and that's very important to me and obviously to a lot of other residents through here."
(Michael – Adelaide Hills)

"There's a bit of remnant wildness, that's what I like."
(Bruce – Adelaide Hills)

Associated with caring for remnant vegetation are practices of weeding and planting for revegetation.

"…I'm a member of the Friends of Belair National Park. You have a responsibility as a member when you go there to do some weeding…so when you walk around Belair, because you're a friend of it, it's more than just recreation."
(Carmel – Adelaide Hills)

Arguably, what Carmel is describing here is a sense of stewardship over the Belair National Park which for her creates a deeper connection to the landscape than simply enjoying it for recreation. In a similar vein, Paul speaks of how becoming a steward (which he describes as managing "*the invasion of one ecology by another set of…ecologies*") has generated his sense of place in the Adelaide Hills:

"I feel like I am one of those stewards because I understand how the environment works here now and because I think I'm new to it, it's a bit like being a reformed smoker, you tend to be a bit more passionate than everybody else, if you've grown up here, you sort of pretty much take it for granted but I feel like I can't leave. I want to be here and I want to be part of that process of caring for this environment."

Therefore, the practices of recognising and caring for, or being a steward of, remnant vegetation are connecting these participants to the Adelaide Hills landscape.

The connection to a single remnant species of flora creates an extraordinarily deep connection to landscape for participants in the Southern Grampians. They are valued partly for their age and beauty:

"…because of their age, they've got these great funny old trunks and they've still got a good head up top. They're beautiful. The best Red Gum specimen on our farm is the one just before the hayshed, there's a beautiful big shady one there"
(Margaret – Southern Grampians)

"[Red Gums] are the life blood of this area…because most trees, where they grow the canopy, no grass will grow, but with a Red Gum the grass grows right up to the edge of it and it's just one of the things that they're good for…but it's just Red Gum country, that's what we call it."
(Adam – Southern Grampians)

"It is certainly Red Gum country…it is very definitely Red Gum growing country because suckers will grow that quick. They are nearly a nuisance actually, but that is the nature of the country and that is us"
(Gerald – Southern Grampians)

For Adam it appears that Red Gums define the landscape, but they also seem like they are almost a 'working tree' that makes a contribution to the productivity of the farm because they allow grass to grow under the canopy. Gerald also defines the landscape in terms of the Red Gum. But it is not only the landscape they define, they seem also an important part of his sense of identity.

Red Gums in the Southern Grampians are in decline due to logging and other stresses. Some participants describe actions similar to the stewardship observed in the Adelaide Hills to address this.

"We've actually shut up a paddock across there. [Husband] wants to wait until some significant looking trees are established, then he wants to put single guards around them and then leave the rest. The sheep will keep the rest trimmed."
(Cecily – Southern Grampians)

"I'm spasmodically planting Red Gums now…last year I put in about 160…just trying to get it back to something like it was…and hopefully it'll be, when I leave, better than what it was when I came here."
(Adam – Southern Grampians)

Participants in both case study locations connect to landscape through the flora and to a lesser extent, birds and other fauna. Those connections are largely made through the practices of

knowing and caring for species. And in the case of Red Gums in the Southern Grampians, farmers almost appear to respect the trees for their longevity and as a 'working tree'.

In the Southern Grampians, the mountain ranges quite literally loom large in people's lives. In the mapping exercise, most participants began by drawing the valley or the mountains.

> *"Naturally enough, the mountains play a big part in our lives because (a) beauty, but (b) the tourism aspect. Also, and of course naturally enough, the fire aspect…it is still in some ways a closed community because of the mountains, because of the mountains…you do really rely upon each other."*
> (Jess – Victoria Valley)

> *"We're just proud of the valley…we love the big Red Gums, the beautiful scenery, and we've got mountains all round."*
> (Margaret – Southern Grampians)

> *"[The mountains] are a part of your life really. You wake up every morning and you're looking at them…"*
> (Jim – Southern Grampians)

> *"When you're coming home from Melbourne, you see the mountains you know you're nearly home, that's home."*
> (Beth – Southern Grampians)

As much as the Red Gums define this landscape and the identities of the people who live in it, so do the mountains. Beth explicitly associates viewing the mountains with the experience of feeling "at home", especially after having been away from home.

While sense of place is clearly associated partly with *things* – objects (e.g. the mountains) and living things in the landscape that people become attached to, it is also about practices – the things we *do* that create meaning. We have already noted how the practices associated with knowing the flora and fauna and of stewardship produce place meaning. Now we turn to some the more intangible ways people connect to the landscape.

In the Adelaide Hills, many participants spoke of their practice of regularly walking in their local landscape.

> *"Walk around Scott Creek, a few walks a week…down toward the Conservation Park and around, so that's my walking trail."*
> (Kathy – Adelaide Hills)

> *"I really like to see all the kangaroos and the birds and everything around here when I walk which is one of the reasons I do lots of walks around here."*
> (Graeme – Adelaide Hills)

> *"I'm noticing their [neighbours] gardens and what they've done for attracting birds and have they got veges and fruit trees. I can't help that and I'm doing that all the time, I like that you can do that when you're walking around here…"*
> (Carmel – Adelaide Hills)

> *"So that's what really gels when we're walking around…'hey did you see that?' and counting the number of koalas, he's [husband] is often doing that. He gets all disappointed, 'oh, we only saw 7'".*

Walking is connected with knowing and constructing the landscape – blazing your own trail looking at and comparing management practices and informally taking stock of the wildlife.

Perhaps because of the comparative size of the Southern Grampians landscape, walking appears to be a less common but still important way of knowing.

> *"We've got the old cottage linked to Settlers walk and a lot of historical markers along the river within the township...[Settlers Walk] tells stories about what has happened over a long period of time. The various waterholes are named when you walk along the river. It's quite interesting actually, some of the stories, a significant part of the Cavendish folklore I suppose."*
> (Donald – Southern Grampians)

In Cavendish, the local Townscape Committee have created a walk that 'narrates' the place and the history of the town through its river (the Wannon). It reflects the significance of the river both ecologically and as habitat for birds, but also because of its perceived role as a place of refuge if there is a bushfire.

The desire for space and privacy was a contributing factor the led many people to choose the place where they live.

> *"We lived down in town for probably 20 years till we finally could afford to move back with a bit of space around us"*
> (Kathy – Adelaide Hills)

> *"I chose this property which is just under an acre because, yes, I like the privacy, yes, I like some trees and yes, I'm prepared to live with some degree of fire risk."*
> (Matt – Adelaide Hills)

> *"The importance of my place to me is the views, but the most important thing is the space because for me having this barrier between the road and for the kids to play on. As I was a kid growing up, I always loved space..."*
> (Geoff – Southern Grampians)

Establishing and managing a garden is a major activity that connects people to the landscape.

> *"Most people work in their garden, [revegetation] is what I do instead of gardening…it's a mixture of stringy barks, candle barks…various wattles, some manna gums…they're all local natives and things, but most of what I've put in there has been little things, shrubs and heaths and grasses…"*
> (Michael – Adelaide Hills)

> *"This little front yard is really like a tiny version of what you get in [Belair National Park]. But you have to every now and again go to the Park to make sure, yeah, that's what's happening there."*
> (Carmel – Adelaide Hills)

"I'm a Sydney girl and I wanted to have somewhere that had trees already established…my husband's a very keen gardener so he's made it into a very, very pleasant living space…we've got a rose garden here and at the back…it's more like a rainforest…"
(Gwen – Adelaide Hills)

"We've totally changed this garden from a native garden to more of an English version…we shifted in here as a new property, but we planted a native garden, didn't we, like everyone else does who lives in the bush. But we've changed it all, not because of fire, but because it's far easier to manage as a cottage garden…For 35 years, I saw enough of that out in the bush. I didn't want it when I come home. So, I wanted English trees, plenty of leaves, so I could sit down in the shade and have a beer at night time or in the evening. A cooler garden."
(Donald – Southern Grampians)

In the three examples here, each participant has remade their environment but for different reasons. Michael and Carmel are almost making their home landscapes extensions of the indigenous landscape, Carmel specifically making Belair National Park her point of reference. On the other hand, Gwen and Donald are trying to make their home landscape different from the bushland around them. Gwen identifies as a Sydney girl and she reflects that in her adopted landscape in the Adelaide Hills. Donald has created an environment that is different from the bushland he works in but is a source of relaxation after a day's work.

Family history is a most significant source of place attachment. In response to the question "how long have you been here?", one of the Southern Grampians participants replied *"1877",* referring of course to the arrival in the district of his great grandfather. It's a familiar narrative throughout the Victoria Valley.

"Our family came out to Australia in 1852 and they settled in this part of the world somewhere around 1870, so we've been here for some time really… not exactly the same piece of land…probably about the fourth block we've lived on but they're all only a few k's from where we started. So we're nomadic but not very nomadic."
(Jim – Southern Grampians)

> *"My great grandfather came out in about the late 1840s…he was a shingle splitter back in England and he came to this district because of the rich woodland, because there was a lot of sawmills…I'm told that if you go down to Melbourne, some of the blocks between the tram tracks are Red Gum blocks and they're still the same Red Gum blocks they put down there and he may have some of his thumb prints on."*
> (Damian – Southern Grampians)

Damian's short story about his great grandfather is an example of the intertwining of family, why this family found its way from England to Red Gum country, the reshaping of landscapes (shifting of Red Gum forest to Melbourne tramlines) and continuity (the Red Gum blocks might still be there) and the sheer complexity of place-making across spaces and time. Damian's connection to place is partly about trees that are no longer in the landscape.

There are also some intangible connections to place. When asked what was special about his place, Jim (Southern Grampians) simply replied *"time, we've been here all our lives and from my point of view it's our heritage."*

Nathan, also from the Southern Grampians told how:

> *"I was trying to think about it the other day, what is more important, the stock or the farm? And for me it's an easy one. It's the farm and not so much from a real estate point of view. It's the place…it's almost like that spirit of place where if you've been there long enough it becomes like you become a part of it…"*

Other Southern Grampians participants spoke of how the landscape *"gets into your blood"*. These complex and at times intangible connections need to be addressed by fire management agencies who are trying to isolate the assets of value to communities.

4.2 Locating bushfire in the everyday landscape

One of the biggest problems facing fire management agencies is the perceived lack of preparation, or under-preparation for bushfire among residents of fire-prone regions. Lack of preparation for bushfire is often linked to a lack of recognition of risk, or complacency by residents. The academic literature of risk perception however, reveals a complex picture

where the link between high risk perception and risk mitigation action is unclear. Wachinger *et. al.* (2012) argue that the weak relationship between risk perception and personal action is due in part to individuals' accepting risk because the perceived benefits of living where they do outweigh the potential negative impacts. This argument is supported by research findings in an Australian bushfire context (eg. Bushnell & Cottrell 2007).

Overall, participants in this study had a high level of awareness that they were living in a fire-prone landscape.

> *"…it's only a matter of time before we have another big fire go through, I think anybody who doesn't think that is living in la-la land as far as I'm concerned."*
> (Paul – Adelaide Hills)

> *"[Fire is] inevitable…there's always going to be fires"*
> (Marisa – Adelaide Hills)

> *"The hills are a dangerous place to live you know, 360 days of the year it's just paradise…about 5 days a year it's quite creepy if there's a fire around and it's that kind of weather."*
> (Michael – Adelaide Hills)

> *"…a big bushfire, oh gosh yes, the whole area is at risk…it is just that a smaller fire, that's controllable, if you do the right thing you have got a pretty good chance of avoiding it, but one big fire…Ash Wednesday fire, the wind kept in the same direction, whoosh and nothing you can do about that…"*
> (Herb – Adelaide Hills)

> *"We're totally at risk every day…with the fire coming out of those mountains [Victoria Range]…in the right weather conditions."*
> (Edward – Victoria Valley, Southern Grampians)

> *"Yes [we are at risk of fire], but that's just part of the fabric of the place. It's just how it is, it always has been and presumably always will be."*
> (Nathan – Victoria Valley, Southern Grampians)

The Adelaide Hills data shows clear understanding of the risk of bushfire. Michael however, balances the risk against the quality of living in the Hills for the majority of the year when there is no fire weather. Herb recognises that there are different types of fires – the risk of fire generally may be high, but many will be small and controllable. On the other hand, he recognises types of fires and fire conditions that can't be managed at all.

Gerald and Gwen offer a slightly different perspective on the risk of fire.

> *"No I don't [think of myself as living in a bushfire prone place]…yes, there is a danger of fire always, and always will be…we haven't had any big dangerous fires through Cavendish for, well, not in my time."*
> (Gerald – Cavendish, Southern Grampians)

> *"Not a lot [of risk], no…there hasn't been one, touch wood, for the last 25 years…but every summer you think, oh yeah, get ready just in case."*
> (Gwen – Adelaide Hills)

While Gerald acknowledges that there can be fires, he does not appear to see bushfire as defining the place he lives in. For both Gerald and Gwen fire is a possibility, but an unlikely one given their experience of fire history. (Gerald has lived in Cavendish all his life and Gwen has lived in Aldgate in the Adelaide Hills for 25 years).

It should also be noted that in relation to fire risk, the Southern Grampians data has been deliberately separated into Cavendish and the Victoria Valley. All of the Victoria Valley participants recognised bushfire as an ever-present possibility. On the other hand, while all participants from Cavendish were prepared for bushfire, none saw Cavendish as being especially at risk. According to Donald who works for one of the fire management agencies:

> *"I can't understand why Cavendish was put in a high bush fire category…looking at the fuel around Cavendish and the stepping stones for fire to get in, generally speaking we're moderate, very moderate."*

Most participants when asked were able to locate where in the landscape they saw risk as coming from.

Participants in the study also spoke of objects in the landscape that they saw as representing bushfire risks. They also spoke of the objects that they think are at risk of bushfire. There is however, no particular consensus about either. It was most common for participants to nominate people and houses as the priorities for protection, however many people noted that being properly insured was one of their main bushfire mitigation practices. The other most commonly cited objects seen as at risk in a bushfire were:

- livestock and pets;
- remnant vegetation;
- insects and pollinators
- habitat (especially for birds).

Damian from the Southern Grampians highlights the difficulty in specifically nominating the assets that need to be protected:

> *"Well, the first thing is you're trying to save the district, but then if it gets in the district then it becomes asset protection which is of course homes and people, and not in that order of course, but I would suggest that most people here wouldn't leave their homes."*

He goes on to say:

> "S*ure you can go and buy more sheep, but when you've spent 30 or 40 years getting up a genetic line...well you just can't go out and replace that...this is our business here, the cleared land, it's our living, so not only is it a home..."*

Saving the district is the first priority, although there are clearly defined assets within the district, the homes and the people. But it is more than that; it is the land itself and the things that have been invested in the land, intangibles like a stock genetic line. In fact, the land represents "home" as much as the house does.

Similarly, there is no particular consensus among participants about the sources of bushfire risk in the landscape. In the Adelaide Hills, weed invasions and pine trees were the most

commonly cited risk objects. Narrow tree lined roads being the only source of escape from a bushfire was raised as an issue in both case study sites. Four participants mentioned the careless actions of other people as a concern, for example tourists and campfires in the Southern Grampians.

Participants described a range of actions they take to mitigate the bushfire risk. They have also spoken of the actions they take (or plan to take) on days of high risk or in the event of an actual fire. Most of these practices have been well-documented by previous researchers (eg. vegetation management, leaving early on 'Catastrophic' days, leaving late as a fire approaches). Some participants indicated that the major part of their bushfire plan was to have alternative escape routes for when a fire is almost upon them. Here we focus our attention on observations that are less well documented or understood.

Fire Agencies are already aware of the tendency for people to want to return home during a fire emergency – Victoria's Fire Commissioner commented on the problems associated with the practice during the fires on the grassland fringe of Melbourne in February 2013. For some people, returning home is part of their fire plan. When asked whether she had a fire plan, Marisa (Adelaide Hills) replied:

> *"Yes…we return on extreme fire danger days and we start watering straight away, in the morning. So the plan is to get the pump going, get everything going…"*

Some participants reported having more than one fire plan. For example, when asked the question, do you have a fire plan Simone said:

> *"Oh yes, we've got several. We don't really believe in one because if you have one and something goes wrong or you need a new plan then you are a bit screwed…it all depends who is home…"*

Many people make the distinction between different types of weather conditions and weigh that up against their perceived capacity to defend in deciding which plan to enact on any given day.

"...we came to the conclusion if it's a catastrophic day then we'd just be out of here for the day, we wouldn't stay. On the other day of the extreme, depending on how well prepared we thought we were, we may choose to stay and defend, but then with the kids here it depended on whether they're here or at school...there were a few different scenarios to go through. My husband works down in town so he might be down there in which case I'm not staying here by myself."
(Rosalie – Adelaide Hills)

Consistent with prior research (eg. Proudley 2008), Rosalie's bushfire planning takes account of which family members happen to be at home or away at the time of the fire.

Some people have highlighted the limitations of Fire Danger ratings when it comes to being prepared for a bushfire because fires sometimes happen during otherwise mild conditions.

"...it can be the most pleasant, lovely 30 degree January day and if someone throws a cigarette butt up there, my house isn't going to have 30 minutes worth of warning..."
(Simone – Adelaide Hills)

Some participants expressed the view that under some circumstances the time between a fire's ignition and its approach to properties could be very short.

"If you had those horrible days...you don't have half an hour, you might be lucky to have five minutes' notice..."
(Jim – Southern Grampians)

"It's the one that...starts close and gets going on a really bad day and within twenty minutes you've gone from having no fire to property engulfed"
(Damian – Southern Grampians)

Under these types of circumstances, the conventional wisdom of leaving before there is a fire (ie. the evening before a day of high risk) may not be possible. It suggests that even if a resident's primary bushfire plan is to leave early, that having an alternative, back-up plan is also essential.

Many participants base their construction of bushfire on their past experience with bushfire. 18 participants were able to relate detailed stories about those experiences. We don't include those stories in this report. We do however note, that of the 18 with actual fire experience (at least as described in interviews – there may be more participants who had fire experience that they didn't recount at interview – 14 report that their current plan is to stay and defend. Of the other four, two plan to turn on hoses and prepare to leave if the fire gets close, one of them stating that being properly insured is the best plan. Another expressed the view that he will make sure he's well insured and get out; if he judges that any day is of high enough risk he would go to Adelaide for the day. The last of the four seems confused about what action to take:

> *"We've got a list of people we should ring…whether there'd be time or not I don't know…a fellow [from the fire safety department] came out and said that we'd already had the covers put over the gutters and said 'yeah, that's a great idea' and we've got a long sweep of lawn and he said that if anything ever happened that's probably the best place to dig a hole…cover yourself up"*

On the other hand, during a local fire at Scott Creek, this participant did leave but thinks she was one of the few to do so. When asked how that made her feel, she replied *"maybe I am a Sydney-sider still."* The experience made her feel like an outsider.

All participants, whether they had or had not experienced fire were relying to some extent on social memory to inform their construction of bushfire. Examples of social memory include local stories, reference to media images and stories from family history. Michael (Adelaide Hills) tells how he came to understand the impact of a bushfire near his house in 1980 (before he lived there):

> *"The neighbour told me a story about an earthmover coming into our bottom paddock and pushing things around…so I'm not sure exactly where it burnt…I know there was a big pine that was burned up that way…but I don't know I wasn't here…I haven't been through a big fire so maybe I'm silly in my attitude…but I don't actually see any way of living in the Hills and not having to deal with fire…"*

"After seeing the Victorian bushfire film footage where houses and metres and metres of clearance around their properties…razed to the ground…I've now got the attitude that no matter what anyone was to do if a fire's gonna come through…it will take your place anyway…"
(Kim – Adelaide Hills)

Socially shared knowledge about past fires is influencing these participants understanding of bushfire and the way they see themselves living with it.

4.3 "Place mapping" as a research and engagement method

One of the aims of this project was test the 'place mapping' method for academic research and also as a potential tool for fire management agency research and community engagement. The academic application of the method will be reported elsewhere. Here we focus on feedback from agency personnel on the value of the method for their purposes.

DEWNR fire manager Damon Ezis who was a co-researcher on the project provided formal feedback on the pros and cons of the process from an agency perspective. On the positive side, Damon commented that mapping was a "catalyst" that helped interviewees to think more deeply about the landscape. The maps were also a valuable tool in analysis of interviews and helped to orient the researcher in the interviewee's landscape. He also noted that it was an inexpensive research method requiring only paper, pens and a recording device. On the other hand, Damon pointed out that the method is quite time consuming as individual interviews sometimes took an hour or longer. Finding participants was also difficult and time consuming with numerous methods of advertising the project employed to gain the required number of participants. On the whole, Damon positively reported finding the process exceeded his expectations as a research method and a way of engaging the community. By participating as a co-researcher he made some valuable on-going contacts within the Adelaide Hills community and also increased his understanding of how residents of the Hills understand and manage bushfire risk.

Participants at the 'Place Mapping Workshops' also provided positive feedback on the method. At the request of the Bushfire CRC additional workshops are planned and a training

package for will be prepared for agencies to use as part of their community engagement programs.

5. Discussion

In this case study, participants showed a high level of awareness that they were living in a bushfire prone environment. Even those participants who have suggested their homes or even their townships are not particularly at risk of bushfire can recognise that bushfire is possible anywhere and they plan accordingly. This is consistent with prior research that even in a township that had never been directly impacted by bushfire residents understood that under certain weather conditions and ignition locations, it could conceivably happen to them (Reid & Beilin, *in press*).

Despite the high level of risk recognition, some people's fire plans appear to be based upon a limited understanding of fire behaviour. Notwithstanding, many participants do recognise a range of different circumstances that need to be taken account of in the event of a fire (eg. which members of the family are home, weather conditions, location of fire relative to home). People's responses are complex and constructed based upon an analysis of local conditions, prior experience and newly organised or reorganised social memory. There is also an acceptance from some participants that time and place of ignition may mean that there is very limited warning time of an approaching fire. All of this data suggests that having a 'one-size fits all' household bushfire plan is insufficient for all possible scenarios. Arguably therefore, fire management agencies need to go to another level of engagement to better inform people about fire behaviour and what to do in the face of uncertainty rather than a 'one-plan-and-stick-to-it' messages.

The social construction of the case study landscapes responds in part to the physical environment, and partly to the practices of residents. The influence of the physical landscape is exemplified in the Southern Grampians. Here the mountain ranges act as a physical boundary to the community. It is perhaps because of this that they also form such a significant part of local people's identity (Tuan 1977). As much as the people define themselves by the timeless mountains, the Red Gums are also an important part of 'who they are'. Further, understanding the range of a favourite bird, for example, may assist in understanding the connectivity of flora on which the bird species is dependent. It provides a very local scale to build on for a new found sense of neighbourhood or community. Social coherence is about place at some level and if recognising the local ecology helps you to

identify with that place and that is a common thread among respondents as we have said, then we do have social coherence even if people experience it as individuals.
In this study, ideas of 'home' and 'home-making' have emerged as a most important aspect of connection to place, with 'home' representing a very specific type of 'place' (Easthope 2004). Community engagement and research about bushfire tend to use the terms 'house' and 'home' interchangeably, however the two should not be conflated. Whereas a house is a structure where we live, home is about the *meaning* and attachment to a particular place. The house is where we live the home is *how we live* in a landscape. This is significant, because it suggests that the asset to be protected from bushfire is much more than the house or other structures.

Key aspects of the social construction of home (Somerville 1992) are evident in our data. Home is often associated with being a haven or a private space where people can relax away from the outside world, often associated with family and continuity and a place where memories are kept. We observe in this study that in the Adelaide Hills in particular, many participants associated the desire for space or privacy in their choice of home and search for sufficient space. Family history in the landscape also provided many participants with a significant connection to place bringing shared memories, a sense of continuity and belonging, and a responsibility for the future.

In both case study sites, landscape practices were important. Gardening is recognised as an important home-making activity that connects home to nature (Bhatti & Church 2004). In this study gardening emerged as an important activity that connected people to their landscape. Gardens serve the purposes of providing a haven from the work environment where one can relax. To newly arrived in-migrants, a garden can be a way of extending something of "home" into the new environment (Brook 2003). Some participants spoke of creating exotic gardens that were less likely to carry fire, although this was as much for aesthetic reasons as bushfire mitigation. By gardening with indigenous species or involvement in Landcare groups, participants in this study create landscape connectivity where one's back yard is, in the imagination and in reality, an extension of the surrounding bushland. These practices create a particular type of landscape that may, ironically, lead to an increased bushfire risk. Many participants also create connection to the landscape through the practice of walking in their neighbourhood – following defined paths that they claim as their own. On their walks, participants tell of observing, monitoring, naming species of fauna

and flora that they see which helps to construct connection to place and a sense of ownership. We argue that the practices of gardening, walking, bird-watching and monitoring of fauna and flora extend the home-territory beyond the front fence and into the landscape beyond the back yard – spanning private and public landscapes. Furthermore, one participant explicitly states that the land itself is home and more. This expanded conception of home, beyond the house and into the surrounding landscape has implications for fire management agencies whose primary engagement tools focus mostly on protection of the house.

Fire management agencies can therefore assist in building a more expanded understanding of fire risk in which the concept of home extends to the surrounding landscape. Current community education programs focus on readiness of the house and while this is clearly essential, it is possible that such programs fail to capture the imagination of a public who see home as something much bigger. These findings also shed some light on why people are reluctant to leave their homes under potential or real threat of bushfire, and also why people want to return home under such conditions. The asset of value is the landscape itself – the mountains or hills and the trees – as much as the house. Furthermore, these findings put the practice of prescribed burning into a new perspective. While on the one hand this practice may be viewed as managing public land, to residents it may appear as part of their home is being burned.

Finally, this research kept returning to the way that respondents constructed their particular fire landscapes through 'acts of memory'. There are different uses of memory in the interview narratives: sometimes it is collective memory, as in the community has always responded in a certain way to fire risk. Some instances are of personal actions taken during a previous fire. Interestingly, there is little evident self-evaluation of whether they did the right thing—a few say that they would not do the same thing again—but most reflect on their experience as an immediate story.

In a study on peri-urban transition landscapes, Beilin, Sysak and Reichelt, *(in press*) described how ecological memory was being actively negotiated in response to place, its vegetation, topography, and the social and cultural meanings held by these mostly new inhabitants. These new landowners were all members of Landcare or local catchment groups in that study. Through these organizations, they constructed a role and a new identity in their place, as land managers, restorers, stewards, guardians and property builders. The landscape

was actively constructed from their shared experiences and from the opportunities available to them in terms of resources like finance or 'know how'.

Ecological memory alone may not be that meaningful in these situations. In some areas, historically intact or undisturbed seed beds or areas where seed is replenished by natural or other methods, provides tangible evidence of ecological memory; as do bird paths across paddocks, despite those fields providing relatively new sources of sustenance for the birds. However, as noted earlier in this report, in conjunction with the social memory that respondents brought to the table, it is clear that their experience of walking, monitoring, weeding, observing, living in these landscapes, provides imagery and impetus for changing and managing the landscape. Social memory can be invoked to say what 'belongs' in the landscape (red gums and tinsel lilies) and provide guidance, new institutions, 'the rules' on how to manage the landscape or what to expect from likely disturbances such as fire or flood.

Social and ecological memory is defined therefore, as the stewardship practices and traditional knowledge that carry ecological practices (Barthel *et. al.* 2010). Engaging social and ecological experience in the landscape can be a collective activity or an individual one, but Halbwachs (1925) would argue that the collective constantly draws the individual into alignment. This necessarily implies the exclusion of some memories in order to conform to some degree with others and legitimate or reinforce the new ecological practices, for example; or the long term fire management regimes. That is society, in each period, rearranges its recollections in such a way as to adjust them to the variable conditions of its equilibrium (Halbwachs 1925). Davidson-Hunt et al (2003) points to what a creative process social memory can be in relation to local ecological knowledge. If we link these last two ideas of creative construction of memory and the importance of the collective, we can appreciate the dynamic situation, both tacit and otherwise that occurred in the mapping narratives in this study. As respondents mapped they established the scale they were comfortable describing as 'home and landscape'. As Thelen (1989, p.1123) suggested in his study of social organization, people explore for common memories to meet present needs. Through our method, as participants mapped and talked, they recognized common memories and negotiated with the researchers-as-listeners and observers, prompters and surrogates for the rest of the collective, they negotiated meaning. Finally meaning is preserved and absorbed into their ongoing concerns. The maps were a memory aid; but more significantly, the maps acted as a tool to connect intuitive knowing with rational knowing—to assemble

and test memory and to use this assembly to construct future meaning. Sharot (2012) argues that memory from a neurological perspective, is designed to 'flexibly construct future scenarios in our minds', that it is actively constructed into the future from a process that selectively culls or reinterprets or undervalues negative memories.

6. Conclusion

We emphasise that these findings are exciting but fledgling. Their implications are many, but we propose that there is justification to further this research. Social and ecological memory can be used to assist community educators and fire managers to work with their teams and communities in actively exploring and negotiating these memories towards a more integrated understanding of the home-place-fire risk-landscape continuum. Apparently deeply held memories released during the mapping narratives reveal an intuitive understanding of the risk in their landscape and home places that the respondent then physically makes 'real' by drawing on the map, bringing together the rational and the intuitive.

References

ABS. 2013 *Australian Bureau of Statistics Census.* http://www.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/40102?opendocument&navpos=220 (accessed 27 March 2013)

Adelaide Hills Council. 2011. State of the District Report 2011.

Alexandra, J., Riddington, C. 2007. Redreaming the rural landscape. *Futures* 39:324-339.

Alkon, A., Traugot,M. 2008. Place Matters, But How? Rural Identity, Environmental Decision Making and the Social Construction of Place. *City and Community* 7:97-112.

Attiwill, PM., Adams, MA. 2013. Mega-fires, inquiries and politics in the eucalypt forests of Victoria, south-eastern Australia. *Forest Ecology and Management* 294:45-53.

Barthel, S., Folke, C., Colding, J. 2010. Social-ecological memory in urban gardens - Retaining the capacity for management of ecosystem services. *Global Environmental Change* 20 (2):255-265.

Beilin, R., Sysak., T, Reichelt., N (in press) Resilience in the Transition Landscapes of the Peri-urban: from 'where' with 'whom' to 'what', *Ecology and Society*

Brenkert-Smith, H. 2006. The Place of Fire. *Natural Hazards Review* 7(7): 105-113.

Bushnell, S., Cottrel, A. (2007). Increasing community resilience to bushfire - implications from a north Queensland community case study. *Australian Journal of Emergency Management* **22**(2): 3-9.

Cacciapaglia, MA., Yung, L., Patterson, ME. 2011. Place Mapping and the Role of Spatial Scale in Understanding Landowner View of Fire and Fuels Management. *Society and Natural Resources*.

Cloutier-Fisher, D., Harvey, J., 2009. Home beyond the house: Experiences of place in an evolving retirement community. *Journal of Environmental Psychology* 29 (2):246-255.

Cheng, AS., Kruger, LE., Daniels, SE. 2003. "Place" as an Integrating Concept in Natural Resource Politics: Propositions for a Social Science Research Agenda. *Society and Natural Resources* 16:87-104.

Clarke, PA., Gepp, B., Vickery, F., Wouters, M., Henderson, M. 2005. The Urban Forest 4: Fire, Biology and City Living. In *Adelaide: Nature of a City*, edited by C. B. Daniels, C. J. Tait and T. Flannery. Adelaide: Wakefield.

Easthope, H. 2004. A place called home. *Housing, Theory and Society* 21 (3):128-138.

Flemsæter, F., 2009. Home matters: The role of home in property enactment on Norwegian smallholdings. *Norsk Geografisk Tidsskrift* 63, 204-214.

Gill N. 1994. The Cultural Politics of Resource Management: the Case of Bushfires in a Conservation Reserve. *Australian Geographical Studies* 32(2): 224-240.

Goemans, M. Ballamingie, P. 2013. Forest as hazard, forest as victim: Community perspectives and disaster mitigation in the aftermath of Kelowna's 2003 wildfires. *Canadian Geographer* **57**(1): 56-71.

Greider, T., Garkovich, L. 1994. Landscapes: The Social Construction of Nature and the Environment. *Rural Sociology* 59 (1):1-24.

Griffiths T. 2009. We have still not lived long enough. *Inside Story*, 16 February 2009.

Griffiths, T. 2002. How many trees make a forest? Cultural debates about vegetation change in Australia. *Australian Journal of Botany* 50:375-389.

Gunderson, K., Watson, A. 2007. Understanding Place Meanings on the Bitterroot National Forest, Montana. *Society and Natural Resources* 20:705-721.

Halbwachs, M. 1925. Les cadres sociaux de la mémoire, Paris: F. Alcan

Kruger, LE., Jakes, PJ. 2003. The Importance of Place: Advances in Science and Application. *Forest Science* 49:819-821.

Kyle, GT., Theodori, GL., Absher, JD., Jun, J. 2010. The Influence of Home and Community Attachment on Firewise Behavior. *Society and Natural Resources* 23:1075-1092.

Lewis, PF. 1979. Axioms for reading the landscape. in *The Interpretation of Ordinary Landscapes; geographical essays*, edited by D. Meinig. New York: Oxford Press.

Mallett, S. 2004. Understanding home: A critical review of the literature. *Sociological Review* 52 (1):62-89.

McCaffrey, S., Toman, E., Stidham, M., Shindler, B. 2013. Social science research related to wildfire management: An overview of recent findings and future research needs. *International Journal of Wildland Fire* 22 (1):15-24.

McCann, L (Manager VFRR) 2012, *personal communication*, 20 January 2012.

Morehouse, BJ., O'Brien, M., Christopherson, G., Johnson, P. 2010. Integrating values and risk perceptions into a decision support system. *International Journal of Wildland Fire* 19:123-136.

Morehouse, BJ., O'Brien, S. 2008. Facilitating Public Involvement in Strategic Planning for Wildfire Management. *The Professional Geographer* 60:495-507.

Meinig, DW. 1979. *The Interpretation of Ordinary Landscapes*. New York: Oxford Press.

Nelson, KC., Monroe, MC., Fingerman Johnson, J. 2005. The Look of the Land: Homeowner Landscape Management and Wildfire Preparedness in Minnesota and Florida. *Society and Natural Resources* 18:321-336.

Powell, K. 2010. Making Sense of Place: Mapping as a Multisensory Research Method. *Qualitative Inquiry* 16:539-555.

Reid, KA., Beilin, RI. (in press) Where's the fire? Co-constructing bushfire in the everyday landscape, *Society and Natural Resources*

Reinders, L., Van Der Land, M. 2008. Mental geographies of home and place: Introduction to the special issue. *Housing, Theory and Society* 25 (1):1-13.

Samuels, MS. 1979. The Biography of Landscape. in *The Interpretation of Ordinary Landscapes: geographical essays,* edited by D. Meinig. New York: Oxford Press.

Sharot, T. 2011. The optimism bias: A tour of the irrationally positive brain, New York: Pantheon

Stedman, RC. 2008. What Do We "Mean" by Place Meanings? Implications of Place Meanings for Managers and Practitioners. USDA Forest Service, Pacific Northwest Research Station, Portland OR.

Thelen, D. 1989. Memory and American History, *Journal of American History,* 74(4): 1117-1129.

Tuan, Y-F. 1977. *"Space and Place: The Perspective of Experience",* University of Minnesota Press, Minneapolis.