

**PERCEPTIONS OF BUSHFIRE RISK AND PLANNING  
IN PERI-URBAN ADELAIDE, AUSTRALIA  
AND LOCARNO, SWITZERLAND**

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## ABSTRACT

Peri-urban areas are dynamic spaces. In both South Australia and Ticino, Switzerland, peri-urban areas are often associated with high amenity and biodiversity values, but are also characterised by substantial risks of environmental hazards such as bushfires. As cities such as Adelaide and Locarno expand, conflicts of interest arise along with the transition of rural and natural areas to urban land uses. South Australia is implementing new planning legislation that aims, in part, to better manage those conflicts by becoming more inclusive of community opinion, while Switzerland has a highly developed deliberative planning system that has attempted to incorporate citizen's voices directly into the heart of land use planning decision. Together, those situations led to a very interesting analysis, where the experiences of Swiss planning could be used to contrast with South Australian experiences, and inform potential paths for planning to pursue in the future.

Householder surveys were conducted in 2015 in the Mitcham and Onkaparinga Councils on the peri-urban fringe of Adelaide in South Australia, and adjacent to the city of Locarno in Ticino, Switzerland. Residents living in close proximity to important conservation areas in both places were asked to provide their perceptions of the risks of environmental hazards, place values and levels of satisfaction with vegetation management and land use planning. Key elements of the questionnaires enquired about residents' involvement with current planning processes. The differences of opinions were analysed in relation to demographic and socio-economic information, as well as Australia's representative and Switzerland's deliberative political structures. The analysis established that the political structure influences residents' sense of agency and their willingness to participate in planning decisions.

A number of important results emerged. One significant finding was that residents living in high bushfire risk areas in close proximity to Sturt Gorge Recreation Park in South Australia were accepting of the risks associated with living in forested suburbs and were supportive of current levels of vegetation management, yet felt vulnerable to bushfire due to inadequate vehicle egress opportunities to evacuate before or during an emergency event. Results for both surveys suggest that respondents were very attached to their local area and the appreciation of the vegetation was high. Close to forty percent wished for more trees in the Adelaide Hills. Respondents were concerned about continued suburban development and the increasing numbers of people moving into their scenic, but bushfire-prone residential area. A large number of respondents from South Australia did not trust the authorities to manage the bushfire risk, in contrast to almost universal support in Switzerland. Younger

respondents with families in South Australia were indicating that the level of bushfire risk was such that it was making them think of leaving the area. The Swiss deliberative approach to planning provides more opportunities for citizens' voices to influence decision-making, but even then, it is not clear that surveyed Swiss community members felt that planning was responding effectively to their concerns.

These findings from both places suggest that decisions directly affecting daily lives and residents' vulnerability to environmental hazards require a deliberative process that allows for the expression of local voices in relation to both risk and value. Deliberative interactions between government planning authorities and the local community, aside from offering valuable local knowledge and specific insights into local issues to help guide authentic planning outcomes, also offer important opportunities for risk mitigation education in areas of increasing environmental risk. This conclusion is important just at a time when South Australia is reforming its planning system in the aim of striking a balance between the influence of specialist planners, developers, the community and elected representatives' decision-making.

## DECLARATION

I, Annette Bardsley, certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint - award of this degree. I give permission for the digital version of my thesis to be made available on the web, via the University's digital research repository, the Library Search and also through web search engines, unless permission has been granted by the University to restrict access for a period of time. I acknowledge the support I have received for my research through the provision of an Australian Government Research Training Program Scholarship.

Annette Bardsley

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## ABBREVIATIONS

AFAC	The Australian Fire and Emergency Service Authorities Council
AHS	Australian Householder Survey
ARC	Australian Research Council
ASHN	Australian Survey Householder Number
BOM	Australian Bureau of Meteorology
CFS	Country Fire Service
EFPAs	Environment and Food Production Areas
FFDI	Forest Fire Danger Index
MLR	Mount Lofty Ranges
MFS	Metropolitan Fire Service
RSF	Risk Society Framework
SA	South Australia
SHS	Swiss Householder Survey
SPC	State Planning Commission (South Australia)
SPPs	State Planning Policies
SSHN	Swiss Survey Householder Number
WSL	Institute for Forest, Snow and Landscape Research
WUI	Wildland-Urban Interface



# CHAPTER 1

## INTRODUCTION AND SIGNIFICANCE OF THE PROBLEM

### 1.1 Introduction

Planning for environmental risk is becoming one of the most important challenges for modern societies. When there is an event, such as a wildfire/bushfire, everyone within a place is affected and so a combination of individual and collective actions are required to prepare for that eventuality. The purpose of this thesis is to develop knowledge on how to better prepare places for environmental hazards, with a focus on bushfires. This chapter initially outlines the problem of planning for risk, along with key definitions of relevant terminology, the aim and objectives of the research and key research questions. The thesis focuses on the period of the late modernity as it transitions into a risk society, targeting issues within two peri-urban regions: the Mount Lofty Ranges in South Australia (SA) and the Locarnese region in Ticino, Switzerland. Those temporal and spatial aspects are introduced below, followed by the key theoretical frameworks of Risk Society and deliberative planning. This work positions issues of bushfire risk, environmental values and landscape responses within a context of peri-urban land-use planning.

Over the last few decades, southern Australia has seen many devastating bushfires that have created considerable economic damage and cost many lives. For example, recently in SA, the Pinery fire of November 2015, started 70km north of Adelaide, burned 82,500 hectares, and caused the loss of two lives and the destruction of ninety-one homes (CFS 2017). An independent investigation of this bushfire concluded that the speed and ferocity of the fire was such, that '[...] no actions taken by the Country Fire Service could have altered its course' (ABC 2016). Despite being located on the plains and not in the more problematic terrain of the Mount Lofty Ranges, the actions of emergency services were limited in this case only to the protection of lives and property. With weather conditions and global climate change, fuel levels, social capacities and urban planning provisions seen as the ultimate drivers of bushfire risk, such an event must serve as a warning of the possible future levels of environmental risk for the forested settlements of the Mount Lofty Ranges. If such a fire cannot be fought, the imperative ought to shift now to greater preparedness in planning, to anticipate and abate the deleterious consequences of future catastrophic blazes. Planning can improve or worsen the

reality for local residents, it just depends on the circumstances, but there are inherent risks within a discipline that deals with highly diverse and complex settings and variables. This thesis intends to answer the question: how can we better establish planning arrangements to prepare our places for environmental risk?

## **1.2 Significance of the problem and key theoretical framework**

An increasing proportion of the population in southern Australia resides in areas that are highly exposed to the risk of bushfires. Much of that risk is concentrated in the peri-urban fringe. The peri-urban is 'the area of transition between well recognised urban land uses and the area devoted to agriculture' (Wehrwein 1942, p.217); it encompasses an in-between space that is neither entirely urban nor totally rural (Buxton *et al.* 2008). In a global context, the peri-urban can also be referred to as the wildland-urban interface, defined as:

'[...] the area where houses meet or intermingle with undeveloped wildland vegetation' (Radeloff *et al.* 2005, p.799).

In the context of this work the term peri-urban will be used, but in both case-study areas there are interactions between urban development and a combination of largely agricultural and forested areas.

Functionally, the peri-urban space is characterised by the converging and mingling of both social and environmental management priorities. The multiple priorities can generate great value for people and conservation, but also raise the potential for negative impacts such as the destruction of homes by bushfires, habitat fragmentation and pollution, the introduction of non-native species, and the loss of biodiversity (Bryant 1982; Bunker and Houston 2003). Therefore, peri-urban areas are dynamic spaces, often with a large amount of resource and conservation potential, but also spaces of conflicting interests and pressures as cities continue to expand (McGuirk and Argent 2011). With more people choosing to live surrounded by nature or agriculture, encroachment and mingling of the urban and natural or agricultural land uses can enhance management issues for both social vulnerability and ecological sustainability; with environmental hazards playing a big role in heightening risk levels. In fact, part of the motivation for this research stems from a realisation that peri-urban areas are in many cases simultaneously spaces of both high value, as well as social vulnerability and ecological fragility (Gurran 2005; Guerin *et al.* 2016). There is a strong premise to the arguments developed in this thesis. Finding answers that could contribute to solving some of the pressing issues of risk emerging in this

dynamic space through improved spatial planning practices specifically designed with the peri-urban in mind, has the potential to achieve more sustainable outcomes.

A further set of terms used in this thesis is linked to the effects or threats of the bushfire hazard on the peri-urban fringe. The terms 'bushfire' describes an unplanned fire in bushland. This is a general term, almost uniquely used in Australia, and it includes grass, forest and scrub fires. In the United States this type of unplanned fire is called a 'wildfire' or a 'wildland fire'; in Europe, and Asia it is usually referred to as a 'forest fire' (Underwood 2018). For this thesis, the term 'bushfire' will be used when referring to or describing an Australian context, while the synonymous term 'wildfire' will be utilised when discussing transnational or international issues of community safety relating to fires. The term 'environmental risk' is used in this thesis to describe '[...] the probability of an event causing a potentially undesirable effect' (Beer and Ziolkowski 1995, p.1). The United Nations Office for Disaster Risk Reduction refers to such an event as a natural hazard (UNISDR 2007, p.21), and defines it as a 'natural process or phenomenon that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage'. Environmental hazards stem from the interaction between natural and social systems (Whittaker *et al.* 2012). Importantly, hazards are defined and treated distinctly from 'extreme' events: 'Although environmental processes and events such as bushfires are often referred to as 'hazards', they are only hazards when they threaten human life, assets or other values we want to protect' (Hewitt, 1997 cited in Whittaker *et al.* 2012, p.162).

Large numbers of individuals are experiencing an increased environmental risk within the peri-urban fringe, and many others are moving into those places because of urbanisation and population growth in southern Australia. This situation is not unique to Australia but is actually a global phenomenon, as environmental risk is often concentrated on the fringes of growing cities. As the peri-urban becomes increasingly risky, new explicit approaches to planning for environmental hazards are required. The task of finding appropriate statutory and planning approaches that provide safe and sustainable outcomes for both residents and the environment in these interface landscapes is proving to be problematic in relation to bushfire (Moritz *et al.* 2014). For example, following the series of destructive fires in California, an August 2018 article in the Californian Sacramento Bee newspaper, described the path ahead as necessarily involving 'more ambitious' future prevention strategies, outlined as:

[...] aggressively thinning out thick forests in rural, rugged parts of the state; increasing state funding for firefighters, training and equipment; incorporating into firefighter training new methods for battling unpredictable, wind-driven fires; and working with local governments

to update land use plans and building codes that discourage development in fire-prone areas or call for more safety measures’ (Hart and Luna 2018).

No mention is made in this list of the essential roles that social interactions must play amongst stakeholders to enhance opportunities for dialogue and community-building as a means to reduce social vulnerability, and enable the requisite evolution in planning and management.

In this thesis, engagement is defined as: ‘[...] both an orientation that influences interactions and the approach that guides the process of interactions among groups’ (Taylor 2014, p.384). The target of successful engagement is to facilitate the bi-directional exchange of information, which has the potential to lead to a mutual understanding amongst stakeholders, as well as strengthening commitments to dialogue and community-building. As indicated by Margerum (2011, p.83):

‘Many participants in collaboration point out that it is not just important *whether* stakeholders reach agreement on a plan or policy but instead *how* they do so.’

Effective forms of engagement imply a valorisation of interactions between stakeholders, such as community members, and organisations such as emergency services and local councils (Johnston 2014). Similarly, deliberation as a ‘kind of communication’ (Dryzek, p.1381) is deemed a quintessential part of formal democratic processes of engagement, especially to guide sustainable forms of environmental and spatial planning (Hill 2013). Communications are thought to be deliberative when:

‘they are noncoercive, are capable of inducing reflection about the preferences that individuals hold, and able to relate the particular interests of individuals and groups to more universal principles’ (Dryzek, 2000, p. 68).

However, the deliberative capacity of a political system can vary enormously. The differences in how deliberation is understood by residential stakeholders in the context of planning for environmental hazards in Australia and Switzerland forms a major component of this thesis.

The value of engagement and dialogue as a tool to help achieve ‘more ambitious’ goals of resilience and improve safety in areas of elevated environmental risk, is increasingly recognised in the preparedness and vulnerability literature (see Bardsley and Rogers 2010; Whittaker 2012; Prior and Eriksen 2013; McCaffrey 2015), but is often overlooked in spatial planning discourses for risk mitigation strategies (Godschalk *et al.* 2003). Nevertheless, there is an increasing willingness by spatial planning authorities to include residential perspectives into planning, as the value of local knowledge and priorities is being recognised as contributing to achieve positive outcomes. Importantly for this thesis, there is a reform of the spatial planning system underway in SA that aims to implement

collaboration and engagement at the heart of the new approach (DPTI 2018). In the Australian land-use planning context, such a willingness to engage with residential stakeholders has rarely extended to include environmental hazard prevention strategies (Bond and Mercer 2014). Emergency services, who have the task of fighting bushfires are taking up the responsibility of reaching out to communities, and are clearly understanding the value of engagement for hazard management. Even in that case though, the communication is often unilateral and interaction with communities is seen as an opportunity to have residents listen to what emergency services have to say, rather than to facilitate real deliberative planning responses that lead to substantial changes in the spatial arrangement of peri-urban residential areas or conservation estates. Rather, in Australia, community engagement is for the most part seen as a tool for preparing individuals for action prior or during events, or rebuilding communities after the impact of a disaster. In contrast, the Swiss planning system has prided itself on its abilities to democratically incorporate cultures of environmental risk into planning processes for some time (Pfister 2009). The Swiss approach is one of the closest to a deliberative planning ideal found in any society, as the formal processes are constantly asking local residents to articulate through referenda and plebiscites, what they think about planning goals. In such an ideal planning situation, the role of the public in decision-making for spaces of high environmental risk would assume a supervisory role of:

‘[...] an ‘upper chamber’. It would be charged to apply the standard, ‘How do we wish to live?’ to scientific plans, results and hazards’ (Beck 1992a, p.119).

Although opportunities exist for deliberation and engagement in Switzerland that exceed Australian practices, Switzerland is also a place where people have struggled to learn to coexist with a precipitous topography and climatic hazards. Unprecedented population pressures, new home-ownership aspirations, land scarcity, loss of biodiversity and environmental hazards are matters that have been treated with upmost urgency by Swiss planning authorities for some time (Gennaio *et al.* 2009; Giacomazzi 2013; Lendi 2016). To help manage the high risk levels, spatial planning and the management of environmental risk are approached in an integrated and collaborative manner. There is much to learn from an analysis and critique of the Swiss planning approach. Therefore, a cross-cultural and cross-national approach to this research was chosen to use the Swiss case study to inform potential developments within the South Australian planning context, especially as it is set to become far more open to the input of residents in matters of spatial and environmental consequences (DPTI 2018).

This research asks whether deliberative planning approaches have the potential to produce sustainable spatial outcomes in peri-urban areas increasingly characterised by high environmental risk. According to Parkinson (2006, p.1) deliberative democracy is:

‘[...] a way of thinking about politics which emphasises the give and take of public reasoning between citizens rather than the counting of votes or the authority of representatives.’

Fung and Wright (2003, p.17) state that within deliberative decision-making ‘[...] participants listen to each other’s positions and generate group choices after due consideration’. There is considerable enthusiasm about the opportunities for deliberative planning to facilitate better management outcomes amongst theorists (Healey 1999; Gallent and Ciaffi 2014), and yet real comprehensive initiatives that effectively exploit that opportunity remain limited. In part, this thesis questions whether Swiss experiences with deliberative planning truly engage residents and whether it can inform potential applications in Australia. It does so with the goal of better preparing communities for risk, ahead of the impact of any particular natural hazard. In such a manner, learnings from how Swiss authorities plan their landscapes of high environmental risk using deliberative governance, through the allowance of citizen involvement in spatial decision-making through participatory approaches, has the potential to guide future research and planning action in the high bushfire risk context of the Mount Lofty Ranges in South Australia.

### **1.3 The temporal and spatial scope of the study**

This research project is interested in the environmental risks affecting human life, resources and material property, such as homes and infrastructure. The hypothetical and anticipatory nature of risk necessarily involves human decisions (Joost van Loon in Beck 2006), and therefore interacts with the realm of values, perceptions and actions of individuals, land managers, policy makers and communities. The level of risk that individuals or groups are willing to accept is of interest to this project. There are a range of complex variables and interactions that enhance or reduce risk levels to individuals, assets and resources, and these are negotiated within society (November 2008; November and Leanza 2016). Thus, actual or hypothetical ‘acceptable risk levels’ are both an environmental and social construct, and the perceptions and active roles of stakeholders therefore have direct management and planning implications (Beck 1992b).



This research on resident's perceptions contributes to the social science field of hazard risk management by providing knowledge on the extent to which participatory forms of planning and community engagement can contribute to an overall reduction in risk levels. Specifically, the project is interested in the perceptions of residents in the peri-urban space. To develop appropriate case studies, it targeted areas of elevated bushfire risk and high environmental value in two countries. The scope of the project is to examine the type of planning institutions and practices that can positively affect social and ecological outcomes in such places of high environmental risk, with a focus on learning from experiences in Switzerland to inform opportunities in SA or elsewhere. By identifying approaches to incorporate residents' personal values and priorities in relation to the landscape and environmental hazard management, the knowledge generated in this thesis also has potential to inform the field of deliberative planning in general to better manage risk in a late modernity.

There are many benefits and opportunities of the modern era, however this era has also brought with it a plethora of problems that are yet to be fully understood and resolved. As Harvey (1990, p.11) fittingly observes, 'The only secure thing about modernity is insecurity, its penchant for totalising chaos'. Society is still trying to come to terms with the corollary unfolding from the successes of the modern era. Social scientists are describing a transition from a first modern era to a reflexive or second modernity increasingly defined by emerging risks (Beck *et al.* 2003). In a temporal sense, the modern age can be defined by the industrial era. A second modernity would move away from the relatively simple processes of production and consumption associated with the productivist industrial world to generate sophisticated local approaches to inform a reflexive society. For the individual, social reflexivity signifies the compulsion to find and invent new certainties for themselves or others without the framework of traditional models or patterns (Lupton and Tulloch 2002; Rossi 2014). The argument runs that social reflexivity will need to be guided by decision-makers, but traditional governance structures and institutions will increasingly lack the ability to effectively respond to the new challenges presented by socio-ecological risk (Beck 1992b). Policy choices will need to drive and support new actions and behaviours in relation to risks to natural, built and social environments. Due to its mature economy, population pressures and socio-political contexts, Switzerland could be perceived as lying ahead of Australia on its trajectory towards such a Risk Society. In this sense, it will offer valuable perspectives for a quest aiming to examine avenues to follow for highly democratic engagement in spatial planning. As stated, this will make the learning from the analysis of the Swiss case study particularly valuable to develop a narrative on potential approaches to deliberative planning for risk, with specific reference to opportunities in SA.

The spatial focus of this thesis is on the Mount Lofty Ranges in SA and the Locarnese region in Ticino. Urban developments in elevated bushfire risk areas on the peri-urban fringe in SA, and areas that present an elevated likelihood of hazards on the forested peri-urban slopes of the Locarnese region in Switzerland, characterize the spatial boundaries for the primary research. The Mount Lofty Ranges case study survey was undertaken in residential suburbs surrounding the Sturt Gorge Recreation Park located in the Mitcham and Onkaparinga Council areas, including the neighbouring suburbs of Bellevue Heights, Eden Hills, Blackwood, Craighburn Farm, Coromandel Valley and Flagstaff Hill. This location was chosen, in part, because of the significant endangered ecological communities such as the grey box (*Eucalyptus macrocarpa*) grassy woodlands found in the Park. These South Australian peri-urban settlements also face the potential impact of bushfires in the same way urban settlements situated on the peri-urban fringe in the Locarnese region face the potential impact of a range of natural hazards, including wildfires, landslides and rockfalls. The target region in Switzerland includes residences in Ronco sopra Ascona, Locarno-Bré, Orselina, Muralto, Minusio, Brione sopra Minusio and Minusio. Importantly however, the democratic systems in the two places are approaching planning for environmental risks in different ways. Identifying what perceptions and needs exist in the local resident populations within their respective specific social, economic and physical contexts, and how those residents are interacting with the planning systems, are vital steps for informing a new reflexive approach to planning. These spatial components, including maps that detail the spatial elements of the two case studies, are included with further detail in the next chapter.

#### **1.4 Thesis aim and objectives**

The research aims to establish whether political structures influence residents' sense of agency and their willingness to participate in planning decisions. The key aim of the thesis is to determine how a deliberative planning process supported by an understanding of local perceptions of risk and value can contribute to better management outcomes in peri-urban areas of sustained bushfire risk. The relevant research objectives identified to achieve this research aim are:

1. To determine possible relationships between amenity/conservation values and perceptions of environmental hazards on risk mitigation behaviours in local residential populations on the peri-urban fringe.
2. To appraise the potential for participatory planning strategies in educating the population about socio-ecological risk and in shaping effective policy and planning in peri-urban spaces of high environmental risk.

3. To understand to what extent planning for environmental risk in one context can be informed by the approach taken in a different place with different social and environmental contexts.

The research responds to the increasing vulnerability of residential peri-urban spaces, exposed to changing ecological and climatic conditions, in the context of rising pressures from expanding urban populations. The urban periphery is in turn, recognised as a storehouse of conflicting requirements including settlement, transport and food provision; recreation and leisure activities; aesthetic, lifestyle and amenity values that attach people to place; and biodiversity conservation: all factors playing a large role in determining the quality of life of current and future generations (Wehrwein 1942; Bunker and Houston 2003; Low Choy and Sutherland 2008; McFarland 2015). People perceive of the value of their place in relation to a range of these environmental factors, but they also recognise the risks of environmental hazards such as bushfire in the Mount Lofty Ranges; or wildfire, landslide and rockfalls risk in Ticino. The research is asking if, within a representative democratic system such as experienced in SA, spatial planning tools and approaches could provide effective public deliberation platforms to complement the range of current risk mitigation actions carried out by emergency agencies, such as the SA Country Fire Service (CFS) and SA State Emergency Service (SES). It could be argued that to address the increasing risk levels, novel and innovative risk mitigation forms will have to be devised that move beyond the liberal planning processes within contemporary SA.

### **1.5 The rationale for the cross-cultural research approach**

A mixed methods approach, including most importantly surveys that aim to gather quantitative data and that are complemented by preliminary stakeholder interviews, sets out to achieve a comprehensive coverage of the research topic, to explore and answer the research questions. Selecting a Swiss case study and conducting research in a second country added significant complexity to the research project beyond any simple local study in the Mount Lofty Ranges. This additional case study offers the opportunity to query if more deliberation and public involvement with land-use and planning decisions, as exist in Switzerland, produces safer and more sustainable spatial outcomes than in a comparable established democratic context in Australia. In Switzerland, environmental risk is an all-persuasive influence on its people, its institutions and culture - an influence that reaches an extent described by some as a national 'risk culture' (Pfister 2009, p.239). Simultaneously, the Locarnese region of Ticino in southern Switzerland provides a context of rapidly expanding forested landscapes that experience wildfires (Prize 2015), and future climatic projections are indicating likely warming and drying trends (Reinhard *et al.* 2005). These combined characteristics make the Locarnese region

a unique cross-national case study location to draw from to better understand the potential use of deliberative approaches for environmental risk mitigation planning in the peri-urban spaces of the Mount Lofty Ranges of SA.

The novelty of this research project partly stems from the analysis of deliberative planning processes for high-risk peri-urban contexts. It does this by comparing and contrasting approaches to planning in two highly democratic, wealthy societies with distinctly different perspectives on the importance of deliberation in public governance. As a citizen of both locations, the author is able to contribute in-depth insights on both places, including multi-lingual expertise and socio-cultural understanding essential to authentic social science research. This cross-cultural, cross-national knowledge allows for a unique interrogation of the risk-culture and perception within both the area surrounding the Sturt Gorge Recreation Park in the Mount Lofty Ranges, and the Locarnese region of Ticino. Other work has explored similar themes separately within these two broader regions, but by contrasting the two places, the cross-cultural findings can be juxtaposed. This project is distinct in its ambition to draw from the cultural and geographical complexities of the two separate settings to try to analyse the merits and limitations of high levels of deliberation for environmental risk situations in peri-urban areas.

## **1.6 Outline of the study and key research questions**

This thesis is divided into eight chapters. This first chapter introduces the key elements of the thesis, including an overview of the problem of planning for risk and its significance to social science research, important terminology and theory, as well as initial outline of the research approach. Chapter Two presents a theoretical framework and a review of the literature on the topic of planning for high environmental risk in the peri-urban space within a risk-society context. Aspects of the theory included relate to a Risk Society framework and to motivational goals associated with environmental values of place. Perspectives from the literature on collaborative management in an era of personal disengagement are also a focus here, as well as a review of aspects relating to the dynamics of the peri-urban space. After an initial focus on a global perspective in the first part of this second chapter, the latter part focusses on perception of environmental risk and place values, within the specific Australian context of the Munt Lofty Ranges of SA. Finally, Chapter Two also considers views on comprehensive spatial planning through education and deliberation.

Chapter Three provides a more in-depth overview of the geography, climate and environmental risk factors of the two research locations, in Australia and Switzerland with the aim to offer an outline of the interplay between humans and their environment in the contexts associated with the study-sites. This chapter also includes background to the research sites' governance and planning approaches.

Chapter Four outlines the cross-national mixed method approach to inform Australian planning approaches for peri-urban high-bushfire risk areas by contrasting with case a study from Switzerland. Details of the Australian Householder Survey (AHS) and Swiss Householder Survey (SHS) are presented in this chapter. The socio-cultural and demographic profiles of respondents, ethical considerations, limitations of the research methodology and methods to ensure the quality of research are also included here.

Chapter Five is dedicated to presenting and discussing the results of the Australian Householder Survey (AHS) undertaken to meet the aim of this thesis, with a focus on vulnerability to bushfire risks and conservation values of residents in the Mount Lofty Ranges peri-urban fringe. Chapter Six presents the Swiss Householder Survey (SHS), undertaken to provide the comparative perspective. The SHS results and a discussion are focussed on exploring the relationship between residents' values and risk perceptions of landscape planning perspectives for high environmental risk within a deliberative democratic setting. Both results chapters are structured to start with residents' attachment to place and personal values influencing choice of residential location, followed by results to survey questions interested in their perceptions of natural hazard risk and vulnerability. The final set of results presented in both of these chapters concerns respondents' relationship to the urban planning process in their distinct context.

Chapter Seven is structured around the thesis aim and themes and it involves an analysis of the merits of a deliberative democratic approach to mitigating the bushfire risk within the context of high environmental risk and environmental value of the Mount Lofty Ranges peri-urban fringe. The discussion includes the planning challenges associated with areas of high environmental risk and value. Issues facing spatial planning in a highly deliberative context, hazards education and communication through participatory planning are debated next. In the concluding section of this chapter, the merits of a deliberative planning system for South Australia are contemplated in the light of the empirical results and theoretical framework considerations. Chapter Eight is the final chapter and provides some answers to the research questions posed by the thesis.

Specific questions emerge from the aim and objectives that frame this research. These questions are posed and addressed at different stages across the eight chapters of the thesis. Table 1.1 provides an overview of the relevant questions organised according to two themes: residents’ perceptions of value and risk and spatial planning in deliberative democratic settings.

**Table 1.1: Key research questions organised by theme**

<p><b>Theme 1: Perceptions of environmental values and risk within a Risk Society context</b></p>	<p>What are the dominant environmental values and risks perceived by South Australian and Swiss residents on the peri-urban fringe and how do those perceptions impact on their behaviours?</p> <p>What are the relationships between identified perceptions of environmental values and risks?</p> <p>Are residents’ values and emotive concerns in relation to those environmental values and risks sufficiently considered in current governance and planning policies?</p> <p>How can we use residents’ perceptions of value and risk to better inform policy for sustainable development outcomes during an era of enhanced environmental risk?</p>
<p><b>Theme 2: Spatial planning in representative or deliberative democratic settings</b></p>	<p>How are residents engaging with the local planning processes in South Australia and Switzerland?</p> <p>Do planning conflicts arise over the conflicting priorities of risk reduction and the retention of environmental values?</p> <p>Is the far greater degree of public deliberation achieved through the Swiss direct democratic voting system providing better outcomes for the peri-urban spaces of high risk than the spatial outcomes identified in South Australia?</p> <p>What role should resident participation play in planning within high-risk peri-urban contexts in South Australia?</p>

## 1.7 Conclusion

The motivations for selecting a cross-national research approach include opportunities for generating more depth and perspective in the way the research questions are answered and discussed. Observing social phenomena in areas of comparable environmental risk within two separate national contexts

allows for an investigation into potential links between environmental risk perceptions, behaviours and community engagement levels in two uniquely individual settings.

This introductory chapter provided the context for this study and outlined the main objectives and research questions that set its research trajectory. The increasing vulnerability of residents in peri-urban areas demands novel ways to plan those same spaces, which are explored in this thesis. The Risk Society perspective that frames this work and current discourses on the planning requirements best suited to harness and manage the dynamic forces at play in peri-urban space of high risk, are introduced as key topics of the next section.

## CHAPTER 2

# PLANNING FOR HIGH ENVIRONMENTAL RISK IN THE PERI-URBAN SPACE WITHIN A RISK SOCIETY CONTEXT

### 2.1 Introduction

This chapter provides a review of the literature regarding experiences of, and responses to, the planning challenges identified in the South Australian Mount Lofty Ranges. Attention is drawn to identifying planning approaches suitable for high environmental risk and ecological value in the forested peri-urban space. This review starts by identifying the conceptual framework of the Risk Society and then moves to analyse how personal perceptions of risk and value translate into actions and support for policy. The third section focusses upon assessing parameters of collaboration and engagement, and the spaces or '*locale*' to engage in formal communicative exchanges in an era focussing on the individual and self. Section four illustrates the complex and at times surprising, reality of planning in the peri-urban fringe in a high environmental risk context. In section five, the attention is on South Australia, where the picturesque and ecologically unique landscapes of the forested Mount Lofty Ranges present significant planning challenges in increasingly populated and fire-prone spaces. Next, the review shifts focus to present contemporary thoughts and research on residential perceptions of risk and values in amenity-rich spaces, which are also characterised by highly flammable vegetation in a drying Mediterranean climate. The interest of the concluding section of this chapter lies in the multiple and diverse views expressed on collaborative planning and engagement strategies in both the international and local, Australian academic discourse.

The growth areas on the fringe of urban settlements are dynamic and evolving spaces. The way that the urban fringe and the risks within it are perceived by residents is of particular interest here because of this dynamism. Population pressures and lifestyle choices related to specific personal value-sets are driving forces for urban settlements to come in ever-closer contact with 'wild' places (Schwartz 2012). These 'wild' places may be spaces that have been left in a natural state or, in many developed countries, a result of the ongoing abandonment of farming land and the consequent 'rewilding' of the landscape (Pereira 2015). The theoretical framework utilised in this research primarily draws from Ulrich Beck's (1992b) seminal work on the modern risk society, which is used here to explain the



processes of environmental risk observed as the urban and the wild meet and merge. As they do, new priorities of landscape and risk management can arise, and within the further context of new and unprecedented weather patterns resulting from human induced climate change, new levels of environmental risk are testing the capacities of individuals and of governance structures to make effective decisions to plan for safe and sustainable outcomes.

Societies develop methods to calculate and model risks in the attempt to try and respond and minimise them. This process of risk minimisation does however itself harbour more risks, because further opportunities are generated to create vulnerability both to the environmental and social hazards themselves, as well as the governance decisions associated with them. Neil Adger's (2006) conceptual framework guides an understanding of how groups and societies facing increased exposure to hazard can respond and adapt to reduce social vulnerabilities. Key also is Dryzek's (2009) work that discusses deliberative capacities in political systems, particularly in relation to the degree to which decisions truly reflect the wishes or values of a population. The aim is to introduce an analytical approach to risk management that could be truly democratic and lead to outcomes that are 'authentic, inclusive, and consequential' (Dryzek 2009, p.1382). Those collaborative governance theories for effective spatial planning are explored further in the results and discussion chapters, to inform the examination of environmental risk planning approaches within the Australian representative and the Swiss deliberative democratic systems.

## **2.2 Risk society and the motivational goals of personal values**

Ulrich Beck theorises that in the later Twentieth Century, industrialised societies started experiencing a major shift, whereby the defining parameters of class, stratum, occupation, gender, family and commercial goals all changed fundamentally (Rossi 2014). He proposed the Risk Society (*Risikogesellschaft*) theory (RST) to provide both the etymological and conceptual means to analyse the new situation of western societies' emerging preoccupation and engagement with risk. Beck's theory (1986) reflects on the significant complexity of the current social reality, but goes further to evoke and anticipate a new, second or reflexive modernity, in which governance must effectively incorporate current knowledge and understanding of the risks faced in contemporary societies. A reflexive modernisation within the new risk society becomes a comprehensive response to the structural crisis developing within the dominant industrial society. In this sense, the early modern period in history (or first modernity), is defined by plentiful resources, economic growth and technological advancement that mark a relatively relaxed period for industrial society; while the second modernity is seen to take

hold in a social and economic context that is fundamentally different, because of the implications of the risks generated and maintained by the earlier form of development itself. The context responsible for this change in social paradigm is clarified by Rossi:

‘It is not poverty or scarcity, but economic growth, rapid technological development, and the security of high employment that has propelled industrial society into the stage of risk society’ (Rossi 2014, p.61).

As part of this transition, people’s lives are increasingly affected by anthropogenic risks such as global warming, resource depletion and the spread of infectious disease at a global scale (Urry 2004). Perhaps the most astonishing part of the Risk Society Theory is its attempt at making sense of a revolution, which while underway, slips under the guard of social commentators on the lookout for traditional indicators of, and pathways for, social change such as conventional forms of social upheaval or a crisis. This avoidance of the underlying social and ecological risk generates further challenges for decision-making, as the true situation within a place is not producing the parameters that are being responded to. In other words, society seems to be progressing effectively, with increasing wealth, but all the time new and old risks are building.

The structural crisis identified by Beck (1992a; 1992b) relates to the relictual institutions, communicative practices, governing bodies and infrastructure that become essentially inadequate to deal with the new levels of risk imposed on modern societies. In fact, ever-new levels of manufactured risk are reflected in the day-to-day functioning of society in which governance must respond to safeguard against a range of risks, including those emerging from natural disasters such as bushfires. The responses to risk rapidly become both misplaced and inadequate if not framed within the new paradigm. Rather than decisions conceptualising and responding to specific analyses of the likelihood and consequences of socio-ecological risk, solely on the margins of actions and policy, the risk society argues for a complete transformation in the conceptualisations of risk to respond to an entire society in crisis. To achieve this, Beck’s work, and work by other theorists such as Hulme (2008), propose that broader critical analyses of the complex interactions that influence vulnerabilities for individuals, communities, ecosystems and governments will need to be directly integrated into practice and policy. To enact these fundamental changes, societies will, in particular, require new forms of social reflexivity, a process explained in terms as belonging to:

‘[...] a society where the conditions in which we live are increasingly a product of our own actions and, conversely, our actions are increasingly oriented towards managing or challenging the risks and opportunities that we ourselves have created’ (O’Brien 1998, p.16).

This cultural shift affects human perception and actions at a societal scale, but also individual behaviours in response to the plurality of options available when creating and maintaining a personal identity, while no longer relying solely on conventional social customs and tradition as points of reference (Giddens 1990; 1991; 2009).

Giddens' (1991) theory guides an understanding of how peoples' perceptions of environmental values or risks are created, how they can change, and what part those perceptions can play in shaping effective spatial planning policy. The first step to make sense of our social context is seen as occurring through the process of reflexivity (Beck 1994; Beck *et al.* 2003). For the individual this signifies:

'[...] the disintegration of the certainties of industrial society as well as the compulsion to find and invent new certainties for oneself and others without being able to rely on existing certainties' (Rossi 2014, p.61)

Much of this change is occurring through the process defined as 'individualisation' (Beck and Beck-Gernsheim 2002).

'Since the individual is forced to make many choices at great speed without existing models, he acts like a reflex or an interminable producer of indeterminate and immediate reflexes: deals, networks and alliances are continuously constructed, combined and re-combined' (Rossi 2014, p.61).

The work of both Beck and Giddens stipulates that individuals are making decisions according to new, reflexive value sets. These choices lead to new actions and behaviour patterns in relation to the natural and the built environment that do not necessarily follow traditional models. One of the most important elements of these choices relates to environmental risk perceptions, which are social constructs of environmental hazard and change that are in a continual state of flux dependent on many factors, including personal interpretation of value and risk (Beck 2016). These scholars argue that human decisions of the reflexive society are to be understood as a new grouping or sets of values that motivate the individual to achieve certain goals or outcomes.

According to Schwartz's (2012) theory of basic values, the fundamental individual values do not change. Schwartz's work is based on the premise that there are 19 fundamental personal values and that these values are linked to create a continuum illustrated in Figure 2.1. The values that are of interest for this research include: hedonism, security and universalism. 'Hedonism' is defined as a value driven by pleasure and sensuous gratification for oneself. 'Security' is split into two sections, to

distinguish between personal and societal security values. For this work, the personal security value is of particular interest as it is motivated by goals of safety in one's immediate environment, instead of those of safety and stability in the wider society. Both hedonism and safety values revolve around a focus on self. Finally, 'universalism' is split into three sections, the most relevant for this work is the role of nature. As such, nature values manifest through goals of universal preservation of the natural environment, and hinge on a societal focus and a sense of self-transcendence.

**Figure 2.1: The circular motivational continuum**



Source: Schwartz et al. 2012, p. 669.

Schwartz's interpretation would suggest that even as the Risk Society evolves the core attributes of human endeavour remain constant. In a risk society however, individual goals are no longer as strongly framed, or constrained by conventional norms of behaviour or belief. That situation suggests that understanding individual perceptions of value or risk within a place becomes vitally important for negotiating broader goals of landscape management. Schwartz's conceptualisation of the consistency of human values enables social scientists to access and interpret people's views and attitudes - to find out and even anticipate actual and intended goals and behaviours in certain circumstances. Nature itself is problematicised within Risk Society theory, as the threats are emphasised, and the benefits

diminish. The new importance of risk within these broader value sets are collated and analysed in this thesis using the survey mechanism. The goal is to establish what respondents consider normal or common-sense actions and policies in the increasingly volatile environments in which they live.

### **2.3 Collaborative management in an era of personal disengagement and focus on self**

At the same time as individual goals become paramount in a Risk Society, a loss of human emancipation, individual responsibility and initiative is seen as one of the downsides of the late modern era where the body politic and associated bureaucracy is seen to manage risk. Importantly for this thesis, so is society's penchant for trying to harness and control nature through an instrumental rational approach. As Marx saw it, societies that are dominated fully by this reflexive approach to modernity would see an upsurge of indifference and apathy to effective governance amongst its citizens (see Allmendinger 2009, p.175). As such, it is thought that when scientific rationality and objective knowledge become the dominant rationale guiding the understanding and control of social and natural systems, the unplanned result is a loss of intuitive reasoning within populations, associated with the need for complex analytical dialogue and conversation. John Dryzek (1990, p.4) observes that the resulting instrumental rationality is essentially antidemocratic and that:

‘Instrumental rationality destroys the more congenial, spontaneous, egalitarian and more intrinsically meaningful aspects of human association’.

Habermas' (1984) concept of communicative rationality both highlights these potential failings in a late modernity and suggests an approach to deal with the problems, based on the development of a collaborative rationality emerging from true communication and the creation of social room for deliberation. As Allmendinger (2009, p.137) explains, Habermas' interaction between individuals and groups must be based on 'trust, sincerity, comprehension and legitimacy'. Dryzek (1990) notes that rather than abandoning all elements of the modern rational approach to governance, Habermas' approach proposes a way to evolve and improve upon it, removing its failings and, through a stronger emphasis on deliberation, develops the value of the dialectic to a new level. The instrumental approach is, however, not seen as having become obsolete within such a framework. Rather, its place is harnessed by a real process of democracy where the individual's values are incorporated in decision-making to deal with situations of high environmental and anthropogenic risk and threats (Dryzek 1990; Beck 1992b). In other words, rather than becoming automons, simply marching on the treadmill of

modernity, a truly deliberative process would ensure that instrumental rationality serves humanity's goals and ambitions in a Risk Society.

Habermas' (1989, p.4) discourse on communicative practice comes as an answer to the problem identified as the process of 'decomposition', observed as a tendency 'pointing to the collapse of the public sphere'. While the modern era has seen an expansion of democratic rights in the western world, with the greatest number of individuals being enfranchised and able to access full voting rights, Habermas (1989) highlights how, at the same time, the functions of the public realm appear to have become 'progressively insignificant'. In this sense, the current interpretations of 'public realm' are radically different to that common in the Hellenistic tradition, where the public sphere was the essential step in making 'what existed become revealed', because only 'in the discussion amongst citizens issues were made topical and took on shape' (Habermas 1989, p.4). He sees the means of reviving this earlier conceptualisation of the notion of public realm through meaningful public debate played out as communicative action within a specific 'locale'. In the words of Patsy Healey (1997, p.48), this can also be understood as 'an interactive and discursive effort, through which new understandings and institutional capacities may be built'.

In the nearly six decades since Habermas first highlighted (in his 1962 work entitled '*Strukturwandel der Öffentlichkeit*'), the fickle nature of the relationship citizens entertain with the civic realm, there has been a spectacular transformation in the way communication can occur within the public sphere, including a range of formal and informal procedures, as well as conventional and new media. Nevertheless, the predicament that Habermas (1989, p.211) described as a passive attitude towards political participation, whereby citizens adopt a 'general attitude of demand – expecting to be provided for without actually wanting to fight for the necessary decision', still represents the great challenge in participatory planning today. While the public realm generates ample communicative opportunities increasingly offered through virtual forums, the risk is that the communications and the exchanges within this manifestation of the public sphere may become increasingly meaningless and inconsequential. As indicated by Healey (1997, p.52):

'Within the public sphere [...], we need to feel free to make claims on the basis of moral value and emotive concern, just as much as in the language of material interests and outcomes'.

As Arnstein (1969) also outlined, the resulting processes of engagement are often tokenistic rather than truly influential over decision-making, which may be a particular concern in a region where environmental risk is increasingly obvious to residents. Offering opportunities for engagement and

communication between all stakeholders in a form that is meaningful and open and truly influential over planning, is the challenge facing governing bodies and planning actors in order not to lose or miss unique opportunities for sustainable social and spatial outcomes within the public sphere. That challenge is only heightened by the growing risks in the peri-urban space, which is likely to lead to policy interventions generating further governance risks. Aspects that can limit deliberative and collaborative social processes are issues that will be discussed more broadly in subsequent chapters.

## **2.4 The dynamics of the peri-urban space**

The peri-urban fringe goes by many names including peri-urban space, ex-urban or wildland-urban interface (WUI). This territory is identified in the literature as a dynamic space with a large amount of resource and conservation potential, but also as a space of conflicting interests and pressures as urban areas continue to expand into traditional rural or conservation areas (Bryant 1982; Houston 2005; Ravetz *et al.* 2013; Scott 2013; Buxton 2014; Taylor *et al.* 2017). In most Mediterranean climatic zones including SA (CSIRO-BoM 2018; Guerin and Lowe 2013), high fire risks and biodiversity values are characteristic of these spaces, and climate change is adding yet another level of complexity and risk. From a planning perspective, despite its relative proximity to the urban core, the peri-urban fringe is often seen as the ‘last frontier’ of the city (Gallent and Shaw 2007). A critical literature on peri-urban planning has now a substantial history (Wehrwein 1942), and yet the application of unique planning tools and goals for the space remains problematic.

The peri-urban fringe is a space that is necessarily generated through the creation and establishment of large human settlements. For that reason, the peri-urban fringe can be defined as an evolving space: in early years ‘the area of transition between well recognised urban land uses and the area devoted to agriculture’ (Wehrwein 1942, p.217); or at times, as an in-between space that is neither entirely urban nor totally rural (Buxton *et al.* 2008). In fact, the history of major Australian cities is one of continual and largely unhindered outward growth and expansion (Bunker and Houston 2003). In association with population growth, the fringe has been represented by the increasing number of dwellings, manufacturing and retail precincts, and waste storage facilities that develop out from urban centres into farming land or remnant vegetation beyond the existing urban boundary. A strong emphasis in the academic literature is placed on the dynamism and the inherent complexities that characterise this space (Randolph 2004; Low Choy and Sutherland 2008; McFarland 2015). Bunker and Houston (2003) summarise the key defining elements:

'[...] the Australian fringe is also characterised by the presence of natural resources that are either strategically important (e.g., metropolitan water supplies), threatened (e.g., remnant native bushland and fauna habitat) or scarce (e.g., 'prime' agricultural land), as well as fiercely contested heritage, landscape, and environmental amenity values' (Bunker and Houston 2003, p.304).

And further:

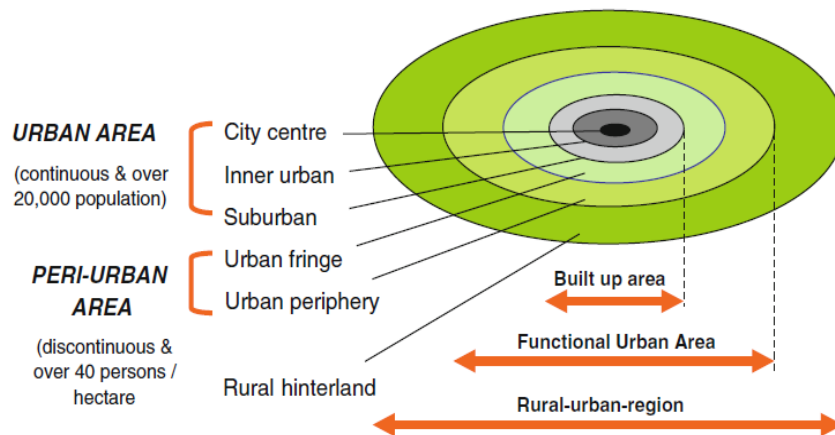
'[...] the fringe is a complex arena where a range of public policy issues related to population growth, urban development, environmental protection and natural resource management intersect' (Bunker and Houston 2003, p.307).

A large part of the planning complexity and potential for conflict, relates to the fact that peri-urban fringe is a permanently evolving space that goes through a rolling process of change, as the wave of urban development moves across the landscape. What exists near the edge at one moment will, over time mature and turn into an established settlement, while the head of the development pushes further out into land commonly defined by rural use. By its very nature and definition, the fringe is not a static entity: change and evolution mark this transitional space and thus planning goals must also evolve. As the space changes, peoples' conceptions of their places also evolve and change, and thus their desires for particular planning outcomes will also remain fluid.

In the European context, urban growth began to push beyond original city walls in the 18<sup>th</sup> century, whereas Australian cities had no such built constraints. In Europe, the medieval town walls were often demolished altogether to make space for the housing demands of the growing populations and the growth of industrial precincts (Lévy and Lussault 2013), while in Australia the rural areas were nearly boundless in scale. Rather than a belt of continuity, the peri-urban is in perpetual evolution, fluidity and fragmentation, and that consistent change may have led to the relatively late identification and appropriate recognition of this unique space by the planning community (Wehrwein 1942). Most commonly now in Europe and Australia, the peri-urban is defined by settlement forms and associated commuter habits from the periphery to the urban core. In many instances, the commuter choice of habitual movements that connect the outlying dweller with the city centre, also referred to as commuter belt, are utilised to delineate the extent of the fringe. In many cases therefore, the reach of the daily suburban commute often also defines the extent of the influence exerted by urban area over its periphery (McKenzie 1997; Bunker and Houston 2003). A practical schematic representation of the peri-urban defined by its form and function, as well as distance from the city centre, is shown in Figure 2.2.



**Figure 2.2: The dynamics of peri-urbanisation**



Source: Ravetz 2013, p.32.

The literature also reveals that a wide array of residential values and emotions have been linked with the urban fringe. In both academic literature and in popular culture references exist emphasising the romance of the space right through to the forbidding elements of nature or human settlements. Early on, Wehrwein (1942) strongly emphasised the neglected and transient aspects relating to the peri-urban and referred to it as the ‘twilight zone’ or ‘transition zone’. In the contemporary Australian context, the peri-urban can at times be romanticised and associated with the rural idyll. For example, Plate 2.1 shows a billboard using idealised rural attributes as means of attracting new residents to the estate of Blackwood Park, located within the space targeted by the Australian Householder Survey. For obvious, commercial reasons, no mention of the substantial bushfire risk in the Mitcham and Onkaparinga Hills is made on this outdoor board for displaying advertisements at the same time as the substantial values of the place are emphasised!

**Plate 2.1: An example of the romanticisation of the peri-urban, Blackwood Park, Mitcham Hills**



Source: the author (2015)

The peri-urban space in Australia often defines places removed from the stresses of the city and closer to nature and favoured by 'tree-changers' or 'lifestylers' in search of a more peaceful and easier life (Buxton *et al.* 2008; Beilin *et al.* 2013). It is often on the fringes of urban centres that urban developers and real estate agents selling properties find their commercial niche, and city dwellers looking for a more meaningful and relaxing existence find their happiness. Similarly, high amenity peri-urban settings in the United States, such as the outskirts of Los Angeles or the town of Paradise in Mono County, devastated by the 2018 wildfires, are at times typified as places for 'newlyweds' or 'nearly-deads' (Bennet 2018). While the peri-urban is often venerated, it can also represent a very different scenario characterised by car yards, industrial estates and rubbish dumps, and be a place of degradation instead of relaxation. Within a global context, far less idealised or satirical associations are to be made with the peri-urban interface which, in many cases, houses the urban poor in 'favelas' or 'slums' (McGregor 2012).

In Australia, professionals and retirees are attracted to peri-urban landscapes by the prospect of a semi-rural lifestyle based on different values and socio-economics to the traditional peri-urban dweller (Burnley and Murphy 2004; Argent *et al.* 2007; Ragusa 2010; Buxton 2014). The effects of a combination of social drivers involving personal values, affordability factors and accessibility, often result in a complex population profile for the in-migrants. Low Choy is cited in Buxton (2008), as describing the population of the peri-urban as a diverse lot of:

[...] the seekers: including tree/sea changers, life–stylers, alternative life stylers, religious communities; the survivors including home builders, adaptive farmers; and the speculators including farm stays and retreats, boutique farmers, recreational providers, landscape suppliers, developers and real estate agents, as well as the existing community of ‘adaptive’ farmers; finally there are the strugglers or ‘holding on farmers’ (Buxton 2008, p.122).

That list includes a potential range of affluent resident groups, but many fringe areas may rather be characterised by lower wealth, income and education levels than the general population (Sharma-Wallace 2016). There may, for example, be only spatial pockets of amenity migrants within a broader area (Ford 2001), but importantly for this study, a different socio-demographic of the elderly and young families often moves to the fringe from urban centres in search of more affordable housing. As peri-urban populations are often disparate groups with a variety of backgrounds, needs and values, they represent a population that is difficult to plan for, or even communicate with uniformly (Healey 1997; Paveglio *et al.* 2009; Eriksen 2010). The trend of increasing peri-urban populations, as well as the dispersed nature of settlements in peri-urban areas, are seen as factors contributing to greater bushfire risk levels. For that reason, a large component of the current risk mitigation research is dedicated to the study of individual and group behaviours and risk perception, in the attempt to anticipate decisions that are likely to be made by residents in preparing for or responding to bushfire (Paton *et al.* 2008; Eriksen and Gill 2010; Brenkert-Smith *et al.* 2012; Morrison *et al.* 2014; McCaffrey 2015; McLennan *et al.* 2017).

The greater understanding of the peri-urban complexity has led to a recognition of the need for more comprehensive population analyses capable of targeting specific social trends within the intervening ‘space between’ rural and urban to enable strategic planning:

‘a first step beyond the simple-urban-rural dichotomy [...], an intermediate, or transitional category of space, recognising a more graduated set of situations between the most urban and the most rural locations’ (Hugo *et al.* 2003, p.278).

In this respect, Bryant (2013) highlights the importance of recognising the significant heterogeneity that characterises peri-urban spaces, and the importance of managing this space appropriately for that complexity. Place-specific spatial differences that are influenced by environmental constraints, demographic shifts, cultural and lifestyle changes, economic development and governance are at play within various locations (Randolph 2004). This heterogeneity also hints at the difficulties governments encounter when attempting to plan for and govern the peri-urban. There are intrinsic values of the novel multi-functional territory in-between city and countryside that require an understanding of

dynamic systemic interactions and changing behaviours (Gallent and Shaw 2007), rather than a sole focus on the development potential, very aptly described as '[a] space waiting for something better to come along' (Scott *et al.* 2013, p.9).

A refined understanding of the population allows for an improved understanding of the complexity of the settled rural space on the margins of the city (Thompson 2007). For example, in Australia the emergence of a new nomenclature from the 1960s onwards, with terms such as 'exurbia', 'peri-metropolitan areas' and 'extended metropolitan region' included in the demographic glossary made it possible to statistically represent and study the new forms of settlement (Hugo *et al.* 2003, p.282, McGuirk and Argent 2011). From this greater analytical understanding and finer grained statistical data, targeted planning and demographic tools could better facilitate unique outcomes for this diverse and incongruous space. The challenge lies in the capacity to generate and easily access highly refined information specific to peri-urban spaces, and this thesis is partially designed to help in that endeavour. One approach to understand the peri-urban is to focus on aspects of functionality, because the dynamic forces affecting the spatial distribution and uses of the peri-urban space are largely determined by its adopted functions. Bryant (2013) identifies four major categories of collective function attributed to the dynamic urban fringe: place functions, play functions, production functions and protection functions. Highlighted in the protection functions, are the (often still untapped) conservation and development values of the space, and the failing of the planning system to realise their potential (Gallent and Shaw 2007; Ravetz *et al.* 2013). What emerges is that no single planning answer will meet all the needs of individuals or circumstances; the importance of community interactions is, however, consistently highlighted as a significant variable in helping to understand residents' behaviour and in managing vulnerabilities. To explain the challenging dynamic of the peri-urban space within the Mount Lofty Ranges, greater detail is provided on how values and risks are being managed in the region, with a specific focus on the aesthetic and conservation values initially, and latterly a focus on the bushfire risk.

## **2.5 The management of values and risks in the Mt Lofty Ranges**

### **2.5.1 Landscape value and biodiversity management**

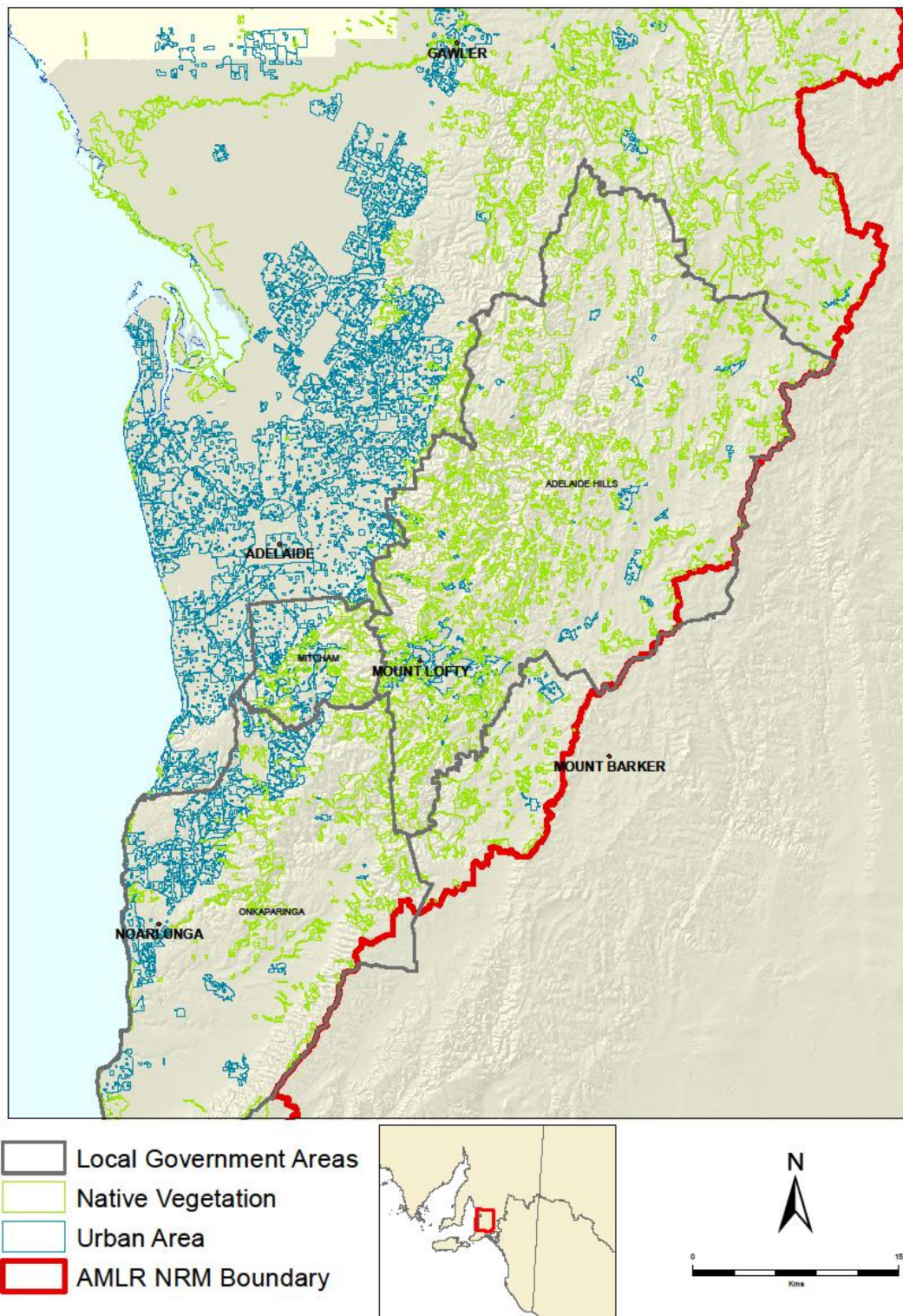
Vegetation within the Mount Lofty Ranges often generates a combination of both high amenity and biodiversity values. The peri-urban interface contains pockets of marginal land left comparatively untouched by development, in some cases due to its lack of viability for agricultural purposes. The remnant vegetation is often characterised by high species diversity and is, therefore, of ecological

significance and value (Guerin and Lowe 2013). Such biodiversity hotspots often go hand in hand with high landscape amenity values, and the associated amenity-led migration adds to the already complex task of environmental management (Fallding 2004; Bardsley *et al.* 2015). As bushfire risks are increasing in association with changing societal and environmental conditions, areas of high conservation value are being further impacted by spatial constraints and social demands on planning and risk management (Moskwa *et al.* 2018).

The Mount Lofty Ranges is characterised by dry sclerophyllous forests that create picturesque landscapes of native trees and grassy or shrubby understory, but the forest are also notorious for their readiness to burn. A national conservation rating applies to approximately one fifth of all the local native plant species in the region (AMLR NRM Board 2013). Much of the valuable biodiversity that remains in the Mount Lofty Ranges is highly fragmented, and, as with many ecosystems across the state, many patches of native vegetation are in decline and threatened by urban encroachment (DEH 2007; DEH 2010; SA Government 2012b; Guerin and Lowe 2013). A number of local native ecological assemblages are listed as threatened under the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1999, including: the Fleurieu Swamps, the Grey Box grassy woodland, the Peppermint Box grassy woodland, and the Irongrass grassland.

Today's land-use palette in SA is the result of substantial and far-reaching interventions that have occurred prior and post European colonisation, and over the last 180 years has been linked to extensive clearing of the native vegetation to secure agricultural lands. Remnant native vegetation patches are located both on public lands, particularly in conservation reserves, and on private lands ranging from the small suburban blocks to rural locations on farmland (DENR 2012). The physically disjointed reality of the native vegetation and the range of ownership situations across the landscape is evident in Figure 2.3. This map of the Adelaide-Mt Lofty Ranges Natural Resource Management Region also provides a picture of the intermixing of forested spaces and housing located in the Adelaide peri-urban belt, especially in the Mitcham and Onkaparinga Council areas. These factors present land managers and conservationists with a complex set of organizational challenges, and that complexity is increasing with more extreme weather patterns and recent demographic changes.

Figure 2.3: The Adelaide-Mt Lofty Ranges Natural Resources Management Region indicating the areas of native vegetation and urban land use



Source: GISCA (National Centre for Social Applications of Geographical Information Systems), 2015.

An appreciation of the environment and strong connections to place, often include an acceptance and a degree of discounting of risk represented by the threat of wildfires (Eriksen and Prior 2011; Ratnam

*et al.* 2016). In Mediterranean climatic zones such as that of SA, Mediterranean Europe and in California, that attraction to vistas and a landscape dominated by remnant native vegetation can accentuate risks associated with the threat of wildfires (see Troy 2007; Moritz 2017). Research on landscape amenity aspects in high fire-risk areas focuses on several topics that impact on management decisions including: behaviour (decisional), preparedness, mitigation, risk perception and vulnerability levels. In Australia, people attracted to high-amenity landscapes, or lifestylers, can be split between those attracted to coastal landscapes (sea-changers) and those headed inland (tree-changers) (Burnley and Murphy 2004; Ragusa 2010; Eriksen *et al.* 2011). The increase in demographic heterogeneity has important implications for the way the peri-urban space is being managed, especially if those residential choices are linked to socio-economic marginality, families or retirees.

New priorities to conserve native vegetation and to stop clearing started in the 1970s in SA, in conjunction with changing values and priorities amongst the population that has welcomed a gradual return of the forest to previously cleared regions of the Mount Lofty Ranges. The introduction of the *Native Vegetation Act* in 1985 (amended in 1991) (SA Government 1991) accelerated this trend and saw the end of broadacre vegetation clearance across SA, the first State to implement such legislation in Australia. Permission to cut down significant individual trees from then, has been overseen by the Native Vegetation Council, with approvals granted only in exceptional circumstances (Harris 2013).

Since 2004, in an attempt to integrate different aspects pertaining to land use and management practices, matters relating to native vegetation are considered under the guidelines of the *Natural Resources Management Act 2004* (SA Government 2004). The implementation of the guidelines and responsibilities of the Act including biodiversity conservation, are overseen by The Department of Environment, Water and Natural Resources (DEWNR 2014). This agency, re-named DEW in 2018 (Department of Environment and Water), functions in conjunction with the Environment Protection Authority (EPA), established under the Environment Protection Act 1993, to manage many South Australian environmental issues. 'NatureLinks' represents one multidisciplinary approach, initially supported by the South Australian Government, which aimed to address the issue of fragmentation of native vegetation in the landscape, by creating five biodiversity corridors across the State with the aim of connecting fragmented habitat areas (DENR 2012). Now that approach is receiving less interest, and the idea of accepting and promoting 'Novel Ecosystems', that provide important environmental services are being discussed, whereas the policy conception of the vegetation as being native and untouched is losing its primacy (Hobbs *et al.* 2009). Of vital importance to this thesis, is the roles of

both native and exotic terrestrial biodiversity in generating high bushfire risk through the amount of fuel and the flammability of the species (Bradstock 2008; Gill and Catling 2012).

The application of prescribed or controlled burning is one of the key interventions for fire-prone vegetation management and bushfire risk mitigation in SA. Bushfire suppression through fuel management aims to reduce the intensity, size and destruction of bushfires (Fernandez *et al.* 2003). The SA Government in conjunction with the CFS, schedule and execute burns on public lands with the primary aim of protecting economic assets and human lives in some places, while others are principally carried out to provide impetus for ecological regeneration (Penman *et al.* 2011). Prescribed burning is, however, also a disputed practice, and it is argued that excessive burning can be implicated in ecological degradation. Especially in situations where asset protection is the primary goal of the prescribed burn, the ecological implications of regular fires may be overlooked to afford greater protection to human settlements and communities. This is a particularly relevant issue in the peri-urban space, where there is often overlap of high-value economic assets situated right next to significant and threatened ecosystems, especially when new assets are continually being added in these same spaces adjacent to important ecosystems (Gibbons *et al.* 2012; Moskwa *et al.* 2016).

The complex management reality of high fire risks and the growing imperative for hazard management has become apparent in attempts by the Government to make individual houses embedded in forest more defensible in the case of a bushfire. At the same time as more prescribed burning was instigated in the Mount Lofty Ranges in 2008, amendments to the *Development Act* have permitted residents to clear all vegetation within 20m of a dwelling, including 'Significant Trees' normally protected under the *Development Act* and the *Native Vegetation Act* (SA Government 2003; DPLG 2011). Under the new regulation, in medium or high bushfire risk areas, private landowners are entitled to remove native vegetation adjacent to their dwelling without prior assessment by the Native Vegetation Council under the *Native Vegetation Act* (Bardsley *et al.* 2015). That policy direction seems to contravene the trajectory of greater conservation within all South Australian legislation over the previous thirty years, and perhaps reflects a changing level of concern associated with large, highly flammable vegetation in close proximity to houses in the region. Given the density of dwellings across the Mount Lofty Ranges, this brings a change with potentially profound implications for the sustainability of native vegetation management.



### **2.5.2 Bushfires in the Mt Lofty Ranges**

Regular and damaging bushfires (or wildfires) are a normal and inevitable occurrence in southern Australia and property damage and loss of lives, are a sad and all too frequent manifestation of this natural hazard (CFS 2015). The sclerophyllous forests, woodlands and heathlands of south eastern Australia are of considerable conservation value, but they also rank amongst the most fire-prone ecosystems globally (Bradstock 2010; York *et al.* 2012). Fire risk is dependent on a number of dynamic elements including fuel levels, terrain, land management, suppression/preparation and weather (Hennessy *et al.* 2005).

The peri-urban interface is regularly identified as the most critical space in the landscape when it comes to bushfire-prone assets, given the juxtaposition of high fuel loads and large populations (Gill and Stephens 2009; Cary *et al.* 2012; Moritz *et al.* 2014; Moritz 2017). The peri-urban space itself is not a homogenous landscape and pockets of heightened bushfire risk are scattered in a patchwork mosaic. The forested Mount Lofty Ranges represent just such a place of medium and high fire risk where, each fire season, communities face the grim prospect of substantial loss of life and infrastructure should a severe bushfire occur. Here, a landscape mosaic of communities characterised by low and medium density housing, intermixed with vegetation that links directly into large areas of highly flammable vegetation, contributes to the heightened risk of bushfires.

Agricultural land, which once played a traditional role in buffering communities from the risks associated with bushfires, now faces the ongoing pressures of urban expansion. The loss of agricultural land on the fringes of cities has long since been acknowledged as a significant food-security issue for the urban population (Bunker and Houston 1992; Barr 2003). One aspect that is perhaps less recognised, however, is the role agricultural landscapes can play in providing communities with a buffer from bushfires. During early colonial history in Australia, clearing was seen an indispensable measure to protect vulnerable settlements, as well as preparing land for agriculture, accelerating any traditional burning practices of resident Indigenous communities (Griffith 2002). Thus, the decline in the number of irrigated agricultural production areas, such as orchards and vineyards in the peri-urban interface, has the potential to contribute to an increase in the fire risk across that space.

The literature reveals concern over vegetation thickening and woody encroachment rates (Gill *et al.* 2014), resulting from a combination of natural revegetation and planting in the peri-urban, with the expansion of urban forests in previously open grassland areas (Bardsley *et al.* 2015). In areas where previous generations had cleared the forests and shrubs in an effort to reduce the fire risk to

communities and vital agricultural production systems, the return of the woody plant cover and increasing volumes of flammable biomass cover close to dwellings is enhancing the risk. The bushfire risk in south eastern Australia is also increasing in association with more regular and extreme fire weather conditions (Bradstock *et al.* 2012; Clarke *et al.* 2013). The climatic outlook for all Mediterranean regions globally is for a lengthening of the fire seasons. In SA, winter and spring rainfall are projected to decrease and the number of heatwaves and dry storms are predicted to continue to rise (Hasson *et al.* 2009; CSIRO and Bureau of Meteorology, 2016). In Adelaide for example, the annual cumulative FFDI (forest fire danger index), is likely to increase by between 2 and 8 percent for 2020 and 3 to 25 percent for 2050 (Lucas *et al.* 2007).

Despite significant improvement in bushfire risk mitigation in Australia and globally, there has been little change to the forms of settlements in peri-urban areas, which still face considerable risk that is set to worsen in the future (Gibbons *et al.* 2012). In recent years, southern Australia has seen numerous large and out of control fires across populated areas on the peri-urban fringe, which is altering the perception of bushfire risk amongst residents and decision-makers (Gill *et al.* 2009). As indicated in the literature, reducing this risk is not a simple task and involves a complex plethora of actions:

‘[...] controlling fires and fire regimes, increasing the resistance of assets to fires, locating or relocating assets away from the path of fires, and, as a probability of adverse impacts often remains, assisting recovery in the short term while promoting the adaptation of societies in the long term’ (Gill *et al.* 2013, p.438).

In Australia, many important lessons in risk mitigation were learnt from the findings of the Victorian Royal Commission into the effects of the devastating 2009 Victorian Bushfires (Teague *et al.* 2010). The recommendations led to a range of changes including fireproofing peri-urban spaces in fire-prone regions, regular fuel reductions (Gibbons *et al.* 2012), stricter building codes and building performance (Blanchi and Leonard 2008), strategic firebreaks and more sophisticated fire-fighting capabilities (Troy *et al.* 2013), and also to bushfire preparedness being treated as a shared responsibility between government actors and with the community (Frandsen 2011). However, even in that extreme case, land-use planning recommendations to account for natural hazard risk have been relatively minor.

In summary, high-value conservation assets are often identified within the highly fragmented landscapes of the peri-urban space, and expanding urban developments, revegetation and climate change are increasing the risk and simultaneously placing significant management pressures on already vulnerable species and ecosystems. Over the last few decades, southern regions of Australia

including peri-urban settlements have seen the impact of large out of control bushfires. Despite the ongoing threat, settlement patterns in Mediterranean climatic regions of the world are not changing in response to the increasing risk (Troy and Kennedy 2007). Repeated severe wildfires in California and southern Europe in 2017 and 2018, where numerous lives and a large number of houses within the peri-urban interface were lost (Moritz 2017), provide other examples of the problems fringe areas are facing with changed wildfire risk conditions. Similarly, in Australia, the issue of heightened bushfire risk in the peri-urban space has not attracted sufficient spatial planning attention, and urban expansion continues in locations such the Mount Lofty Ranges. Given the combination of landscape and ecological values and risk factors in peri-urban areas, it could be argued that land-use planning must now be undertaken with a full acceptance of bushfires and with more consideration directed at involving the population in decision-making processes.

## **2.6 Personal perceptions of values and risks**

Humans develop complex feelings in relation to place, a characteristic possibly linked to a primeval survival instinct aimed at improving our chances of survival (Brown and Weber 2012). While everyone has at some point, experienced feelings and emotions arising from the interaction with a certain place, this experience often remains deeply personal, and difficult to fully explain or to generalise across a wider population. For good or for bad, feelings associated with a place can influence our well-being and our sense of self from a very early age. The following section aims to examine the literature studying attachment in high-amenity and high bushfire-risk places and how sense of place impacts on preparedness and risk minimisation behaviours.

Place attachment is broadly expressed as the positive emotional bond that develops between individuals or groups and their environment (Altman and Low 1992; Brehm *et al.* 2013; Anton and Lawrence 2016). Formulation of place attachment is seen to be influenced by socio-demographic characteristics, recreation activity involvement levels and preferences, experience and also by landscape typology (Davenport *et al.* 2005). While there may be confusion as to what exactly to focus on when gathering information on how people attach meaning to place (Anton and Lawrence 2014); the length of time lived in a place appears to influence the depth of place sentiments. Over time, individuals are able to develop an accumulation of experiences, resulting in an associated layering of emotions and place meaning (Manzo and Perkins 2006; Lewicka 2011). Research on the topic of attachment indicates that new arrivals tend to focus their sentiments on the physical environment, while long-term locals generally emphasise social dimensions (Lewicka 2011). Importantly, Brehm's

(2006) findings suggest that strong social attachment to community and place result in environmental concerns that are relevant to community culture or identity, whilst attachment to natural places is seen as relating to a stronger focus on goals of protection of the local environment and landscapes. This finding is of particular relevance for the peri-urban interface, with its distinguishing feature of local, long-term residents and more recent in-migrants, especially when the goals of conservation directly conflict with development aspirations.

Place values are dynamic and evolving, but are generally believed to be slow in changing, just as human values in general are considered to be relatively stable over time (Manzo, 2003; Brown and Weber, 2012). Greider and Garkovitch (1994, p.14, as quoted in Davenport *et al.* 2005, p.630), recognise that place meanings are 'symbolic reflections of how people define themselves and that changes in the environment can challenge existing cultural expressions, and require renegotiation of meaning of both themselves as people and their relationship to the environment'. People perceive place values and risks in complex ways. The Concise Oxford Dictionary (1952), defines perception as 'action by which the mind refers its sensations to external object as cause', implying that the perception of value or risk is not a purely rational mental process (see also Lupton and Tulloch 2002). However, high-risk spaces can give rise to peculiar and unique place sentiments. Part of this research is to consider scenarios where place values could be suddenly and dramatically altered due to the impact of bushfires. Perceptions of risk can, for example, be impacted by the portrayal of natural hazards in the media and, in the case of bushfires, residents' perceptions of risk and landscape values can be altered by fire events situated in a different state or even in a different country.

Risk is itself a complex term defined as a 'combination of the probability of an event and its negative consequences' (UNISDR 2009). Rather than just focussing on the likelihood and the consequences of events, Ulrich Beck (1986) extends the definition of risk to include the groups and societies in which the natural hazard occurs. Thus, he suggests risk is a broader and more convoluted equation and a social construct which cannot be fully grasped without its social context. Risk is changing alongside society and with the secularisation of western society, risk steps outside the realm of divine intervention and becomes a core responsibility of formal governance organisations: 'risk makes its appearance on the world stage when God leaves it' (Beck 2006, p. 333). Paul Slovic sees 'risk' as a human necessity and indispensable coping mechanism:

[...] human beings have invented the concept of *risk* to understand and cope with the dangers and uncertainties of life (Slovic 2000, p. xxxvi).

The perception of a risk is understood as an 'intuitive judgement of risks, made by individuals and groups, in the context of limited and uncertain information' (Slovic 1987).

The important link that exists between the concept of risk and human perceptions is provided by cultural theory, with its roots in the discipline of psychology. Cultural theory on environmental risk perceptions stipulates that peoples' perceptions of risk and beliefs about how these risks should be managed can vary significantly. Whilst some individuals will express serious concern about a particular natural hazard, others will instead express scepticism or indifference towards it (Xue *et al.* 2014). In this sense, the individual's cultural worldview, or individual preferences for how society should be structured, has a direct impact on the way the individual evaluates and responds to environmental risk. Within the cultural theory framework, the individual is seen as accepting or dismissing the threat posed by a hazard, according to the degree in which he or she perceives the threat to jeopardise his or her preferred cultural lifestyle.

Common sense would suggest that residents should shy away from places of high natural hazard. The population growth occurring in peri-urban spaces of southern Australia, however, tells a different story, and research conducted on place sentiment in high-risk contexts indicates that traumatic and risk experiences can generate a special emotive attachment to a place (Anton and Lawrence 2014). The risk appears to create a common cause in the resident population that in turn may even deepen attachment to place. In the particular context of high bushfire risk areas, the influence of regular and persistent information campaigns on the risks of damage and destruction by fire run by government agencies and the media, could help to explain higher place attachment. The heightened awareness of the threat leads to more time spent thinking about and understanding 'emotional and functional bonds with the places [where] they live' (Anton and Lawrence 2014, p.453). Risk also brings people together because it forces communities to cooperate and look after each other, creating a sense of common responsibility. As strong social bonds develop, organisations such as volunteer fire-fighting services such as the CFS in SA evolve to manage the risk effectively.

There is the potential, however, for changing perceptions of place in association with the awareness and understanding of risk (Paton *et al.* 2008; Eriksen and Gill 2010). Bushfires can cause sudden and dramatic emotional changes through the experiences of tragedy and loss (Proudly 2005). Psychological impacts of bushfire events on individuals and communities are known to be profound, with impacts on personal strategies as well as on the social and cultural contexts that perform key roles in an individual's creation of meaning (Smith *et al.* 2011). Cultural relationships are also vital. For

example, any lag or apathy in preparation by residents (Eriksen and Gill 2010), needs to be considered not only in the light of the multiple priorities associated with the threat itself, but the contexts of their place, their heritage and their busy lives. The focus on how people might renegotiate the meaning of themselves (self-identity) and their relationship to a place, and their expectations of hazard management and the natural environment that dominates their place, is of specific interest for identifying vulnerability to bushfire in this research.

Research on vulnerability and resilience focuses on 'the susceptibility of human beings to harm from events, processes and changes in their physical and social environments' (Whittaker *et al.* 2012, p.162). In conceptualising these goals, a particular framework and a nomenclature is utilised to assess and discuss the causes and impacts of environmental hazards and disasters on human beings (Whittaker 2012). The analytical approach identifies two facets of vulnerability and resilience with hazard exposure as one element, and the capacity to respond, cope and adapt the other. The importance of context is highlighted in all research on vulnerability and the assessment of the vulnerability levels of a certain location must take into account the multifaceted nature of both the social and the physical context (Cutter *et al.* 2000; Adger 2006; Whittaker 2012). From a social perspective, more vulnerable individuals and groups can be found to be living in peri-urban areas, as original rural inhabitants are progressively engulfed by the outward progression of urban development, or those who settled at the fringes seek more affordable housing options (Hugo 2012; Hugo and Harris 2013). For that reason, the aged, families with young children and ethnic minorities are groups that are often disproportionately represented in the urban fringe. Considering the needs of groups that can potentially be more vulnerable than the rest to environmental risk factors is seen as one of the key challenges associated with managing the peri-urban fringe sustainably (Hugo and Harris 2013; Hugo *et al.* 2013, Ravetz *et al.* 2013). The study of social vulnerabilities must also include issues regarding 'levels of urbanisation, growth rates, and economic vitality' (Cutter *et al.* 2003) and within the Mediterranean biome, the exposure to the bushfire hazard (Füssel 2007).

In the case of the Mount Lofty Ranges, it is evident that there are pockets of higher vulnerabilities where the risk factors for both human beings and the natural ecosystems, as defined by the combination of the probability of an event and its negative consequences, are higher than for the rest of the territory. These very points of concern expressed in a dual complexity, are indeed raised in bushfire management documentation from Mitcham Council and the broader Mount Lofty Ranges planning system. As such, the current Mount Lofty Ranges Reserves of the Hills Face Zone Fire Management Plan 2009-2019 (2009, p. i), states:

The Reserves of the Hills Face Zone, Mount Lofty Ranges were identified as a priority for fire management planning within the DEH Adelaide Region to address the following issues:

- The positioning of the reserves within the urban interface and the protection of significant built and natural assets adjacent to the reserves.
- The general protection of life, property and environmental values.
- Extreme overall fuel hazard levels in some areas of the reserves due to the long-term absence of fire and modification of the natural vegetation.
- Protection of fauna and flora species of conservation significance, some of which are unique to the Hills Face Zone.
- High visitor numbers.
- Regeneration and revegetation processes changing fuel hazards.
- The likelihood of arson and accidental fire ignitions.

In a 2003 submission to the Federal Committee on Bushfires and the South Australian Premier's Bushfire Summit, Mitcham Council expressed concern over the bushfire risk in the Mitcham Hills. The situation is detailed in this extract by the Chief Executive officer at the time:

'The areas is partly dominated by a national park of some 500 hectares (Belair National Park) and, combined with tracts of undeveloped woodlands, is mostly within 10 to 15 minutes' drive of the central Adelaide precinct. The area we talk about represents one of the highest fire risk places in an urban context in Australia, an area that was mostly devastated by fires like the 1954 fires, styled Black Sunday, and an area badly affected by the Ash Wednesday fires in 1983' (Malcom 2003).

Once the circumstances that make human beings and ecological systems vulnerable to the impacts of environmental hazards and disasters are identified, the literature discusses the importance of taking into account the capabilities of a society to deal with the potential risk. In this sense Adger (2006), adds a new element to the definition of the term of vulnerability by including the capacity of socio-ecological systems to adapt to stresses and hazards (social adaptive capacity). A systemic and social transformation aimed at reducing vulnerabilities and increasing resilience with a focus on social capacity is understood to be the optimal path to reducing risk levels of bushfires in the peri-urban space (Kuhlicke and Steinführer 2010; Whittaker *et al.* 2012). The key element of that adaptation response to be investigated here is the opportunity for new, collaborative, planning approaches aimed at transforming the peri-urban space while mitigating risks and promoting ecological value.

## 2.7 Comprehensive planning through education and deliberation

A gap in knowledge emerges from this initial review of the characteristics of the peri-urban fringe and associated opportunities to plan for bushfire risk. While it is accepted knowledge that the peri-urban space requires specific and targeted planning attention, what is discussed less frequently is how the viewpoints of residents could be effectively included in the land-use planning of these high environmental risk areas. Importantly, it is possible to argue that the enormous natural and economic potential of the peri-urban space is put in jeopardy by an inability to effectively address the risk of bushfires in planning systems across southern Australia (Gill 2005; Bradstock *et al.* 2012; Moritz *et al.* 2014; Liu and Robinson 2016). The peri-urban could be used more effectively to buffer human settlements from environmental risk. However, for peri-urban spaces to support cities in the adaptation to radically changing ecological conditions by being that reserve of resilience, effective bushfire management strategies will have to be prioritised at a landscape scale.

A collaborative approach to solving complex planning dilemmas is being discussed in the natural resource management literature through the respectful treatment of local knowledge and perspectives (Carroll *et al.* 2006; Bardsley and Rogers 2010). A strengthening of local community agency and capacity to conceptualise and respond to risk is seen as a key policy aim for more reflexive responses to risk (Carroll *et al.* 2006). Research on the capacity of an individual or a population to undertake risk mitigation activities (Martin *et al.* 2008), emphasises the need for land managers to develop an in-depth understanding of the social characteristics and level of knowledge of specific population segments. Smith *et al.* (2011), investigate the value resource planners can achieve from knowing and understanding meanings and perceptions that stakeholders attribute to place, effectively linking place meanings and desired management outcomes. As such, those individuals who use and value a natural resource 'as a creative or recreational outlet' are more likely to also value it for the part it plays in their lifestyle and perceived quality of life:

'Individuals who endow a space with meaning because that space allows them to express themselves may be more likely to support management decisions and become involved in collaborative planning and management if they believe management is actively seeking to preserve local lifestyles and the quality of life of local residents' (Smith *et al.* 2011, p.366).

Contemporary outreach must seize all engagement opportunities emerging from the range of complex social and communication networks of the resident population to achieve such deliberative outcomes.



If taken in isolation, the brittle nature of collaborative planning can get in the way of achieving effective communication goals (Forester 1999). Forester (1999), however, also emphasises the vast potential for education and associated production of applied knowledge that results from deliberative processes. Drawing from the foundations of Forester's work, Natarajan (2017) focusses on socio-spatial learning. The knowledge that can be drawn from local residents is treated distinctly from the normative type drawn from rational and scientific sources in planning, and is valued exactly because it is inextricably linked to the context where it is generated. An issue also discussed by Mees *et al.* (2018) when investigating co-production, or the equal and reciprocal relationship between professionals and citizens, in delivering vital services such as flood risk mitigation. This subjective knowledge is laden with the actors' values and risk perceptions, and can therefore be deemed indispensable in the management of risk within highly dynamic contexts such as the peri-urban fringe. As such, Innes and Booher (2016; 2004) describe how collaborative participation has the capacity, when it engages through authentic dialogue, to solve intricate and divisive problems. Drawing from 'ordinary citizens' and their specialised knowledge of place makes planning more democratic (Inch 2015), and ultimately, has the potential to reduce the conflict and opposition that can result from bad planning paths. However, there is a dual function of communication (Habermas 1984). In addition to the significant value that can be extricated from collaborative planning and engagement practices in terms of the contribution residents provide to the decision-making process, residents can simultaneously learn about the full extent and ramifications of the hazard. There is the potential of educational benefits for the individual when engaging or grappling with bushfire risk planning questions. From a European context, Wachinger *et al.* (2013) in their review of risk perceptions, support this view in suggesting that in high environmental risk settings, collaborative planning projects can lead to highly favourable personal protective actions in participants:

[...] public participation measures are probably the most effective means to create awareness of potential disasters, to enhance trust in public authorities, and to encourage citizens to take more personal responsibility for protection and disaster preparedness' (Wachinger 2013, p.1063).

By engaging with the issues of risk, local residents are developing an understanding and learning about the concept. Champ *et al.* (2012), when looking at shared and contested meanings of wildfire mitigation in the context of the United States, identify the potential for engagement and collaborative planning strategies as high-priority tools for 'building relationships with communities and other consumer groups' (Champ *et al.* 2012, p.593). In the Australian context, Brady and Webb (2013) raise the significant point that whilst a greater level of community engagement was one of the key recommendations of the Victorian Bushfire Royal Commission, following the 2009 Black Saturday

bushfires, the implementation is not necessarily as straightforward as it might seem, with agencies 'under pressure to accommodate' it (Brady and Webb 2013, p.351). Issues of information reliability through engagement, and the potential for deliberative communication to provide inaccurate information are also of concern.

Researchers are also problematising the concept of deliberative planning which will be further elaborated in the following chapters. Legacy and Legacy *et al.* (2017; 2018) ask some pertinent and timely questions about the wide-spread inclusion of collaborative approaches in planning and governance. They challenge the validity of public participation in the contemporary Australian city as an effective method for citizens to be heard or make a difference. In their research, the authors question consensus democracy as a potential trajectory to achieve positive outcomes or enable effective change. Thus, even as deliberative planning processes present opportunities for significantly improving risk management with detailed understanding of populations and their views in high-risk contexts, it also generates risks in itself. The research in South Australia and Canton Ticino aims in part to examine how planning is interacting to inform spatial outcomes and learn how it could be developed to lead to more effective, reflexive outcomes in the future.

## **2.8 Conclusion**

The already fragmented remnant native vegetation in the peri-urban interface within regions such as the Mount Lofty Ranges, is potentially further threatened by altered risk evaluations in the resident population. Competing interests and management priorities are the focus of a planning conflict literature relating to biodiversity conservation and hazard risk management in the peri-urban belt. As identified in this review when looking at the dynamic forces that define the peri-urban space, the overlay of natural spaces with increasingly dense vegetation and more people is, in combination, leading to increased bushfire risk levels and vulnerability. A recognition of both the values and risks influencing understanding of the peri-urban space has the potential to guide targeted responses to the specific needs that arise from the bushfire threat. Moreover, the landscapes that are present in the peri-urban, including areas of nature and agriculture, also generate resource potential to mitigate the impacts of climate change for the urban core. One way of achieving such an outcome is through deliberative discourses associated with public engagement and participatory planning. This form of connection and exchange, consisting of both formal and informal processes, allows for the discussion of diverse opinions. Partly it is for the process to generate the social room for popular deliberation on the risks to their place, and partly it is also meant to generate better knowledge of how planning could

respond to those risks. As awareness is raised with residents, and new knowledge is generated of a place, the community agency is strengthened through a growing understanding of the complex issues in their local area. To provide the socio-political and geographical background critical to the interpretation and analysis of natural hazard issues, the next chapter focuses on the local environmental risks and important governance elements in the Australian and Swiss research settings.

## **CHAPTER 3**

### **SETTING THE SCENE: STUDY SITES**

#### **3.1 Introduction**

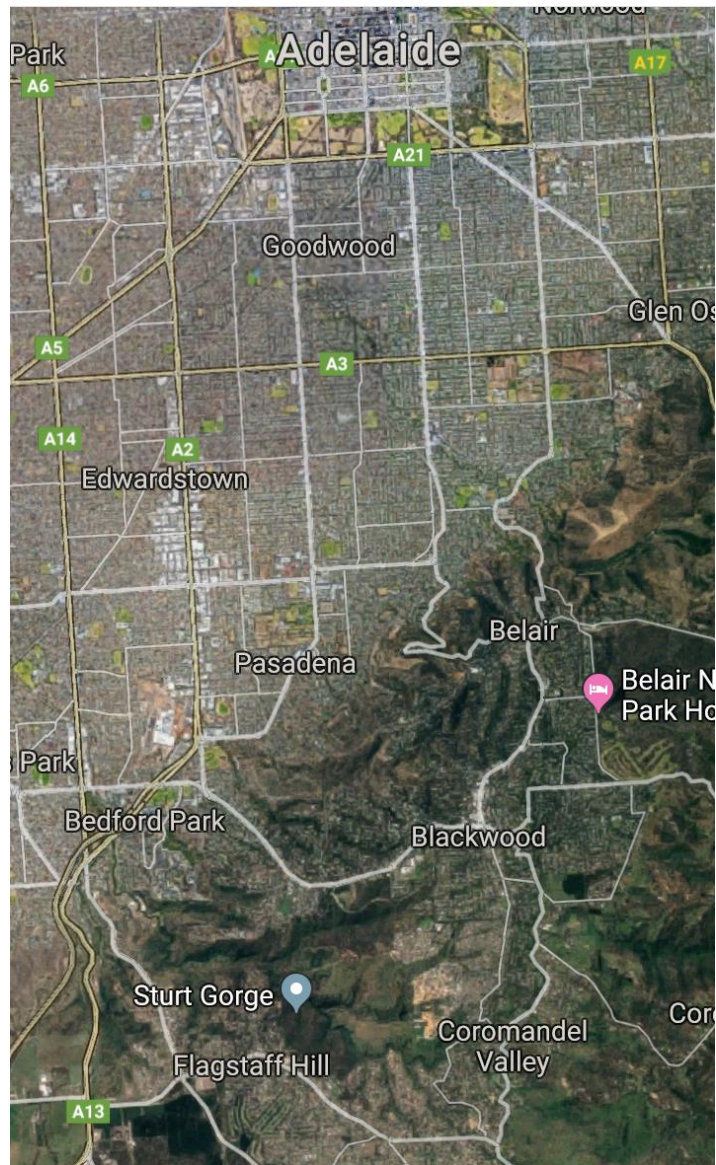
This chapter outlines the important socio-ecological context of the study sites in South Australia (SA) and in Ticino, to set the scene for this research. The perception of and planning for environmental risk and value are strongly tied to a context of a place and society. Therefore, this research is not possible without a thorough understanding of the two places and the socio-cultural elements that characterise the two research locations. Background of the local geography, climate and environmental risk factors, as well as aspects of governance and planning, are presented for each site in two separate sections of this chapter.

This chapter has been set apart from the earlier review of the literature because it is an important premise to this thesis that planning must become more reflexive – responding to the unique situations that are presented locally. Therefore, unlike other research where a deep understanding of place might not be required, in this case, the specific context is valuable for its own sake, as well as helping to consolidate the core argument of the work. Brendan Gleeson highlights the important point that planning is not a free-standing discipline and remains ‘exposed to the lingering tendency [...] to align and define itself with the interests that dominate the urban process’ (Gleeson 2012, p.243). Similarly, Booth (2009) argues that a focus on technical aspects, tools and competencies of the planning system is not sufficient to fully understand a process that is embedded in a specific spatial, political and institutional context. In this sense, an appreciation of the environmental and social contexts as well as the governance structures is essential to understand current planning systems and also the possible future pathways that the planning discipline might follow in Australia and globally.

### 3.2 The Australian study site

The Mt Lofty Ranges (MLR), where the author is currently resident, skirt the Eastern flank of the capital city of the state of SA, Adelaide, situated in south-eastern Australia. The Mount Lofty Ranges region of SA experiences a Mediterranean climate with hot, dry summers and cool, wet winters (Lucas *et al.* 2007), with an annual average of 600-1000mm rainfall (BOM 2010). The Ranges themselves are mostly covered in native sclerophyllous vegetation that is adapted to the region's climate and edaphic characteristics and requires fire to regenerate (Enright *et al.* 2012), but it also burns very strongly in hot, dry and windy conditions. Large areas of forest and grasslands are situated close to the city of Adelaide and have attracted residential developments because they are also beautiful places to live in relative close proximity to amenities and the city centre. Entire suburbs are situated very close or even amongst heavily vegetated areas that have been touched by wildfire in the past, particularly during the 1983 Ash Wednesday event (Bardsley *et al.* 1983). Figure 3.1 shows a Google Maps screenshot of the Adelaide CBD situated on the plains, contrasting with the heavily vegetated uplands of the Mount Lofty Ranges. This satellite image also shows the proximity of Sturt Gorge to the centre of Adelaide, which are distanced only just over 10 km apart, and highlights the attraction of a quasi-rural lifestyle on the perimeter of the forested gorge, whilst also being very close to the centre of Adelaide.

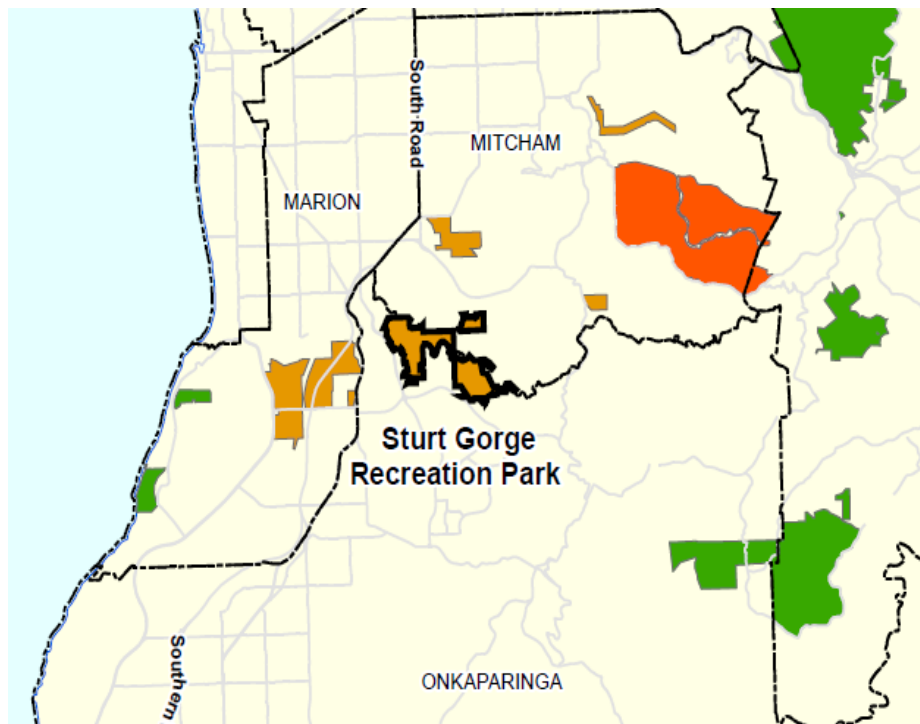
**Figure 3.1: The Adelaide CBD and the Mount Lofty Ranges, with Sturt Gorge Recreation Park**



Source: Google Maps, 2018.

Figure 3.2 on the next page shows the position of Sturt Gorge Recreation Park in relation to the local government boundary, and as can be seen it straddles the boundary between the two neighbouring council areas of Mitcham and Onkaparinga.

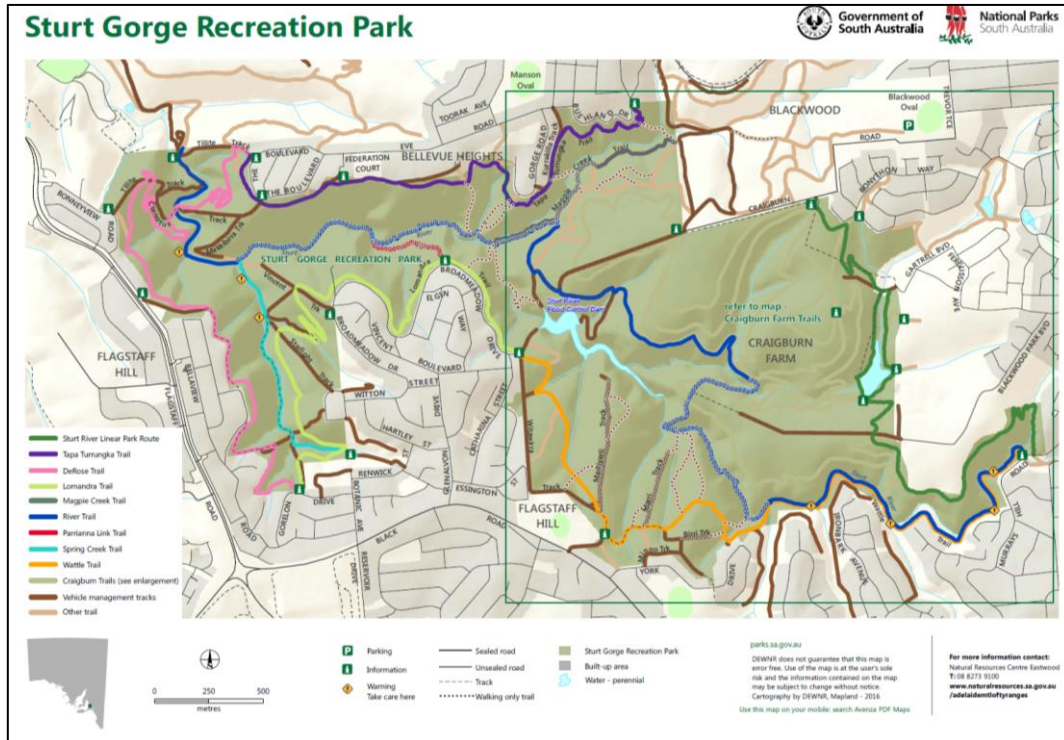
**Figure 3.2: Sturt Gorge Recreation Park, Mitcham and Onkaparinga Hills**



Source: Sturt Gorge Recreation Park Management Plan (2008)

Figure 3.3, shows a map of the Sturt Gorge Recreation Park in greater detail, with information on the trails within the park which run through the highly variable terrain with steep gradients and slopes of various aspects. This map also shows how close the existing residential areas are to the boundary of the park. Beyond those elements however, the map gives a good indication of the types of suburban streets, short, curvy and interwoven and with limited direct access to arterial roads which residents would need to negotiate in the case of a bushfire event. Many streets can be seen to be cul-de-sacs or no-through roads, which increases the challenge of egress during an emergency event. Moreover, the narrow streets are in many cases covered completely by Eucalyptus tree canopies creating a continuous link of fuel from the park to outer streets and also generating significant risk of fallen branches or trees during a bushfire. Many people who have perished in recent catastrophic bushfire/wildfire events in Australia, Europe and USA succumbed to heat or smoke while unable to escape because the roads were blocked and traffic backed up along transport routes, for eg. Victoria (Haynes *et al.* 2010), Portugal (Viegas 2018), and California (Riotta 2018).

Figure 3.3: Map of Sturt Gorge Recreation Park



Source: National Parks South Australia ([https://www.environment.sa.gov.au/parks/find-a-park/Browse\\_by\\_region/Adelaide/sturt-gorge-recreation-park#maps](https://www.environment.sa.gov.au/parks/find-a-park/Browse_by_region/Adelaide/sturt-gorge-recreation-park#maps)), viewed 4.5.2018.

### 3.2.1 The geography, climate and environmental risk factors of the Mount Lofty Ranges

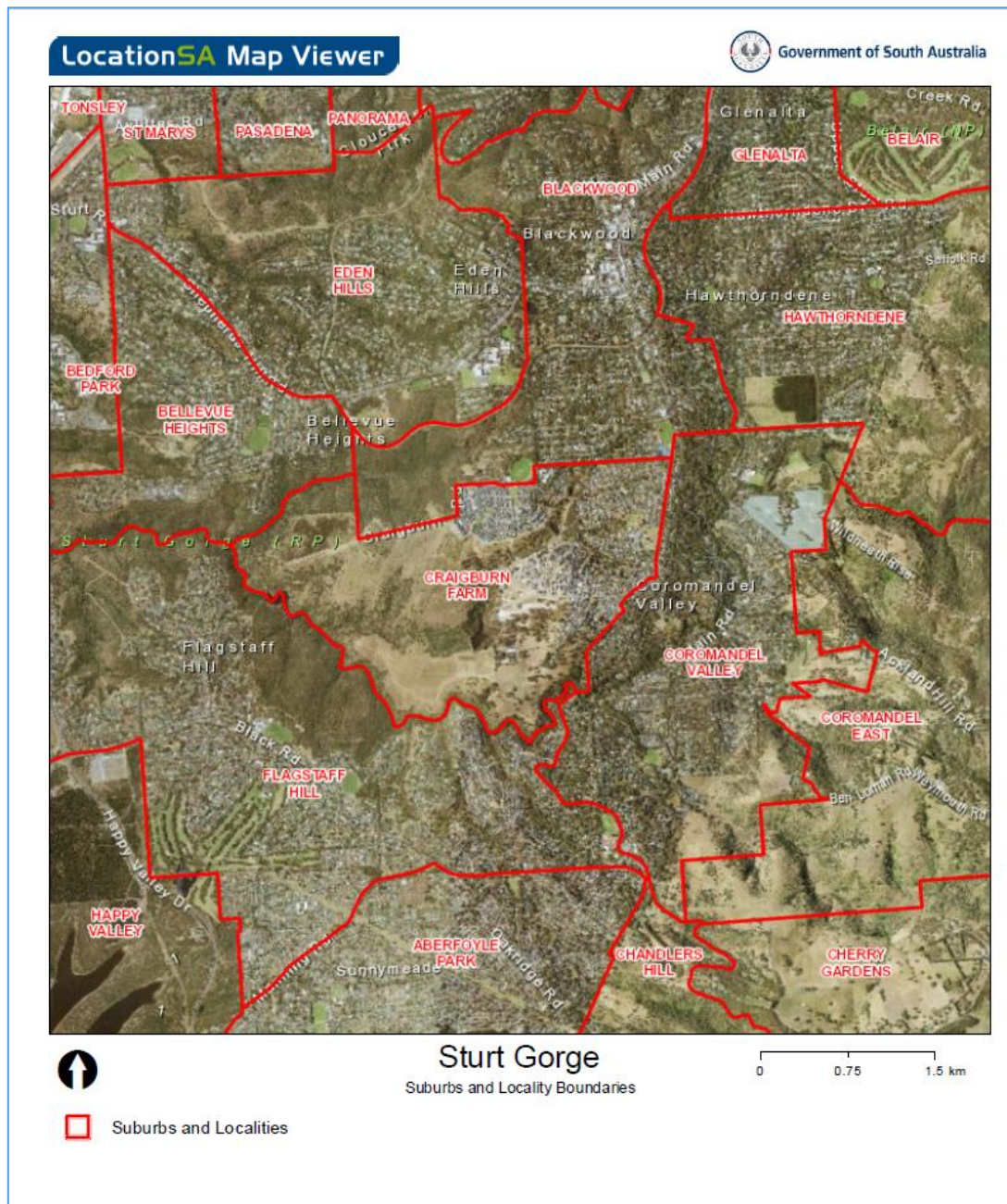
The peri-urban fringe of the Mount Lofty Ranges is characterised by high amenity and conservation value with dense tree-cover and low-density suburban-style housing. Historically, the city of Mitcham, the area where most of the South Australian case study is situated, was amongst the first local government areas to be settled outside of Adelaide. Before the development boom in the Mitcham Hills in the 1960s and 1970s, the hills area was used for mixed farming with some dairy and horticultural specialisation, with the names of many farms still appearing in the toponymy today (Mitcham Bushfire Prevention Plan 2016-2017, p.24). Today, only the Adelaide Hills Council Area in SA has a higher tree cover than Mitcham, and in both cases, the tree canopies exceed 40 percent of the land cover (Jacobs *et al.* 2014). The other important council area for this map study is the city of Onkaparinga, situated further to the south on the southern fringe of urban Adelaide, and South Australia's largest metropolitan council with just over 10 percent of the state's population. Onkaparinga has one of the most rapidly growing populations in the state, and the council area ranges from coastal flat land to hilly and forested terrain in the hinterland, where the surveyed suburbs are located ([www.onkaparingacity.com](http://www.onkaparingacity.com)).

Figure 3.4 shows a satellite image screen-shot of the 2015 Australian Householder Survey site with a Location SA Mapviewer suburbs and localities' boundaries overlay. Suburban developments bordering



Sturt Gorge Recreation Park and situated in the localities of Bellevue Heights, Eden Hills, Blackwood, Craighburn Farm (which includes Blackwood Park), Coromandel Valley and Flagstaff Hill, are shown here. Again, the image clearly indicates the important proximity of the residential suburbs of the Mitcham and Onkaparinga council areas in relation to large areas of remnant native vegetation.

**Figure 3.4: Suburbs and localities' boundaries for Australian Householder Survey 2015**



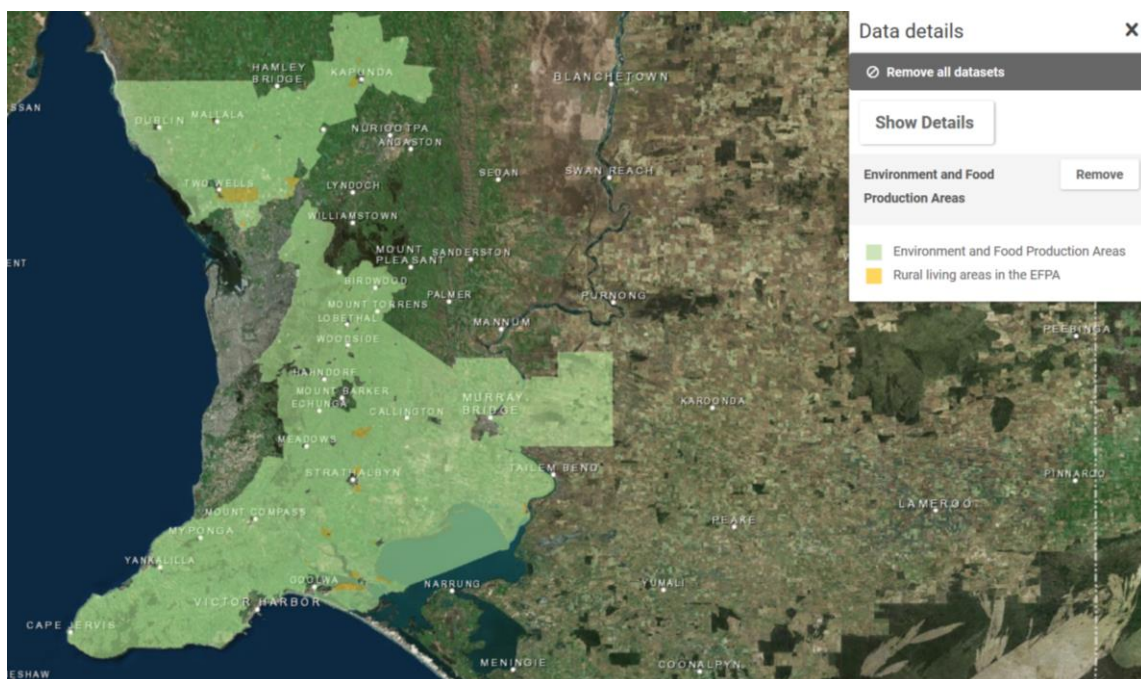
Source: author, through the SA Government mapping portal ([www.naturemaps.sa.gov.au](http://www.naturemaps.sa.gov.au)), 2018.

The geographical situation of surveyed residential developments is therefore one in which houses are embedded or very close to forested spaces in a bushland type setting, with many dwellings located on

ridgetops and near escarpments overlooking the gorge itself. The Grey Box grassy woodlands in the Recreation Park includes some of the largest intact examples of this important endangered ecological community in SA (DEH 2009; DENWR and SA Water, 2014). Thus, the issues for planning and management of bushfire risk are further complicated by the significant conservation value of the forest.

In a rare example for Australia, South Australia has worked to secure the urban growth boundaries of metropolitan Adelaide. With the new Planning, Development and Infrastructure Act (2016), the state government has imposed strict regulations in an attempt to safeguard peri-urban agricultural production and conservation zones to protect its unique horticultural and viticultural areas to the north, east and south of Greater Metropolitan Adelaide (State Planning Commission 2017). In Figure 3.5 the Environment and Food Production Areas (EFPAs) surrounding the metropolitan area are identified in light green. From April 2019, land division creating additional allotments to be used for residential development will not be permitted within these protected areas. Sturt Gorge Recreation Park and the suburbs included in the survey are just outside the western boundary of the southern EFPA.

**Figure 3.5: South Australian Environment and Food Production Areas (EFPA) and Rural living areas in the EFPA's**

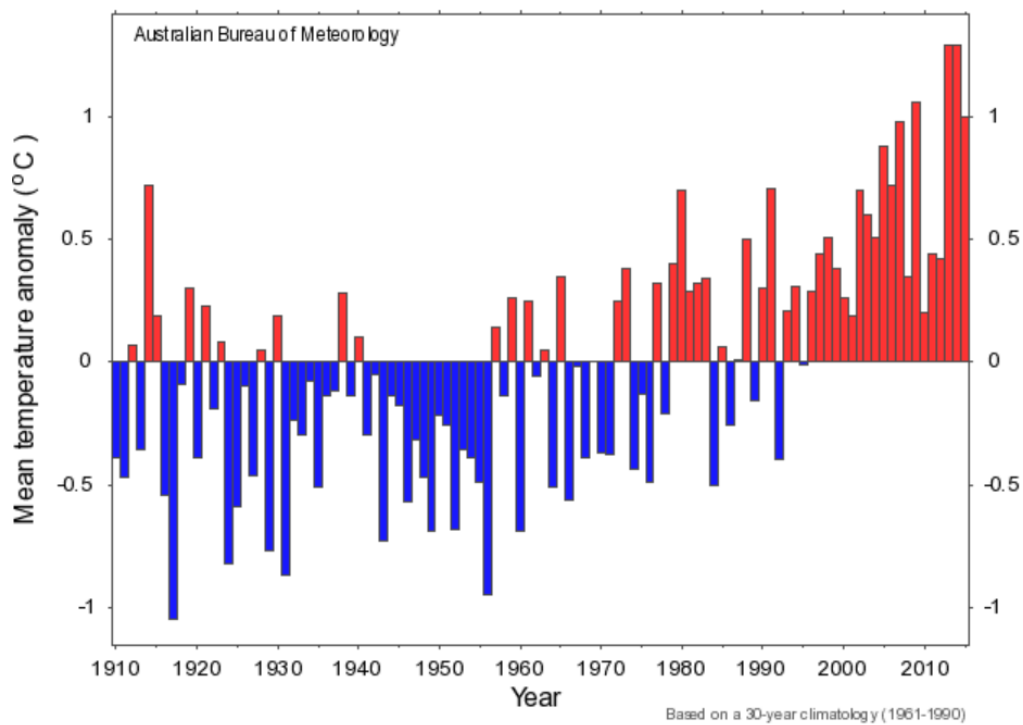


Source: Location SA Mapviewer, accessed 31 August 2018, <<http://location.sa.gov.au/viewer/?%20map=hybrid&x=139.22788&y=-35.03088%20&z=9&uids=223&pinx=%20&pinx=&pinTitle=%20&pinText=>>>

Parts of the area targeted by this research in the Mount Lofty Ranges were impacted by severe fires in 1954 and again in 1983 (Bardsley *et al.* 1983). Since then, the closest a fire has come to settlements in the Mitcham Hills was on February 8, 2014 when during a 40-degree day, a bushfire burnt across the back of Belair National Park (Sutton 2018). A Parliamentary Committee, using CFS reports to investigate the bushfire risk in the Mitcham Hills area in 2012 noted, 'If a firestorm comes from the west it will impact heavily on [the suburb of] Craighburn Farm and is unlikely to stop there because of the gullies that pass through the middle' (Kelton and Rice 2012, n.p.). New residences continue to be built in that same suburb, and the broader peri-urban regions including the Mount Lofty Ranges are amongst the regions expected to see some of the highest population growth rates in SA over the next decade (EPA 2013; Hugo *et al.* 2013). The Blackwood Park land division situated in Craighburn Farm is the most recent large-scale subdivision in the Mitcham Hills area, and the third and final stage of the Adelaide Development Corporation's Craighburn Farm project is still underway in 2018, as this thesis is completed. Importantly for this research, in the case of these developments, there are large numbers of new residents moving to a bushland setting of elevated bushfire risk.

As well as ongoing urban development increasing residential exposure to bushfire risk within the study site in SA, the climate has also changed. Average, maximum and minimum temperatures have been increasing in SA since the 1960s. Figure 3.6 shows the extent to which temperatures are projected to continue to rise with a forecast minimum of 0.8 degrees and a maximum of 3.4 degrees centigrade higher to 2090 (BOM 2016). The Australian Bureau of Meteorology (BOM) projects that the region will experience more hot spells and fewer frosts, as well as a continuing decrease in winter and spring rainfall. In other research, climate projections for the southern regions of SA, which include the Mount Lofty Ranges, predict increasing average temperatures across all seasons, a rise in hot days and heatwaves, as well as 'harsher fire-weather climate' (Hope 2015; Clarke *et al.* 2013; CSIRO-BoM 2018). Perhaps of particular concern, days in Adelaide with temperatures above 35 degrees Celsius (°C) are set to rise from a current average of 17 per annum to 23 by 2030; with possible averages of 36 such days occurring by 2070 (Steffen and Hughes 2012). While the attraction of the cooler Mount Lofty Ranges as a place to live may increase in comparison to the urban agglomeration of the Adelaide plains in a future warmer climate, clearly that climatic shift will also increase the regional vulnerability to bushfire.

**Figure 3.6: Annual mean temperature anomaly – Southern Australia (1910-2015)**



Source: Australian Bureau of Meteorology, viewed 4.13.2016, <<http://www.bom.gov.au>>

Planning documents for the suburbs of the Mitcham and Onkaparinga council areas targeted by the 2015 survey identified those areas of the Mount Lofty Ranges as harbouring considerable bushfire risk levels (see Mitcham City Council Development plan 2018 and Onkaparinga Council Development Plan 2018). In a 2003 submission to the ‘Select Committee on recent Australian Bushfires’, the City of Mitcham illustrated the threat level to the upland parts of the council areas by saying: *‘in fire terms the area is known as Region 1 and is regarded as the most populated fire-prone area in South Australia’* (Malcom 2003). The settled areas of the Mitcham Hills that are of greatest concern regarding bushfire threat are among others, the suburbs of Eden Hills, Bellevue Heights and Craighburn Farm adjoining Sturt Gorge (Mitcham Bushfire Prevention Plan 2016-2017, p.23). The strongest concern for fire ignition in the Sturt Gorge Recreation Park lies in the eastern sector, which includes the Craighburn Farm development of Blackwood Park, with the risk defined as ‘very high’ in the gullies (DEH 2009).

‘High to Extreme bushfire hazard ratings occur in the Sturt Gorge Recreation Park, and in the vicinity of the creek lines through Craighburn Farm, on the Flinders University campus and along creek lines in Bellevue Heights, [...] and along some adjacent creek lines in Eden Hills’ (City of Mitcham Bushfire Prevention plan 2013, p.43; City of Mitcham Bushfire Prevention plan 2016).

Within the Onkaparinga Council development plans, the suburbs of Flagstaff Hill and Coromandel Valley are defined as ‘very high’ bushfire risk areas due in part to their complex network of roads,

including numerous dead-ends, and the proximity of Sturt Gorge Recreation Park. Here, according to council documents, the potential exists 'for a fire front to travel south through Sturt Gorge Recreation Park and up slope towards the residential areas of Flagstaff Hill' (City of Onkaparinga District Bushfire Prevention Plan 2006, p.30). As early as 2009, a parliamentary report identified the road network through parts of the Mount Lofty Ranges as being in need of an upgrade, to ensure residents could exit the area quickly in the event of a major bushfire event (Sutton 2018). Together, therefore, the site and situation of the suburbs of the Mitcham and Onkaparinga Hills make them important areas for the examination of opportunities for mitigating bushfire risk. The research sites were also chosen because of their proximity to Sturt Gorge, which contains large areas of the important Grey Box woodland, and therefore is an area of considerable environmental value. That combination of bushfire risk and forest values frames the key focus of the survey and subsequent analysis.

A wide range of drivers determines the levels of environmental risk in the Mount Lofty Ranges, but the extremely flammable nature of vegetation is of critical concern. Despite the devastation caused by the Ash Wednesday fires in 1983, with over 160,000 hectares of the Mount Lofty Ranges burnt and twenty-eight lives lost (Bardsley *et al.* 1983), development attention remains strongly focused on the urban fringe, and over the last sixty years, the population of the region has increased quicker than that of the plains (EPA 2013). Substantial environmental risk decision-making challenges are faced by legislators and planners as the population of the Adelaide urban space continues to grow outwards, while with increasing density of residential areas many more people become exposed to the potential of devastating bushfires on the peri-urban fringe. Due to the significant hazard risks, a range of work is being carried out to mitigate the risk of local bushfires in the region (SA Government & CFS 2016; Mitcham City Council 2018; Onkaparinga Development Plan 2018).

Fire Management Plans for the Sturt Gorge Recreation Park are produced 'in accordance with Fire Management Policy and Procedures and the provisions of the Native Vegetation Act 1991' (DEH 2009, p.18). Prescribed or controlled burns are organised on public lands by the State Government agency DENR, reducing fuel loads and increasing patchiness within the vegetation during the non-fire danger season, with the aim of avoiding large uncontrolled bushfires. This approach is also designed to protect and regenerate the significant Grey Box woodlands found in the Recreation Park. In addition, ten to 30-metre wide fuel break separation zones between the vegetation and assets such as houses and other buildings are cleared prior to each Fire Danger Season (DEH 2009; City of Onkaparinga District Bushfire Prevention Plan 2006). While the state and local governments undertake important work on public lands, private landholders are also encouraged or required to manage their properties to

mitigate bushfire risk. All residents in the Mitcham Hills are encouraged to create and maintain a defensible space around their property by cutting long grass and removing leaves, dead branches and undergrowth from around their home in accordance with the Native Vegetation Act and the Significant Tree Legislation. Coinciding with a national push for residents to assume responsibility of their own safety and the safety of their property (AFAC 2012), and under the SA Fire and Emergency Services Act 2005, councils will issue infringement notices and fines should landowners fail to clear excess vegetation (Villani 2016). The roles and choices of private landholders are not without potential controversy. For example, since 2009 private landholders residing in medium and high bushfire risk areas in the Mitcham and Onkaparinga council, in order to create an asset protection zone, have the option of removing all vegetation at a distance of 20 metres from their dwellings (DWLBC 2009; DPLG 2011; SA CFS 2018).

The contemporary attraction of the Mount Lofty Ranges as a place of residence has a long tradition. In an era long preceding mechanical refrigeration, the promise of a cool refuge during hot summers led to the early development of urban settlements in the Ranges, and the beauty of the natural environment is to this day, a decisive factor in attracting new residents to the urban-style developments, such as Craighburn Farm in the Adelaide foothills. Wide-scale clearing carried out in the Mount Lofty Ranges from the late nineteenth century for agricultural development and to protect Hills settlements from the risk of wildfires, may have led to some discounting of the potential for bushfire hazard in the region. The ongoing population growth in areas embedded within native bush- and grasslands; inadequate or inappropriate infrastructure or egress; variable levels of vegetation management on public and private lands; as well as a mix of individual values and lifestyle choices, are all part of the multifaceted social and ecological processes that determine risk levels in peri-urban settlements of the surveyed area.

### **3.2.2 Governance and planning in South Australia**

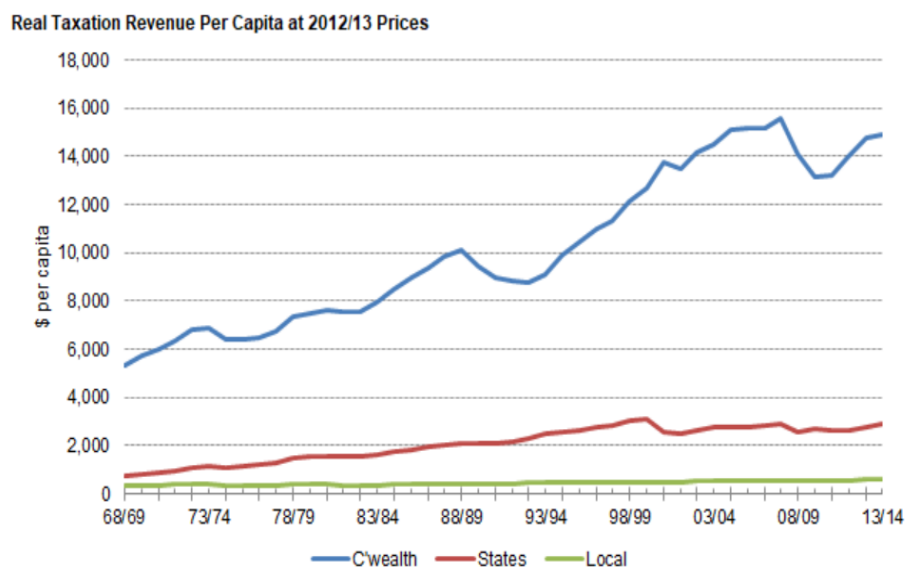
Federation in 1901 brought Australia a democratic political system relying on the effective interaction between States and Territories and the Commonwealth Government. The resulting 3-tiered system of government comprises the Commonwealth or Federal Government, the States/ Territories and Local Government – the latter only created through a State Act of Parliament in South Australia. While the powers of the Federal Government are constitutionally constrained and often dependent on negotiation with the States, its economic dominance, based on having a majority share of tax revenue, provides it with a disproportionate level of influence (Stilwell and Troy 2000). As such, fiscal arrangements within the multi-layered governance structure create a very top-heavy hierarchy.

Importantly, the Federal Government does not hold power over the management of natural resources, planning, environment, and the regulation of land-use development, aside from matters of national environmental significance (Williams 2007a). Rather, it is the State Government, which has the key governance and planning responsibilities for managing natural hazards. There are problems with an arrangement that sees one government level holding a majority of power and wealth, and the other, primary responsibility for the planning and management of place, whilst being plagued by a chronic lack of financial capacity to activate plans, even when they are fully developed for sustainable outcomes. Despite there being at different times discussions over creating a national environmental planning blueprint, no such framework has ever been realised (Gleeson and Low 2000; Gleeson 2001; Dodson 2015).

States and Territories in Australia create their own spatial and natural resource planning systems that include statutory, policy and procedural frameworks (Williams 2007), and thus have the primary role in the administration of places. The States and Territories in turn, delegate numerous decision-making functions to Local Government. Historically, in the Australian context, the tyranny of distance that led to essential local administration of key services and planning, has contributed to a strong sense of self-reliance within local governments (Forster 2004). However, over time and particularly with new means of communication and transport, and the rapid population growth experienced in the post-WWII era, many formerly remote councils were incorporated into the sprawling urban area of Adelaide, and with increasing residential density and planning responsibilities became increasingly dependent on the SA state government for guidance and funding. That trend has seen a retraction of planning responsibilities that had earlier been delegated to local councils to state governments, and state governments have been eager to reclaim their former powers, particularly in relation to major developments (Williams 2007; Hamnett and Freestone 2018). By 2020 for example, it is expected that individual council development plans in SA will be replaced by a single, standardised state-wide 'Planning and Design Code', with only limited individual council input to reflect local issues (SA Planning Portal 2018). The process of council amalgamations is also a means to streamline local governance procedures. For example, Onkaparinga Council is a relatively recent amalgamation of the Happy Valley and Noarlunga Local Government areas, and includes a part of the rural area of Willunga ([www.onkaparingacity.com](http://www.onkaparingacity.com)). Williams (2007) argues that centralisation is seen as way to generate efficiencies and reducing 'red tape' to streamline decision-making to attract private investment, and could be seen to occur at the expense of local community viewpoints if residents are increasingly distanced from key decision-making processes.

With a trend towards increasing centralisation of decision-making power, the broader strategic planning process including the 'identification of desired or future land uses and the implementation of these through the preparation of statutory planning controls' (Williams 2007, p.41), is already largely in the hands of the State Government. Already, Local Governments' powers and breadth of action, as well as their boundaries, are determined by State Government legislation and scrutinised by SA ministers who have the discretion to further reduce local government powers and responsibilities (Stillwell and Troy 2000). Moreover, local government responsibilities within the community are carried out with a relatively small share of the total Federal fiscal revenue allocated to the State. Figure 3.7 shows how the Local Governments' fiscal share in Australia has stagnated over the past 30 years, while the overall taxation revenue continued to increase, exactly at the same time as the complexity of the planning and administration challenges within Local Government areas have accelerated considerably.

**Figure 3.7: The relative growth of government tax revenues over the past 30 years in Australia**



Source: Local Government Association of South Australia, accessed 4 September 2018, <<https://www.lga.sa.gov.au/LocalGovernmentinSA>>

It was previously assumed that Local Governments' breadth of functions included the mundane 'roads, and rates and rubbish' and community services and leisure activities, along with some building and development control (Forster 2004; Williams 2007b). Local government responsibilities now extend into more strategic roles including sustainable environmental and socio-cultural management, but often without the necessary fiscal support to undertake those roles effectively (Mitcham City Development Plan 2018; Onkaparinga Council Development Plan 2018). While a relatively marginal



position of local government in Australian governance arrangements is due in part to the legacy of historical colonial organisation and to their very limited capacity to raise tax revenue, Hamnett and Freestone (2018) argue that, it is possibly also an historically entrenched mechanism devised to curtail citizens' direct influence granted through the channels of participatory democracy over land-use planning and development decisions. Thus, both the marginal status and limited capacity of Local Governments in Australia have influenced the capacity of local communities to influence planning to guide sustainable processes of urban development (Stillwell and Troy 2000).

Community consultation is not a novel concept in Australia as several shifts in levels of participation and input can be identified from the post-WWII era until present times (Troy 2013). Forster (2004) and Zehner & Marshall (2007), identify a clear break with a more traditional 'top-down' approach in Australia from the 1960s onwards, as a governance style that involves community perspectives and interests emerged to move away from a centralised 'government knows best' administration tradition. Up until that time, planning had largely involved a group of 'experts' working in isolation. In the 1960s and 1970s, input from community members and stakeholders into planning decisions were increasingly sought at all levels of governance in the form of participation or consultation (Zehner and Marshall 2007). This step is seen as seminal in defining the current planning system in Australia as thereafter, public participation became a key objective defined by planning legislation and minimum statutory requirements were generated for community consultation (Williams 2007b). In fact, Forster goes as far as arguing that:

'Because the local government is residentially based, it tends to give too much weight to the views of existing residents at a cost to overall planning objectives and, in particular, the facilitation of economic development (Victoria Ministry for Planning 1993, p.13 quoted in Forster 2004, p.155)'.

Partly in response to that sense within the planning community that the pendulum on consultation had swung too far, there has been a generalised attempt at rationalising the decision-making process in the first decade of the 21st Century. That change has been associated with a reduction in efforts to involve the public in the strategic planning process and greater effort to attract investment and increase the competitiveness of State capital cities (Bunker 2012). In his review of the SA planning reform, Kellett (2014) portrays the contemporary failure of genuine public participation in SA as a widely known fact. That conclusion is based on the fact that there have been a number of contentious decisions, where local residents did not appear to have their voices reflected in planning outcomes. He argues that there has been a tendency to seek reactive comment from residents only after previously determined policy directions. Now, once again, new changes in planning legislation

initiated in 2013 are seen to be driving efforts towards more authentic forms of civic engagement (Kellett 2014). In other words, the planning processes of SA have gone through cycles of centralisation and community participation over time, with the contemporary SA planning reform process - at least on paper – now recognising the important roles of engagement as a central element of good governance once again.

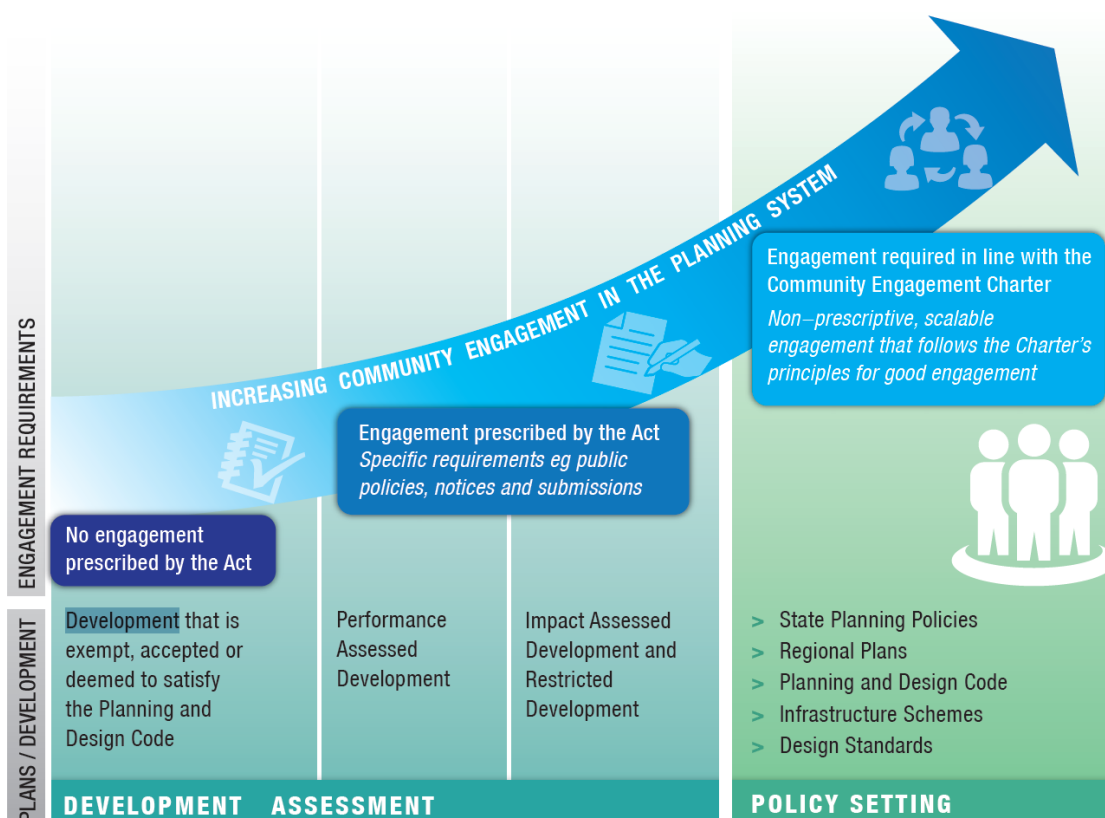
From early 2013, SA's planning system underwent a review process of which the principal aims included an attempt to provide more scope for broad metropolitan strategic planning over local details and concerns; as well as develop new approaches of community consultation and engagement (Kellett 2014; Hamnett 2018). SA's Expert Panel on Planning Reform (Government of South Australia 2014, p.36) argued for the creation of a network of regional planning boards with the function of 'preparing regional strategies, approving council rezoning proposals, undertaking public hearings and other engagement, and appointing regional assessment panels'. The new Planning, Development and Infrastructure Act, was passed by the South Australian Parliament in 2016. The associated State Planning Policy Fact sheet released in February 2018 by the then Weatherill SA Government Planning minister, John Rau (DPTI 2018), outlined the State Planning Policies. The key principles at the basis of this new approach outlined that planning should 'minimise adverse effects of planning and development decisions on the climate and promoting development that is resilient to climate change', as well as act to enhance 'biodiversity and minimising adverse effects of development on biodiversity within the state'. Particular goals relevant to environmental risk management include:

- Minimise risk to people, property and the environment from exposure to hazards (including bushfire, terrestrial and coastal flooding, erosion, dune drift and acid sulphate soils) by designing and planning for development in accordance with a risk hierarchy of: avoidance, adaptation, protection (DPTI 2018, p.118).
- Improve the integration of disaster risk reduction and hazard avoidance policies and land use planning (DPTI 2018, p.19).
- Decrease the risk of loss of life and property from extreme bushfires through creating buffers in new growth areas that are in or adjacent to areas identified as high risk from bushfires (DPTI 2018, p.120).

The overhaul of the planning system was seen as a necessary step to enable the implementation of the strategic 30-Year Plan for Greater Adelaide, updated in 2017 from its original 2010 version, in which building resilience to hazards such as bushfires was also identified as a priority (SA 30-year-Plan 2017). The amended version of the 30-year Plan also puts renewed emphasis on urban growth occurring within the existing urban footprint, as well as providing more protection for the food

production and agricultural lands under threat from encroaching urban developments. However, all of these reform processes occurred under a left-wing, Labor Government in SA, and the democratic process of state elections has disrupted the rolling-out of the legislation. While a new right-leaning Liberal-National government was voted in during the March 2018 state election, the SA Planning Commission, whose members were appointed by the previous Labor State Government, will not be revised until the end of November 2018. In the interim, they have released a Community Engagement Charter (April 2018); effectively continuing the previous State Government’s agenda, without necessarily obtaining a mandate from the public. The engagement process within the new charter is designed to frame the functioning of the new planning system as shown in Figure 3.8.

**Figure 3.8: Community engagement in the South Australian planning system as required by the Planning, Development and Infrastructure Act of 2016**



Source: South Australian Community Engagement Charter 2018, p.5.

The key preoccupation of the charter is to ensure that engagement is genuine, inclusive and respectful, fit for purpose, informed and transparent, and that engagement processes are reviewed and improved (State Planning Commission 2018, p.7). Under the Charter, public entities are required by law to implement community engagement approaches for planning policy (State Planning Commission 2018, p.4). The State Planning Commission; Chief Executive of the Department of

Planning Transport and Infrastructure; Infrastructure Scheme Coordinators and government agencies; Councils and Joint Planning Boards must all abide by the Charter (State Planning Commission 2018, p.4). At the time of writing, the new state planning policies are under review through public and government agency consultation, and implementation is still expected to occur in the third quarter 2018. Whether or not, these reforms will be enacted after changes in the SA Planning Commission personnel is uncertain. This raises the important point about planning in SA, in contrast to some considerable extent with Switzerland – planning is largely at the discretion of the elected representative State Government of the day, rather than directly asking people about their preferences for particular issues through established referenda. This contrast is a significant reason why a parallel case study on planning for hazard risk was undertaken in Switzerland.

### **3.3 Swiss study site: the Locarnese region on Canton Ticino, Switzerland**

#### **3.3.1 Geography and climate**

Switzerland is divided into relatively small areas of governance, called Cantons. The Canton of Ticino, where the author grew up, is in the Italian part of Switzerland, located on the southern foothills of the Swiss Alps. The climate in this southern part of Switzerland is defined as warm temperate, with warm wet summers and cold winters. The median annual precipitation for the Locarnese region averages 1457mm (MeteoSwiss 2012), considerably wetter than the Mount Lofty Ranges. The peri-urban fringe of the Locarnese region is characterised by high landscape amenity, with bungalow and medium density development situated on the steep south-facing slopes overlooking the lake (Lago Maggiore). The slopes of the Locarnese region are covered in a mixed-forest, dominated at lower altitudes by sweet chestnut (*Castanea sativa*), a tree rich with cultural significance and a forest-type that is most likely to burn during the winter dormancy phase (Bajocco *et al.* 2011). The localities included in the fieldwork are situated in the municipalities of Ronco sopra Ascona, Locarno, Orselina, Muralto, Brione sopra Minusio and Minusio. These municipalities located on the upper slopes of the Locarnese region (as identified in red in Figure 3.9) are characterised by steep gradient, overlooking the city of Locarno and Lake Maggiore.

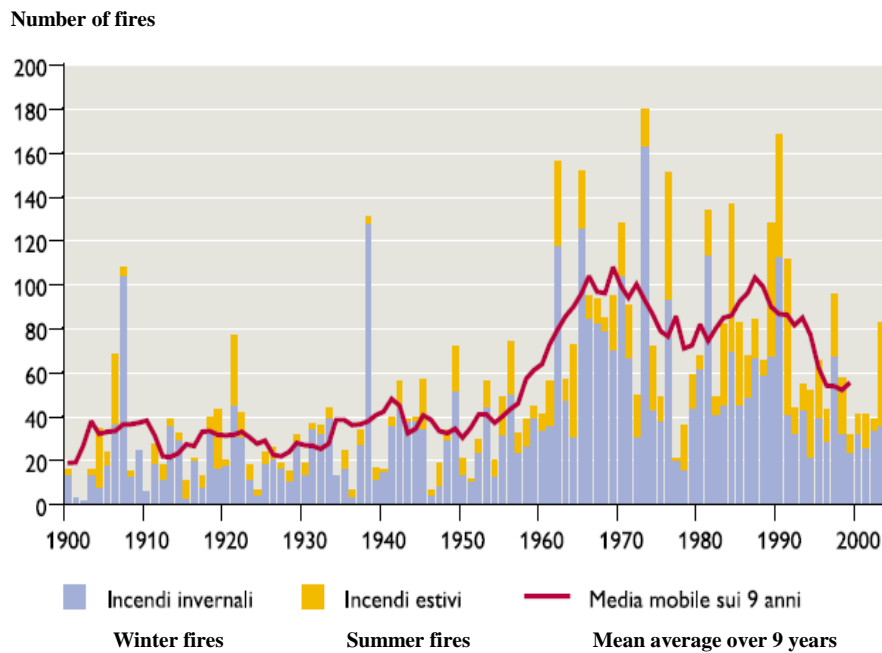
Figure 3.9: Locarnese region of Switzerland with research sites highlighted in red



Source: Search Switzerland (map.search.ch), viewed 04.03.2016

The management of wildfires has a long history in Canton Ticino, however official fire bans were only introduced in 1975 to try to reduce the occurrence of wildfires during extended dry periods (Conedera *et al.* 2005). The Ticinese cantonal decree of 21 October 1987, which was initially conceived to address air quality issues by abolishing agricultural burning, also served to considerably reduce wildfires in Ticino (Conedera and Pezzatti 2005). This downward trend in the average yearly occurrence of wildfires in Canton Ticino is shown in Figure 3.10.

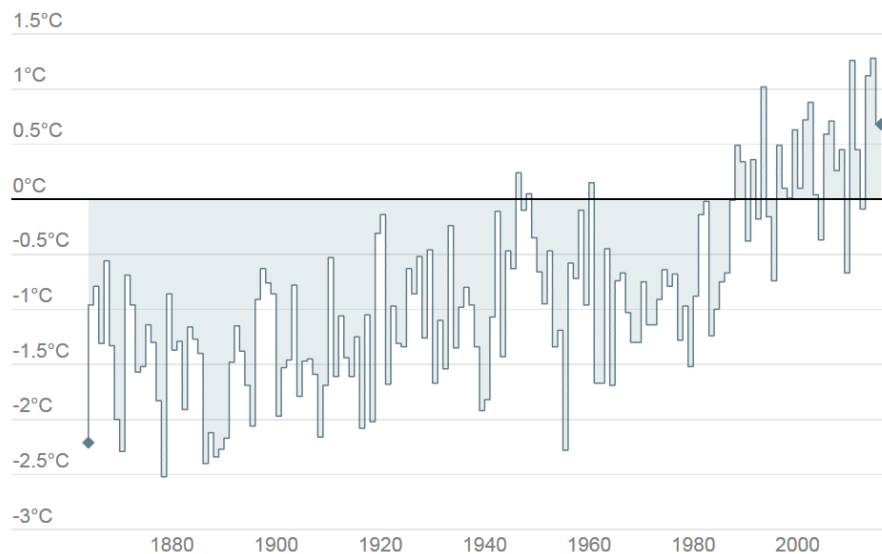
**Figure 3.10: Evolution of the annual frequency of wildfires for the winter and summer period in Canton Ticino, from 1900 to 2003.**



Source: Conedera and Pezzatti 2005, Gli incendi di bosco: cosa ci dice la statistica, *Dati*, vol.1, p.7, Bellinzona.

Although the occurrence of wildfires in Ticino has decreased in recent decades, temperature trends are moving upwards. On average between 1880 and 2005, the length of summer heat waves over Western Europe, including Switzerland, has doubled and the frequency of hot days in that time has almost tripled (Brönnimann *et al.* 2014). A significant variation from the standard average temperature trends in Switzerland before 1988 is evident in Figure 3.11, suggesting a warming trend since the 1950s.

**Figure 3.11: Average annual temperature in °C in Switzerland from 1864 until 2016, compared to the average temperature between 1981 and 2010 (represented by the horizontal line).**



Source: Nguyen 2017, Explore 150 years of global warming data in Switzerland, viewed 4 September 2012, <<https://www.swissinfo.ch>>

In Ticino, on the southern flank of the Alps, the increase in dry spells has become particularly clear since the 1970s (Reinhard *et al.* 2005; Rebetez 1999), which along with the overall trends in atmospheric warming in the Alpine region, is raising concerns that environmental conditions are becoming more favourable for dangerous wildfires (Rebetez 1999). Long-range climate forecasts indicate that in the future Canton Ticino is likely to continue to experience a rise in the number of hot days and the median temperatures across all seasons while summer precipitation is likely to decrease, and winter precipitation is expected to rise (Moser and Del Priore, 2013; MeteoSwiss 2012; Spinedi and Isotta, 2004). Importantly, as highlighted in the 2007 IPCC report (MeteoSwiss 2012), over the last thirty years temperatures in Canton Ticino have risen at a rate almost double the median global average during the same timeframe. On the topic of drought conditions and associated fire weather in Canton Ticino, Reinhard *et al.* (2005, p. 8) conclude:

‘Decision makers have to deal with more severe framework conditions than twenty of thirty years ago and should implement appropriate measures. Agroforestry will also need to rethink its role in reducing fuels within the forest boundaries’.

Switzerland has a long history of dealing with environmental risks, especially in relation to floods, landslides, debris flows, rockfalls, storms and avalanches (WSL 2017). Pfister (2009) describes a ‘risk culture’, to exemplify a society that has evolved to incorporate the risks associated with

environmental hazards within its cultural practices and spatial planning decisions. That risk culture has fed into rigorous spatial planning processes and has meant, for example, that Swiss Alpine villages have been located outside the path of avalanches, much in the same way as Dutch towns were built on dikes with flood events in mind. The Swiss national risk management approach focusses on an integrated approach to adaptation, mitigation and prevention of current and future environmental risks with the aim of achieving and maintaining targeted security levels (FOEN, 2016). This approach is illustrated schematically in Figure 3.12 where it shows the focus on reducing risks to acceptable levels, rather than trying to eliminate them. Environmental hazards are centrally documented, and their impacts tracked by the Federal Office for the Environment (FOEN) through the online ‘StorMe’ cadastre (see <https://www.bafu.admin.ch/>). As well as keeping a record of past events, Swiss Cantons are also mandated to compile hazard maps showing hypothetical natural events in terms of intensity and annual probability.

**Figure 3.12: The Swiss integrated risk management approach**

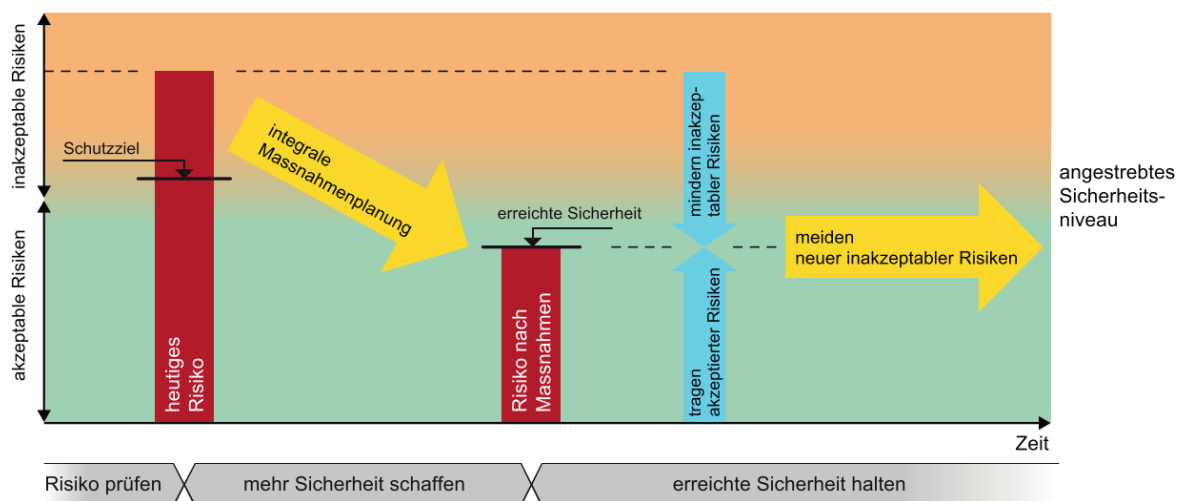


Abbildung 7: Vorgehen, um das angestrebte Sicherheitsniveau zu erreichen und zu halten.  
Quelle: PLANAT, 2013.

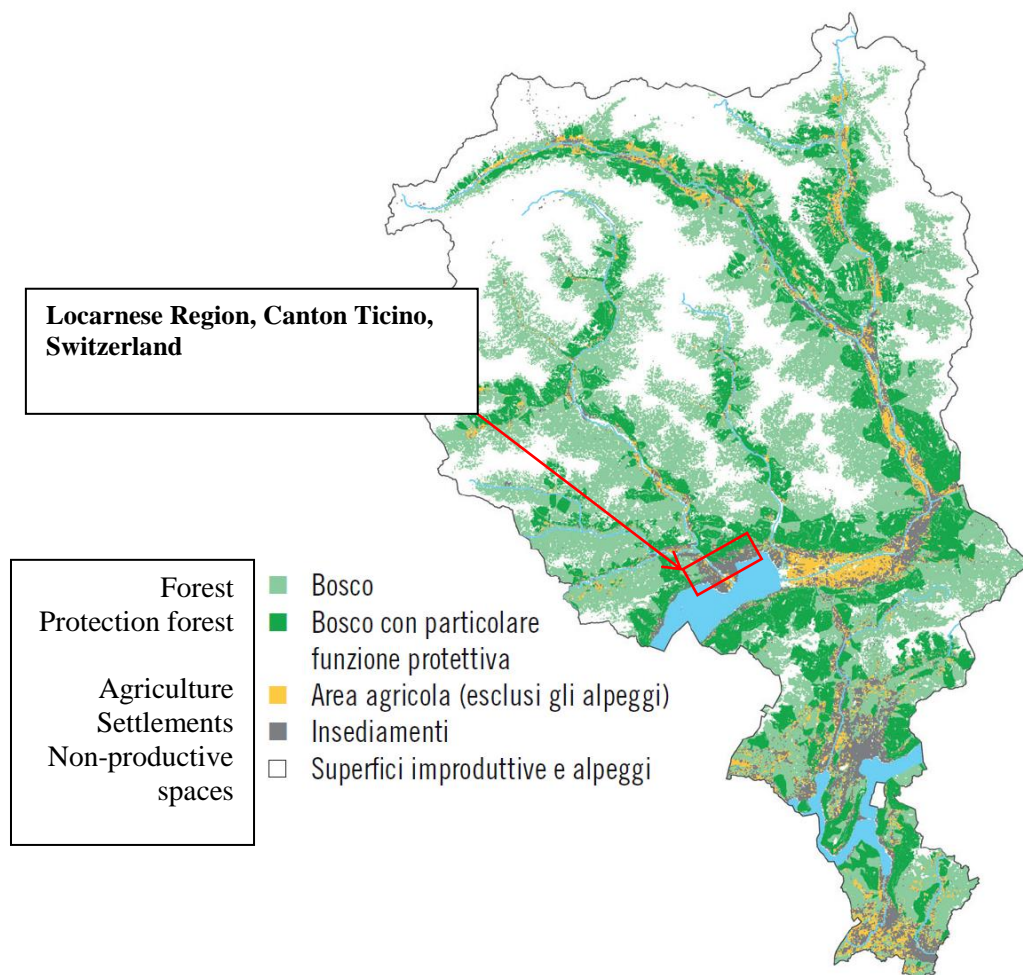
Source: FOEN, 2016, p.18

The forests of Canton Ticino were severely degraded by the mid-nineteenth century, primarily due to a history of unregulated forestry. In an endeavour to deal with landslides and flooding hazards, as early as 1876, the Swiss Federal Government introduced a ban on clearing which was extended across all forests (FOEN/WSL 2015). Over time, the stabilisation of forest stocks and a comprehensive re-forestation of denuded hillsides proved a successful measure in protecting settlements and other vital infrastructure from gravitational hazards and worked to reduce the severity of flooding events due to reduced runoff. In the 100 years to 1950, the proportion of forest cover in Ticino increased from 20 to 50 per cent (Bettelini 2007). Currently, 51 per cent of Canton Ticino is covered by forest



(Ufficio Cantonale di Statistica 2018). Figure 3.13 highlights the extent of the Ticinese forest classified as 'protective forest', with the specific designated function of shielding settlements and infrastructure from the impacts of landslides, rock falls and avalanches. As can be seen from the map, the area chosen for the Locarnese case study mostly includes protective forests on the periphery, and generally above the city of Locarno. Over time Ticino, as the Swiss Canton with the highest incidence of wildfires (Sezione Forestale 2008; Vega Orozco *et al.* 2012), has dealt with this environmental risk through policy measures and by increasing its fire-fighting capacity. As might be expected, as the forest has returned, the potential for dangerous wildfires has also increased.

**Figure 3.13: Protective forests in Canton Ticino for the category buildings**



Source: Ufficio di Statistica Cantonale, <[www.ti.ch/ustat](http://www.ti.ch/ustat)> , viewed 27.10.2016

Although soil-carbon measurements provide evidence of frequent wildfires in Canton Ticino throughout history (FOEN / WSL 2015), the official classification of the hazard, and the communication of a wildfire risk to the public, are only recent features in southern Switzerland. Wildfire danger ratings and associated bans were not widely communicated through the media until 1989, with wildfires only

added to the list of natural hazards in the Canton of Ticino in 1998 (Conedera *et al.* 2005). The combination of a forest that continues to expand (Price *et al.* 2015; Loran *et al.* 2017), an increasing incidence of dwellings in the peri-urban spaces around the larger cities of Locarno, Bellinzona and Chiasso (OST-TI 2014), and the associated loss of traditional buffers such as vineyards surrounding those built-up areas, has resulted in an increased potential for dangerous wildfires in Ticino.

From 1912 onwards, a series of decrees and organisational acts were established to address the issue of wildfires (Pezzatti *et al.* 2013). Landscape transformations experienced in the post WWII period in Ticino induced by a shift in agricultural practices and subsequent processes of re-afforestation and re-wilding (Conedera and Pezzatti 2005), are recognised for their role in shaping the peak fire period experienced in Ticino in the 1970s (USTAT 2013). These challenges were however successfully addressed through policy interventions, and the currently reduced impact and incidence of wildfires are the result of a concerted effort to prepare for and respond to the wildfire-risk, especially through as improved fire-fighting measures that have contributed to the reduction of the frequency and size of fires in Ticino. Now however, ongoing development and climate change impacts have the potential to jeopardise these achievements in wildfire risk reduction, and concern about the likely impact on drought and wildfires in Ticino continues to grow amongst the scientific community (Reinhard *et al.* 2005; FOEN / WSL 2015; PLANAT 2016).

Pfister (2009) argues Switzerland is only now fully re-discovering its traditional 'risk culture' that was lost in the modern era, and resulted in a century-long 'disaster-gap' from the late nineteenth to the 20<sup>th</sup> century, due to a combination of technological advancement and a preoccupation with military security. According to Pfister, during this high-modern era, Swiss authorities forgot about environmental risks, a situation that loosened planning regulations and led to settlements expanding into previously set aside 'risky' areas. As part of this new recognition of risks, the Swiss National Platform for Natural Hazards (PLANAT) published its first national risk-based strategy on natural hazards in 2014. That reform suggests a cultural shift in the risk management approach is being realised, with environmental hazards returning to play a central part in Swiss planning discourse (Camenzind and Loat 2014). This trend is echoed within the 2016 publication of Federal Office for the Environment (FOEN 2016), where it is emphasised that the focus of Swiss environmental risk management has shifted to become a comprehensive nation-wide approach. The updated risk management strategy entitled 'Reduction of risks from natural hazards' (PLANAT 2018) provides the implementation plan to achieve a national approach to risk reduction. That plan outlines a fully integrated risk management approach across all levels of government and sectors of the society with

climate change a pre-eminent consideration. This integrated approach to risk management endures that risk is considered explicitly by all sectors and is a bi-product of the Federal governance structure and of the direct democratic process. All level of governance are guided by citizen votes, which means that citizens are effectively governing the nation, and that their concerns about environmental hazards are reflected in policy.

An example of the nation-wide approach to civil protection is the national emergency alert system, managed by the federal office for civil protection, which spans a network of over 4000 sirens across all of Switzerland. As illustrated by Plate 3.1, the system that was updated and extended in 2015, is designed to alert the population of potential threats and hazards by means of a range of communication channels using software and hardware such as rooftop sirens (FOCP 2009).

**Plate 3.1: Emergency alert system across the nation, Swiss Polyalert sirens on house rooftop**

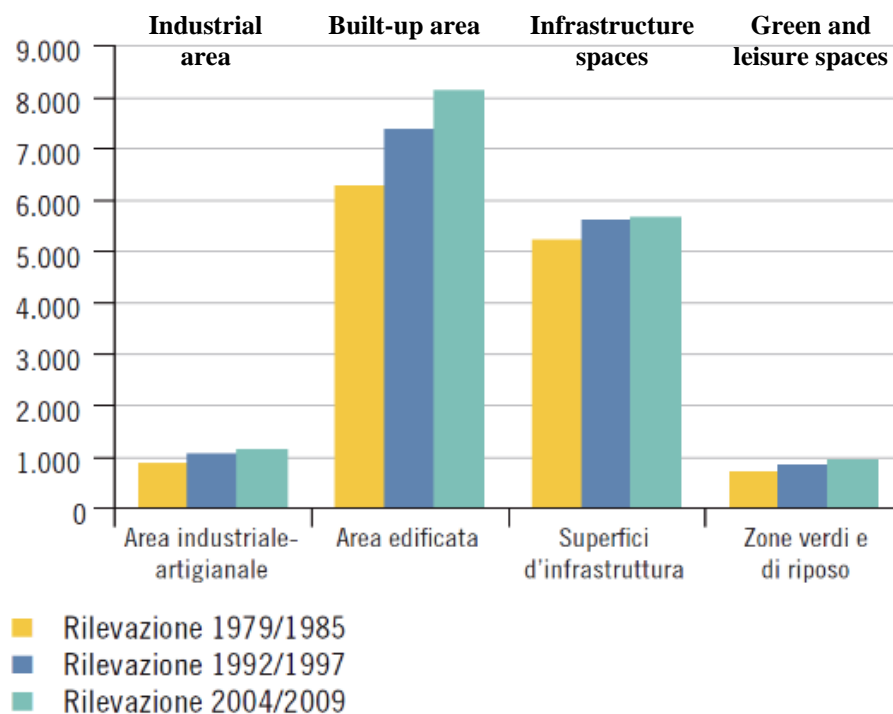


Source: Fotogonnella, Corriere del Ticino, 23 May 2018, viewed 26.7.2018

The planning framework in Ticino since WWII has been described as ‘generous’ about making land available for housing development and has resulted in urban sprawl or ‘*urbanizzazione diffusa*’ (USTAT 2013). Partly as a result, From the 1970s urban centres in Canton Ticino experienced increased population growth rates and started to spread into the peri-urban sphere that had largely been used for agriculture (OST-TI 2014). The gradual exhaustion of residential-type land available on the valley floor, and the increasing trend to develop hillsides to capitalise on premium real estate values associated with a view, has changed the layout of the traditional high-density urban agglomerations that had originated as Middle Age trading centres. This new process of urbanisation has continued

with an acceleration in population growth rates in Ticino (Torricelli and Garlandini 2013), and is leading to an increasing development on the plains and further up hillsides, as the residential land reserve on valley floors is gradually being exhausted (OST-TI 2014). As shown by Figure 3.14, across the Ticinese territory the built-up area (*Area edificata*), has experienced the most rapid growth. The other land-use types including industrial areas (*Area industriale-artigianale*), green spaces (*Zone verdi e di riposo*) and infrastructure spaces (*Superfici d'infrastruttura*), have grown at a slower rate. At the same time, the slopes and the uplands have become increasingly covered by managed forest.

**Figure 3.14: Land-use types in Ticino (measured in hectares), between 1979 and 2009**



Source: USTAT 2013, p.7.

### 3.3.2 Governance and planning

The modern Federal state of Switzerland was born in 1848. In contrast to the SA case, where planning governance is concentrated at the state level, the responsibility for the legislative framework of Swiss spatial planning was conferred to the Federal level of government in 1969 (Muggli 2013). The Swiss federal system entails three governance levels: Federal, Cantonal and Municipal. The spatial planning system in Switzerland is strongly shaped by the political structure and involves municipalities holding a large part of the planning responsibilities (Grams and Nebel 2013). The provision of the legislative planning framework is generated at the Federal level, while the implementation of the planning guidelines is under the authority of the Cantonal and Municipal administrations. The Federal law on

spatial planning provides the all-important guiding principle of parsimonious/ economical use of the limited land resource, which permeates all aspects of planning at all governance levels in Switzerland, and the overall strategic framework is provided by the 'Swiss Planning Policy Guidelines' (Muggli 2013). In practical terms, while the responsibility for transport infrastructure, economic policy and environmental protection fall to the Federal level of government, land use planning and nature and habitat conservation are mostly guided by the cantonal governments (Muggli 2013). A need for a particularly robust Federal planning system exists within a context of 26 Cantons and over 2000 municipalities, especially as citizens have substantial reach into the political system through direct democratic channels. Key spatial planning tools and procedures include cantonal structural plans and municipal land use plans (Grams and Nebel, 2013). Within the framework provided by the National Legislation for Spatial Planning of 1979, cantonal structural plans operate with guidance from the Federal level but with significant autonomy for cantonal-level planning and building regulations (Lendi 2012).

The Swiss Confederation reserves its right to regulate key areas defined by the constitution, such as the principle of separation of building zones and non-building zones, as well as maintaining an oversight of cantonal arrangements by approving structural plans (Muggli 2013). Cantonal structural plans are of a strategic nature and defined as 'a process plan for coordinating and steering the next stages of spatial development already under way' (Muggli 2013, p.6). Cooperative federalism is embodied through the cooperation on planning matters between the Confederation and the Cantons (Muggli 2013). This joint governance responsibility results in a wide range of interpretation of the Federal spatial planning law and in a plethora of different applications across the Cantons (Muggli 2013), which in turn has resulted in calls for nation-wide guidelines and a simplification of the process. Through a principle of municipal federalism, local authorities (Communes) in Switzerland are granted wide-ranging powers in relation to decisions regarding local land use, and are charged with the creation of land use plans (Muggli 2013), and in most cases, the issuing of building permits. In direct contrast to Australia, municipal authorities in Switzerland enjoy significant autonomy and have relative wealth, as they have the capacity to raise local tax revenues to generate a competitive federalism. In effect, different local jurisdictions compete to attract industry and increase fiscal revenue through company taxes. Above the similar type of council rates to those collected by Local Governments in Australia, Swiss municipalities can therefore levy a supplement on Cantonal direct income taxes and collect their own property taxes (Adamovich and Hosp 2003). All of these key policies have been taken to the people and supported through referenda/plebiscites.

Despite voting being one of the key channels of the direct democratic process, casting one's vote is not compulsory in Switzerland, and participation rates for the decade 2001-2011 stand close to the fifty percent mark, with an average 46.5 percent voter participation at Federal level (Federal Statistical Office 2017), and 44.8 percent at Cantonal Ticinese level (USTAT 2017). It is however essential to note that the topics put before the population during a vote in Switzerland are often abstract and theoretical, rather than of a practical nature that may have direct spatial outcomes. As such, the items voted on are generally legislative frameworks and planning principles that subsequently require a lengthy implementation period and application through the cantonal and municipal governance channels (Auer *et al.* 2012). At a Federal level, the important 2012 planning initiative called 'Stop the unrestrained building of secondary homes' (Swiss Federal Chancellery 2016; Price *et al.* 2015) for example, was successfully accepted, with considerable nation-wide spatial repercussions. One direct outcome of this initiative was the introduction of a 20 percent cap on the secondary housing stock across all Swiss municipalities. Such a law will significantly impact on land use practices over long time-frames, especially in tourist regions, but may not have any apparent impact in the short-term across the landscape.

Table 3.1 provides an overview of recent Ticinese cantonal votes where spatial planning issues were decided. Initiatives and referenda are key instruments of the Swiss democratic process, and while Initiatives have the purpose of changing a law or the constitution by direction of the people, a referendum gives citizens direct power, by means of a vote at the ballot box, to have the final word on certain parliamentary decisions. In 2014 for example, two issues of intergenerational equity, the protection levels for natural and cultural local heritage were brought to the vote through popular initiatives. Another example of a successful intervention by the Ticinese population on a spatial planning issue was the 2007 referendum vote against a parliamentary decision to build a freeway across the Magadino plain in northern Ticino. As will be discussed later, part of the challenge of the deliberative process is to sufficiently reflect the will of the people in local planning decisions.

**Table 3.1: Popular Initiatives and Referenda on issues of planning at cantonal level (*Repubblica e Cantone Ticino*) between 2005 and 2015**

Year	Initiatives	Referanda	Outcome
2014	Spazi verdi per i nostri figli   Green spaces for our children		Successful
	Un futuro per il nostro passato: per un'efficace protezione del patrimonio culturale del territorio ticinese   A future for our past: for an effective protection of the cultural heritage of the ticinese territory.		Successful
2012		Autostrada in città? No grazie!   Freeway in the city? No thanks!	Successful
	Circonvallazione del Basso Malcantone tutta in galleria: che sia il popolo a scegliere!   Malcantone ring road all in a tunnel: may the people decide!		Successful
	Avanti con le nuove città di Locarno e Bellinzona   Forward with the new cities of Locarno and Bellinzona.		Successful
2007		Via la superstrada dal Piano   Away with the freeway from the Piano	Successful

Source: Swiss Federal Chancellery, accessed, 21 May 2016, <<http://www4.ti.ch/generale/dirittipolitici/iniziativa-e-referendum/archivio-iniziativa-dal-2003/iniziativa-2006/>>.

The social, spatial and political contexts shape the Swiss planning approach, and the current planning system is seen as the answer to the specific spatial context and the problems and opportunities it entails (Lendi 2012). One of the core principles of the Swiss Planning Act is the strict separation of the territory in land for building and non-building (Lendi 2012). In recent years, there has been a growing acceptance that Municipalities and Cantons have enjoyed too much freedom in decision-making regarding spatial planning due to a lack of strict guidelines in the Planning Act for Cantonal structure plans and for Municipal land use plans (Lendi 2012). This fluidity is now recognised as having provided Cantons too much scope for individual interpretation, resulting in an unsustainable rate of land consumption. Federal Swiss planning reforms are now characterised by a strong sense of urgency in relation to the greater preservation of non-urbanised land (Lendi 2012). The perceived unsustainable use of the land resource has resulted in an overhaul of the Spatial Planning Act and in the reform of current spatial practices with the development of a nation-wide, multi-level strategic spatial plan for Switzerland in 2013. Land scarcity and population pressures have, therefore, contributed to a shift in perceptions and have created the need for the Swiss Federal planning blueprint (Raumordnung Schweiz | Spatial Concept Switzerland 2012).

### **3.4 Conclusion**

This chapter provides the geophysical and planning contexts for the two study sites in SA and Ticino. Geography, climate, and key environmental risk management issues were presented, and the relevance of governance and planning systems were also introduced. Importantly, both study sites are located on the peri-urban fringe where suburban-type developments are increasingly encroaching on predominantly forested areas. Both research sites include high environmental and amenity values, as well as considerable risk, due to the potential impact of natural hazards on the population and infrastructure. Importantly however, they differ considerably in the approaches undertaken to plan the landscape to accommodate or mitigate the risks of environmental hazards based on the involvement of the community directly in decision-making. It is this particular distinction that focuses the research undertaken in the two sites. The empirical research for this thesis aims to examine how participatory processes in separate representative and deliberative democratic settings could better guide spatial planning decisions for high environmental risk. The social science research methodology, involving the contrasting of SA and Ticino as two case study settings, is described in the following chapter.



## **CHAPTER 4**

### **RESEARCH METHODOLOGY**

#### **4.1 Introduction**

This chapter describes the methodology used to collect and analyse the empirical data gathered in Australia and in Switzerland to fulfil the research objectives. It outlines the merits of using a cross-cultural, cross-national mixed method research approach and emphasises the importance of the socio-cultural context for social science research. This chapter also explains how the two case studies fulfil different purposes and are not meant to be directly comparable with each other. As such, the Swiss case study is treated as a learning exercise providing data to parallel the Australian survey results. In the first part of this chapter, characteristics of both the case study samples are described together. Subsequently, the Australian and the Swiss case studies are considered separately to highlight issues that are methodologically specific to each context.

#### **4.2 Quantitative and qualitative research methodologies**

A mix of both qualitative and quantitative data collection can provide an optimal path to achieve a broad coverage of the chosen topics, as well as allowing for a detailed insight into respondents' perceptions of ecological values and risks of hazards (Johnson and Onwuegbuzie 2004; Walter 2006; Matthews and Ross 2010; Eriksen *et al.* 2011; Bryman 2012). In this study, the research sets out to examine the merits of increased participation of citizens in the spatial planning decision-making process in Australia. A mixed methods approach was selected based on the specificities of the research questions, and to fulfil the research objectives of understanding local residents' perceptions of risk and their relationship with planning processes. The cross-national research approach was identified as a method suitable to gain a contrasting perspective between two national contexts. Cross-national research is defined as performing a unique and key function:

'[...] to observe social phenomena across nations, to develop robust explanations of similarities or differences, and to attempt to assess their consequences, whether it be for the purposes of testing theories, drawing lessons about best practice or, more straightforwardly, gaining a better understanding of how social processes operate' (Hantrais 1999, p.93).

The cross-cultural, cross-national comparative case-study research methodology was used in this study to contrast spatial planning approaches for high environmental risk in the two western representative democracies of Australia and Switzerland. This method was also used to help investigate how similar environmental hazard and ecological value situations are interpreted and managed by residents within different national/cultural settings (Hantrais 1999; Mangen 1999; Broadfoot 2000; Esping-Andersen and Przeworski 2015). Switzerland presents a context where over a period of many centuries, the high-risk natural hazard environment has shaped the national identity and the country's institutions. In contrast, Australia's processes of risk mitigation are more recently learned within the modern era – in many ways that temporal difference influences the contrasting depth of management of risk in the two countries.

The study examines the relationships between social change, residents' perceptions of ecological value and risk, in the dynamic context of the peri-urban fringe within the two countries. The chosen comparative research method involved the use of almost identical research and analytical tools in each of the two separate case studies, and the subsequent analysis and contrasting of the results allowed for a broader perspective on the identified social phenomena (Øyen 1990; Hantrais 1996; Bryman 2012). As introduced previously, the rationale behind the empirical data collection is guided by the conceptual bases of the Risk Society theory (Beck 1986) and by Giddens' (1991) perspective on the influences of personal, reflexive value sets on individual's decisions making. Theoretical discourses explaining and countering public apathy, and those responsible for identifying a contraction of the public sphere in a modern democratic setting, were also instrumental in guiding the primary data gathering tools (Habermas 1984; Healey 1997; Dryzek 1990; Allmendinger 2009). In this thesis, peri-urban residents' perceptions of environmental values, linked to the natural forest environment, are examined in conjunction with their attitudes to bushfire risk and their engagement in local planning. Those broader aims framed the questions developed for the householder surveys.

Gathering data on socio-ecological phenomena in the context of their institutional and socio-cultural information is seen as a crucial pre-condition for geographical research that spans different national contexts (Hantrais 1999). For this reason, the research path for this study included drawing from an extensive and heterogeneous range of documents and sources, including government websites and reports, on topics of spatial planning and risk in Australia, Switzerland and internationally. This secondary data research, carried out in combination with the survey of residents in high-environmental risk areas that generated the quantitative primary data, contributed to the fulfilment of the research objectives. In addition, qualitative data was collected in the form of secondary

background data. An ongoing scrutiny of academic literature, websites and media sources in Australia, Switzerland and internationally on issues of risk, environmental hazard, and spatial planning, was also undertaken and utilised to reference and validate the survey results. Qualitative elements were also occasionally drawn from direct observation, the author's personal experience as a Swiss/Australian national and from stakeholder interviews with local risk managers, researchers, politicians and rangers.

The timing, the situation and the wording of culturally specific concepts, are crucial elements of all successful research in human geography (Matthews and Ross 2014). However, as seen in Hantrais (1999), comprehensive knowledge of the socio-ecological context is an indispensable precondition when conducting effective cross-cultural research. As a native of both regions, living in both Switzerland and Australia for close to half of her life, the author found researching the topic of planning for areas of high environmental risk in Australia sparked curiosity for how similar issues are approached in Switzerland. Switzerland, being the place of the author's upbringing, as well as being a place known for extreme natural hazards and sophisticated management approaches.

### **4.3 Gathering empirical evidence**

This section explains the sampling procedures undertaken for the data collection phase of the project. The first part looks at general procedures linked to selecting the sample, designing questionnaires for the household surveys and how they were undertaken. The specific details of each of the two case studies are then outlined, including particulars of each settlement location as well as information relating to the specific sampling and survey administration and procedures for each of the two places. Response rates and demographic profiling of the samples are also presented here.

#### **4.3.1 Selecting the samples**

In both Australia and Switzerland, respondents were selected using a purposive sampling approach, with individual households identified and chosen because of the location of their property in close proximity to an area of both high natural significance and high environmental risk (Matthews and Ross 2014; Etikan *et al.* 2016). People are known to respond to surveys when they feel that the rewards outweigh the cost of completing them (PRASSD 2013). Specifically, the survey targeted spatially distinct dwellings in a specified radius within the urban settlement's perimeter, close to the targeted natural vegetated space in a high environmental risk context – Sturt Gorge Recreation Park in SA and the Locarnese forest in Switzerland. As the survey topic on forest risks, values and management was

of likely interest to householders who are in close proximity to the forest, this method of targeting residents was chosen to maximise response rates.

#### **4.3.2 Pilot interviews and questionnaire design**

In both countries, the surveys were conducted at the end of summer: for Australia in February-March 2015, and for Switzerland in October-December 2015. The questionnaire for the Swiss survey was not directly translated from the original Australian one (Dillman 2014). Instead, to consider and address cross-national aspects such as situational and cultural specificities relating to the Swiss site, the Australian questionnaire was used as a guide to produce the Swiss questionnaire. In other words, although there are a number of common elements in both questionnaires, each was designed with some distinctly different elements of its own, that suited the different context of the research sites. For example, greater detail was obtained on the relationship between residents and the bushfire risk from the conservation estate during the Australian survey. However, the Swiss survey focussed on environmental hazards more broadly, because the risk of wildfire in the Locarnese region is not as acute as it is in the Mitcham and Onkaparinga Hills. In addition, the forests in the peri-urban spaces of the Locarnese region are managed to perform a multitude of risk mitigation functions, including a vital role of consolidating the steep slopes. This difference in the key roles of the two forested areas needed to be considered when asking respondents to assess elements of environmental risk so that the questionnaires were designed to reflect the inherent characteristics of each place.

This research project is linked loosely to a wider Australian Research Council (ARC) Linkage Funded Project that formally concluded in 2017, entitled '*Bushfires and Biodiversity: Optimising conservation outcomes in peri-urban areas at risk*' situated at the University of Adelaide with partners from The University of South Australia (UniSA) and the SA Government. That research began the process of critically examining social elements confronting decision-makers interested in planning and practice for both bushfire and biodiversity management (Bardsley *et al.* 2015). The focus of the broader ARC study was on issues within SA, where it examined the relationships between forms of settlement and vegetation types and the associated bushfire risk; homeowner place values in relation to bushfire risk; climate change, vulnerability and mitigation behaviour, and communicative practices (Bardsley *et al.* 2018; Moskwa *et al.* 2018). The Australian Householder Survey questionnaire used in this research, was partly adapted from, and aligned with, the ARC project survey entitled '*What do you think about bushfire risk and vegetation management in SA?*', carried out in South Australia in 2014. This PhD project needed to offer a degree of compatibility between this earlier and larger ARC survey, while also focussing upon the roles of risk and value perceptions and their association with deliberative

planning outcomes. The methodologies utilised here were designed to develop upon that earlier work, to more specifically examine the implications of widespread usage of participatory approaches in planning outcomes in relation to risk (fire) and safety benefits for the resident population. The Swiss study undertaken for this thesis in Ticino on risk perceptions and deliberative approaches to spatial planning in sustained environmental risk also partly represents one of the international research components undertaken in the ARC project.

For this research, some pilot interviews were conducted in the early stages of the project in both Australia and Switzerland. The interviews were semi-structured and discussion-based, and organised around a set of approximately ten open-ended questions designed to seek attitudes and opinions on management strategies and planning approaches. The information collected in the pilot interviews helped in the identification of key issues and guided the selection of suitable locations for the surveys, as well as framing the questionnaire. The interviews were recorded, transcribed and used as a learning tool to support the comparative approach of this research project. The interviewees comprised community leaders, academics and specialists in the fields of peri-urban planning and risk management. Excerpts from these interviews were used at times to support or highlight elements of the results and discussion.

The Australian and the Swiss householder questionnaires were designed to investigate three aspects of residential respondents' perceptions of their place and the associated planning systems: 1) Respondents' perceptions of local forest values; 2) Respondents perceptions of natural hazard risks; and 3) Respondents understanding and relationships to the land-use planning system. The questionnaires (see Appendix 2 and Appendix 3), included a series of approximately 50 questions about their:

- home (length of residence, previous place of residence, factors influential in the choice of location and on possible relocation, location in relation to forest and green spaces);
- location (most and least appreciated aspects, attachment levels);
- perceptions of forest values and biodiversity management;
- perceptions of environmental risk factors and risk management;
- actions and behaviour to prepare for environmental hazards;
- actions and behaviour to help to manage values and protect the environment;
- perceptions of the efficacy of agencies responsible for fire-fighting;
- opinions about and knowledge of the spatial planning system;

- engagement levels with spatial planning decisions (perceptions); and
- demographic data of respondents (gender, age, household composition, nationality, place of birth, employment, education and income).

The householder surveys contained simple nominal binary (yes, no) questions with opportunities to select a 'don't know' option, Likert-scale type questions (on a 1-5 scale), and also open-ended questions that allowed respondents to provide greater detail on important topics.

#### **4.3.3 Undertaking the surveys**

Surveys were either hand-posted in Australia or posted through the formal postal system in Switzerland. The reasons for the slightly different method used for survey distribution are outlined in detail below. Respondents had the choice of answering the questionnaire in paper-format or online. The survey was delivered with a participant information letter (Appendix 4; Appendix 5), which specified that participants needed to be 18 years of age or over, and residing at the given address. Apart from these more general conditions, further specific information on how the surveys were administered are described in the following sections.

#### **4.4 Methodological specificities of the Australian case study**

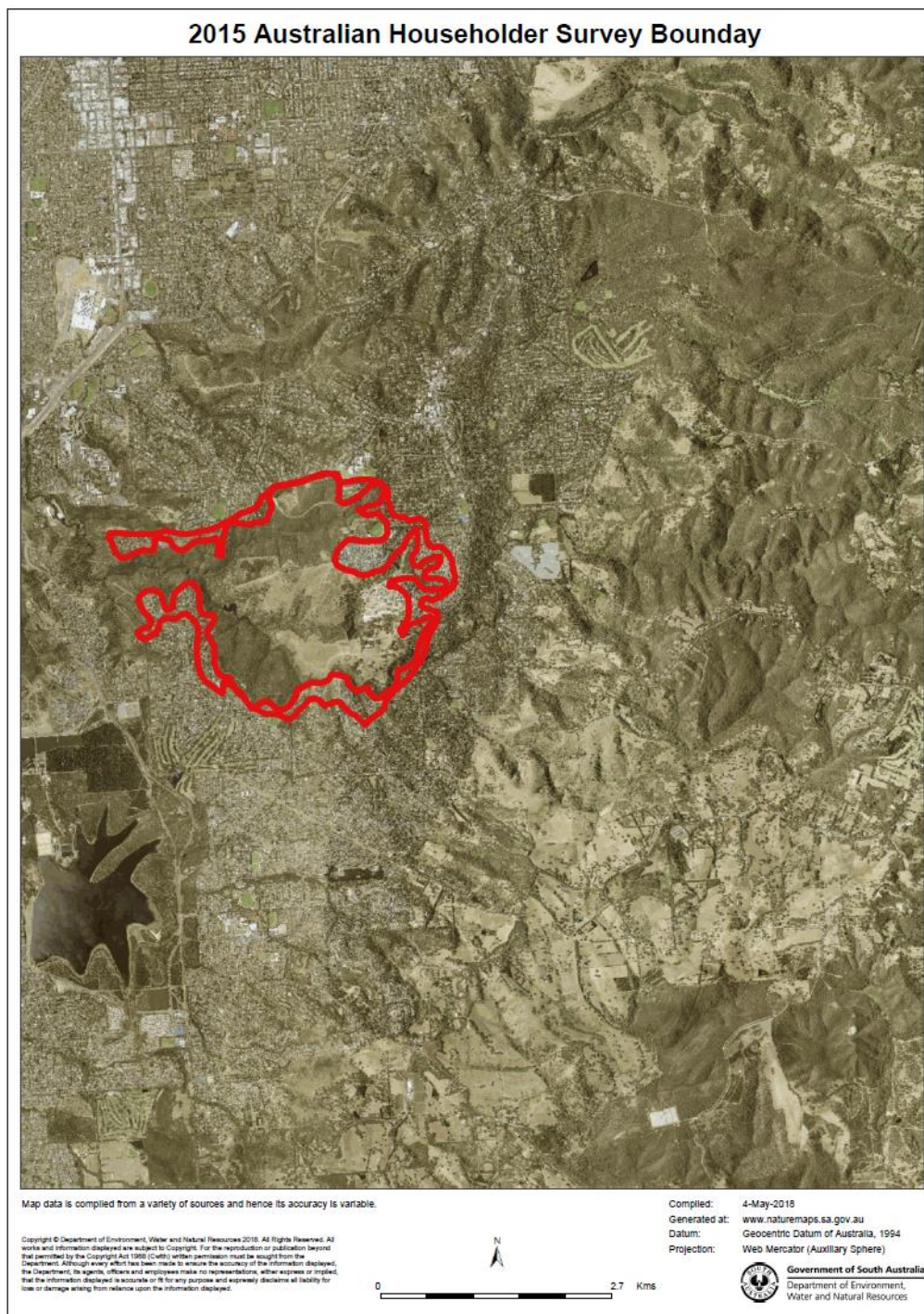
The 2015 Australian survey was entitled '*Lifestyle, conservation and fire risk in the Adelaide Hills*' and is referred to throughout this thesis as the Australian Householder Survey. Households were identified purposefully, according to their geographical location in relation to the Sturt Gorge Recreation Park, introduced earlier in Chapter Three. The fire rating for the surveyed locations ranges between medium and high bushfire risk, as in all cases the residences were located near highly flammable vegetation (Mitcham Council 2015). The method chosen to select the population sample was to target spatially distinct dwellings within a specified radius of the settlement's perimeter in relation to the natural vegetated space, within the selected urban development or suburb. Maps were obtained of the suburban streets surrounding Sturt Gorge Recreation Park, and surveys were hand-delivered to all residences within two house-blocks of the upper section of the Park. Some dwellings were directly in contact with vegetated areas included in the Park or contiguous to other remnant vegetation in association with the Park, or a further house-block distanced from that vegetation.

The Australian Householder Survey was hand-delivered to 700 households in the Mitcham and Onkaparinga Hills areas situated on the edge of Sturt Gorge Recreation Park between February 28 and

March 5, 2015 (Appendix 2). The term 'Adelaide Hills' was used in the questionnaire to refer to the local environment, as this is the general name used by locals for the Mount Lofty Ranges within the chosen survey area. Sturt Gorge Recreation Park lies across parts of both Mitcham and Onkaparinga council areas. A mixed-mode survey design allowed participants to answer the questions either on paper or electronically through Survey Monkey, and participants were given an initial 4-week timeframe to complete the survey. Each Australian questionnaire was individually coded, and the survey package included an information/introduction letter and a pre-stamped return envelope. The code served as an access key to the online completion option for those who chose to complete the survey electronically, and was also linked anonymously to the recipient's street address at the point of delivery. This method allowed the mailing of a reminder postcard to be sent out on March 24, 2015 to households that had not already returned a completed survey approximately three weeks after the initial hand-delivery. This reminder postcard also informed households of an extension of the survey duration from the original closing date of March 31 to a new date of April 10, 2015.

The survey was delivered to a group of 700 households located in both older established suburban settlements and more recent developments (see Figure 4.1). With only a limited research budget, hand-delivery was chosen as a distribution method over postal mailing to avoid the high cost associated with postage, while enabling the specific method of choosing households within a two-block radius of the Park. Completed questionnaires were returned by pre-paid envelope. Figure 4.1 shows an approximate of the Australian Householder Survey Boundary (in a red line). The residential areas located close to vegetated areas in the Park which are not included in the sample, consist of residential spaces that were still under construction in 2015.

Figure 4.1: Australian Householder Survey Boundary (2015)



Source: author, through the SA Government mapping portal ([www.naturemaps.sa.gov.au](http://www.naturemaps.sa.gov.au)), 2018.

Table 4.1 shows the overall response rates for the targeted suburbs located on the perimeter of Sturt Gorge Recreation Park. The lowest response rates appear to have been generated from the older suburbs of Blackwood and Eden Hills, whereas Bellevue Heights, Coromandel Valley had the highest response rates, both exceeding one quarter of returns. Those latter suburbs as well as Flagstaff Hill are adjacent to the areas of steep topography within the Park, and that may have influenced people's



attitudes to bushfire risk, and consequently their interest in the survey. As shown earlier in Chapter Three, the suburbs of Bellevue Heights and Eden Hills are located on the northern side of the gorge, while Coromandel Valley and Flagstaff Hill are situated on the southern side. The suburbs of Blackwood and Craighburn Farm on the other hand, are located at the head of the gorge, mostly on the eastern side of the Park. Total response rates for the Australian Householder Survey are presented in detail in a later section.

**Table 4.1: Australian Householder Survey response rate by suburb**

<b>Suburb</b>	<b>Surveys Sent</b>	<b>Survey Returns</b>	<b>% Response rate by suburb</b>
Bellevue Heights	112	29	25.9
Eden Hills	34	5	14.7
Blackwood	75	9	12.0
Craighburn Farm	209	37	17.7
Coromandel Valley	23	6	26.0
Flagstaff Hill	247	54	21.9

*Source:* Australian Householder Survey, Feb-March 2015

#### 4.5 Methodological specificities of the Swiss case study

The 2015 Swiss Householder Survey was entitled “*Stile di vita, pericoli naturali e tutela dell’ambiente nel Locarnese*” (Lifestyle, natural hazards and conservation in the Locarnese region) (Appendix 3). Figure 4.2 locates the Swiss research site on the southern side of the Alpine range in northern Ticino. The map also shows the mountainous terrain surrounding the research site in southern Switzerland.

**Figure 4.2: Survey site of Swiss Householder Survey, Locarnese Region, Canton Ticino, Switzerland.**



Source: author, through Map Search Switzerland ([map.search.ch](http://map.search.ch)), viewed 04.04.2017

Peri-urban households for the Swiss Householder Survey were identified purposively with individual households chosen because of the location of the property adjacent to a forested area classified under the Swiss Forestry Law as ‘Protection Forest’. Spatial selection criteria parameters included:

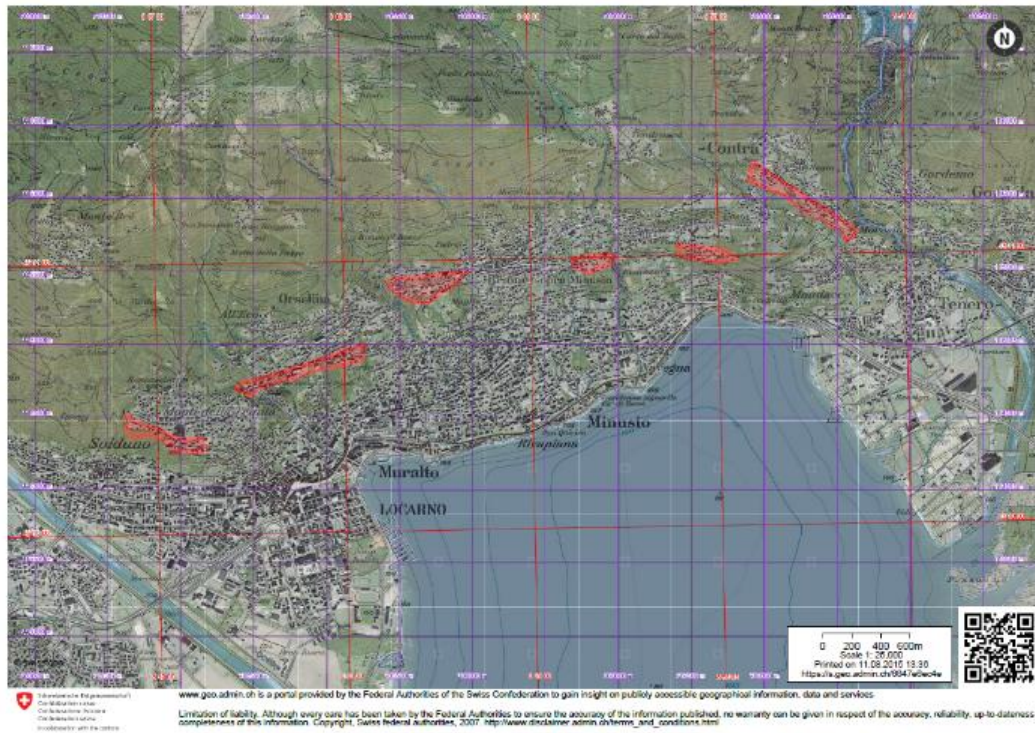
- 1) proximity to the naturally vegetated areas and nationally protected forest and;

2) exposure to geophysical hazards linked to gradient on the upper slopes of the Locarnese region.

Households included within the village cores or '*nuclei*', of the six municipalities were excluded from the sample due to a lower environmental hazard risk level for those locations. Furthermore, households were identified by consulting the Ticinese cantonal environmental hazard inventory (StorMe) and municipal hazard map 'Piani zone di pericolo' (municipal natural hazard plans) (<<https://www4.ti.ch/dt/da/sf/temi/pericoli-naturali/tema/tema/>>), in order to identify households located in areas that had previously been impacted by natural hazards such as forest fires, landslides and rock falls. The households targeted by the survey were identified through a filtering process by using the mapping tools of the Swiss federal mapping portal ([www.geo.admin.ch](http://www.geo.admin.ch)), and Search ([map.serch.ch](http://map.serch.ch)). These visual mapping tools enabled the researcher to pinpoint the addresses of the individual dwellings at street level and within the chosen parameters that met all of the above criteria.

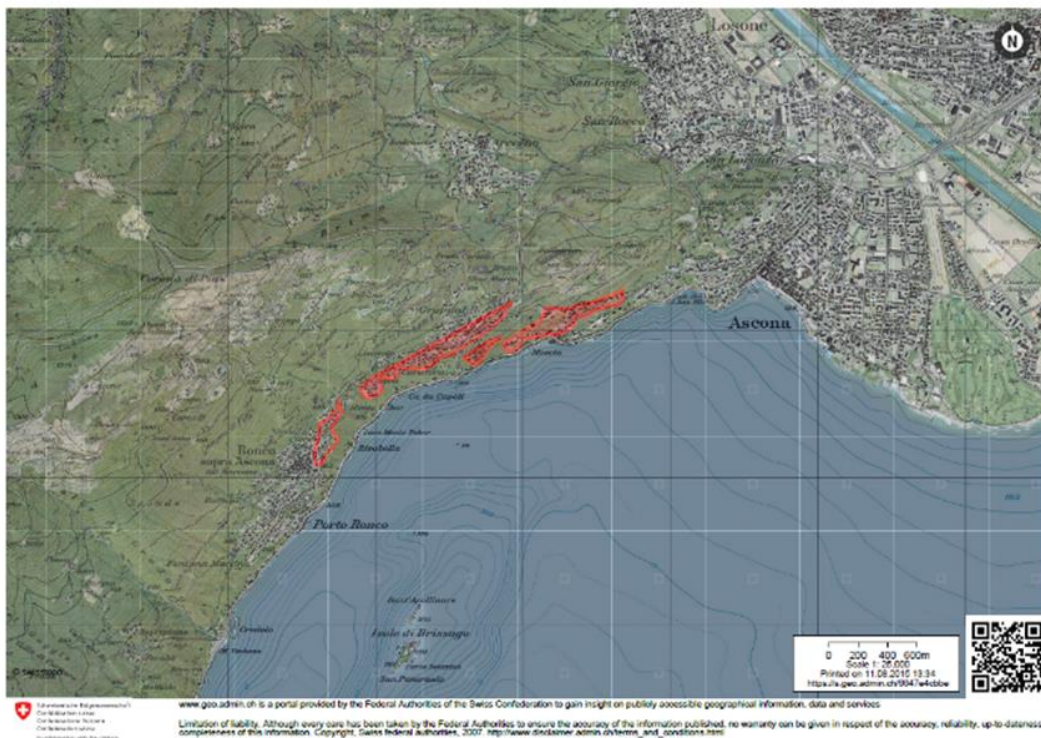
A total of 20,000 addresses were obtained from the Ticinese cantonal population authority, covering all residents in the six municipal areas of interest to the study. The confidential address file also included the details of non-resident homeowners. A decision to filter the addresses and focus on permanent residents was made with the cantonal statistical officer and based on the knowledge that many of the non-resident homeowners live elsewhere in Switzerland or abroad. The Swiss dataset that was used listed the addresses of residents by a 'head of household' criteria, and in most cases, this resulted in the adult male household member being identified as the household representative. In an attempt to balance that potential gender bias within the survey process, in cases where multiple residents appeared under the same address (multi-generational households or co-habitation), or where two individuals (one male and one female) were listed as heads of household for an address entry, the female addressee was selected each time. Even though this attempt was made to counter the potential bias towards male participants in the Swiss Householder Survey selected from the Swiss residential listing, as will be discussed below, there was still a bias towards male respondents in the resulting sample (see Table 4.3). Figures 4.3 and 4.4 show the approximate location of the surveyed households on the forested slopes of the Locarnese region.

**Figure 4.3: Swiss Householder Survey Boundary (2015) within the municipalities of Locarno, Orselina, Muralto, Minusio, Brione sopra Minusio and Minusio (Part 1)**



Source: author, through Swiss Federal mapping portal ([www.geo.admin.ch](http://www.geo.admin.ch)), 11.8.2015.

**Figure 4.4: Swiss Householder Survey Boundary (2015) within the municipality of Ronco sopra Ascona (Part 2)**



Source: author, through Swiss Federal mapping portal ([www.geo.admin.ch](http://www.geo.admin.ch)), 11.8.2015.

The Swiss Householder Survey was adapted from the Australian Householder Survey conducted previously at the start of 2015. Direct equivalence with the Australian survey was not the aim of the Swiss survey, with the Ticinese questionnaire designed to suit the local environmental risk typologies and cultural context. This was undertaken with the assistance of the Swiss authority on wildfires in Ticino, Dr Marco Conedera, from the Institute for Forest, Snow and Landscape Research (WSL) in Cadenazzo. To optimise coverage in this multi-lingual context, a mixed-mode multi-language survey mode was selected. Italian was the chosen language for the paper questionnaire mailed to residents. The online version of the questionnaire was initially offered in English only. The paper survey presented to householders was specifically designed to include an access key to an electronic completion option in English. A need for a third option in German emerged from direct respondent feedback to the researcher by phone. Consequently, an additional German version of the online questionnaire was produced, and an access key to this further online completion mode distributed with a reminder postcard four weeks after the initial mail out. With two additional language options, it was possible to overcome the linguistic barrier that had become apparent and help residents with limited knowledge of Italian to participate in the survey. This was particularly important in the context of the Ticinese study because many respondents did not originate in the Canton and therefore did not have Italian as their primary language.

The decision to filter the data based on residency status and age (aged 18 and above), also assured that both homeowners and renting tenants were included in the dataset. Distribution logistics aside, the Swiss Householder Survey questionnaire was designed and worded with the input provided by Dr Conedera of the WSL Institute between July and October 2015. Dr Conedera also facilitated the interaction with the cantonal population authority in Ticino. The areas of interest for the survey included the municipalities of Ronco sopra Ascona, Locarno-Bré, Orselina, Muralto, Minusio, Brione sopra Minusio and Minusio, all part of the wider Locarnese region. The choice of setting the sample-size at 900, in contrast with the lower benchmark of 700-households set for the Australian Householder Survey, was made with the knowledge that linguistic and cultural barriers could play a significant role in reducing response rates. The official language in this area of Switzerland is Italian, but in the Locarnese region, German is also widely spoken by many in-migrant residents originating from the Swiss-German parts of Switzerland and from Germany itself. This area also has a considerable non-resident population who own or rent a secondary, vacation home in the Locarnese region for holiday purposes. Accessing the primary address of this population and mailing a survey to their permanent address in Switzerland and abroad (especially in Germany), was also considered but deemed impractical for this research project.

Surveys were posted by Swiss postal service on October 29, 2015 to 900 Locarnese households by B Mail (postal mail with a maximum of 5 working day delivery time). In contrast to the Australian survey, the Swiss survey was not hand delivered as Swiss WSL Institute colleagues advised against it for the Swiss context, where people are used to receiving survey questionnaires through official postal channels. In this case, cultural issues of acceptance had to be taken into account, as it was asserted that hand-delivery would not reflect well on the Swiss research organisation WSL and more generally, reduce the credibility and impact of the survey. The researcher was advised that within a Swiss context, householders/residents would be more receptive of a survey posted to their name and address, in an envelope carrying the WSL logo. Printing and postage costs were covered by the hosting institute.

Participants were given 4 weeks to answer the questions either on paper (in Italian) or online (in English) through Survey Monkey. A second missive, a reminder postcard, was mailed to all 900 households targeted by the initial mail-out approximately four weeks after the initial delivery. Reminder postcards informing households of an extension of the survey duration from the original closing date of November 27, to the new date of December 7, were sent out on November 23, 2015.

#### **4.6 Survey response rates**

Seven hundred surveys were distributed for the Australian Householder Survey 2015, and nine hundred surveys were distributed for the Swiss Householder Survey. In Australia, the survey was hand distributed into residential mail boxes, whereas in Switzerland it was distributed by mail through the Swiss postal service. In both cases, reminder postcards were sent to householders by post and the completed surveys are listed here as 'Additional' in Table 4.2.

Although these response rates are far from ideal, they are typical for mail-out surveys (Kaplowitz *et al.* 2004), and data were sufficient to satisfactorily answer the research questions. The 16.2 percent response rate achieved in the Swiss survey in particular, must be seen in the light of the sensitive nature of environmental hazards as a research topic, as well as within the complex social context, including considerable language barriers within the population of the Locarnese hills. Clearly, higher response rates would have been desirable, however, Fowler (2002, p.42), states: '[in social sciences] there is no agreed-upon standard for a minimum acceptable response rate.' The reluctance to set clear boundaries on what is an acceptable response rate for social science research pertains to the specific context of each research project, including its administration method (Carley-Baxter 2009).

What is being identified as more relevant is the issue of self-selection within the respondent group, with the potential for non-response bias (Fowler 2002; Kreuter 2013). Evidence exists for a certain degree of self-selection within both surveys, largely associated with people who held strong positions on the issues covered by the survey, choosing to complete the questionnaire. However, the analysis and discussion are achieved knowing that with such non-probability samples generalisation to the wider population are limited. Nevertheless, data are valid to elicit perceptions and values of respondents that have completed the two surveys.

As shown in Table 4.2, there were 105 surveys responses for the Australian survey received before the reminder postcard was mailed on March 24, 2015 (paper 96 and online 9). In addition, there were 37 surveys responses collected after the mail out of the reminder postcard, after April 24, 2015 (paper 22 and online 15). There were 13 responses collected with the reminder code (paper 1 and online 12). Of the 118 paper responses, one response was invalid, as it was completed by an individual not residing in the chosen area; while of the 24 online responses, only one was submitted incomplete and was therefore invalid. A total of 140 valid survey responses were received (paper surveys 117 and online surveys 23), equating to a 20.0 percent response rate.

**Table 4.2: Australian Householder Survey (AHS) and Swiss Householder Survey (SHS) response rates by site**

	Initial surveys	Undeliverable*	Delivered	Responses before reminder postcard	Additional	Completed and valid	Total	Response rate
AHS (Feb 28 - Apr 10, 2015)	700	-	700	96 (paper), 9 (online)	22 (paper), 15 (online)	117 (paper), 23 (online)	140	20.0%
SHS (October 29- Dec 7, 2015)	900	13	887	94 (paper), 10 (online)	41 (paper), 17 (online)	124 (paper), 22 (online)	146	16.2%

\* Surveys in the Mitcham and Onkaparinga Hills were hand-delivered

Source: Australian Householder Survey, Feb-March 2015 and Swiss Housholder Survey, Oct-Dec 2015

For the Swiss survey, some 94 surveys were returned before the reminder postcard was mailed on the 23rd of November 2015 (paper 84 and online 10). A further 58 surveys were received as a result of mailing the reminder postcard, of which 41 were on paper and 17 online. Of the 152 responses received by closure of the online survey on January 4, 6 were incomplete and consequently discarded. The total of valid responses amount to 146 (paper surveys 124 and online surveys 22). Of the 900 paper surveys mailed out, only 887 arrived at their destination (with 13 returned to sender). The response rate was 16.2 percent based on 887 questionnaires reaching their destination.

#### **4.7 Socio-cultural and demographic profile of respondents**

Respondents to the surveys in Australia and in Switzerland did not belong to any ethnic, religious or trade community, and were selected according to the geographical positioning of their place of residence in the peri-urban space. Demographic characteristics of the population such as age, family composition and potential mobility challenges play a significant role in helping to identify vulnerability levels in a context of environmental hazards (Buckle 2002; McKenzie and Canterford 2018). The demographic and socio-economic characteristics of sampled respondents in relation to age, gender, income, education and place of birth for respondents in each case study, are shown in Table 4.3. Even though a direct comparison between the two samples was not sought as a part of the research method, it is relevant to highlight some of the key differences. For example, the Swiss respondents were older, less likely to be female and had lived at the address for longer than the Australian respondents. In addition, the Swiss respondents were more likely to be from a lower income household, less educated, with fewer children and more likely to be living in a two-person household. Finally, Swiss household respondents were less likely to own their home and more likely to be renters, less likely to be born in another country and more likely to have a previous address in a State/Canton/Country other than the survey. More importantly though, these demographic characteristics must be considered in their separate contexts which is the aim of the next section.



**Table 4.3: Characteristics of survey samples**

<b>Demographic characteristics</b>	<b>Mitcham and Onkaparinga Hills (Australia)</b>	<b>Locarnese Region (Switzerland)</b>
Percent of sample above 65 years of age	32.8	43.2*
Percent of Female sample	56.1	34.3**
Mean length of residency in years	15	24***
Percent of sample with yearly household income		
\$/CHfr 0-\$39,999	9.4	32.2
\$/CHfr 80,000-199,999	47.6	35.0
Percent of sample with tertiary and higher education level	77.8	46.0
Percent of households with children	55.0	30.0
Percent of two-person-households	46.0	67.0
Percent of sample that were owners	97.1	64.1
Percent of sample born in country other than survey	36.4	13.3
Percent of sample with previous address in State/Canton/Country other than survey	17.0	29.0

\*Average for region across the municipalities 31% above 65 years

\*\* Swiss Sample has male dominance due to address format provided by cantonal authority MovPop

\*\*\* Paper survey only

Source: Australian Householder Survey, Feb-March 2015 and Swiss Housholder Survey, Oct-Dec 2015

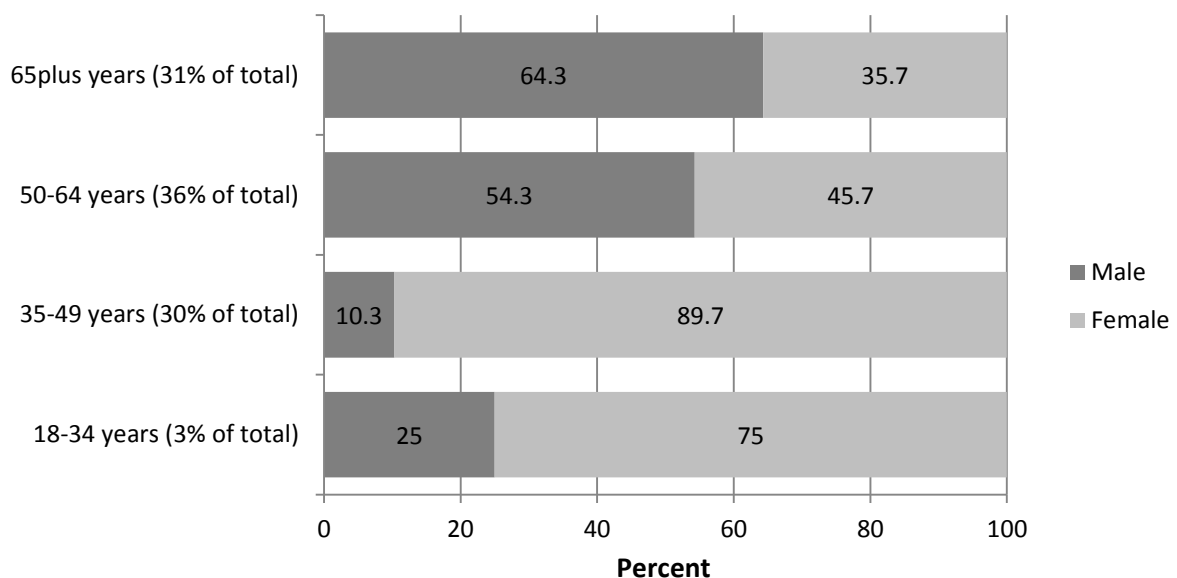
The demographic characteristics highlighted in Table 4.3 were used extensively in later analysis to examine patterns of perception and support for planning across the sampled population.

#### **4.7.1 Demographics of Australian respondents**

Of the 140 respondents in the Australian survey, 43.9 percent were male and 56.1 percent female, revealing a significant gender imbalance in the Australian Householder Survey with more females than would be expected compared to similar census data for the surveyed areas (female proportion 50.8%) (ABS 2016). Household income information indicates that close to half the Australian Householder Survey respondents belong to a higher income group and educational level, with 77.8 percent tertiary-educated, which is higher than the 2016 census figures of 62.4 percent for the targeted suburbs (ABS 2016). The proportion of tertiary education attainment in the sample is by far higher than the

Australian national figures, where 24 percent of population had attained a Bachelor’s degree or higher in 2016 (ABS 2017). This high proportion of tertiary educated respondents could be due to the proximity of the survey site to the Flinders University campus in Bedford Park, but it is certainly also linked to the socio-economic group attracted to the unique landscapes and leafy suburbs of the Mitcham and Onkaparinga Hills. One third of respondents were aged 65 and over, while close to two-thirds were aged 55 and over (63.8%). Figure 4.5 shows that of the 32.8 percent of respondents aged 65 plus, nearly two thirds were male. In the younger age-brackets on the other hand, respondents were predominantly female. Respondents were older than could be expected with census data showing a median age of 44 years for the surveyed suburbs (ABS 2016). Therefore, respondents tended to be highly educated, well-off, predominantly female, and mostly over 55 years of age.

**Figure 4.5: Australian male and female respondents by age**



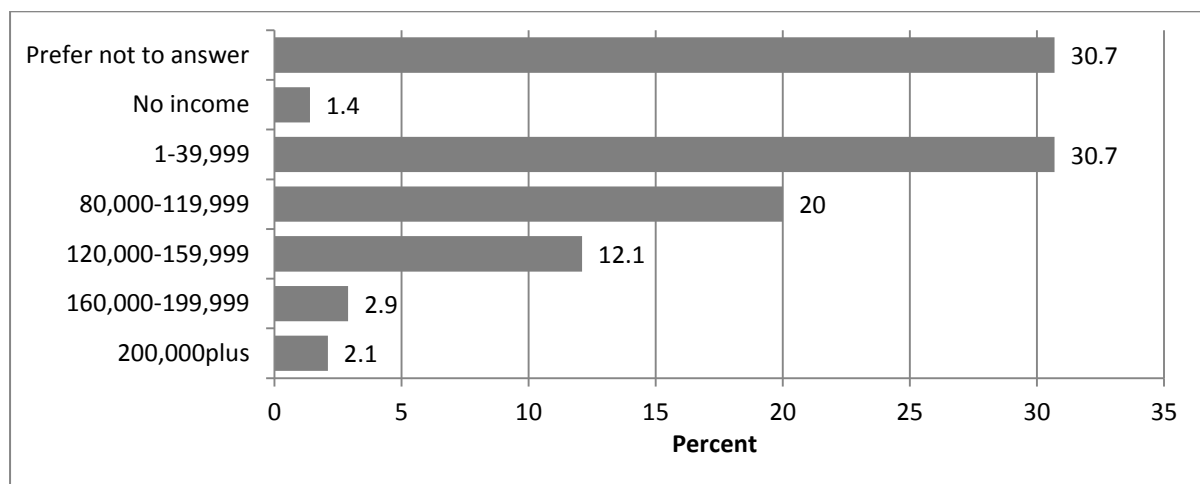
Source: Australian Householder Survey, Feb-March 2015.

#### 4.7.2 Demographics of Swiss respondents

Some 65.7 percent of the 146 participants in the Swiss survey were male and 34.3 percent female. This was not representative of the general sex balance in the resident population of the surveyed municipalities in the Locarnese region, and data of these six municipalities from the cantonal statistics office (USTAT 2016), show a predominance of females (53.1%) over males (46.9%) in the resident population. As already discussed, this imbalance was expected and can partially be explained by the format of the addresses accessed through the cantonal population authority, where the resident population is listed by ‘head of the household’. This categorisation resulted in a far higher ratio of males than females being reached by the postal survey in 2015.

Swiss respondents appear rather sedentary with an average of 24 years for their length of residence. High real estate prices and strong cultural ties to place across Switzerland, can explain these results relating to a relatively immobile population. Most importantly, yearly household income results for the survey provide some surprising findings, with the Swiss participants' income levels lower than expected for that relatively wealthy country. Figure 4.6 provides a more detailed break-down of respondents' income. Retirement benefits in Switzerland range from a minimum of CHF 14,100 to a maximum of CHF 28'200 for unmarried persons, and a maximum of CHF 42,300 for married persons (Swiss Life 2015). These results would indicate that a large proportion of respondents are aged-pension recipients, and also indicates a disproportionate representation of those 65 years and over within the sample, who are recipients of low-income aged-pension. Almost a third of respondents opted not to disclose salary information, which is in line with the fact that the Swiss are notoriously reluctant to disclose income and wealth information (Burkhard 2017).

**Figure 4.6: Swiss respondents' yearly household income**



Source: Swiss Householder Survey, Oct-Dec 2015.

It is important to note the dominance of those aged 65 plus, who represent 41 percent of the total sample. This anomaly can be a function of older people having more time and being more disposed to completing a survey. The issue of wildfire risk, environmental value and planning may also be disproportionately more important for elderly people who may have witnessed the development of the Locarnese region or may feel more vulnerable to evolving changes in the landscape. Data from the Ticinese statistical yearbook (USTAT 2016) for the surveyed municipalities in the Locarnese region indicates that 58 percent of survey respondents being aged 18 to 64 years, comes very close to the overall average of 56 percent across the entire population of the six municipalities.

Other demographic data from the sample showed that couples were the dominant household category (46%); with 21 percent of participants single-households and only 27 percent of households comprised of dependents and non-dependent children. According to the Swiss Federal Statistical Office (FSO), in 2012 over 35 percent of households in Switzerland were single-households (FSO 2015). Moreover, 89.9 percent of respondents indicated being Swiss citizens. According to the Swiss Federal Statistical Office, 1'227'900 foreigners resided in Switzerland with a permanent residency permit in 2013 (FSO 2015), which represented just under a quarter of the total resident population in 2013. In contrast, only 10 percent of respondents within the surveyed sample indicated having a single non-Swiss nationality, with 23 respondents indicating that they had double nationality, and all had Swiss as one of their two nationalities. Most participants (54%) specified Ticino as their Swiss Canton of birth, and 32 percent indicated that they were born in other Swiss Cantons, while only 13.2 percent were born in a country other than Switzerland.

Switzerland is a multilingual country, and the linguistic prevalence of the Italian language in the survey region provides an insight into the composition and the origin of the resident population. The Locarnese region of Canton Ticino has a long history of being favoured by people from north of the Alps, escaping the cold weather and coming south, to the 'sunroom' of Switzerland. For that reason, the Locarnese region has become the retirement location of choice for large numbers of Swiss Germans and Germans. This fact is highlighted by the high rate of survey respondents whose place of birth was not in Canton Ticino (31.9%), and also the high proportion with their previous place of residence in a State/Canton/Country other than the survey (29%). This high percentage of non-locals could also potentially indicate a lack of comprehensive knowledge of the local weather conditions, particularly of the relatively high frequency of forest fires characterising this region of Switzerland. Although there is a large group of primary language Italian speakers in Canton Graubünden, Canton Ticino is the only Swiss Italian Canton in which Italian is the official language, with some 88.3 percent of the resident population in 2013 who indicated Italian as their primary language (USTAT 2016). Italian was however not the clear language preference across the Swiss study site. For the surveyed Swiss municipalities where respondents resided, Swiss Federal data shows that Italian is only moderately prevalent as in the case of 2 of the 5 municipalities, or, as is the case of the remaining three municipalities surveyed, there is no clear linguistic prevalence of Italian at all (Table 4.4). Thus, for this region and in a linguistic sense, the sample is rather representative.

**Table 4.4: Linguistic prevalence of the Italian language in the surveyed municipalities**

<b>Municipality</b>	<b>Linguistic prevalence</b>	<b>Italian spoken</b>
Locarno	Italian: medium	70 to 84.9%
Orselina	No linguistic prevalence	
Ronco Sopra Ascona	No linguistic prevalence	
Minusio	Italian: medium	70 to 84.9%
Brione Sopra Minusio	No linguistic prevalence	

Source: Swiss Federal Statistical Office (2013),  
[https://www.atlas.bfs.admin.ch/maps/13/de/3561\\_3070\\_104\\_70/3007.html](https://www.atlas.bfs.admin.ch/maps/13/de/3561_3070_104_70/3007.html), viewed 27.10.2016

The survey sample was comprised of a higher proportion of male respondents with post-secondary qualifications. Across Switzerland, levels of educational attainment in 2013 (BFS 2013), indicated that the male post-secondary educational attainment proportion was significantly lower (45.9%) than what was found in the Locarnese survey, where 56 percent of males had completed tertiary and post-graduate study. The female participants on the other hand, had a slightly lower proportion of post-secondary attainment (31.1%) than the national average (34.4%).

#### **4.8 Analytical approach and data presentation**

The Australian and Swiss surveys predominantly asked for and provided numerical responses. However, written, textual responses were also collected through open-ended questions. Survey results are presented in text, table and chart formats. Even though direct equivalence was not the aim of the two separate surveys, they were designed to be as similar as cultural and ecological contexts would permit. Because the two surveys were not identical, data collected were evaluated and primarily analysed separately for statistical purposes. Although there is no true compatibility in the two datasets, the similar nature of the surveys does however offer opportunities for some comparisons of responses, in the full knowledge of the limitations associated with the differences in sampling and data collection methods.

The primary categorical data was analysed with IBM SPSS (version 22). ‘Rank and order’, frequency and bi-variate approach were the methods utilised for a first-order descriptive analysis, while non-parametric statistical tests were used to assess the significance of associations and variations for second-order or confirmatory analysis. Three non-parametric tests were undertaken to assess bi-variate variation and measure the relationships between categorical variables and Likert-scale responses: Pearson Chi-square Test, Mann-Whitney U Test and Fisher’s Exact Test (see Table 4.5). The

assessment of the strength and direction of relationship between ordinal variables (Likert-scale responses) was achieved by the measure of correlation, using Spearman’s rho test.

**Table 4.5: Three non-parametric tests utilised in the statistical analysis**

<b>Test</b>	<b>Selection Criteria</b>
<b>Pearson Chi- square Test</b>	To establish the strength in the relationships between two categorical variables (Bryman 2012)
<b>Mann Whitney U Test</b>	When comparing two groups on their responses to Likert Scale questions. When comparing the differences in Likert responses across groups where violations to the assumption of normality are found.
<b>Fisher’s Exact Test</b>	Used when the sample size is small. Fisher’s Exact Test is found to be more accurate than Pearson Chi-square Test when expected cell counts are low

*Source: Adapted from Flowerdew and Martin 2005*

In the second-order analysis, data were interrogated to establish the relationship between indicators of values pertaining to residents’ personal safety, self-enhancement and universal values of nature conservation with other predictors, including:

- demographic variables
- attitudes to bushfire risk
- relationship to the urban planning process
- amenity-type values and
- attachment to place values

This analysis was based on the following hypotheses:

- 1) Demographic variables and perceptions of environmental values and risks do interact with risk behaviour in the peri-urban;
- 2) Peri-urban residents are aware of the risks, but they do not necessarily behave according to what logic would suggest they do in a context of high environmental risk;
- 3) Peri-urban residents do not see the current spatial planning system as offering ways for them to influence outcomes through participation that would significantly improve their safety or offer conservation outcomes that reflect their values.

When presenting and discussing statistical test results, the details of the type of test are only provided when the test is not Pearson Chi- square Test.

#### **4.9 Ethical considerations when dealing with environmental risk**

People can be affected to different degrees by previous experiences relating to environmental hazards such as bushfires or landslides. Questions asked in the surveys had the potential to evoke traumatic experiences. For this reason, a warning in this regard was included in the introductory letter sent to households accompanying the questionnaire. In both countries aged-care facilities, and in Switzerland all hotels located in the survey area, were omitted even when they fitted the spatial criteria for location in relation to the environmental risk. This step was taken due to the potential distress the survey could have caused to residents/guests.

#### **4.10 Limitation of research methodology**

Various aspects that have the potential to restrict the aim of this research are discussed here, including the size of the sample, cross-cultural and linguistic factors, and limitations related to the topic of environmental hazard and risk. Of particular relevance is the size of the samples for each of the two case studies and the choice of non-probability sampling method, which lend themselves to drawing conclusions on the sampled population only. Thus, all analyses discussed in the results chapters to follow are related to the sampled populations, with generalisations to the wider population, or indeed to other similar peri-urban spaces, possible only to a minor degree.

As mentioned earlier, slightly different approaches were used in Australia and Switzerland to collect the survey data. Although the surveys were hand-delivered in Australia, this method was deemed inappropriate in Switzerland by the author's research partners, WSL. Cultural and logistical factors, dictated the postal distribution of the Swiss questionnaire that required the addresses of respondents, which can be seen as limiting factors in the validity of the method. In this case, though, a direct comparison between the data sets obtained from the two sites was not sought, and this methodological difference does not affect the primary research outcomes. However, it is important to acknowledge that the cultural acceptance of one data collection method over another has the potential to jeopardise an entire survey process if not fully investigated ahead of time. Moreover, the linguistic competence of survey participants in the official language in multi-lingual contexts is of crucial importance, and if not addressed correctly can lead to the failure of the approach. As seen earlier in this chapter when looking at the specificities of administering the Swiss survey, time and resource constraints limited the survey to three languages. The paper survey was offered in Italian,

the online completion options were in English and German. Linguistic aspects relating to competencies of both participants and researchers clearly have the potential to limit the uptake of a survey in any multi-lingual context, and certainly did dictate boundaries to this project. In this case, the author is fluent in all three languages and was able to perform her own translations.

The self-selection of participants who have a grudge with, or particularly support planning-related issues can be a limiting factor causing survey bias, as well as attracting respondents who have prior-knowledge of the issues due to their professional experience (emergency services, planning, etc.). Both these elements are out of the hands of the researcher but have the potential to significantly influence the outcomes of the empirical research and must be recognised. In addition, a negativity bias towards the planning discipline and planning issues in general, could exist in both of the surveyed samples. This aspect could even be the reason that prompted participants to take part in the surveys, as the most common reason for residents to interact with the planning system is associated with protest action or disapproval of current planning strategies. Finally, the knowledge that online and paper surveys have the potential to attract different individuals was acknowledged and countered by including two response modes in the survey method.

#### **4.11 Methods to ensure the quality of research**

The use of a range of methods increases rigour and helps to warrant meaningful inference (Baxter and Eyles 1997). Method triangulation is one such technique utilised to prevent such research 'pitfalls' and involves a validation of information obtained from a range of sources of evidence by the researcher, using multiple methodologies instead of relying on a single source of information to answer the research questions on a topic (Baxter and Eyles 1997; Bowen 2009). Triangulation is based on the principle of convergence or saturation, whereby the researcher proves that the phenomenon is seen emerging from a range of different sources and is therefore more likely to be true and helps in the effort to strengthen accuracy (Mangen 1999; Eriksen *et al.* 2011). Both methodological (mixed method) and data (qualitative and quantitative) triangulation techniques were used in this research to lessen the potential for researcher or sampling bias. For the analysis of the survey data from Australia and Switzerland, several non-parametric statistical analytical approaches were also used to try and examine the relationships between variables in different ways.

All efforts were made to ensure the anonymity of respondents, as outlined in the ethics application for the research (for Ethics Approval see Appendix 1). In social research that asks individuals to reveal



personal opinions, fears and political positions on certain questions, it is vital to ensure that those respondents' identities are protected, as has been achieved here. Therefore, all respondents are simply identified according to a code based on their location and the number of the returned survey. Precautions were also taken to anticipate any issues with potential trauma associated with respondents' experiences with hazards, both by wording the questions carefully and by including contacts of organisations that could provide assistance.

#### **4.12 Conclusion**

This chapter presented the approach utilised to collect and analyse survey data on householder perceptions of value and risk, and the relationship respondents have with the spatial planning system in high environmental risk contexts. A description of the rationale behind selecting a cross-national, cross-cultural and multi-lingual approach to gain a contrasting perspective on the participatory approach for spatial planning in high-risk contexts was provided. It also delivered an account of how this approach was translated into a practical sampling procedure through a mixed-method data collection in Australia and in Switzerland. An overview of the demographic and socio-economic characteristics of the respondents group of in both countries, as well as the analytical approach and the limitations of the study, were discussed with the aim to enable the analysis in the two results chapters to follow.

## CHAPTER 5

# PERCEPTIONS OF BUSHFIRE RISKS AND ENVIRONMENTAL VALUES IN THE MOUNT LOFTY RANGES

### 5.1 Introduction

This chapter explores data from the Australian Householders Survey (AHS) conducted in February-March 2015, in the peri-urban residential areas surrounding Sturt Gorge Recreation Park in the cities of Mitcham and Onkaparinga. This area of SA consists of hilly terrain with houses often located on ridgetops or on steep slopes, with suburban sub-divisions surrounded by fire-prone eucalyptus forest and grasslands. The survey was designed to examine respondents' perceptions of the local environment, to identify their planning priorities in relation to risk reduction and environmental values. Research objectives covered in this chapter include an evaluation of residents' perceptions of environmental risk and value; the dynamics of the peri-urban fringe within a drying and warming climatic context; and residents' perceptions of current South Australian planning approaches. Specific research questions addressed in this chapter include:

1. What are the dominant environmental values and risks perceived by South Australian residents on the peri-urban fringe and how do those perceptions impact on their behaviours?
2. What are the relationships between identified perceptions of environmental values and risks?
3. How are residents engaging with the local planning processes in South Australia?

The challenges of bushfire/wildfire management globally are numerous and complex and the processes of how the public measures risk and makes decisions remains under-explained (Adams 1995). Knowledge of public opinions on relevant issues are key to more successful spatial planning (Pilgrim 1999), and effective risk mitigation in general (Champ *et al.* 2012). Seminal work by Schwarz (1992; 1994; 2012) on the theory of basic values, suggests that proving the assumption that personal values do indeed have predictive and explanatory power on behaviour, is still a fundamental unrealised research step. A review of research conducted by Moskwa *et al.* (2016) on the perceptions of bushfire risk mitigation and biodiversity conservation identified the need for more research into community perceptions of risk and of the underlying community values. The research in SA goes some

way to filling that gap, and will be used in contrast to Swiss findings discussed in Chapter 6, to support an analysis of approaches to deliberative planning outlined in Chapter 7.

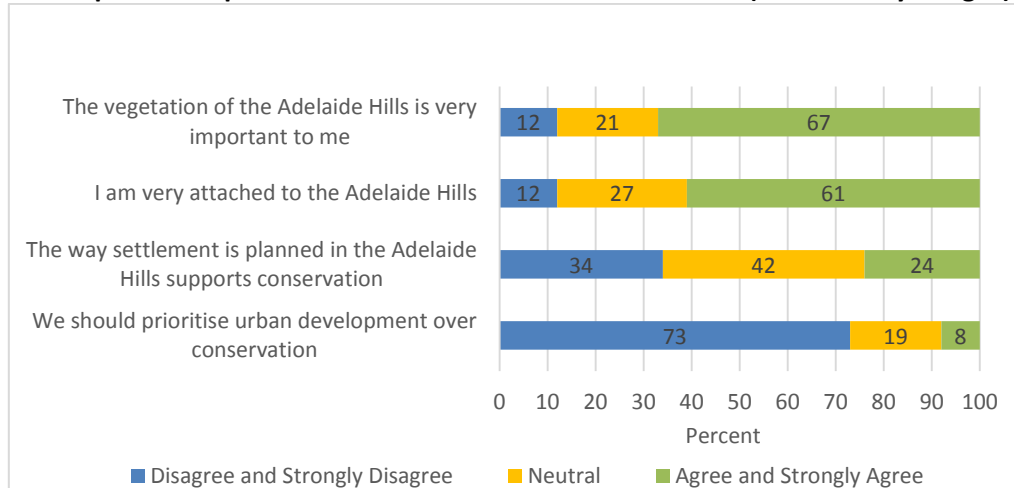
## **5.2 Personal values of place and of the environment**

There is global recognition for the need of a closer examination of social perceptions and interactions in the role of bushfire preparedness (Moritz *et al.* 2014; McCaffrey 2015). Much previous work in the social sciences in relation to high bushfire risk contexts in Australia has focussed on community landscape values, rather than on the role of motivational dynamics determined by personal perceptions of risk and value. Yet, a series of studies are beginning to show that how people perceive of their place is vital for guiding responses to risk. Reid and Beilin (2014) argue that our lived experience of physical settings including landscape, are at the heart of how we make sense of natural disasters. Similarly, Paton *et al.*'s (2006) research that focused on behavioural intentions and preparedness for bushfire hazards, found that a connection to the natural environment is one of the critical factors in determining preparedness. Again, Eriksen and Gill (2010) identified the materiality of everyday life as a significant factor shaping landowners' relationship to bushfire-prone landscapes, influencing preparedness. Anton and Lawrence (2014) found links between strong place attachment and a discounting of environmental risks in areas of high bushfire risk in Western Australia. Together with the research discussed below from SA, there appears to be a growing consensus that effective risk planning responses will need to integrate understandings of how local residents view their environments.

### **5.2.1 Attachment to place and personal values influencing choice of residential location**

Figure 5.1 shows that high value is attributed to the vegetation of the Mount Lofty Ranges by 67 percent of respondents. Strong attachment to place was found in the surveyed sample, with 61 percent of respondents agreeing with the statement '*I am very attached to the Adelaide Hills*'. By contrast, 73 percent of them disagreed with urban development over conservation. The result is not so clear-cut in relation to whether the settlement is planned in a way to support conservation, with 42 percent opting for a neutral position.

**Figure 5.1: Respondents' personal values towards the Adelaide Hills (Mount Lofty Ranges)**



Source: Australian Householder Survey, Feb-March 2015.

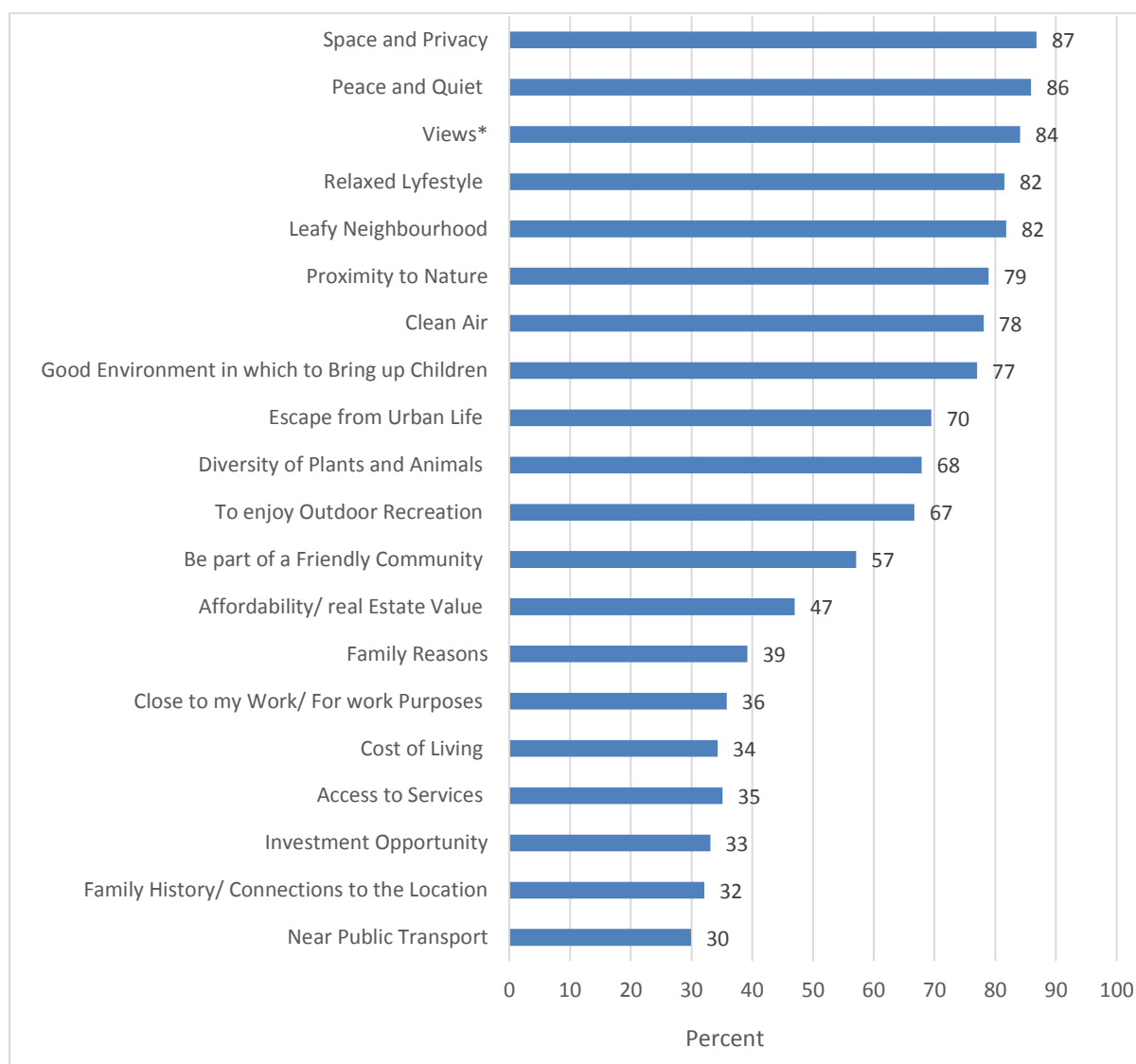
Other profile factors consistent with 'strong attachment' are also detected in the sample from the Mitcham and Onkaparinga council areas, including the duration of residence and social engagement in the district. According to such attachment notions, the overall mean duration of residency of 15 years found in the surveyed population, itself suggests strong attachment to place amongst many. Patronage of local shops and services was also high, with 92 percent of respondents shopping and using services locally at least once a week (39 percent 'most days'). Information gathered about participation in local community life also suggests strong feelings of attachment, with 43 percent indicating that they participate in a community group. Similarly, patronage of native bush/recreation spaces in the local area was high with 65 percent using these spaces at least once a week (30 percent 'most days'); and the vast majority of respondents were homeowners (97%). These results from activity indicators examined here are consistent with signs of strong place attachment found in the literature, including patronage of local spaces and shops (Scannell and Gifford 2010), participation in local community life (Manzo and Perkins 2006), duration of residence (Brown and Raymond 2007), and more freehold forms of housing tenure (Anton and Lawrence 2014). Survey results show that both amenity and ecological values of the vegetation of the Adelaide Hills are an important motivation for living in the hills, with most respondents agreeing with the statement 'the vegetation of the Adelaide Hills is very important to me'.

Broadly speaking, most household respondents generally expressed negative feelings towards new urban-style developments, as most respondents believed priority should be given to conservation over development. These results are in line with local values of place identified as most important to respondents in their choice of residential location, such as private and peaceful spaces. Some 62 percent of respondents however, did not see new housing development nearby as a reason to

relocate. When asked to express feelings about the recent new housing developments in the area, one respondent replied: *'Good. I'm living in one!'* (ASHN31). Out of 122 responses to the question 'what do you like least about where you live', only 4.9 percent gave reasons linked to new housing developments, such as *'houses too close together'* and *'feeling crowded'*. Participants' perceptions of the impact of more urban-style developments in the surveyed areas are analysed in more detail later in this chapter in the section on respondents' interactions with the planning system.

Factors pertaining to the choice of residential location are also utilised as indicators of how respondents value place. Figure 5.2 shows that the most important factors influential on respondents' choice of residential location included: space and privacy, peace and quiet and views, followed closely by relaxed lifestyle, leafy neighbourhood, proximity to nature, clean air, good environment to bring up children, escape from urban life, diversity of plants and animals, to enjoy outdoor recreation and to be part of a friendly community. Amongst the highest-ranking reasons that attracted respondents to the surveyed area were drives associated with hedonistic, scenic and self-centred well-being values: space and privacy, peace and quiet, views and relaxed lifestyle, which was also identified by Schwartz (2012) as fundamental to choice of residential location. Significantly, the desire to be close to nature was listed as a reason for choosing the location by 79 percent of respondents. The eight reasons deemed overall least important in the choice of location, were linked to practical issues such as travel, family, work and financial considerations. This leads to the conclusion that, within this sample, personal well-being, environmental and aesthetical values dominate the motivational dynamics influential in the choice of location over more mundane and practical issues. Thus survey respondents are making decisions to live in the Mitcham and Onkaparinga Hills for reasons that extend beyond livelihood or transport practicalities – many are 'lifestylers' choosing their place to enhance their sense of wellbeing and to facilitate a lifestyle linked directly to their local environment.

**Figure 5.2: Respondents' most important values influencing their choice of residential location**



Source: Australian Householder Survey, Feb-March 2015.

\*'Views' not included in online survey.

Overall, attachment to place for respondents was high. As shown in Table 5.1, respondents over 65 years of age were significantly more likely to feel a strong connection to place (76.7%), than those aged between 18-44 years (48.3%), or those aged 45-64 (57.4%). These associations between levels of attachment and age were found to be statistically significant ( $p < .05$ ).

**Table 5.1: Attachment to place by age of respondent**

Attachment to place	18-44 years	45-64 years	65 plus years	Total
Very attached	48.3	57.4	76.7	61.7
Neutral	41.4	34.4	9.3	27.8
Not very attached	10.3	8.2	14.0	10.5
Total	100	100	100	100

Source: Australian Householder Survey, Feb-March 2015.

### 5.2.2 Personal values in relation to the natural environment

The survey found evidence indicative of strong perception of environmental value in the sample population. A strong appreciation of the native vegetation and support for conservation and protection of rare and endangered species was accompanied by generally negative feelings towards new urban-style developments. Table 5.2 shows an overview of the analysed values in a summarised format. Respondents' appreciation of the native vegetation, the removal of invasive weeds, and the protection of endangered species can be identified as priorities.

**Table 5.2: Summary evaluation of respondents' environmental values**

	≤29% Weak	>30-59% Medium	>60% Strong
<b>Vegetation</b>			
Importance attributed to the native vegetation of the Adelaide Hills			✓
Owning native garden		✓	
Support for more forests in the Adelaide Hills		✓	
Importance of native species over exotics			✓
Removal of invasive weeds			✓
Importance attributed to endangered and rare species as a component of local forests			✓
Support for more set aside/ strict conservation areas		✓	
<b>Other</b>			
Patronage of green spaces			✓
Involvement in environmental organisation	✓		
Support for conservation practices over development			✓

Source: Australian Householder Survey, Feb-March 2015.

These findings of a general appreciation of environmental values are further supported by responses to the question asking householders to rate the level of importance to be attributed to the conservation of plants and animals when considering bushfire risk prevention measures. In that case, 89 percent of respondents deemed conservation when considering bushfire risk mitigation to be either 'important', or 'extremely important'. The author's personal experience of living in the Mitcham Hills, as well as confirmation gathered from an interview with a local government representative, highlight the close relationship to nature found in a segment of the local population:

*'There are these sorts of very strong green roots and I think the people who have come here have come for the environment for a very long time and it wouldn't have been just a change just in the last ten years. I think that has been the driving force for a very long time'* (Stakeholder #2).

The sum of these findings leads to the conclusion that individuals within the sample, value the local environment very highly, and that includes the recognition of local native species. These results

support findings elsewhere that the quality of the environment generates important motivational or pull-factors to draw people to rural and peri-urban locations, and supports the earlier finding that place values are very important for the majority of respondents (Smailes *et al.* 2005; Paveglio *et al.* 2009; Hugo *et al.* 2013; McFarland 2015; Reid and Beilin 2015;).

### 5.2.3 Personal safety and security values in relation to forest management aimed at mitigating the risk of bushfires

After exploring results that relate to perceptions of amenity and other values of the natural environment, it is relevant to assess the results pertaining to perceptions of personal security in relation to the bushfire hazard. Table 5.3 shows that household respondents were broadly in favour of forest management approaches to reduce fire risk, the elimination of non-native species, and the maintenance of the attractiveness of the landscape. Respondents were particularly supportive of forest management focused on reducing the risk of bushfires, with 47 percent strongly agreeing, and a further 30.6 percent agreeing that this option should be the management priority. A total of 58.4 percent of respondents strongly agreed or agreed with the removal of non-native vegetation. Respondents were more decisive in their opinion to manage the bushfire and non-native species than they were positive about the need to retain attractiveness of the area.

**Table 5.3: Respondents' forest management priorities**

Priorities	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
Reduced bushfire risk	47.0	30.6	17.2	3.7	1.5	100
Non-native species	34.6	23.8	24.6	5.4	11.5	100
Attractiveness of the area	20.5	25.0	31.8	13.6	9.1	100

Source: Australian Householder Survey, Feb-March 2015.

Overall, despite the strong support for the native environment presented earlier, vegetation clearance to reduce bushfire risk was a popular intervention, with only 4.4 percent of respondents not supporting this form of risk minimisation in the region. The survey also found that current levels of clearing of native bush or scrubland to reduce fire risk was endorsed by 45 percent of respondents, and a further 42 percent saw the necessity for even more clearing than is currently undertaken. These findings highlight that when grappling with concrete questions of personal safety in a high bushfire risk context, respondents were supportive of approaches that could in fact diminish the environmental values of the forest even if that was not their aim. This is in line with Schwartz's (2012) theory where conservation values are attributed to a more peripheral decisional process to core survival values, and therefore, in the case of residents surrounding the Sturt Gorge Recreation Park, helps to explain support for a reduction of fuel loads within this context of sustained environmental hazard.



### 5.3 Perception of natural hazard risk and vulnerability

The relationship between perceptions of risk and personal actions aimed at mitigating those risks is not necessarily a direct one for members of the community. As others have also found, high levels of risk perception do not necessarily translate into actions such as effective preparedness or other risk mitigation behaviours (Eriksen *et al.* 2011). This research examined the possible relationships between residents' perceptions of environmental values and risk and preparedness: an issue previously raised by McCaffrey (2004). Such an analysis is particularly important because prior research in this field suggests that whilst the more vulnerable in the community are perceptive of environmental risk, they are potentially the least able to reduce exposure to the potential hazard and to enact effective mitigation measures to protect themselves or their properties (Eriksen and Simon 2017), and are even likely to become 'stuck' in dangerous situations (Black *et al.* 2011; Bardsley and Hugo 2010).

#### 5.3.1 Personal experiences and knowledge of bushfires

Within the sampled population, there are many differences in respect to age, gender, and national background associated with a range of different perceptions of bushfire risk. Just over a quarter of survey respondents indicated previous experience with bushfires (26.4%), and 5.7 percent of respondents noted either personal involvement or that of a family member within the Country Fire Service (CFS) or Metropolitan Fire Service (MFS). Only a very small number of respondents, 2 percent, responded in the affirmative to the question '*Have you ever had your house or property damaged or destroyed during a bushfire?*' Nevertheless, personal experiences related by respondents that were not of a professional nature suggest both direct and indirect contact with bushfires, as well as varying degrees of concern:

One female resident of Blackwood aged between 40-44 years, who had lived in the area for less than 6 years said: '*Every summer there are days of close bushfire threat and people evacuate in panic*' (ASHN112).

A male resident of Bellevue Heights aged between 35-39 years, who had lived in the area for less than 6 years said: '*We prepared to evacuate when fire occurred on the hill opposite our house. We have an evacuation plan and boxes with our special belongings prepared for evacuation*' (ASHN90).

A female resident of Flagstaff Hill, aged between 25-29 years, who had grown up in the country and had lived in the area for less than 6 years, provided an altogether different insight by saying: '*I am from the country (farm) and experienced many bushfires and just see it as a part of life and don't excessively worry about it*' (ASHN13).

And finally, a male resident of Bellevue Heights aged over 65 years, who had lived in the area for over 21 years, mentioned another important issue of concern for residents by adding: *'On odd occasions fires have been deliberately lit in Sturt Gorge in summer by arsonists - fortunately none have threatened our property'* (ASHN47).

The experience of a local governance stakeholder in dealing with new residents moving into the Mount Lofty Ranges highlights the lack of knowledge in certain residents, as they discover their responsibilities and obligations around bushfire safety in the hills. New residents are able to purchase a property without being aware of the important issues of safety and preparedness associated with residing in a high bushfire prone area:

*'Some people move up there without any real thought about the fire risk. It is quite concerning, sometimes, I have received more than one phone call from people who have moved up into that area, six months after they have moved in. They ring me to ask "do I live in a high fire-risk area?" They hadn't thought about it before they purchased a house up there. So that is quite concerning and they're a bit shocked when I tell them that they are, and then they panic a bit and ask me all these questions - what they have to do - and then they realise they've got a legal and, ethical obligation really, to maintain their property. (Stakeholder #4).*

Plate 5.1 shows houses in Craighburn Farm, where new developments are in close proximity to the vegetated space listed under the National Parks and Wildlife Act (1972) and Sturt Gorge Conservation Reserve. The large-scale revegetation that is occurring in the Reserve, in part to promote local biodiversity conservation, is also visible in the foreground of the image. Survey respondents were asked about the proximity of large areas of vegetation to their property. One quarter indicated being immediately adjacent to such an area and of those, 52.9 percent said the large area of vegetation directly adjacent to them consisted of native forest. Of those who said their property was not immediately adjacent to a large area of vegetation, 71 percent estimated being less than 100 metres away from such a space. A third of respondents indicated knowledge of the vegetation immediately adjacent to their property having burned at some stage in the past, while 28 percent indicated uncertainty on this point. Of those 41 respondents who replied to the specific question asking if the fire had been a bushfire or a prescribed burn, a quarter recalled the incident as a bushfire, while the remaining respondents could recall witnessing a controlled burn in the area close to their property.

**Plate 5.1: Adelaide Mount Lofty Ranges landscape-type targeted in the 2015 Australian survey**



Source: Field study site of Craighburn Farm (2015)

### **5.3.2 Personal agency in risk mitigation and satisfaction with the organisation of fire risk management**

Human agency, or the capacity of individuals to protect themselves independently or in association with the structural support offered by emergency services, represents one of many intervening variables that have important implications for disaster risk mitigation (Wachinger *et al.* 2013; Edwards and Gill 2016). Most of the sampled household respondents (59.4%) perceived that they could to some extent influence bushfire risk levels in the Adelaide Hills through their own actions, while 27.3 percent were extremely positive about their influence, with ‘a lot’ of influence over such risk. Only a relatively small proportion (13.3%) felt they were unable to influence the bushfire risk levels through their own actions. The pre-retirement age group (45-64 years) were those most likely to believe they had some personal influence in reducing bushfire risk.

Importantly, the survey also asked household respondents to indicate their level of satisfaction with the work carried out by authorities to mitigate bushfire risk. One third of respondents indicated satisfaction with the good and/or excellent work carried out to manage the risk of bushfires by fire-

fighting authorities, DEWNR and the Local Council. A further 36 percent thought the work that authorities had carried out was adequate. Of note, however, a significant 30 percent felt the current bushfire risk management was 'poor or non-existent' in the region where they lived. This result contrasts with the Swiss case study findings, discussed in the following chapter, and is important for any discussion on the role of participation in risk management decision-making.

### **5.3.3 Likelihood of a major bushfire occurring**

Residents' subjective evaluation of the likelihood of a bushfire occurring in their area was analysed (McCaffrey *et al.* 2017). It was found that 64 percent of surveyed households saw the most likely timeframe for a high-severity bushfire to occur in their area to fall within the next 10 years, while only 15.5 percent maintained such a fire would never occur in their town or suburb. This result provides an insight into the high-levels of exposure perceived by the majority of the sampled local population in relation to the bushfire hazard. This result raises interesting questions about decisions to increase population densities in a region of high levels of perceived risk. Within the region, many new homes are being built in green-field developments, and there is also considerable subdivision of existing large plots into smaller ones to allow for higher density and the upgrading of residential forms.

When splitting the potential hazard timing brackets further to include a finer 5-year interval, it was found that older respondents (65 plus), were more likely to estimate the likelihood of a major fire occurring in the area within a 10-year period; whereas the majority within both of the younger groups (18-44 and 45-64) predominantly thought this could happen within a 5-year period. There were also different views expressed according to gender, with females more likely than males to say that a bushfire would occur within the next 5 years, while males were more inclined to believe that such a fire would happen within a 10 to 30-year timeframe. Higher levels of caution in female respondents could be linked to household composition, and a statistically significant relationship was found between family composition and gender of the person completing the survey.

Duration of tenure in the area showed no significant relationship with the perception of the likely timeframe of a high-severity bushfire. As shown in Table 5.4, respondents perceived likely timeframe for a severe bushfire did however reveal a significant association with those same respondents having strong attachment to place, with 35.7 percent of respondents who felt a strong bond to the location more likely to think that a large bushfire would never occur in their area ( $p < .05$ ). Those not very attached to place, considered ten years to be by far the most likely timeframe for such an event in their area (63.6%), and this result was very similar to those who had reported a 'neutral' attachment

level to the place where they lived (64.7%). Only 50 percent of those who felt a strong emotional attachment to place considered that the most likely timeframe would be within ten years.

**Table 5.4: Likely timeframe of a severe bushfire by attachment levels**

<b>Timeframe</b>	<b>Very attached</b>	<b>Neutral</b>	<b>Not very attached</b>	<b>Total</b>
Within 10 years	50.0	64.7	63.6	62.4
Within 5 years	14.3	11.8	27.3	21.6
Never	35.7	23.5	9.1	16.0
Total	100.0	100.0	100.0	100

*Source:* Australian Householder Survey, Feb-March 2015.

### 5.3.4 Perceived vulnerability of the residential property

As a further measure of risk estimation, respondents were asked to rate the perceived vulnerability level of their home in the event of a major fire. Due to substantial changes in the Australian standard for buildings in bushfire prone areas introduced in 2010, following the Victorian bushfires in 2009 (ABCB 2018), it appears important to consider the age of the building stock survey respondents lived in at the time they completed the questionnaire. The survey shows that 30 percent of the properties were built after the year 2000, with some 27.7 percent built between 1986-2000, 31.4 percent between 1971-1985, and the remaining 11 percent of properties were built before 1971. It might also be important to reiterate that all the households targeted by the survey were located in a bushfire risk area not defined as a ‘Bushfire Safer Place’ (Find your bushfire risk status, CFS 2018), and rated a bushfire rating of medium or high in the development plan. Overall, 68.5 percent of respondents considered their property to be ‘vulnerable’ or ‘extremely vulnerable’, with just over one third of younger respondents more likely to feel extremely vulnerable as indicated in Table 5.5. By contrast, one third of those aged 45-64 years, and just over one third of those aged 65 plus considered their property not to be very vulnerable.

**Table 5.5: Perceived vulnerability of the property by age of respondent**

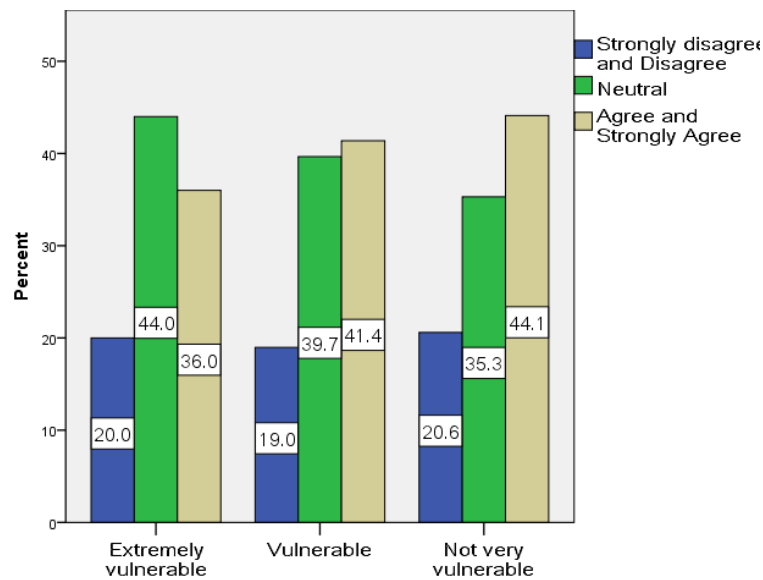
<b>Perceived vulnerability</b>	<b>18-44 years</b>	<b>45-64 years</b>	<b>65 plus years</b>	<b>Total</b>
Extremely vulnerable	34.5	13.0	17.1	19.4
Vulnerable	44.8	53.7	46.3	49.2
Not very vulnerable	20.7	33.3	36.6	31.5
Total	100.0	100.0	100.0	100

*Source:* Australian Householder Survey, Feb-March 2015.

No significant relationship was found between age of the property and perceived vulnerability. In terms of respondents’ estimation of their property’s proximity to a large area of vegetation, 25.5 percent considered their property to be situated immediately adjacent to such an area of vegetation, and the remaining three quarters did not. Surprisingly, the majority of those who felt their property

was extremely vulnerable, were those who also indicated that their property was **not** located immediately adjacent to a large area of vegetation (84%). Conversely, 28.2 percent of those who felt their property was not very vulnerable in the case of a major fire indicated that the property was located immediately adjacent to a large area of vegetation. This result could be understood by acknowledging that householders have differing levels of bushfire understanding and preparedness, and that those with a property situated closer to large areas of vegetation might be more knowledgeable on issues of bushfire risk and were more likely to be prepared (see Morrison *et al.* 2014). This same issue could be influential on participant’s desire for more trees as it is revealed in Figure 5.3, with those people who felt their property was not very vulnerable also more likely to wish for more trees.

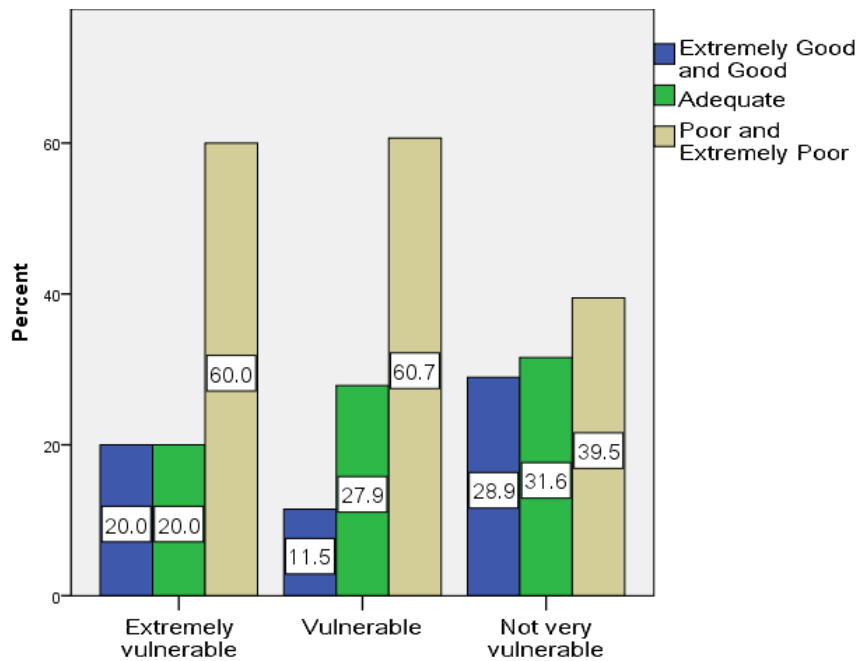
**Figure 5.3: Respondents’ perceived vulnerability level of their property by agreement level with ‘more trees’**



Source: Australian Householder Survey, Feb-March 2015.

The perceived quality of the escape routes from the residential home was also assessed, and Figure 5.4 shows that those who did not perceive their property to be very vulnerable, and therefore felt safer, were far more likely to say that the exit routes were good or adequate, than those who felt vulnerable. For each of the three perceived vulnerability levels of the property, the quality of the exit routes was predominantly deemed poor or extremely poor – an issue that is further investigated later in section 5.3.7.

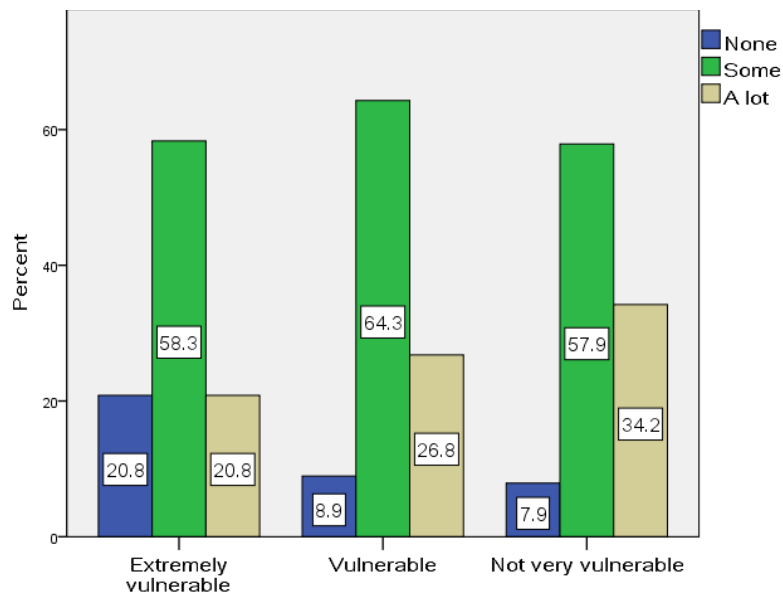
**Figure 5.4: Respondents' perceived vulnerability of property by quality of exit routes**



Source: Australian Householder Survey, Feb-March 2015.

Figure 5.5 shows that respondents who felt safer, with lower vulnerability levels of their property in the event of a major fire, were also those more likely to say that they felt they had considerable personal influence over bushfire risk levels.

**Figure 5.5: Respondents' perceived vulnerability of property by personal capacity to influence bushfire risk**



Source: Australian Householder Survey, Feb-March 2015.

When looking at respondents' perceptions of the property vulnerability and their assessment of the likely timeframe for a bushfire, it was found that a majority of those who believed such a fire would never occur, were also those who saw their property as not being very vulnerable (64.7%). This relationship was found to be statistically significant (Fisher's Exact Test  $p = < .05$ ). This result may seem unsurprising, but it has the potential to be an important indicator of a group of people who are being relatively blasé in relation to the risk, and discounting the natural hazard as an important issue.

### **5.3.5 Planned behaviour for a catastrophic fire day**

The current official advice in Australia on fire-weather danger days rated as 'catastrophic' is for residents in high bushfire risk areas to leave early in a process of voluntary self-evacuation (AFAC 2012). In Australia, a large body of research now exists on the topic of homeowner preparedness and evacuation intentions in high-risk contexts, which particularly began focussing on this topic following the large number of casualties partly associated with the delayed residential evacuation during the 2009 Victorian bushfire event (McLennan *et al.* 2012; Whittaker *et al.* 2013; Reid and Beilin 2014; Morrison *et al.* 2014; McLennan *et al.* 2014; Dunlop *et al.* 2014; McCaffrey *et al.* 2017). That body of work highlights the complexity of decisional processes involved in such situations of emergency self-evacuation. Residents in high-risk situations are likely to wait for trigger events such as the palpable evidence of a bushfire (smoke and flames) before deciding how to act. Instead of leaving early, the tendency is to wait until others, such as neighbours are leaving or feeling directly threatened.

The survey was partly designed to explore respondents' likely choices in the situation of a 'catastrophic' fire danger level being announced in SA – a situation that has occurred on several occasions since the concept was introduced in 2009. Respondents were asked to indicate what would most likely reflect their actions on a fire danger day declared 'catastrophic' or 'code red'. Contrary to other research projects in this area (eg. McLennan *et al.* 2014), no imminent fire threat was hypothesised here.

Responses were grouped into three behavioural categories: 'evacuate or enact plan to defend', 'business as usual' or 'wait and see'. The first category reflects two types of actions that follow emergency guidelines recommended in the case of an emergency by the CFS, either leaving or staying and enacting an appropriate emergency plan. The second and the third categories 'business as usual' and 'wait and see', could both qualify as problematic as they imply staying in areas where a bushfire could have a potentially catastrophic impact. A 'business as usual' approach could be seen as particularly alarming, as in this case no acknowledgement of a heightened risk awareness is reflected

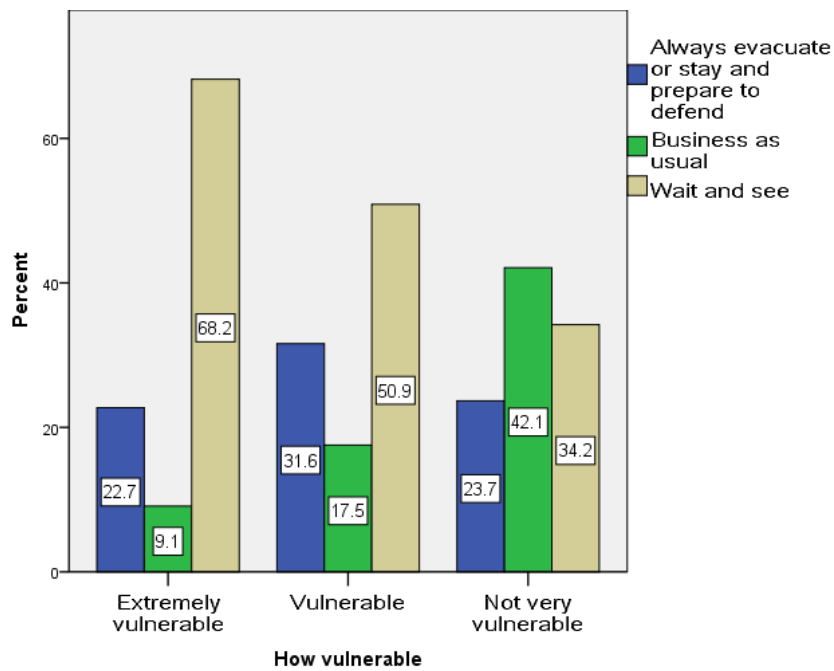


in respondents' intended behaviour. A review of research conducted on risk perception and preparedness revealed that no behavioural option equivalent to 'business as usual' had been explored to date. This may be the result of a general assumption that householders living in a high fire risk context would, as a matter of course, change their behaviours from the running of their day-to-day activities on a declared catastrophic fire danger day. One aspect of the literature that examines Australian householders' failures to mitigate natural hazard risks (McLennan *et al.* 2017; Eriksen and Gill 2010), could however provide some commonality. As those studies found, the 'business as usual' attitude identified in this survey, could be associated with aspects of denial or fatalism amongst householders who were failing to mitigate risks associated with bushfire, resulting in 'maladaptive' responses, which in turn leads to increased vulnerability (McLennan *et al.* 2017).

Survey data showed that a quarter of the sample declared that they approached catastrophic fire danger days with a 'business as usual' attitude. A further 49 percent of respondents indicated that they favoured the 'wait and see' approach. These two groups combined (74%) are acting against official emergency services guidelines; whilst only just over a quarter of the sample stated that they act according to emergency services' protocol, specifying that they 'always evacuate' or 'stay and prepare to defend, enacting my fire plans', as their usual behaviour on declared catastrophic fire days. In other words, despite elevated risk evaluations in relation to the likelihood of a large bushfire and the general perception of vulnerability of their properties, most respondents indicated approaching a day rated as 'catastrophic' with behaviours that contradict official safety recommendations for such an extreme bushfire-risk situation. In the light of the considerable public safety concerns surrounding last-minute evacuation, these results prompted an analysis into the socio-demographic details of those who anticipate taking a 'business as usual' or 'wait and see' approach, as well as of those who were going to follow guidelines on such a potentially catastrophic day.

The survey found that a significant relationship exists between perceived vulnerability levels for the home and intended behaviour patterns on catastrophic fire days. Figure 5.6 shows that those who perceived their property to be 'extremely vulnerable', the 'business as usual' course of action was the least popular (9.1%), whereas 'wait and see' was the most likely behaviour amongst respondents (68.2%). This result was statistically significant (Fisher's Exact Test  $p = < .05$ ). A similar pattern was found for those who considered their property to be 'vulnerable'. As expected, those who felt their property was 'not very vulnerable', were far more likely to say they would carry on with 'business as usual' (42.1%).

**Figure 5.6: Respondents' perception of their property's vulnerability by intended behaviour for a catastrophic fire day**



Source: Australian Householder Survey, Feb-March 2015.

The dilemmas surrounding decision-making on high fire-risk days was highlighted by the results showing that those who perceived that their property was vulnerable, were also those most likely to have selected a 'wait and see' approach (68.2%) on a declared catastrophic day. This result from residents in the Mount Lofty Ranges supports other research findings showing that knowledge of the exposure and risk levels in householders does not readily translate into explicit risk mitigation actions (McLennan *et al.* 2014).

Table 5.6 shows that in total, 49 percent of respondents stated that under such potentially critical circumstances as a 'catastrophic' or 'code red' day, they would wait and see, whereas one quarter would evacuate or enact a fire plan and the remaining would carry on with business as usual. Of particular note, those of older ages, particularly those aged 65 or more (62.8%), were more likely to wait and see than younger respondents, which was statistically significant ( $p < .05$ ). This raises some important issues for bushfire risk mitigation if potentially more vulnerable and less mobile individuals are more likely to delay their evacuation. These results also show that approximately one quarter of respondents across all age groups would act according to authorities' advice and always evacuate or enact an existing fire plan to stay and defend their home.

**Table 5.6: Usual behaviour on a catastrophic bushfire day by age of respondent**

<b>Usual behaviour</b>	<b>18-44 years</b>	<b>45-64 years</b>	<b>65 plus years</b>	<b>Total</b>
Always evacuate or enact plan to defend	25.0	26.3	27.9	26.6
Business as usual	25.0	35.1	9.3	24.2
Wait and see	50.0	38.6	62.8	49.2
Total	100.0	100.0	100.0	100.0

*Source:* Australian Householder Survey, Feb-March 2015.

As mentioned, the dilemmas and complications surrounding residents' reluctance to leave when warned of potential or actual bushfires has been the topic of research in Australia and overseas, and has become known as 'wait and see' problem (see for example Reid and Beilin 2015; McCaffrey *et al.* 2017). Importantly, the survey findings suggest that in the case of a bushfire emergency on a declared catastrophic fire danger day, a large number of individuals aged 65 years or more would potentially need to face the highly complex task of a self-evacuation, as they would have opted to wait and see rather than leaving early. In addition, the 'business as usual' approach explored in this survey, attempts to provide further understanding for the types of behaviours residents adopt when catastrophic fire conditions are forecast. This behavioural category implies that residents would not at all modify or adapt their activities ahead of such potentially critical conditions. Importantly, one quarter of survey respondents, would be relatively unprepared, as they would have chosen to carry on normally with their daily lives. Based on these results, the critical issue of risk mitigation could be a focus of public engagement projects directed at these specific groups. Those residents aged over 65 could be particularly encouraged to leave early, and especially those aged 45-64, targeted with a message focussed on the potentially negative consequences of a 'business as usual' attitude leading up to, and during, critical fire-weather days for themselves and others.

It must be noted that neither gender, education levels nor sector of employment did appear to influence intended responses to a catastrophic fire-weather warning, with little difference shown for the three groups of intended behaviours. However, the type of behaviour intended for a catastrophic day and time-lived in the location revealed that the most sedentary group who had lived in the area for over 16 years, were most likely to 'wait and see' (53.2%). The most recent arrivals in the surveyed location, having lived in the area for up to 5 years, were slightly more likely to follow official protocols. While there was no statistically significant difference in these results, it could be an indication of a certain level of 'alert fatigue' or simply a downplaying of the risk by those who have lived in the location for some time. Based on country of birth information, it was revealed that whilst overall the preferred approach is to 'wait and see', those born in a country other than Australia were proportionately less likely to follow emergency services guidelines. Table 5.7 shows that only 17

percent of those born in another country chose to ‘always evacuate or stay and prepare to defend’. Almost one third of those born overseas said they followed a ‘business as usual’ approach, compared to one fifth of Australians. For both groups, about half said that they would ‘wait and see’. Once again, these results suggest that there is merit in targeted communication and engagement programs, in this case targeting residents not born in Australia, to raise awareness of the importance of leaving early or having a comprehensive fire-plan for a forecast of weather conducive to catastrophic fire conditions.

**Table 5.7: Usual behaviour on a catastrophic bushfire day by country of birth of respondent**

<b>Usual behaviour</b>	<b>Australia (n= 79)</b>	<b>Overseas (n= 47 )</b>	<b>Total</b>
Always evacuate or enact plan to defend	31.6	17.0	26.2
Business as usual	20.3	31.9	24.6
Wait and see	48.1	51.1	49.2
Total	100.0	100.0	100.0

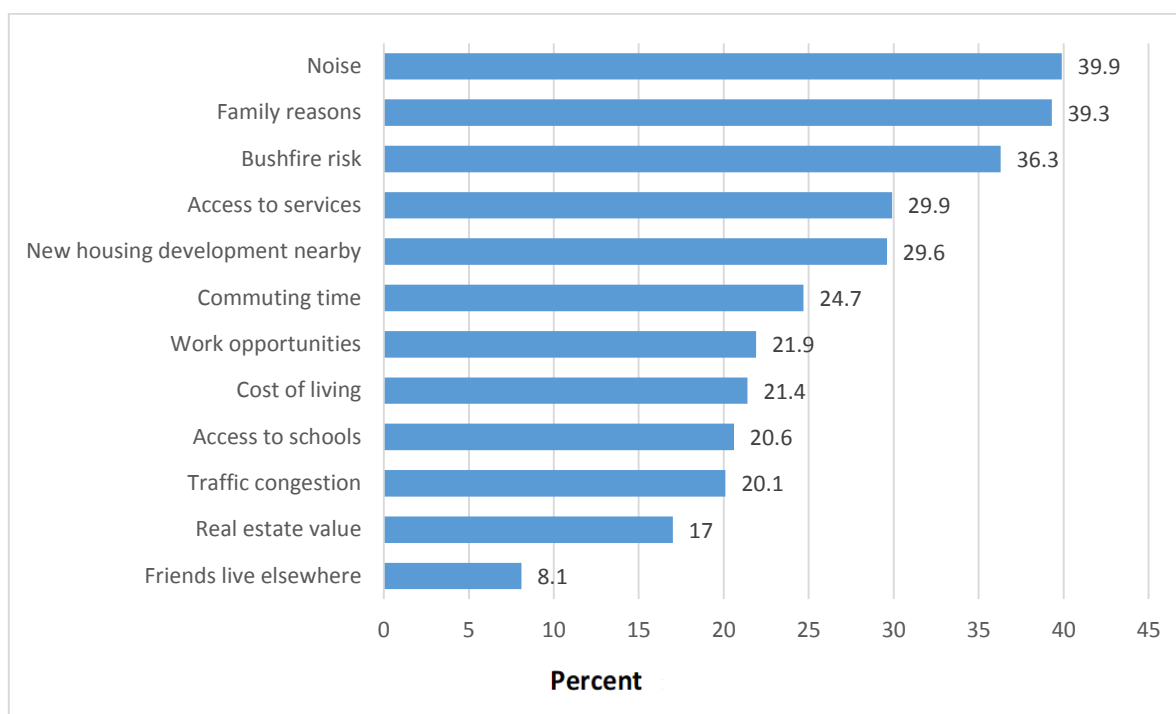
*Source: Australian Householder Survey, Feb-March 2015.*

In summary, clearly older respondents, and to some degree those who have lived in the location for the longest and those born overseas, are more likely to take a ‘wait and see’ approach on a declared catastrophic day. Younger respondents on the other hand, especially those aged 45-64 years, were more likely to select ‘business as usual’ as their most likely response to a catastrophic fire-weather warning. Clearly, these different groups within a community will act differently before and during a bushfire event, and that social complexity will be important to understand to communicate effectively during both preparation and response phases of hazard management.

### **5.3.6 Voluntary relocation due to the perceived bushfire risk**

The potential for bushfire risk to be a driving factor influencing decisions to relocate to a different area was considered. Figure 5.7 shows that the risk of bushfires was the third most important reason that might make respondents think about moving away. The importance respondents attributed to noise and family reasons however, prevailed over the risk of bushfires as a reason to leave. Access to services, the building of new housing estates nearby, commuting time, work opportunities, cost of living, access to schools and traffic congestion followed next in decreasing order of importance. Finally, real estate value, and choices linked to friends were the factors that were seen as less important in this context.

**Figure 5.7: Most important factors influencing respondents' thoughts of relocation**



Source: Australian Householder Survey, Feb-March 2015.

Table 5.8 shows that age of respondents was closely associated with responses to 'move away due to bushfire risk', with a significant 50 percent of the 18-44-year old group seeing bushfire as an important enough risk to potentially justify moving to a different area ( $p < .05$ ). Conversely, within the 65 plus age group, a majority (58.3%) considered that bushfire was not an issue that would make them consider moving. This result perhaps mirrors earlier results that found younger respondents overall more likely to feel that their home was extremely vulnerable in the event of a major fire.

**Table 5.8: Bushfire risk as motivation for relocation by age of respondents**

Bushfire risk as motivation	18-44 years	45-64 years	65 plus years	Total
Important	50.0	29.3	36.1	36.1
Neutral	21.4	36.2	5.6	23.8
Not important	28.6	34.5	58.3	40.2
Total	100.0	100.0	100.0	100.0

Source: Australian Householder Survey, Feb-March 2015.

Close to half of all the couples with children are considering moving because of the bushfire risk, whereas for respondents from a household without children, this issue did not appear to be so relevant. Table 5.9 shows the relationship between household composition and bushfires as a motivation for relocation, and revealed that families with children were significantly more likely to consider relocation ( $p < .05$ ).

**Table 5.9: Bushfire risk as motivation for relocation by household typology**

<b>Bushfire risk as motivation</b>	<b>Couple with children</b>	<b>Couple only</b>	<b>Other</b>	<b>Total</b>
Important	47.7	22.0	38.2	36.1
Neutral	29.5	24.4	14.7	23.5
Not important	22.7	53.7	47.1	40.3
Total	100.0	100.0	100.0	100.0

Source: Australian Householder Survey, Feb-March 2015.

In this particular case, gender, education, length of stay of the respondent do not appear to influence thoughts of relocating to a different place. In summary, older household representatives and those living as a couple with no children, were most likely to have said that they did not consider the bushfire risk in the area as a reason to move. Importantly, younger respondents, often with children, thought that the risk situation is significant enough to make them think that they would rather live somewhere else.

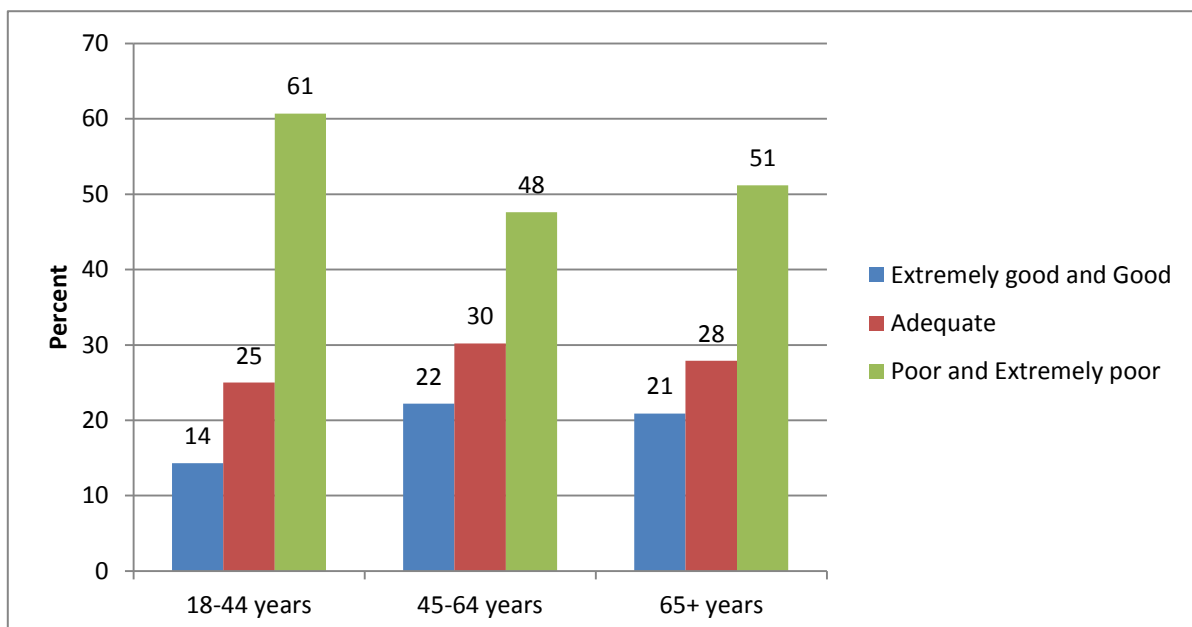
When looking at responses to this question of voluntary relocation and possible relationships to other variables posed by environmental hazards, results show a significant relationship between the 'move away' responses and a personal evaluation of the vulnerability of the property. Amongst those who considered their property to be very vulnerable, a significant 54.2 percent of respondents considered bushfire risk as a potential reason to move (Fisher's Exact Test  $p < .05$ ). Amongst those who indicated having a large area of vegetation immediately adjacent to their residence, nearly half rated 'bushfire risk' as an important factor influencing a decision to move away (46.9%). Also presenting a statistically significant difference with 'thoughts of moving away' was the patronage of native bush/recreation spaces in the local area. In this case, people whom frequented local green spaces 'most days' largely equated with a dismissal of bushfire risk as a reason to move away. This result further highlights the importance of personal knowledge and values in relation to the forest, with people who are very attracted to the natural spaces perhaps more willing to discount some of the inherent risks of the forest.

### **5.3.7 The capacity to escape a potential fire**

Bushfires and risks associated with poor road egress are important planning issues in the surveyed area, and are regularly covered in the local Blackwood Times and Messenger newspapers (Spencer 2014; Penrose 2014). Questions raised in those local publications include concern over traffic congestion and the management of the freight trains on the Adelaide to Melbourne interstate train line, where long freight trains up to 1.8 km in length can simultaneously block multiple rail-crossings and potentially obstruct vital emergency escape routes. Discussions on the safety of trains were

intensified following the revelation that the 2014 bushfire in Belair National Park, an area in close proximity to the surveyed residences, was started by sparks emitted from a passing diesel freight train. Figure 5.8 shows that for respondents of all ages the quality of the escape routes from their home in case of a fire was predominantly rated as poorly or extremely poor. The perceived quality of escape routes was closely associated with ‘bushfire risk as a motivation to move’, with those estimating the quality of the existing roads as ‘very poor’, most likely to consider bushfire risk as one of the reasons why they would voluntarily shift residence (Fisher’s Exact Test  $p < .05$ ). The only difference in respect to age was expressed in greater concerns about the inadequacy of escape routes amongst younger participants.

**Figure 5.8: Respondents’ evaluation of the quality of the escape routes in the case of a fire by age**



Source: Australian Householder Survey, Feb-March 2015.

It might be that younger people are not simply recognising higher risk, but also that their residences are likely to be deeply embedded in estates that would require long drives to escape in an emergency. Over ten road intersections between residences and potential main road escape routes are not uncommon within the surveyed area, with a single exit route option common for many respondents. Respondents’ concerns on the issue of escape routes were made clear in comments provided on the major problems in the area and in what householders liked least about their area. A map of these localities, found in the background chapter (Figure 3.3), indicates convoluted nature of roads in the target suburbs.

## **Craigburn Farm**

A respondent aged between 35-39 years, who did not want to disclose their gender and who had lived in the area for less than 6 years said: *'Escape routes from the estate. We live in [Street name removed] and realise it will be crammed with people getting out in the event of a fire'* (ASHN95);

A female respondent aged between 55-59 years, who had lived in the area for less than 1 year said: *'Open some more escape routes. There are a couple of cul-de-sacs that could easily be opened up to a street in Blackwood (Cumming Street)'* (ASHN105);

A female respondent who did not wish to disclose their age, who had lived in the area between 6 and 10 years said: *'I am nervous about bushfires and the lack of escape routes' and 'definitely lack of escape routes during a bushfire'* (ASHN106);

A female respondent aged between 60-64 years, who had lived in the area for less than 6 years said: *'Council needs to support CFS regarding escape routes and SA planning should not allow such narrow roads'* (ASHN108);

A female respondent aged between 40-44 years, who had lived in the area for less than 6 years said: *'[...] not enough roads leading out towards Shepherds Hill Rd, Coromandel Parade will be impossible to get out onto with all the roundabouts. I am very upset about the closure of Hayman Rt'* (ASHN132);

A male respondent aged between 55-59 years, who had lived in the area for less than 6 years said: *'Poorly planned transport routes, particularly in case of a bushfire and major evacuation. Insufficient "escape routes"'* (ASHN139).

## **Flagstaff Hill**

A male respondent aged over 65 years, who had lived in the area for over 21 years said: *'Blacks Road/ Kingfisher Circuit only escape route'* (ASHN18);

A female respondent aged over 65 years, who had lived in the area for less than 6 years said: *'Only one road in out to escape however cannot think of any other alternative'* (ASHN20).

## **Blackwood**

A male respondent aged over 65 years, who had lived in the area for over 21 years said: *'Level Rail Crossings at 3 locations. Major delays occur when freight trains go through. Inadequate rail network particularly if motorists attempted "escape" on a catastrophic day. There would be enormous problems if motorists in "panic mode" did not consider residents entering escape routes. Smoke could exacerbate this concern'* (ASHN115); and he also added:

*'A new escape/ access road is desperately needed to link Craigburn Farm with Shepherd's Hill Rd (Or Bedford Park)'* (ASHN115).

Together, the quantitative and the complementary qualitative responses obtained from the survey generate strong evidence suggesting that in certain areas, the limited opportunity to escape effectively during an emergency event is very important to surveyed residents. In more recent times



and since the survey was conducted in 2015, there have been changes in the level of access to some areas, with the opening of an additional exit out of Craighburn Farm Estate in 2017 through Hayman Retreat and Cumming Street, following considerable pressure from residents concerned about poor egress routes (Swanborough 2018).

### 5.3.8 The relationship between inhabitants and trees in the Hills

In relation of the management of the forest, people are not just concerned about the bushfire risk; they also value the vegetation deeply and are concerned that it is managed appropriately. The results indicate that 38.5 percent of respondents agree with the survey statement *'I would like to see more forest in the Adelaide Hills'*. Although the desire to see more forests in the Adelaide Hills could be associated with environmental or amenity-type personal values, this variable is important in contributing to an overall risk evaluation. It could be argued that a perception of the need for 'more trees' has a threefold interpretation: a) a lack of concern about the risk of bushfire; b) values of the forest are more important than the potential risks from bushfires; or c) personal safety concerns are deemed less significant than universal ecosystem conservation values associated with the native bushland. The second option (b) appears to be more likely, and relates to what a local resident expressed in a comment in the local Messenger press on the issue of creating buffers between dwellings and a potential bushfire:

'I don't want to sound like a greenie. I like the environment, but I am not a green, green person. This [issue of not cutting all large trees within 20 m of the property], to me, is about common sense' (Bond 2017, p.6).

When looking at this issue in relation to the age of respondents, Table 5.10 show that 50 percent of younger respondents were more inclined to want more trees in the Adelaide Hills, with only 28 percent of the 65 plus group, and 43 percent of those aged 45-64 showing agreement for more trees. Some 28 percent of older respondents indicated not wishing more trees, and almost half of them selecting a neutral position on this issue.

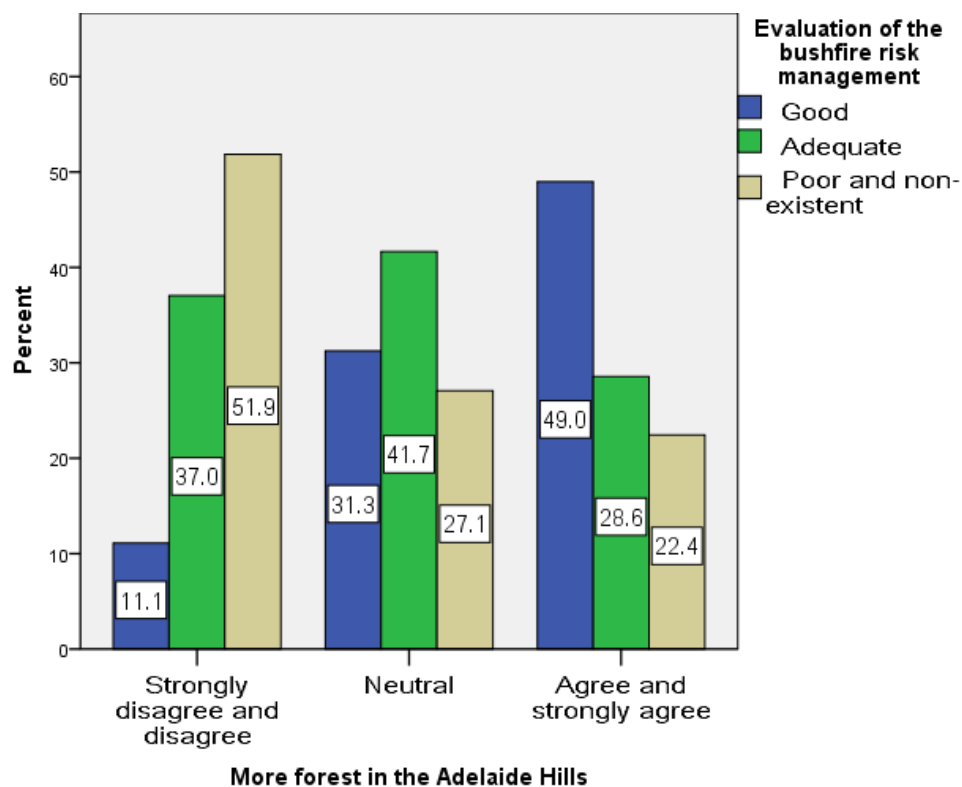
**Table 5.10: Support given by respondents for more forest in the Adelaide Hills by age**

<b>More forests</b>	<b>18-44 years</b>	<b>45-64 years</b>	<b>65 plus years</b>	<b>Total</b>
Strongly disagree and Disagree	17.9	18.3	28.2	21.3
Neutral	32.1	38.37	46.6	38.6
Agree and Strongly Agree	50.0	43.3	28.2	40.2
Total	100.0	100.0	100.0	100.0

*Source:* Australian Householder Survey, Feb-March 2015.

Figure 5.9 shows that the evaluation of bushfire risk management is associated with the wish for more trees, with those who are satisfied with the current risk management significantly more likely to be in favour of more trees. As such, half of the respondents who want more trees (49%) are also more likely to approve current management approaches, compared to only 11 percent of respondents who evaluate that bushfire risk management is good but do not want more trees. Of those not wanting more trees, some 51.9 percent thought management poor or non-existent. This relationship was found to be statistically significant ( $p = < .05$ ), and this finding suggests that there are two groups of residents with contrasting views and values on trees. One group is prioritising conservation outcomes and is therefore willing to discount the associated risk, whereas the other group includes those for whom the risk estimation exceeds amenity and ecological values, and where vegetation close to the home presents a more important concern. These results parallel a broader study in SA (Bardsley *et al.* 2018).

**Figure 5.9 Respondent’s evaluation of the bushfire risk management by their expressed support for more forests**



Source: Australian Householder Survey, Feb-March 2015.

Whether residents perceived that they can influence the fire risk through their actions was found to be related to their personal value of wanting more forests in the Adelaide Hills ( $p = < .05$ ). The wish for yet more forest was also found to bear a statistically significant linear relationship with

disagreement with the statement that 'vegetation clearance to reduce fire risk is acceptable'. Again, this result indicates that vegetation clearance, even to reduce fire risk, was not a popular option with those who would like to see more forests ( $p = < .05$ ). In addition, 57.7 percent of respondents who rated their access and escape routes 'good and extremely good' wished for more forests. These findings suggest that most respondents who would like more trees in the landscape, value the forest to an extent that prevails over any security concerns, especially when they feel confident that they can escape potential bushfire events. The question to be asked however, is whether a series of bad fires in the vicinity or in similar areas elsewhere in the world, or a prolonged period of drought, might suddenly convince these individuals to prioritise safety? In such a case, what would happen to the local and nationally significant intact Grey Box grassy woodlands, part of the peri-urban areas covered by the survey?

In summary, it was generally found that those who wanted more trees were satisfied with the bushfire risk management in their region, they believed in sufficient personal agency to influence the risk, they didn't support clearing, and predominantly estimated their escape routes as good, and would wait and see how the day unfolded on a day rated 'catastrophic' before deciding what to do. In contrast, younger respondents were more likely to prioritise the risk and were already concerned about the amount of trees in their neighbourhood, as well as the landscape, while problems with access were already making them think of leaving.

### **5.3.9 The question of checking hazard ratings before buying a property**

Some 97 percent of respondents in the Australian Householder Survey were owner-residents, a very different situation to the Swiss survey where a much lower 64 percent of respondents owned their place of residence. In the Australian case, the survey found that almost three quarters of respondents did not check the bushfire rating of the location before buying or building their residence. In their defence, a large proportion of respondents in the sample would have moved into the area before bushfire ratings, or 'bushfire protection provisions' were introduced in 2006 (DPTI 2018). It is important to note that 29.9 percent of homes in the sample were constructed after 2000, and the proportion of those who had checked bushfire ratings increased to 49 percent, or almost half of respondents, for those who moved into a house built after that year. Added construction costs to comply with the 2010 Australian Building Code rulings for construction in bushfire prone areas, are potentially another important factor for homeowners' awareness. It is likely that of the 27 percent of respondents who said that they had checked the bushfire rating, a number would have needed to do so in the process of obtaining building permission for a new home or renovations. It is not possible to

establish how many respondents had sufficient prior knowledge of the risk posed by fires in their area to check about the bushfire rating before buying/building or renting. Importantly, for those who bought an existing house or are tenants in a rental property, the question of how dangerous the location would be for them and their family in case of a bushfire, might not have come up at all. These and other planning issues which emerged during the analysis of survey data raise important topics that will be discussed further in relation to the manner in which residents are interacting with the planning process.

#### **5.4 Relationship to urban planning processes**

As shown in previous research (Bekessy *et al.* 2012; Bardsley *et al.* 2015), peri-urban areas generate significant challenges for any spatial planning system, particularly as urban-style infrastructure development must be managed in areas where there is also conservation of significant ecosystems. In the South Australian context, the peri-urban is also increasingly marked by the additional challenge of managing the substantial bushfire risk resulting from a situation where, in many cases, an almost seamless canopy stretches between the areas where trees are growing in gardens or along verges, and the conservation estate. To deal with these challenges, Paul Slovic (2016, p.26), in his overview of perceived risk, emphasises the need for an approach focussed on:

‘public participation into both risk assessment and decision making in order to make the process more democratic, improve the relevance and quality of technical analysis, and increase the legitimacy and public acceptance of the resulting decisions’.

Collaborative spatial planning has the potential to generate an understanding of community values and perceptions to fulfil the dual mandate of conservation and bushfire risk management in association with urban development pressures in the Mount Lofty Ranges. For that reason, residents’ relationship with the planning process, their involvement in local community life, their conception of the vegetation and how it should be managed, as well as future spatial priorities for the local area were assessed.

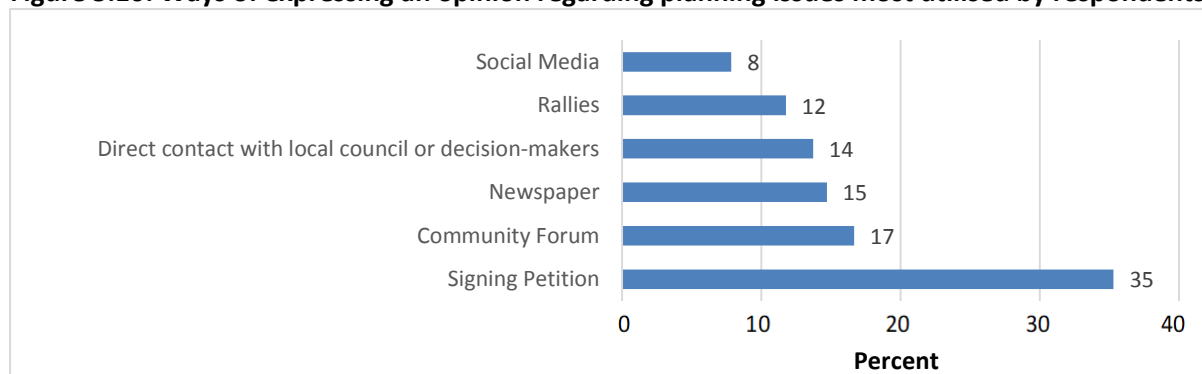
##### **5.4.1 Voice, familiarity/ knowledge of the land use planning system**

The survey asked about perceptions of local land use planning, including: levels of engagement and methods used to generate participation of residents in the local area; the levels of understanding of the South Australian land-use planning system; satisfaction with, and perception on levels of influence on land-use planning decisions. Over half of the respondents said they felt they had no voice in

planning issues concerning their local community (56%); while only 23 percent felt they did have a voice and a further 21 percent were unsure. Those respondents who indicated having ‘no voice’ were more likely to be male, with little difference shown among them according to their length of residence.

Over one-third of respondents provided details on how they had been able to express their opinions regarding planning decisions for the local community. Figure 5.10 shows that ‘signing a petition’ was the primary approach residents had taken (35%), followed by attending a ‘community forum’ (17%) or engagement through the ‘newspaper’ (15%). Most of these methods could be classified as ‘token’ approaches to engagement according to Arnstein (1969), in comparison to the strong Swiss engagement approaches that will be discussed in the next chapter.

**Figure 5.10: Ways of expressing an opinion regarding planning issues most utilised by respondents**



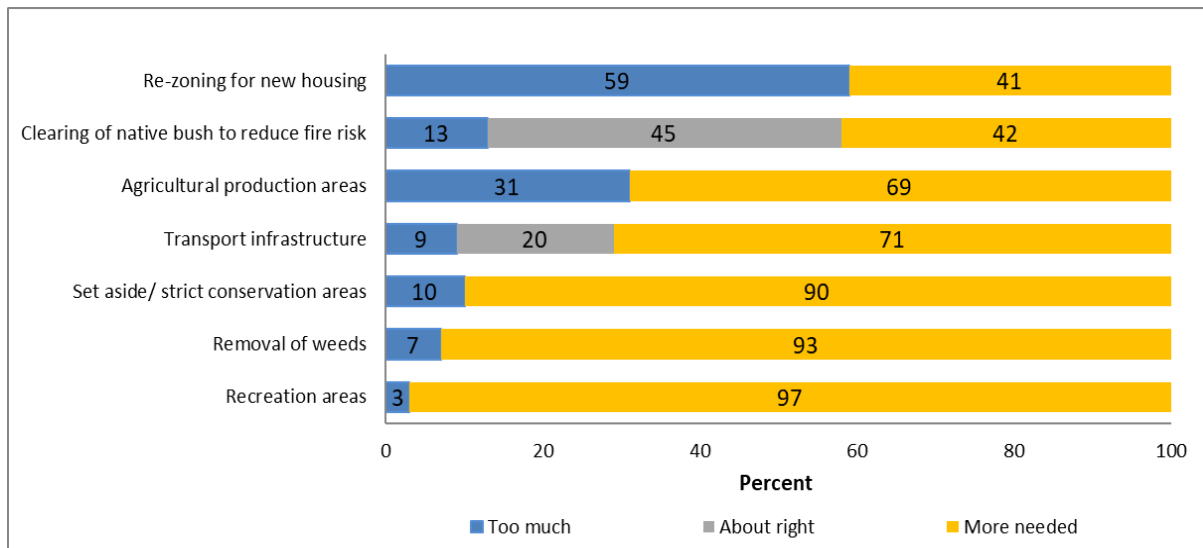
Source: Australian Householder Survey, Feb-March 2015.

Familiarity with the formal planning system is not widespread in Australia (Rogers *et al.* 2017). Sixty-five percent of the survey respondents reported having no familiarity with the South Australian planning system, while one third had some knowledge, and only 2 percent said that they were extremely familiar. Most respondents reported not having heard of any recent changes to the planning guidelines that would affect their local area. Additional comments provided by the 10 percent who indicated some knowledge of such changes to planning processes, outlined a wide range of issues including: building regulations for home extensions; new guidelines on the subdivision of existing blocks; a road upgrade at nearby Darlington intersection; moves to regionalise planning away from local councils as part of the State’s planning reform; and the release of more land for the Craighburn Farm development within the Mitcham Council area.

A lack of familiarity with details of the formal planning system, including its governance mechanisms, does however not preclude respondents from having an opinion on aspects of local planning. Figure 5.11 highlights how respondents believe that there has been enough zoning for urban development, and how more conservation areas are now required. More recreation areas, the removal of invasive

weeds and more strict conservation areas, were also priority concerns for over 90 percent of respondents. While the survey responses indicated that there was general support for current levels of clearing and the management of native bush to reduce the fire risk, transport egress was a particular concern. The results also show strong support for more infrastructure to deal with traffic congestion, with 71 percent seeing a need for more investment in this area.

**Figure 5.11: Future priorities for local planning as expressed by respondents**



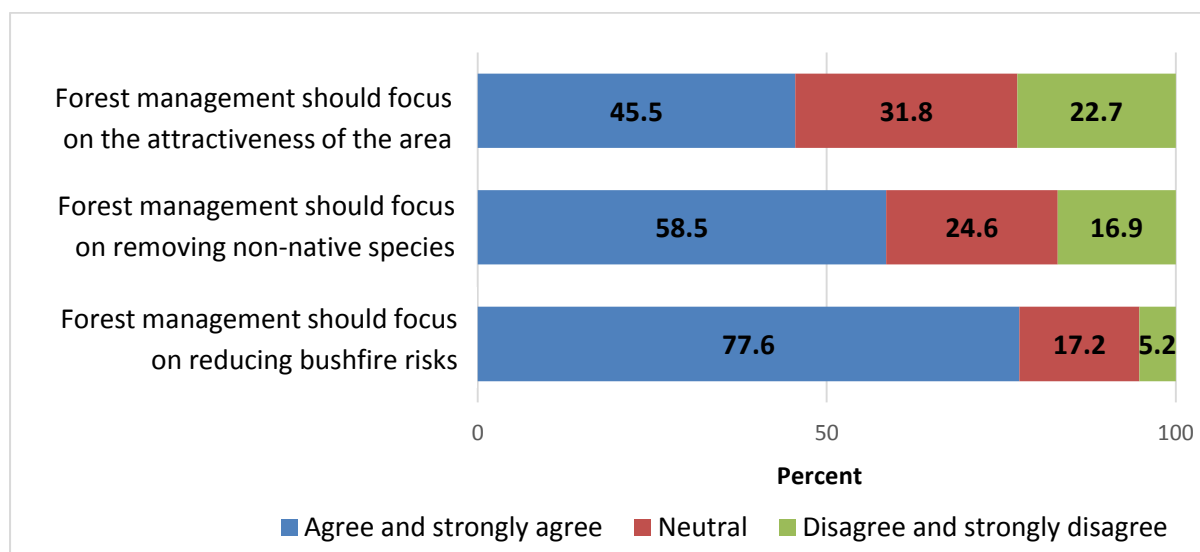
Source: Australian Householder Survey, Feb-March 2015.

#### 5.4.2 Satisfaction levels with the land use and spatial planning system

The survey found that 84 percent of respondents were satisfied with the management of environmental assets and risks. However, due to the complexity of the planning issues and due the nature of respondents' multiple and at times, conflicting priorities, results are presented in three sections. The first section analyses the approval of vegetation management practices for environmental values, the second, the approval of vegetation management for fire risk reduction, and the third considers aspects of infrastructure provision, including transport and exit routes.

Figure 5.12 shows that residents clearly value native vegetation highly. Nevertheless, the majority of respondents highlight the need for forest management to prioritise the reduction of bushfire risk. There are many invasive, exotic species in the forests of the Mitcham and Onkaparinga Council areas, many of which, such as olives, are a known fire hazard (DEH 2009), and that issue may partly explain the high level of concern about the need to remove non-native species.

**Figure 5.12: Forest management priorities according to respondents in the Mount Lofty Ranges**



Source: Australian Householder Survey, Feb-March 2015.

Respondents were clearly very conscious of the need to control the bushfire risk through the implementation of management measures such as maintaining buffer zones and reducing fuel loads, including those consisting of highly flammable invasive species. This finding is further supported by the fact that an overall 85 percent of respondents supported some vegetation clearance to reduce risk, and also by the evidence that current levels of clearance of native bush or scrubland to reduce fire risk were endorsed by 45 percent of respondents. A further 42 percent of respondents supported yet more clearing of vegetation than is currently undertaken. This result highlights a potential threat to what remains of the natural environment in the peri-urban area, especially if residents' values and priorities swing from the current focus on the importance of landscape values, towards more core concerns of safety and the protection of their homes from bushfires.

Residents are still very concerned about the need for conservation. When looking more specifically at the satisfaction levels with the current zoning of conservation reserves, it is evident that while there was support for some more vegetation clearance on one hand, there was also substantial ongoing support for the creation of more conservation spaces. While 46 percent of respondents agreed that the existing level of set aside or strict conservation areas is 'about right', another 44 percent estimated that more conservation areas were needed.

The survey asked householders to list what they perceived to be the major planning problems in their area. As shown in Table 5.11, the 109 individuals who answered this question raised 185 separate

issues. Those which were most frequently raised by respondents were linked to the lack of emergency evacuation routes out of suburbs, representing nearly a quarter of all the items mentioned (23.8%). Concern with evacuation routes included concern about road infrastructure and accessibility, including ‘inadequate exit routes’ and ‘poor roads’ linked to the risks of bushfires. Everyday traffic congestion due to the growing population represented a further 22.7 percent, followed by topics related to ‘fire risk’ and vegetation management issues. Some 9.2 percent of issues involved a lack of public transport and poor access to it. A very small group of respondents (4.8%) saw no major problems in the area. The remaining 20.5 percent represented a miscellaneous group that referred to services, car parking, shops, and the steep terrain.

**Table 5.11: Respondents’ issues perceives ad major problems in the area**

Major problems	Number	Percent
Emergency evacuation routes out of suburbs	44	23.8
Everyday traffic congestion	42	22.7
Miscellaneous other	38	20.5
‘Fire risk’ and vegetation management issues	30	16.3
Lack of public transport and poor access to it	17	9.2
No problems	9	4.8
Freight trains	5	2.7
Total	185	100.0

Source: Australian Householder Survey, Oct-Dec 2015.

The observations of one participant from the suburb of Flagstaff Hill aged between 60-64 years who has lived there for less than 6 years, provides an example of ideas relating to what could be done to make him feel safer. His ideas epitomise the concern expressed by those who are worried about exit routes:

*‘Have better road access routes out from new housing estates. We chose our house, but it was unfortunately within an estate. I am fundamentally opposed to rabbit warren cul-de-sac designed suburbs, they can be isolating from the wider neighbourhood. This suburb design does not suit a fire danger area with poor road networks. This is likely to be the main reason I would leave this area’ (ASHN133).*

The link between new developments and growing population numbers putting pressure on already inadequate road infrastructure, or in the case of Craighburn Farm, concern over the lack of sufficient exit routes from the new suburb, was outlined by 15 respondents. Five of those recognised that the interaction between all three (fire risk, infrastructure and population growth) creates a situation that is potentially very dangerous. The issue of warning sirens to alert residents was also raised. Residents said sirens installed in the new development of Craighburn Farm would make them feel safer, as the



Blackwood sirens were not audible there. Due to funding cuts, the sirens that had been in operation for decades in the Blackwood area have been removed altogether at the end of 2017 (Bond 2018). In line with other findings that suggest strong environmental values, nearly three quarters (73.2%) of respondents rejected the statement *'we should prioritise urban development over conservation'*.

Respondents were also asked to rate several local planning aspects for the surveyed area (on a Likert scale ranging from 1 'too much already', to 5 'much more needed'). Re-zoning for new housing development was the issue with the highest rejection rate, with respondents feeling that the area had already seen too much urban development, and indicating that future planning priorities should instead focus on the development of transport infrastructure. The survey also asked: *'how do you feel about recent housing developments'*? Of the 96 respondents who answered this question, 47 percent expressed negative feelings; 41 percent good feelings and 12 percent were neutral. The division between those expressing negative and positive feelings for new urban developments could be explained by some respondents living in or near the new Blackwood Park development in Craighburn Farm, and therefore more likely to express positive feelings about somewhere they lived. Some respondents who are part of the new Craighburn Farm development provided comments to explain aspects they appreciated in the new subdivision.

A female respondent aged between 55 and 59 years, who had lived in Craighburn Farm for less than 6 years appreciated the social aspects of a new growing suburb: *'Opposite a native park. Friendly neighbourhood. All building together in the new sub-division'* (ASHN30);

A female respondent aged between 35 and 39 years, who had lived in Craighburn Farm between 11 and 15 years said: *'Nature, quiet, new area so everyone in the same boat and all keen to meet neighbours'* (ASHN28);

A female respondent of neighbouring Flagstaff Hill aged between 50 and 54 years, who had lived in the area between 6 and 10 years, appreciated the new development: *'It's good to see the area with new attractive homes'* (ASHN44);

A male respondent aged over 65 years, who had lived in Craighburn Farm between 11 and 15 years said: *'I think the balance between housing and reserves is about right'* (ASHN3);

A female respondent aged between 55 and 59 years, who had lived in Craighburn Farm between 1 and 5 years emphasised the natural and amenity aspects of the area, as well as the cheaper prices of real estate in the hills: *'Native bushland. New, affordable house close to the city. Happy neighbourhood'* (ASHN30).

There were also respondents representing the view that the new development was acceptable, but who also felt that they did not want more new housing in the area:

A long-term female respondent of Bellevue Heights aged between 60 and 64 years, who had lived in the area for over 21 years said: *'OK but surely we have enough now, considering the above [traffic issues]'* (ASHN56);

A long-term female respondent of Bellevue Heights aged over 65 years, who had lived in the area for over 21 years was clearly not a big supporter of the new subdivision on the opposing side of the gorge in Craighburn Farm: *'Enough is enough [development]'* (ASHN70).

#### **5.4.3 Respondents' suggestions for enhanced safety**

When given a chance to express what the State or Federal governments could do to make them feel safer in relation to reducing bushfire risk, 38 percent of respondents listed improved evacuation routes as their number one planning measure that was required. Some 33 percent listed vegetation management (decrease fuel loads), weed control and burn-offs as measures that would make them feel safer. Enhanced community education was also raised in this context by a female respondent of Flagstaff Hill aged between 45 and 49 years, who had lived in the area between 6 and 10 years:

*'Facilitate education both in schools and to the wider community to increase awareness of bushfire risk - increase funding to emergency community educators (CFS, SES, Red Cross etc.) create a system more akin to the fire danger notification system in Victoria where 4 days' notice is given of fire danger ratings, as opposed to not finding out until 4.30pm the night before whether the following day is a severe, extreme or catastrophic fire danger rating'* (ASHN135).

Clearly, in the minds of local residents, there are a number of actions that could be undertaken to improve the local area. As seen earlier, over half of the respondents from the Mitcham and Onkaparinga Hills survey did not feel that their voices were being heard, and also felt that there were considerable risks inherent to the current planning arrangements, particularly in relation to the lack of good evacuation options from their suburb in the case of a bushfire emergency.

### **5.5 Conclusion**

The survey established that respondents living in the forested peri-urban interface in the Mitcham and Onkaparinga Hills are very attached to their place and highly value the lifestyle and scenic amenity of the area. It was found that these values largely translate into a wish for more trees and native vegetation in their neighbourhoods. Still, sampled respondents put safety ahead of more peripheral ecological or landscape values to support the further clearance of vegetation. This is in the context of the powerful finding that close to two-thirds of respondents think that a high-severity bushfire will occur in the area where they live within a decade.

Despite a high perception of risk amongst respondents, including many younger residents indicating a potential willingness to move to avoid the bushfire risk, data on planned behaviour in view of a catastrophic fire weather forecast revealed dangerous tendencies. Those people most likely to be vulnerable to bushfires, such as the aged and younger age-groups (18-44) that include families with young children, were those most likely to approach a catastrophic fire warning day with a 'wait and see' approach. A large majority approach such a potentially critical situation with intended behaviours that go directly against the emergency services' recommendations to 'leave early' or 'enact fire plans'. The data gathered in the survey suggest that amongst the range of issues that worry respondents most, the quality of the egress routes available in the case of an emergency ranked very highly. All the identified factors combined generate a worrisome picture, and represent a potentially dangerous mix, where many people will wait until it is too late and then find that they are unable to evacuate effectively. Respondents are very favourable towards more vegetation, yet their intended behaviours do not adequately reflect the levels of risk they themselves recognise in their local residential environment, particularly in the context of inadequate road infrastructure to permit their safe escape in case of an emergency.

At the same time, results have provided an insight into a population that appears to have very little knowledge of, or interaction with, the planning system. Over half of respondents felt their voices on local planning issues were not being heard, and at the same time, close to a third felt the current bushfire risk management was 'poor or non-existent' in the region where they live, highlighting a lack of faith in the authorities' capacity to effectively manage the perceived risk. Therefore, aside from extensive investment in upgrading and extending the road network, planning authorities must work with local residents to listen to their concerns. Some of those concerns may lead to a reevaluation of the risks associated with further residential development in the picturesque environment of the Adelaide peri-urban interface. Priority must be given to finding ways of engaging the population in a regular and meaningful way, to exchange ideas about their place and to develop ties to planning. Planning agencies could then use those same communication and interaction channels to educate the local population on aspects of bushfire safety and risk reduction. The strong deliberative and representative political system found in Switzerland, offers a unique example of a governance system where direct democratic channels provide the population with the opportunity to contribute directly to governance decisions. The survey conducted in peri-urban Locarno aims to provide a contrasting viewpoint on approaches to managing risk to inform a discussion on opportunities for improvements in SA planning.

# CHAPTER 6

## LANDSCAPE PLANNING PERSPECTIVES WITHIN A DELIBERATIVE DEMOCRATIC SETTING OF HIGH ENVIRONMENTAL RISK

### 6.1 Introduction

This chapter explores data from the Swiss Householder Survey (SHS) conducted in October-December 2015, in the peri-urban residential areas covering the south-facing upper slopes of the Locarnese region of Canton Ticino. To contrast the Australian situation, the survey of perceptions discussed here was conducted in a fire prone area of the Locarnese region, in southern Switzerland. Respondents' values in relation to place and the environment; their perception of environmental hazard risks; and their relationship with the local spatial planning system were assessed. The survey was designed to provide a complementary perspective to the somewhat similar forested, high-environmental hazard space in the peri-urban setting in Australia. The research objectives covered in this chapter include an analysis of residents' perception of environmental values and risks within the dynamic context of the Locarno peri-urban fringe, and an evaluation of their interaction with the planning system. Some specific research questions addressed in the Ticinese context are identical to those addressed in the previous chapter reporting on the Australian survey, and they include:

1. What are the dominant environmental values and risk perceived by Swiss residents on the peri-urban fringe and how do those perceptions impact on their behaviours?
2. What are the relationships between identified perceptions of environmental values and risks?
3. How are residents engaging with the local planning processes in Switzerland?

The challenges for forest fire management in southern Switzerland, Canton Ticino, are different to those discussed within the Australian context largely because the risk levels are substantially higher within the Mount Lofty Ranges. For this reason, the risks associated with wildfires for the Swiss Householder Survey were investigated as part of a broader environmental hazard discourse.

## 6.2 Perceptions of place and of the environment

Peoples' personal values and worldview shape their relationship to place and environment (Schwartz 1992; 1994; 2012). This in turn can have an influence on people's perception and evaluation of the risks presented by natural hazards (Rose 2007), on expectations in relation to the management of green, forested spaces, and on future spatial planning demands (Goemans *et al.* 2013). Survey results in relation to perceptions of place of residence, the natural and the built environment, as well as opinions on vegetation management practices are evaluated in this section. Indicators of place attachment considered include:

- An appraisal of personal level of attachment to the location;
- The length of residence;
- Participation in local community groups;
- Home ownership; and
- Patronage of local green spaces.

### 6.2.1 Attachment to place and values influencing choice of residential location

Table 6.1 shows that 91 percent of survey respondents were in agreement with the statement '*The green spaces in the Locarnese region are very important to me*'. The importance attributed to the local green spaces, and the attachment to the Locarnese region, were the statements with the highest levels of agreement across the range of potential value statements. Of particular note, over three quarters of respondents disagreed with any prioritisation given to urban development over nature conservation. About one third of respondents were 'neutral' to issues of population increase, effectiveness of the local municipal zoning plan in supporting conservation, and the relative importance of vineyards. These results reflect residents' strong emotive attachment to the region and an appreciation of green spaces, as well as high levels of disapproval of inappropriate urban development in green-field sites.

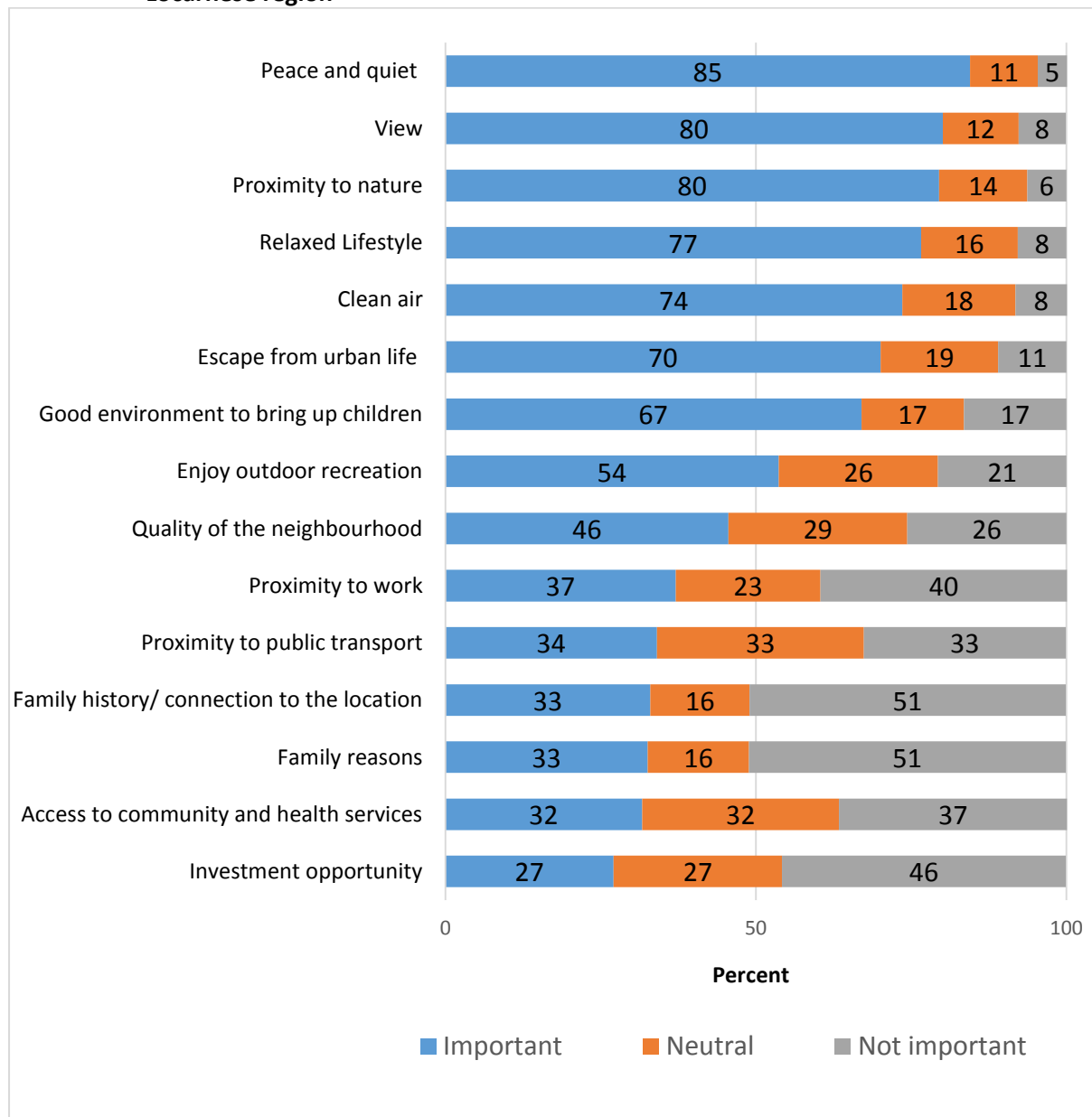
**Table 6.1: Respondents' perceptions of attachment and landscape values for the Locarnese region**

Personal values	Percent		
	Agree and strongly agree	Neutral	Strongly disagree and disagree
The green spaces in the Locarnese are very important to me	91	7	2
I am very attached to the Locarnese region	83	15	2
The more people that live in Ticino, the less satisfied I am	41	32	27
The municipal zoning plan supports conservation of natural assets	30	28	43
Vineyards are more important than forests	20	38	43
Prioritise urban development over nature conservation	10	12	78

Source: Swiss Householder Survey, Oct-Dec 2015.

Lifestyle and hedonistic values, including pleasant visual landscapes and favourable climate, appear to be major factors drawing respondents to the Locarnese region. Figure 6.1 shows that the standout motivation behind respondents choosing the location was peace and quiet (85%), with the view (80%); and proximity to nature (80%). Other important factors included: relaxed lifestyle (77%); clean air (74%); escape from urban life (70%); and a good environment to bring up children (67%). These results highlight the 'sunroom' status of the Locarnese region and helps to explain the attraction that its mild climate has on people from other parts of the Canton Ticino and other regions of Switzerland. Only approximately one third of respondents indicated, proximity to work and transport/services as being important in their location decision.

**Figure 6.1: Personal values in relation to choice of residential location of respondents in the Locarnese region**



Source: Swiss Householder Survey, Oct-Dec 2015.

A values-profile typical of those migrating to more favourable environments emerged, whereby aesthetic and hedonistic lifestyle value aspects prevail over practical every-day concerns. Financial considerations such as ‘investment opportunity’ were not seen as particularly important for close to half of the respondents, as was the case for family-related influences in drawing them to the region. Amongst the motivations that could potentially convince respondents to move away reflective of the ‘push’ effect from their current place of residence, noise stood out as an important factor, with nearly half of them (48%) rating it as an ‘important’ factor that could make them move away.

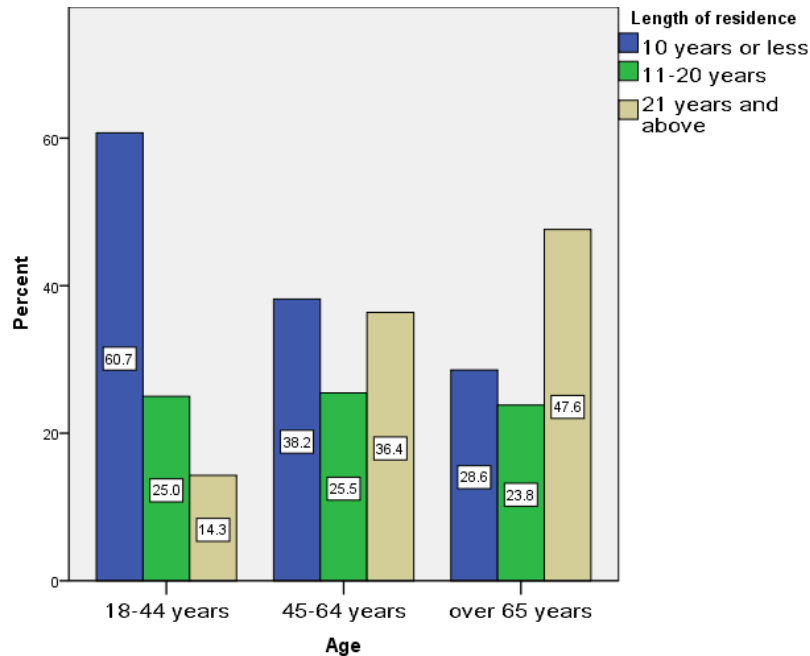
Lifestyle factors also include how respondents choose to interact with the natural spaces surrounding them. When respondents were asked about the importance of the forest in their region, some 94 percent agreed with the statement that forests significantly contributed to the beauty of landscape. The cultural and historical significance of the forest in Canton Ticino, especially relating to the importance of the chestnut tree (*Castanea sativa*), is reflected in these results. Cultivated in Ticino since Roman times and known as 'l'albero del pane' or the bread tree, the sweet chestnut is a key trademark of the Italian part of Switzerland, and the chestnut forests represent approximately one fifth of the total tree stems in Canton Ticino (USTAT 2013, p.18). Growing at lower altitudes in areas that could be regularly managed, the chestnut forest is often located close to settlements. From the author's personal experience of living in the area, forests continue to be frequented by residents to source mushrooms, nuts, berries, fuel and construction materials, and for seasonal game hunting. These personal insights were supported by the survey results. Usage of recreation spaces (green spaces, forests, parks) was very high among respondents, with 71 percent of them using these spaces at least once a week, again indicative of an interest in green spaces as a regularly utilised place. Close to two thirds of respondents either agreed or strongly agreed that to observe the fauna was an important aspect of the forest for them personally. Half of the respondents agreed that the forest was important for the collection of mushrooms and other products. However, 52.5 percent of respondents disagreed with hunting and fishing activities. It can therefore be determined that not all traditional practices associated with the forest in Ticino are supported in equal measure.

The overall mean length of residency, or tenure, for the sample was 24 years (paper survey only), with 38 percent of respondents having moved into the area in the last 10 years, 25 percent had lived there for 11-20 years, and 37 percent residing there for 21 years or more, thus revealing a relatively sedentary sample. This type of permanency could imply a good knowledge of the location and any associated environmental risks. Yet, it may also infer old age and perhaps a greater sense of vulnerability, an assumption supported by the finding that 43 percent of survey respondents were aged 65 years or more and had lived at their address for 21 years or more. The 18-44 year-olds had predominantly lived at the address for 10 years or less, while those aged 45-64 years showed a more even spread in tenure. A significant relationship was found between the length of time respondents had lived at the address and their age. Unsurprisingly, those aged 65 plus were significantly more likely to have lived at the current address for more than 21 years. Still Figure 6.2 provides some evidence for in-migration of over 65-year-olds, with just over a quarter (28.6%) of older respondents living in the area for less than 10 years. This supports the notion that the location is seen as a desirable destination for retirement living, and emphasises the issue of increased vulnerability due to a potential



lack of on-ground knowledge or a limited ability to manage properties or themselves in preparation or during an event.

**Figure 6.2: Length of residence by age of respondents the Locarnese region**



Source: Swiss Householder Survey, Oct-Dec 2015.

Information gathered on respondents' previous address indicated that 28 percent had lived in another Swiss Canton or abroad before taking up residence in the current location. This information also highlights the Locarnese region's attractiveness to individuals from the cooler, northern cantons of Switzerland seeking a 'sun-change' migration, with parallels to the Australian 'sea-change' and 'tree-change' phenomena that draw a certain segment of the population, so-called 'lifestylers', to take up residence in coastal or rural locations (Eriksen *et al.* 2011b; Ragusa 2010).

Local groups with an environmental focus or involved in preserving the local character including natural aspects, rated highest at 40 percent of all the community activities mentioned by the 44 respondents who provided details on the type of local groups they supported. Walking and sporting groups were also popular options but rated lower. The survey found that some 45 percent of respondents were involved in local community groups, a result that could be linked to the relatively high proportion of older people in the sample, meaning that they have the time to dedicate themselves to community groups. Support levels for community groups also provided an insight into respondents' values. Table 6.2 for example, shows that 29.6 percent of pre-retirement aged respondents were found to be involved in an environmental organisation, compared to only 7 percent

of those aged 18-44 years and 8.3 percent of those aged 65 years or more. In total, 16 percent were involved in an environmental organisation, which was somewhat lower than expected.

**Table 6.2: Involvement in an environmental organisation by age of respondent**

<b>Environmental organisation</b>	<b>18-44 years</b>	<b>45-64 years</b>	<b>65 plus years</b>	<b>Total</b>
Yes	7.1	29.6	8.3	16.2
No	92.9	70.4	91.7	83.8
Total	100.0	100.0	100.0	100.0

*Source: Swiss Householder Survey, Feb-March 2015.*

These additional indicators of place attachment support the appraisal seen earlier, indicating overall strong attachment of respondents to the local area. Against expectations, associations between the age of respondents and levels of attachment to place were weak. However, of the 28 percent of those giving a previous address from outside the Ticino and Italian Graubünden region, 73.5 percent of them were aged 65 or more. Thus confirming the hypothesis that ‘Swiss-German-sun-seekers’ who have retired in the Locarnese region represent an important component of the surveyed sample. This immigration to the Locarnese region from other Swiss Cantons is further highlighted by the lower than average prevalence of the Italian language spoken across the study area when compared to the rest of Canton Ticino, as discussed in the Methodology Chapter.

The survey evaluated the potential for higher than average vulnerability to environmental risk levels amongst inhabitants on the south-facing slopes of the Locarnese region. Approximately one quarter of respondents were within a group with higher than average vulnerability to environmental hazards due to a) age or b) potentially having limited linguistic proficiency in the official language of the region, Italian. A low proficiency in the official language of the region has the potential to reduce the resident’s ability to effectively access, or respond to, hazard warnings, with many watching or reading national news in Swiss-German with little coverage of specific local Ticinese issues. Table 6.3 shows that ‘age’ and ‘previous address’ were related and there was a statistically significant difference, with two thirds of those aged 18-64 having given their previous postcode as being situated in another Italian-speaking Canton or region compared to only 32.2 percent of those aged 65 or more ( $p = < .05$ ). Those respondents who indicated their previous postcode as being from a non-Italian-speaking region of Switzerland (Ticino or Italian Graubünden), were significantly more likely to be aged 65 years or more.

**Table 6.3: Age of respondent and linguistic region of previous address**

Age	Previous postcode in Ticino or Italian Graubünden	Previous postcode in Swiss German Canton or region	Total
18-64 years	67.8	26.5	56.2
Over 65 years	32.2	73.5	43.8
Total	100	100	100

Source: Swiss Householder Survey, Oct-Dec 2015.

Against national trends for Switzerland, where home ownership rates stand at 38.2 percent (FSO 2018), the survey reveals 64 percent were homeowners and 36 percent of respondents were renters. This fact could be influenced by a self-selection bias towards home-owners who might have seen greater value in completing the survey than tenants. That assumption is supported by the fact that most respondents were longer-term residents. Tenancy does, however, not appear to influence attachment levels, with owners and renters showing very similar attachment levels to the Locarnese region (83.7% and 82.4%, respectively). These homeownership rates were very different from the Australian sample, where 97 percent of respondents owned their home. A similar pattern as the one seen with tenancy and attachment, equally with very little statistical difference, appears with 'gender' and 'attachment', with both male and female respondents indicating a strong attachment to the Locarnese region (83%). When asked the question '*what do you like least about the place where you live?*', it was found that limited public transport options and general difficulty in accessing the town centre were the most prominent issues. Combined, these two aspects represented close to one quarter (23.6%) of all the least liked issues raised by respondents in regard to the upper slopes of the Locarnese region. Noise and traffic in general, and noise associated with building sites were the next most disliked set of issues (17.3%). As peace and quiet were clearly identified as important aspects in the original choice of locations, this finding would suggest that there is now a perception of more noise and traffic than when respondents first arrived in the area.

### 6.2.2 Perceptions of the natural environment and urban sprawl

The natural environment is clearly of great importance to many household respondents, and people greatly appreciate the forested landscapes as one of the dominant features of the natural environment of Ticino. Valued for recreational, habitat and amenity functions, the Swiss forest also performs a vital role in protecting habitat and infrastructure by reducing the risk of landslides, rockfalls and floods, and covers 50.7 percent of this mountainous region of southern Switzerland (USTAT 2013, p.18).

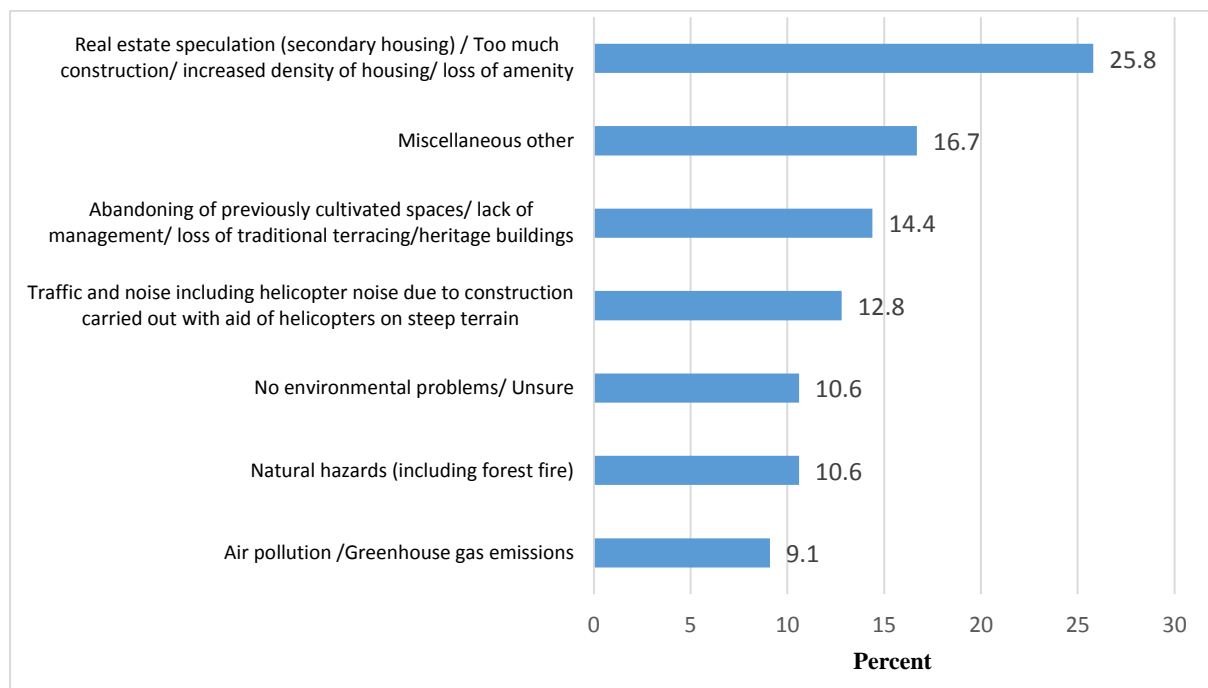
Some 96 percent of respondents indicated that the forest in their municipal area is important to them personally, and most respondents appreciated the forest for its environmental services aspects, including the provision of clean air and water. The survey found that the most significant aspect of forest management according to respondents was its role to protect settlements, thus indicating a recognition of the crucial function of the forest in stabilising steep slopes. A high priority was also attributed to biodiversity values; with over two thirds of respondents attributing a 'high' and 'very high' level of priority to the management of invasive neophyte vegetation. Some 89 percent of respondents saw the forest as an intergenerational asset, recognising its bequest values. These values extend to the entire Ticinese territory, with an overall 72 percent of respondents rating the current forest cover in the Canton as adequate.

Amongst those who expressed concern about the extent of the forest across Ticinese landscapes, older respondents appeared more inclined to say that tree-cover in Ticino was too extensive. Retirees were also considerably less likely to wish for more high-level conservation in natural areas. A concern about the progressive advancement of the forest at the expense of traditionally highly valued pastures or vineyards was likely to be most prevalent amongst those valuing landscape management in association with traditional cultural activities and local identity. For example, the transhumance practice of seasonally moving cattle or goats to upland pastures had evolved to capitalise the rich Alpine pastures during the summer months, which used to be an integral part of subsistence farming in Ticino (Mack *et al.* 2013). Today many Ticinese families still own secondary residences, many of which are '*Monti*', or the intermediate stations of the traditional livestock transhumance, with homesteads and barns now converted from their original function to holiday houses. It was found that 26 percent of survey respondents owned *Monti* or another form of secondary residence. The term '*Monti*' literally translates as 'hills' and is associated with summer pastured areas situated in the altitudinal band that has seen the highest rates of reforestation in Ticino (Rodewald *et al.* 2014). Owners of *Monti* or other secondary homes in rural villages that have land to manage, are familiar with the cumbersome tasks of cutting grass on steep slopes to prevent the forest from reclaiming open grassland and meadows – a landscape management requirement if the area is not to be re-zoned as forest. In fact, one of the great successes of environmental management in Switzerland is the establishment of sustainable forestry practices that have led to very high re-afforestation rates over the last one hundred years on once denuded, eroded slopes (Rigling and Schaffer 2015).

When asked to list what they perceived to be the most important environmental issues for their municipality, respondents provided 132 topics (n= 105). Figure 6.3 shows that the standout issues of

environmental concern revolve around construction and real estate speculation, making up over one quarter of all issues. The ‘Miscellaneous other’ category (16.6%) represents a range of issues which in order of importance include: invasive species, littering, wasteful use of water and global warming. The next category with some 14.4 percent, includes the loss of traditional agricultural practices and the gradual abandoning of traditional terracing in vineyards and heritage buildings. Noise and traffic associated with high rates of urban-style development represented 12.8 percent. Interestingly, only 10.6 percent perceived there to be no environmental issues, while only 10 percent considered natural hazards as the most significant environmental issue for their municipality and few perceived air pollution as a noteworthy issue.

**Figure 6.3: Respondents’ opinions on the most significant environmental issues for their municipality**



Source: Swiss Householder Survey, Oct-Dec 2015.

As seen earlier, natural spaces in the region are highly valued for the aesthetic, cultural and biological functions they perform, and a strong appreciation of the environment can in some cases, coincide with a critical view of urban expansion. Table 6.4 shows that in relation to spatial management policies over three quarters of respondents saw current levels of rezoning for new housing development as excessive and too widespread, while the remainder was evenly spread between those who thought current levels were appropriate and those who thought more was needed. On the question of strict conservation, however, almost half of them saw a need for setting aside more strict conservation areas, and one third thought current levels were ‘about right’.

**Table 6.4: Respondents' views on spatial management priorities for the future of the Locarnese region**

Spatial management priorities	Percent			Total
	Too much already	About right	More needed	
Set aside/ strict conservation areas (n=128)	18.8	34.4	46.8	100
Rezoning for new housing development (n=136)	78.7	9.6	11.8	100

Source: Swiss Householder Survey, Oct-Dec 2015.

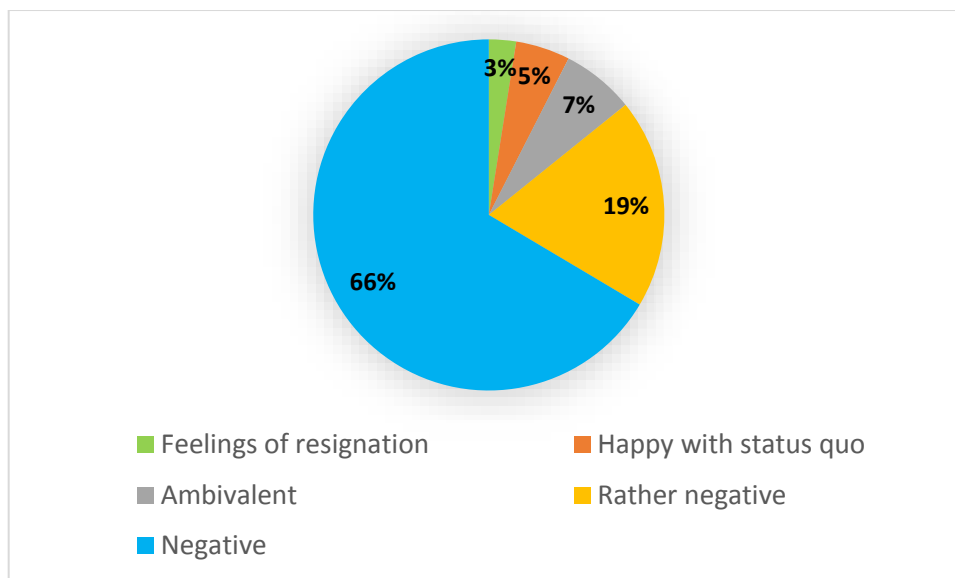
A closer look at those respondents who considered rezoning for new housing development as being too much already, it was found that female respondents (87.2%), were proportionally more likely than males (73.6%) to say there has already been too much rezoning for new developments. Interestingly, those of working age were more decisively against further rezoning for housing development. By contrast, a gender split over who was in favour of more rezoning, revealed that no females were in support of this issue, while close to 20 percent of males said that they were in favour. A look at responses to this question in relation to age reveals that of the males who said 'yes' to more rezoning, the retiree group (65 plus) was by far the largest representing two thirds of supporters. Overall, despite strong consensus across all ages, the working age respondents were more convinced that there was too much rezoning occurring for new developments than the older respondents.

The northern Ticinese plains have experienced considerable urban development in the last 40 years. Rapid urban development was recognised by respondents as the most significant environmental issue, as well as the major land-use planning problem in the area. One fifth of all spatial planning problems for the region listed related to issues of excessive urbanisation and sprawl. Responses such as 'speculation on land and development', and the issue of secondary homes were also found to be of concern to 17.6 percent of respondents. Together these two themes of sprawl and real estate speculation represent 38 percent of all items raised by respondents to this question. A further 22 topics (21.6%) were grouped with the common theme of 'loss of green spaces'. As a direct consequence of increased population and suburban-style developments, 12 topics or the equivalent of 11.8 percent of all issues, raised concern over excessive road traffic. When asked if during the time they had lived at their current address there had been a major change in the management of the area that had resulted in an improved quality of life, only 13 percent of respondents answered in the affirmative, indicating that a majority perceive a stagnation or decline. A total of 22 topics listed as having contributed to a better quality of life included: the improved state of the local road

infrastructure (27%), improved public transport (18%), and improved protection from natural hazards (9%).

Answers to the question asking respondents to express their feelings in relation to new residential developments in Canton Ticino were categorised according to the following classifications: negative; rather negative; feelings of resignation; ambivalence and happy with status quo. Figure 6.4 shows that 85 percent of responses in relation to new residential development attracted 'negative' or 'rather negative' feelings. Those 5 percent of respondents happy with the status quo were mostly male, aged over 65 years and had lived at the current address for over 10 years. Inadequate planning provisions were seen as causing the problems associated with new residential developments in the Locarnese region by 11 respondents.

**Figure 6.4: Respondents' feelings about new residential developments in Ticino**



Source: Swiss Householder Survey, Oct-Dec 2015.

When asked what respondents would do if they were given one wish to change the Locarnese region, it was found that protecting heritage buildings and creating developments that fit into the cultural and environmental context represented 19 percent of all items raised (n=114; Items i=137). An 'increased level of protection for remaining green spaces' was the second largest category with 10 percent, while the 'amalgamation of municipalities to reduce the number of small political entities' emerged as the third largest response (8.8%); followed by only 6.6 percent who said, 'limiting the construction of secondary homes and combat real estate speculation'. Evidently, as seen earlier in responses to factors influencing settlement decisions, aesthetic considerations were an important

part in the choice of residential location for respondents and therefore, any changes affecting the look and character of the region are likely to be unpopular.

### **6.3 Perception of natural hazard risk and vulnerability**

This section gauges respondents' concerns and attitudes towards potential hazards emanating from natural spaces surrounding their place of residence. For this purpose, an evaluation of responses to questions identified as indicators of risk perception was undertaken, and a range of factors including personal experiences and knowledge of potential hazards, and of the protecting infrastructure, were reviewed. The possible relationships between identified values of place and the environment, and perceptions of natural hazard risk were also explored.

#### **6.3.1 Personal experiences and knowledge of wildfires**

Over half of the household respondents indicated having had some personal experience of wildfires in Ticino, with 18 respondents providing detailed examples of their experiences with wildfires, including childhood memories of watching the blazes on the hillsides from afar; with only 2 respondents indicating that they had either their house or buildings adjacent to it damaged or destroyed during a forest fire. From personal experience of having witnessed wildfires on Ticinese hillsides in her youth, the author can concur with one respondent's observation that wildfires on the steep slopes of the mountains can offer a dramatic spectacle, especially at night.

*One female resident of Locarno-Bré, aged between 40-44 years commented: 'I remember the large fires on the mountains in my childhood, when you would be fascinated by the colour and the smoke plumes [of the fires].'* (SSH33);

*A male resident of Locarno-Bré, aged over 65 years said: 'In the 1950-70s, the hills were often on fire. I remember the death of a fire-fighter during my military training, the father of a school mate.'* (SSH26).

Only 8 percent of respondents indicated personal involvement in firefighting or the involvement of a family member. A militia army system across the country and compulsory civil protection corps in Switzerland (Tresch 2011), result in an abnormally high per capita experience and involvement in the protection of the population from natural hazards in comparison to other countries.

The survey asked respondents to provide an estimate of the distance between their home and the nearest green space, and requested information on the type of vegetation found in these spaces to



include meadows, vineyards and forest. Some 73.6 percent estimated their house to be situated within 10-100m of a green space, with over two thirds stating that this green space was a forest, and 27 percent describing the vegetation as shrubs. Vineyards represented only 18 percent of vegetation found in green spaces closest to respondents' homes. A prior history of wildfires in the green space identified near their homes was noted by 26.5 percent of respondents, while nearly a half (47.6%) said it did not happen; and a quarter indicated uncertainty in relation to this point. The expression of uncertainty on the issue of wildfires near their home by a significant minority could be the result of having only recently moved to the area from other parts of Switzerland or from abroad, with Canton Ticino being the region of Switzerland with the highest incidence of wildfires (Conedera *et al.* 2004). Supporting this claim, the survey found that uncertainty on this issue appears to be more accentuated amongst those who said their previous place of residence was outside the area of Ticino and the Italian Graubünden (34.3%), than for the respondents who had lived in the area for some time.

Plates 6.1 and 6.2 show the change that has occurred on the south facing slopes of the Locarnese region of Ticino between 1952 and 2015, as forests have returned and vineyards traditionally cultivated on terraced plots directly surrounding the villages disappeared to make room for residential developments. In particular, Plate 6.1 shows the sweet chestnut forests covering the Locarnese slopes in winter when denuded of their foliage. Plate 6.2 shows how viticulture was once widespread on the Locarnese slopes and how this space served as a buffer zone between the settlement and the forest during a wildfire event.

**Plate 6.1: Settlements part of Ronco Sopra Ascona, December 2015**



*Source:* Field visit (December 2015).

**Plate 6.2: Forest fire above the terraced vineyards of Tenero (Canton Ticino), 1952**



*Source:* Repubblica e Cantone del Ticino (2016), Dipartimento del Territorio, Servizio Forestale, concetto cantonale incendi di bosco 2020, Bellinzona, Switzerland.

### **6.3.2 Satisfaction with the organisation of the fire risk management**

Respondents expressed particularly high levels of satisfaction with the work carried out by fire-fighting authorities to manage the risk of wildfires. The survey included a question specifically designed to gain an evaluation of the current environmental risk management practices, and household respondents expressed positive feelings in relation to the effectiveness of official fire bans, with 52 percent rating them as 'effective' and a further 30 percent as 'extremely effective'. Evidence from the literature suggests that contrary to the situation experienced in the 1970s, in the 1990s two thirds of winter blazes in Ticino did not exceed one hectare (Conedera and Pezzatti 2005). These positive trends are, amongst a range of factors, largely being attributed to the success of the 1987 legislation aimed at stopping inappropriate agricultural burn-offs, and clearly contribute to the positive sentiment expressed by respondents in the Locarnese region towards the work of authorities in managing wildfires.

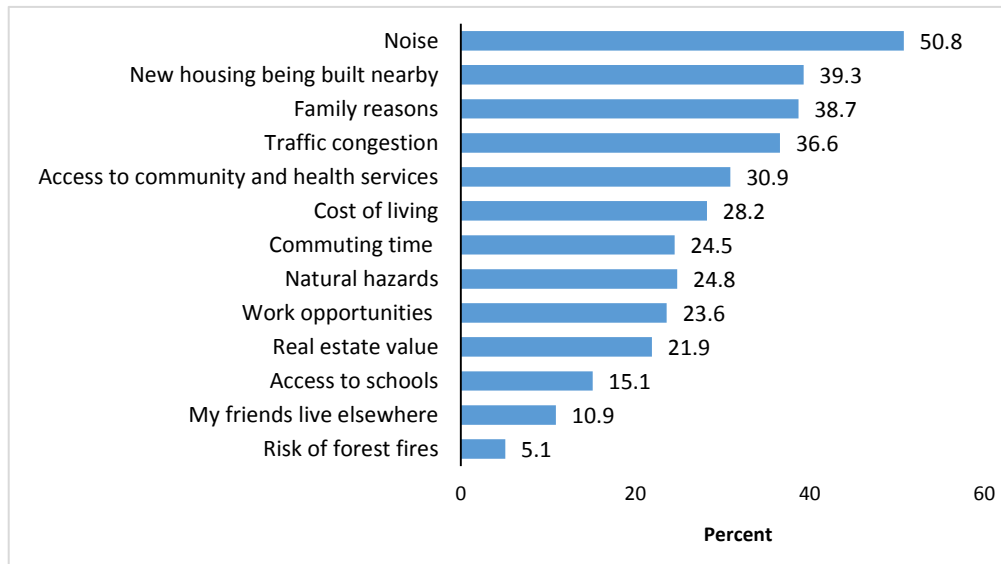
Satisfaction levels of the work carried out by fire fighters in Ticino was very high across various landscape sectors. This appreciation refers to the work of the specialised mountain fire-fighting crews (*pompieri di montagna*), established in the late 1970s and trained to fight fires on difficult mountainous terrain (Conedera *et al.* 2004). Most Ticinese forest fire ignitions occur in the belt between valley bottom and the Monti, halfway up the mountain slopes (Conedera and Pezzatti 2005), and therefore affect the former transhumance dwellings more than most other settlements. Nevertheless, 98 percent of respondents approve of the fire-fighting efforts in the forest, some 96 percent near their residential home, and 92 percent in the Monti regions, suggesting that in the minds of respondents the work of fire-fighting authorities appears basically beyond reproach. These results are in strong contrast to the Australian Householder Survey findings, where one third of respondents expressed serious doubt over the capacity of authorities to manage the bushfire risk.

### **6.3.3 Environmental and social factors acting as push factors**

Respondents were asked to attribute a value to factors that could make them move away. Figure 6.5 shows that perception of risks in association with environmental hazards does not represent a strong push factor for residents of the upper slopes of the Locarnese region. As well as those factors contributing to environmental risk, social factors such as access to work, education, family and services, appeared in the questionnaire to identify what could potentially drive residents to relocate. The results indicate that overall, respondents suggested that noise was by far the most likely factor that might drive them to move residence. The issue of 'new buildings being built nearby' with associated construction noise, impacted negatively on the appeal of the location for 39 percent of respondents, and traffic congestion was a local issue that made 37 percent of respondents think about

moving. In summary, noise pollution and a loss of landscape amenity associated with increased urbanisation were local issues that did bear on many respondents' intentions to move, whereas risk of wildfires was not a significant issue.

**Figure 6.5: Natural hazards versus other factors that residents considered as a trigger for relocation**



Source: Swiss Householder Survey, Oct-Dec 2015.

Only 5.1 percent of respondents in the sample considered the risk of forest fire as a trigger for relocation. However, when looking at the issue of natural hazards more broadly, the percentage of respondents who said the risk level made them consider moving away increased to almost one quarter. As such, it appears from these data that fire risk represents only a small component in the overall natural hazard risk estimation of residents in the Locarnese region, where in recent times flooding, landslides, debris flow and rockfalls have had greater impacts (Bernasconi and Origoni 2017). In the context of those other hazards, survey respondents expressed an appreciation of the vital protective function performed by the forest, with 76.5 percent agreeing that the forests around their local area were important for the protection from gravitational hazards. Respondents were asked to rate the elements of risk endangering people and settlements deriving from the forest itself, such as fire and treefall caused by wind and snow. Over half of them were not concerned about these potentially negative aspects pertaining to the forest (54.9%), and positive feelings and attitudes prevailed. It is relevant here to consider the relationship between deeming risks associated with the forest as important, and thoughts of moving away. Those respondents who only made positive associations with the forested spaces nearby, and did not perceive any natural events coming from the forest as representing a risk, were significantly more likely to discount natural hazards as factors justifying a move (Fisher's Exact Test  $p < .05$ ). Such a complex interplay of messages and decisional

processes amongst residents can be difficult to interpret. However, previous research in this field (Eiser *et al.* 2012), was able to identify an optimism bias leading individuals to interpret ambiguous information and signals coming from natural spaces in a manner consistent with their prior opinions, despite evidence of changing risk levels.

### 6.3.4 Wildfires are the most significant natural hazard threatening the home

Survey results suggest that only a quarter of respondents estimate that on the upper slopes of the Locarnese region, natural hazard risk would be sufficient to trigger thoughts of relocation. Despite this, environmental hazards are never a marginal issue in alpine Switzerland, and Table 6.5 shows that when asked to identify the most important natural hazards threatening their home, the highest proportion of respondents (34.3%) identified ‘wildfires’ as a significant hazard. ‘Landslides’ and ‘rock falls’ were also rated highly, whereas ‘flooding’, ‘earthquakes’ and ‘avalanches’ were not perceived as an important threat to their home. Thus, there is an apparent contradiction in the results in relation to forest fire risk.

**Table 6.5: Most important natural hazard threatening the home of respondents**

Natural hazard	Number	Percent
Wildfires	61	34.3
Landslides	50	28.1
Flooding	14	7.9
Earthquakes	12	6.7
Rockfalls	39	21.9
Avalanches	2	1.2
Total	178*	100

\*Multiple answers permitted

Source: Swiss Householder Survey, Oct-Dec 2015.

The survey found that respondents are aware of the presence of natural hazards in the Locarnese area, including the potential for a forest fire to occur close to their place of residence. While the number and extent of wildfires has reduced in recent decades through the interventions of specialist mountain fire-fighting forces, and since changes in the legislation around burning and open fires were introduced, the issue of wildfires remains significant in the minds of respondents. This issue is reflected in the levels of concern expressed by respondents on natural hazards threatening their home. As such, while the hazard of a forest fire is clearly identified by over a third as one of the primary threats to their home, the fact that only a minority deems this threat as a factor for relocation is indicative of the overall evaluation of the risk. It is assumed that respondents’ confidence in the work carried out by fire-fighters in the Locarnese region discussed earlier, contributes to keeping the risk estimation low. This, in spite of high wildfire risk levels identified by the Federal Office for the

Environment (FOEN), in large part due to a combination of the extent of the forest cover and warmer, drier climatic conditions. Perhaps with fuel loads increasing, but a lack of recent damaging wildfires, people are failing to make the connection between the risk and the reality of their personal situations.

Interestingly, those who value a relaxed lifestyle, are also those who identify wildfires as a potential threat to their homes (Fisher’s Exact Test  $p = < .05$ ). It also appears that a statistically significant relationship exists between those who consider wildfires as the principal environmental threat and those who have a greater knowledge of forest fire events near the home ( $p = < .05$ ). However, no statistically significant difference appeared in the relationship between age and those who consider wildfires as a major threat (Table 6.6). However, there was an over-representation of younger respondents who consider forest fires as a major threat, compared to those aged 65 or more.

**Table 6.6: Wildfires as major threat to the home by age of respondent**

<b>Wildfires as major threat</b>	<b>18-44 years</b>	<b>45-64 years</b>	<b>Over 65 years</b>	<b>Total</b>
Yes	63.2	61.5	56.8	59.8
No	36.8	38.5	43.2	40.2
Total	100.0	100.0	100.0	100.0

*Source: Swiss Householder Survey, Oct-Dec 2015.*

It may be important to reiterate that nearly three quarters, or 73.5 percent, of the 65 plus age group had lived in a German-speaking Canton or region of Switzerland before moving to the current address, and were perhaps for this reason, less informed or experienced in forest fire-risk matters. A lack of information or awareness of the different fire ecology present in Ticino, and an inability to communicate effectively in Italian, which was also identified amongst some respondents, could together add to overall vulnerability levels in this community.

### **6.3.5 Likely timeframe of a major wildfire, hazard evaluation and management responsibilities**

To delve further into the evaluation of the forest fire hazard, respondents were asked to select the most likely hypothetical timeframe applicable for the occurrence of a major wildfire occurring in their vicinity, or within their municipal boundary. A substantial, 51 percent of respondents indicated that they were ‘unsure’ about the timeframe surrounding a possible forest fire. Of those respondents who were willing to speculate, most (69.1%) thought that a wildfire was likely to occur within 10 years. As shown in Table 6.7, younger respondents appeared much more likely to think that such a fire would not occur for a long time, with 30.8 percent of the 18-44 year-olds seeing the likelihood of such an occurrence sometime within the next 30 years, and 23.1 percent saying that it will never occur. In contrast, only 15.2 percent of retirees thought that such a fire would occur within 30 years, and a low

12.1 percent were optimistic enough to think that it would never happen. An interesting contrast also emerged between a combination of those aged over 45 years and retirees, where approximately three quarters thought such a fire would occur within 10 years, and only 46.2 percent of the younger group.

**Table 6.7: Perceived likelihood of a major fire by age of respondents**

Likely timing	18-44 years	45-64 years	65 plus years	Total
Within 10 years	46.2	77.3	72.7	69.1
Within 30 years	30.8	4.5	15.2	14.7
ever	23.1	18.2	12.1	16.2
Total	100.0	100.0	100.0	100.0

Source: Australian Householder Survey, Feb-March 2015.

To evaluate natural hazard awareness and perceptions, respondents were asked: *‘Did you consult your local council (or other authority), to check what the natural hazards rating of your land was, before buying/renting or before thinking of starting to build?’*. Only 8 percent of respondents indicated that they had contacted authorities over hazards ratings. This question may appear obsolete within a Swiss context where natural hazard assessment is an integral part of the building approval process, and where strict zoning and planning codes apply in relation to the presence of natural hazards. It is, however, within this particular Swiss context, where the governance system treats all natural hazards with upmost seriousness, that the importance respondents attribute to natural hazards becomes significant. Although only a small number of respondents did consult authorities on the topic, it must be recognised that there is an awareness of the importance of natural hazards within this peri-urban context. Information gathered from the follow-up question on the type of the risk respondents had enquired about, indicates that landslides and stability of rock substrata were the environmental hazards that were of most interest to them, but earthquakes and flooding were also mentioned.

Some two thirds of respondents indicated not having any knowledge of firefighting infrastructure to combat wildfires in their municipality. Perhaps such low levels of personal knowledge of fire-fighting infrastructure could be expected in a context where the management of this environmental hazard is placed in the hands of the highly specialised mountain fire-fighters (*pompieri di montagna*). Historically, the population in Switzerland is characterised by a strong sense of place and cultural attachment, and an even stronger sense of shared responsibility in the governance and management of the country (Kriesi and Trechsel 2008). An example of this commitment to service is expressed in the Swiss militia army system. The overwhelming satisfaction with fire-fighting authorities articulated in the survey does imply trust in the service they provide. Amongst those who answered the additional request for specific information about fire-fighting infrastructure in their area, 70 items were identified. A summary of the most identified infrastructure is shown in Table 6.8. Some 44.3 percent

of respondents identified fire-hydrants, followed by the ‘firefighters’ themselves, including *pompieri di montagna* (21.4%), fire-tracks in the forest (21.4%), and water basins (8.6%). Other infrastructure items listed by respondents included helicopters, fire station and landing spaces for helicopters.

**Table 6.8: Respondents’ knowledge of fire-fighting infrastructure in the Locarnese region**

Infrastructure and equipment	Number	Percent
Hydrants	31	44.3
Firefighters	15	21.4
Fire tracks/ forestry roads	14	20.0
Water basins	6	8.6
Other	4	5.7
Total	70	100.0

Source: Swiss Householder Survey, Oct-Dec 2015.

### 6.3.6 Risks coming from the forest itself and the extent of the forest

The survey found that forested spaces played a significant role in respondents’ appreciation of place. Asking respondents to rate the elements of risk endangering people and settlements deriving from the forest (such as fire but also treefall due to wind and snow), reveals that 26 percent deemed these risks as being important, while the majority did not. Attention shifts to those who did see the forest as harbouring some threats, as this perception could prove to present significant relationships with other elements of risk and planning for the area.

A significant association was found between the variable assessing the ‘risks coming from the forest’ and one indicating a ‘propensity to move away from the region because of the perceived risk of natural hazards’ ( $p < .05$ ). A significant relationship also existed between the estimation of risk coming from the forest and the sex of respondents ( $p < .05$ ). Table 6.9 shows more than one third of females were more likely to consider elements of risk coming from the forest as being important, compared to 13.6 percent of males; while two-thirds of males appeared to discount this aspect of risk compared to 42.2 percent of females. Indeed, in total 58.6 percent of respondents thought that was not important.

**Table 6.9: Risk elements coming from the forest by sex of respondents**

Risk elements from forest	Male	Female	Total
Important	13.6	35.6	21.1
Neutral	19.3	22.2	20.3
Not important	67.0	42.2	58.6
	100.0	100.0	100.0

Source: Swiss Householder Survey, Oct-Dec 2015.

Despite overwhelming appreciation of the forest, there are also some diverging perceptions held by respondents associated with the peri-urban space: some positive and some negative. Satisfaction with



the current forest cover was high, with some 75 percent evaluating the extent of the forest as being 'ok as is', yet a fifth of respondents (20.3%), believed that the forest was too extensive, representing a view that the forest had exceeded an optimal level of coverage.

Table 6.10 shows that the age of respondents had an influence over respondents' opinion of forest cover. Close to a third of retirees believed the forest was too extensive, while only 14.8 percent of those aged 18-44, and 11.3 percent of those aged 45-64 expressed that view. The middle-aged group includes those who were most favourable of a more extended forest. On this topic, those of retirement age appear to have a view that is distinct from younger participants. Residents with a personal experience of the substantial reforestation that has occurred in Ticino over the last 50 years might now be expressing unease about the extent to which the forest has returned to the landscape.

**Table 6.10: Satisfaction with the extent of the forest in Ticino by age of respondent**

Extent of the forest	18-44 years	45-64 years	Over 65 years	Total
Not extensive enough	3.7	7.5	3.4	5.1
Ok as is	81.5	81.1	65.5	74.6
Too extensive	14.8	11.3	31.0	20.3
Total	100.0	100.0	100.0	100.0

Source: Swiss Householder Survey, Oct-Dec 2015.

### 6.3.7 Removal of trees to create buffer zones

The range of complex and varied emotions associated with the forest is highlighted by the responses to the questions enquiring about tree removal. Some 61 percent of respondents indicated that tree removal should be allowed to create buffer zones in areas that are at high risk of burning and close to houses. Table 6.11 shows that males were significantly more likely to approve the clearing of trees under these circumstances, with 65.5 percent of male support for clearance standing in contrast to 43.8 percent of female support for this issue ( $p < .05$ ).

**Table 6.11: Acceptance of tree clearing to create buffers by sex of respondents**

View of clearing trees	Male	Female	Total
Approve of tree removal	65.5	43.8	60.6
Disapprove of tree removal	32.5	56.3	39.4
Total	100.0	100.0	100.0

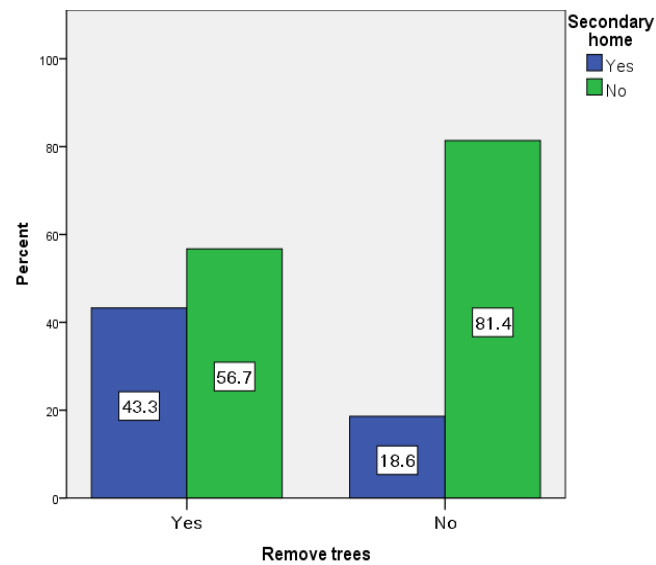
Source: Swiss Householder Survey, Oct-Dec 2015.

The issue of forest clearance certainly touches on a contentious topic in a national context where all forested spaces have been under the guardianship of the Federal State since the second half of the 19<sup>th</sup> century (FOEN 2016). A number of people are concerned about the impacts of wildlife on

vineyards and gardens, but this raises the question of what are the main constituents of that natural heritage. There is perhaps also a sense that the traditional cultural landscape has been diminished by the contemporary dominance of forest in and around settlements, and respondents expressed clear concern about the management of the forest to contain the risk of wildfires.

According to 60 percent of respondents, maintenance work undertaken on their property (vineyards, forested spaces and gardens) has an influence on reducing the risk of wildfires. A sense of shared responsibility is evident in the group of respondents who believed that the work they had carried out had a considerable impact on the wider landscape. Those same individuals were also more likely to believe in the effectiveness of the current fire policy that bans outdoor fires in periods of prolonged drought ( $p = < .05$ ). As shown by Figure 6.6, those owning a Monte or other secondary home, and therefore perhaps more aware of some of the more pressing environmental management and natural hazard challenges facing peri-urban and rural spaces, were more likely to support cleared buffers spaces (43.3%) between houses and the forest, although 56.7 percent did not ( $p = < .05$ ). In contrast, 81.4 percent of those who do not own a Monte or secondary home did not want any trees removed. This result is tied to the earlier observation that elderly individuals were more likely to consider that there is too much forest cover – perhaps with knowledge of an earlier cultural landscape that was dominated by viticulture and agriculture, rather than what is currently promoted through conservation policy.

**Figure 6.6: Identifying a need to remove trees close to buildings and owning a secondary home**



Source: Swiss Householder Survey, Oct-Dec 2015.

### 6.3.8 Identifying risk management options that enhance feelings of personal safety

Household respondents were asked if there were any steps the Federal, Cantonal or Municipal administration could take to enhance their feelings of personal safety by reducing the risk posed by natural hazards. Some 40 percent of respondents said they did **not** think more work was needed to make them feel safer from environmental risk. A further 38 percent of them indicated that they were ‘unsure’ and were reluctant to speculate whether there was anything that could be done to enhance their safety. This outcome may be the result of confusion amongst respondents, because it is understood that within a Swiss cultural and political context, authorities will do everything within their power to manage environmental risk (BAFU 2016). Respondents who did think that something could be done to enhance their protection from danger (22% overall), provided 36 suggestions for enhanced protection from environmental hazards. Interestingly, some 42 percent of these suggestions involved thoughts on improving the management of forested landscapes including: compulsion for landholders to keep the forest clean by removing dead wood and fallen branches; keeping sufficient distance between houses and forest; removal of unsafe trees; keeping the forest open; and, the introduction of fire breaks.

*‘Force landowners to keep the forest close to houses clean’ (SSH26)*

*‘Make sure there is sufficient space between the forest and houses’ (SSH26)*

*‘Eliminate unsafe trees’ (SSH62)*

*'Make the upkeep and cleaning of the forest compulsory, in such a way that the forest can breathe' (SSH113)*

*'Fire-breaks' (SSH136)*

These results would suggest in some particular cases, respondents saw a need for more intervention in the management of forested spaces in their region.

In summary, Swiss respondents do not appear overly concerned about the risk levels posed by environmental hazards in the place where they live. There appears to be an awareness of the risk posed by wildfires and other natural hazards, but for a majority, confidence in the capabilities of firefighters to deal with a forest fire was very high. Consequently, the dominant interpretation of risk levels in respondents did not appear to trigger thoughts of relocation. Despite this, forest fire was indeed, identified as the most significant potential hazard to their homes. A majority of respondents were supportive of the current extent of the forest in Ticino. A relationship appears to exist between being male and owning a Monte or a secondary home, and being in favour of tree removal to create buffers. One important finding in this peri-urban area with a large influx of retirees is that older respondents did appear to support a different spatial management discourse on forests from the rest.

## **6.4 Relationship to the urban planning process**

This section presents findings on how participants related to the planning system, to establish if there is a sense amongst participants that the physical form of the landscape adequately reflects their views and values. Participation in the political decision-making process is a Swiss right, with citizens able to participate in three to four voting sessions each year on topics ranging in scope from the local Municipal, to the Federal level. Findings are presented from the survey of participants' evaluations of their personal level of participation in the planning process, as well as their level of understanding of how the planning system works. In addition, this section also focuses on the potential interactions between participants' values and the type of relationship they have with the planning system.

### **6.4.1 Familiarity with/ knowledge of the spatial planning system**

Household participants were asked to assess their level of familiarity with the spatial planning system of Canton Ticino. Table 6.12 shows that 85 percent of respondents claimed to have some knowledge of the system, while 12 percent were unsure, and only 3 percent expressed an in-depth knowledge. Older respondents were more likely to indicate some knowledge. The form of Swiss democracy could

explain these results. The strong deliberative and representative political process both demands, and is responsible for, a certain level of knowledge of the planning system amongst citizens, and this is evidently reflected in the high proportion of participants who feel they have a reasonable understanding of how the planning system operates.

**Table 6.12: Familiarity with the planning system of Canton Ticino by age of respondent**

<b>Familiarity</b>	<b>18-44 years</b>	<b>45-64 years</b>	<b>Over 65 years</b>	<b>Total</b>
Very familiar	3.8	5.6	0.0	3.0
Some knowledge	84.6	79.6	90.9	85.2
Unsure	11.5	14.8	9.1	11.9
Total	100.0	100.0	100.0	100.0

*Source: Swiss Householder Survey, Oct-Dec 2015.*

Respondents predominantly stated that they had ‘some’ knowledge of the planning system, and this response pattern with a majority giving the same answer, occurred for several key questions in the Swiss questionnaire. While it can reveal interesting findings, as is the case here, this particular pattern also limits the room to establish variation within the sampled householders’ perceptions. Whilst the overall gender split in the survey sample is 63 percent males and 33 percent females, responses here showed that only a few males (5%) and no females were ‘very familiar’ with the planning system.

#### **6.4.2 Voice and participation in the planning system**

Most Swiss Householder Survey respondents perceive that they understand the planning system. Considering this result, and given the direct democratic governance process in Switzerland, it would be easy to assume that respondents would also perceive having an influence on spatial planning decisions. Survey results however, indicate that a high 79 percent of respondents felt they had no voice in spatial planning issues concerning their local Municipality/Canton – a result that is even higher than the responses from the Australian survey. This result was surprising, as there is overwhelming evidence that the Swiss population in general, and consequently the resident population of the Locarnese region, has numerous and ongoing opportunities to participate in spatial planning decision-making (eg. Stanga 2012). What this result is most likely to reflect, is an issue of scale. It may well be linked to the particular level of governance interested in the problems raised by respondents. For example, numerous respondents identified that the issue of sustained traffic and noise related to residential construction sites was a major concern for them, but these are highly localised issues, framed by Municipal development strategies and plans. Residents may feel they have a general voice to frame planning directions but would not be able to influence specific planning decisions through

the ballot-box. In this case, and in a very similar way to Australia, a complaint about such a local issue would require a personal visit to the local council offices or a letter to the local Mayor.

Perhaps the expectations are raised very high in Switzerland by the awareness that in such a robust democracy they should have a voice in all major decisions that affect them personally and collectively. They are provided with effective formalised channels of engagement at the Federal and Cantonal scales on broad statutory decisions, and residents' can easily engage with those processes. Yet when the focus shifts to local concerns, there are few similar easy mechanisms and that creates a particular sense of discontent, which was voiced by respondents in the survey. A limited linguistic proficiency in the official Italian language, as also identified within the sample and introduced earlier in the methodology chapter, would certainly play a role in hindering residents' confidence to engage with the planning process via direct, informal channels or could obstruct effective communications with the local authority completely. In other words, this 'no voice' result could be a sign that respondents felt there is a local communication problem: the public, so used to expressing views and opinions through the formal voting process at the Federal and Cantonal level, feels unable to reach local authorities with their concerns.

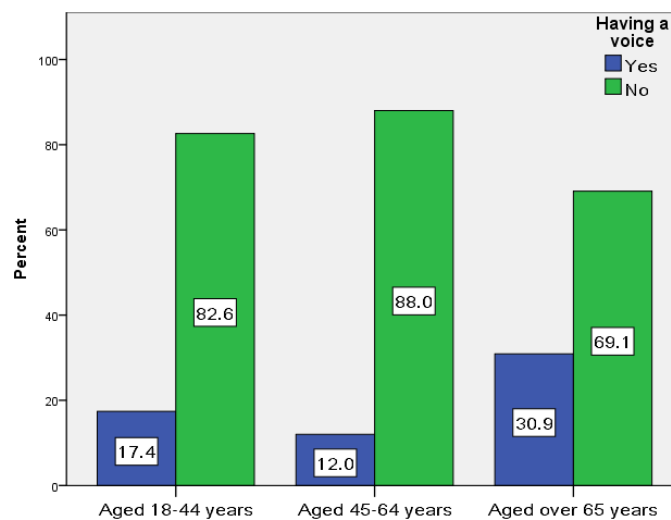
The other important issue is associated with the lack of timely, direct links between any vote and outcomes being enacted. There is a lengthy process that ensues a vote on any particular spatial planning issue, and the eventual implementation of a decision, as raised earlier in the background chapter, could provide another explanation for this 'no voice' result. The example of the 2007 referendum vote 'Away with the freeway from the Piano' is an example of a plebiscite where the result has not been implemented for over ten years (Lob 2018). In that case, where a range of different groups had quite different opinions about where the freeway should be placed, the processes of deliberative planning have been accused of generating significant delays because so many people would become unhappy with whichever outcome eventuated.

The perceived lack of influence over planning could also be indicative of a sense of disengagement with the highly formalised democratic voting process, such that respondents feel their participation, or lack thereof, will not truly influence results. There have been several examples in recent years, where voting outcomes were not applied quickly enough or, where they did not translate effectively into demanded spatial outcomes. Results here may suggest a growing attitude reflective of individuals who see the democratic process as a mere 'window-dressing' exercise, rather than a truly deliberative and representative process. More broadly, this result could also be indicative of a growing sense of

political disaffection and detachment in the population – an issue that is common to most western democracies during the current era.

The survey found that females were more likely to feel that they were not being heard, as a high 92 percent of them selected the ‘no voice’ option in relation to spatial planning issues. As shown in Figure 6.7, a relationship exists between those who perceive that their voices are being heard and age, with 31 percent of those aged 65 years or more saying that they **do** have a voice, which is significantly higher than the 12 percent of those aged 45-64 years and 17 percent aged less than 45 years. In other words, elderly respondents could be seen to be more supportive of contemporary democratic planning processes. This result is also interesting in the light of earlier findings that show nearly three quarters (73.5%) of those aged 65 years or older gave a previous postcode from a non-Italian speaking region of Switzerland. Information on previous addresses shows that those who give their previous address as being from an Italian-speaking part of Switzerland, were significantly more likely to feel they were not being heard than those who gave a previous address from a non-Italian speaking part of Switzerland or abroad ( $p < .05$ ).

**Figure 6.7: Respondents indicating that they had a voice on spatial planning issues at Municipal and Cantonal levels by age**



Source: Swiss Householder Survey, Oct-Dec 2015.

Data on occupation revealed that respondents from the manufacturing and construction industries were the only ones with a net positive proportion who believed that their opinions were influential over planning – perhaps because they were supportive of the dominant urban planning approaches. The ‘voice on spatial planning issues’ and ‘education levels’ variables revealed a significant relationship, with tertiary educated respondents more likely to maintain that their voices were being heard (57.7%), while those with only secondary educational attainments more likely to say they did

not feel like their points of view were adequately reflected (55.1%) ( $p < .05$ ). In relation to income levels, respondents from the 120.000-159.999 CHF income bracket represent the largest 'yes' percentage (35.3%) on this issue – or in other words, relatively wealthy households were more likely to feel they had an influence over planning decisions. In summary, occupational sector, educational level, income level and cultural/linguistic background presented a significant relationship with respondents feeling influential over spatial planning in Ticino. Once again, these results raise important issues for the effectiveness of the democratic planning process, with influence apparently being reflective of particular groups within Ticinese society rather than a simple association with public participation in democratic processes.

Household respondents were asked to specify by which means, other than the official voting process, they had been able to express their opinion on spatial planning issues. Table 6.13, shows that signing a petition and writing a letter to the municipality were the most popular forms of further engagement, while social media appeared to play only a small part in the way respondents engaged with spatial governance. It should be noted however, that the response rate to this question was below the rest of the questions in the survey ( $n=70$ ), and so it might be assumed that respondents who do not engage further in the spatial planning process, might have decided to skip this question. Males were more likely to write to the Mayor of the local government about planning issues, and females were more likely than males to sign a petition. Respondents were able to provide multiple responses for this question.

**Table 6.13: Respondents' ways to express their opinion on spatial planning in the Locarnese region**

<b>Ways used to express opinion</b>	<b>Number</b>	<b>Percent</b>
Signing a petition	33	36.2
Letter to the Mayor/ Municipality	25	27.5
Newspaper article	14	15.4
Social media	11	12.1
Rallies	8	8.8
Total	91	100.0

Source: Swiss Householder Survey, Oct-Dec 2015.

Many political decisions in Switzerland still bypass direct democratic forums, in ways that are more reflective of Representative Democracies. Thus, for many respondents it may be a case where the issues they most care about, never get specifically addressed within a vote. This could in turn have created a sense of pointlessness with regard to political engagement amongst some respondents.



The analysis of potential associations between the 'no voice' variable and respondents' values of place and the environment, highlights some interesting points. For example, those who maintain having 'no voice' were significantly more likely to prioritise conservation over development (Fisher's Exact Test  $p = < .05$ ). Also, key elements that draw people to live in the Locarnese region, such as 'peace and quiet', 'relaxed lifestyle', 'to escape urban life' and the 'enjoyment of the outdoors', were found to present statistically significant relationships with respondents' perception that they have little influence over planning outcomes. No statistical relationship was however identified between the group who perceived having 'no voice' and their perception of environmental risk factors in the Locarnese region.

In summary, the survey found that the 'no voice' group appears to also be supportive of conservation, lifestyle and 'hedonistic' values, and be generally anti-development. It may be for these reasons that many feel they are being overlooked by decision-makers and planners, in a landscape that is rapidly urbanising and losing some of its natural and cultural amenity attributes. That raises important issues for Swiss deliberative democracy. It especially begs the question – does perceived successful participation in the democratic process largely equate with a personal satisfaction with the broader development agenda in the Locarnese Region?

## **6.5 Conclusion**

This chapter looked at perceptions of environmental values and risks on the peri-urban slopes of the Locarnese region. It also related those values and risks to the way that respondents interact with the planning system. The dominant values household respondents expressed in relation to the region were those of high appreciation of lifestyle and amenity values, such as peace and quiet, proximity to nature, views, clean air and a relaxed lifestyle. Respondents felt highly attached to the region and that is partly because the abundant green spaces are highly valued. Some 91 percent of respondents indicated that green spaces are important to them personally, and 96 percent indicated that the forest in their municipal space was important to them. Landscape amenity and lifestyle values were the dominant personal values emerging from the survey, and a significant number of participants were in favour of a further strict conservation policy, as they saw the potential for irreversible landscape amenity and biodiversity loss due to ongoing urbanisation in the region. Nearly half of household respondents would like to see the extension of strict conservation zones, and over two-thirds of them had frequented green spaces at least once a week. Some of the least liked regional attributes raised

by respondents were a lack of public transport options to reach town, and the noise associated with building and construction.

Many respondents were aware of the potential risk of wildfires for their home on the upper slopes of the Locarnese region. Some respondents indicated having direct or indirect experiences with wildfires in Ticino. However, the majority appeared to have had no wildfire experience, and for most respondents the estimation of the wildfire risk did not trigger thoughts of relocation. However, the majority did not perceive the risks coming from the forest as significant, yet importantly most were in favour of removing trees close to homes to create buffer zones to mitigate risk. Some 72 percent of respondents were satisfied with the current extent of the forests in Ticino, however there was concern expressed about the lack of removal of unsafe trees and the clearing of dead wood in the local forests. A need was raised for policy to make the clearing and upkeep of forested areas compulsory for landholders. Respondent satisfaction levels with the work of emergency authorities, especially with the specialized mountain firefighting forces was high. In fact, very high levels of trust were assigned to the emergency services in general, in contrast to the SA case study.

The survey found that most participants felt they had some knowledge of the planning system, but have little voice in relation to spatial planning issues concerning their local Municipality or Canton. Results indicated that residents were concerned about the levels of local urban expansion. There was not a strong relationship between perceived risk levels and the way respondents interact with the spatial planning system. Environmental issues are of concern to respondents, but most are concerned about noise pollution and loss of landscape amenity. Importantly, there appeared to be signs of frustration with the local planning authorities, as respondents felt that their views were not adequately reflected in current spatial planning outcomes. Results suggest that while the relationship with the broader Federal and Cantonal spatial planning system, through traditional deliberative democratic channels is working, there appears to be a degree of unhappiness directed at the local planning level, which requires a more personal interaction with authorities. It could be argued that the relative ease offered by the Federal plebiscites and referenda, creates a sense of entitlement and right to being heard and to be consulted on planning issues. Those Federal votes offer participants voting materials in the Swiss national language of their choice. A lack of proficiency in the Italian language, required to achieve a strong engagement with local democratic processes, was evident in the sample, and could provide an explanation for the reason why many respondents felt their point of view was not sufficiently influential over the current landscape form in the Locarnese region. The influence of this factor on the results is not entirely clear however, and could potentially be the subject

of further research. Results also suggest that current urban planning approaches resulting in substantial development at the peri-urban fringe, especially in areas previously dedicated to vineyards, are not fully addressing issues of vulnerability in the resident population. The demographic characteristics of respondents such as age and sex, family and their economic status and access, both physical due to limited public transport options, and social due to the linguistic and cultural barriers, emerge as factors of increased vulnerability on the upper slopes of the Locarnese region.

Of particular importance, the survey found that a significant proportion of respondents were 65 years and older, and also confirmed the presence of a 'Swiss-German-sun-seeker' retirement cohort within the surveyed sample. A focus on the relationship between age and dominant cultural perspectives on risk and environmental issues revealed some distinct views amongst these older respondents, in particular that they were more likely to say that the current extent of the forest is too great. The older respondents were also more likely to be supportive of more rezoning to aid further urban development, more likely to believe their voices were being heard on Cantonal and Municipal spatial planning issues, and perhaps generally more accepting of contemporary democratic planning processes. As well as presenting the contemporary challenges facing Swiss spatial planning, these findings have important implications for South Australia as it embarks on a reform of its planning system, and raises issues that will be discussed in the following chapter.

## CHAPTER 7

# DELIBERATIVE PLANNING FOR ENVIRONMENTAL RISK

### 7.1 Introduction

The aim here is to discuss the Australian findings in relation to the knowledge gained from the Swiss experiences with deliberative planning. Previous chapters have analysed the survey data obtained from respondents living both in the Mitcham and Onkaparinga Hills on the fringe of the city of Adelaide and in the Locarnese region of Canton Ticino. This chapter focuses on the opportunities for that analysis to offer new insights into approaches for collaborative planning within areas of high bushfire risk. Together, the results from both case studies will be interpreted through the lens of the Risk Society framework. Key to the discussion is whether the increased engagement of the resident population in planning decisions in areas of high environmental risk presents a potential pathway to help shape a new planning discourse.

The research does not aim to strictly compare the results from the two survey sites, because the contexts for bushfire/wildfire risk differ considerably between Australia and Switzerland, but it is critical to consider the findings alongside each other to contrast conceptions of risk and potential opportunities to respond. The discussion of respondents' values, attitudes and intended behaviours within a context of high environmental risk, will shed light on the changing and increasingly reflexive relationships individuals have with environmental risk. This information will help to anticipate the types of priorities residents in South Australia have in relation to the management of vegetation in the peri-urban space. Alongside aspects of vegetation management, the information should allow for a broader discussion on what policies or plans residents would support for their area, and the type of behaviours they are most likely to favour when confronted with bushfire emergencies. The findings contribute to an existing body of knowledge being utilised to inform governance arrangements in planning for environmental risk. Specific research questions addressed in this discussion chapter include:

1. How can we use residents' perceptions of value and risk to better inform policy for sustainable development outcomes during an era of enhanced environmental risk?

2. What role should resident participation play in planning within high-risk peri-urban contexts in South Australia?

This discussion is written with an awareness of the need for more effective planning for environmental risk within a global context of increasingly dangerous bushfires. After recent Australian experiences, and the devastating wildfire events in 2017 and 2018 on the west coast of the United States and in southern Europe, an open discussion has begun in global media and political circles of the entirely new reality emerging for planning to mitigate environmental risk. Much of the risk is concentrated in peri-urban areas in regions experiencing Mediterranean or warm Temperate climates, where increasing population densities are associated with high bushfire fuel loads. These areas, like the two case-study locations, often exhibit a combination of factors such as increasing forest cover; human encroachment into vegetated spaces and agricultural lands; climate change impacts; and laissez faire planning, which together are significantly challenging the capacity of many societies to manage the emergent risk.

People are articulating the growing concern that there have been inadequate planning provisions made for changes in seasonal conditions. After the December 2017 wildfires in southern California, Governor Jerry Brown declared that California faces a ‘new normal’ of intense wildfires (Helsel and Calabrese 2017). In Australia, Jim Casey, a spokesperson for Fire Rescue NSW who was involved in fighting the Menai fires south-west of Sydney in April 2018, raised similar concerns over the impacts of climate change:

‘The fire services don’t plan for major fires halfway through autumn. It [the Menai fire] was so far outside of the bushfire season that aircraft chartered for firefighting operations had been returned to the northern hemisphere’ (Casey 2018, n.p.).

In this case, the specialised firefighting aircraft had left Australia at the end of summer, exposing communities and emergency services to the changed risk conditions that no-longer adhere to any traditional understanding of seasonal weather patterns. A review of the actions of emergency services for the 2016 Pinery Bushfire in South Australia that burned over 82,000 hectares north of Adelaide in November 2015 (CFS 2017), concluded that under the particular circumstances, there was nothing more the Country Fire Service could have done to change the path of the fire (Noetic Solutions Pty Limited 2016). In other words, the report acknowledged that authorities could not fight this intense fire that spread rapidly across dry stubble, fanned by hot 100 km/h winds. The unseasonal fires in California and south-eastern Australia are illustrative of a new bushfire hazard reality, which now changes how societies must plan for environmental risk.

Although the fire risk is increasing in areas that are traditionally associated with a wildfire hazard, new risk situations are also becoming apparent in cooler Temperate climatic regions. During record hot and dry conditions during the 2018 summer, wildfires burned across northern Europe including parts of England, Scotland, Germany and Scandinavia, sparking discussions over an entirely novel environmental risk situation in these traditionally cooler, wetter areas of the globe (Doerr and Satin 2018; Fischer *et al.* 2016). Switzerland is not immune to these trends, with a new awareness of the risks associated with the wildfire hazard. On July 19, 2018 the Institute for Forest, Snow and Landscape Research's website headline banner read: 'Widespread risk of forest fires in Switzerland' (WSL 2018). Wildfires are recognised to have become more common in Switzerland over the last 30 years, and they are forecast to spread with higher intensity across the forested landscapes during the longer, drier hot spells of the future (MeteoSvizzera 2012). Surprisingly however, even as recently as two years ago the Federal Office for the Environment's (BAFU|FOEN 2016) report 'Umgang mit Naturgefahren in der Schweiz | Dealing with Natural Hazards in Switzerland' barely talked about the wildfire hazard and clearly ranked it lower than traditionally recognised flood, landslide and avalanche risks. Only one mention was found in the report of the increasing relevance of wildfires, and this was in a context of the necessity of Cantons across Switzerland to consider forest fire mitigation strategies (BAFU|FOEN 2016, p.39). Therefore, apart from the learning for planning in SA, it is also within that rapidly changing global context for environmental risk, that the opportunities for improvements in planning arrangements are discussed.

## **7.2 Planning challenges in areas of high environmental risk and significant ecological value**

The flammability of native vegetation, together with the climate and current settlement forms are responsible for increasing bushfire risk levels that are characterising parts of the Mount Lofty Ranges (Bardsley *et al.* 2015). Future climate projections suggest that it will be normal for such areas to experience bushfires that emergency services will struggle to respond to effectively in, or close to, settlements (eg. CSIRO-BoM 2018). The challenge in SA and elsewhere is for decision-makers to understand the new risk levels and pre-empt or anticipate the situations by planning collaboratively with the residential communities. Both strengthening current prevention measures and scoping for new and innovative ideas are now essential steps in adapting to bushfire risk in a hotter and drier climate. A set of prerogatives emerge to provide a range of potential avenues to respond to the increased vulnerability levels of communities living in the forested peri-urban interface.

The peri-urban fringe is a residential frontier characterised by rapid land-use change, and in Australia it includes some of the communities most at risk to the threat of bushfires. This 'space in-between', is also often a place of important biodiversity, where fragile ecosystems and species are put under increasing pressure by urban development. The recognition that the peri-urban space requires its very own planning approach, where the special conditions that mark this space are considered and included in policy, is now being widely expressed by scholars in the spatial planning field (Bunker and Houston 1992; Gallent and Shaw 2007; Buxton *et al.* 2008; Gurran 2010; McGuirk and Argent 2011; Aalbers and Eckerberg 2013; McFarland 2015; Taylor *et al.* 2017; Butt and Taylor 2018). In fact, learning to deal with growing societal complexity is one of the substantial challenges facing the planning discipline. A greater focus on the peri-urban fringe and the unique, complex entanglement of needs and priorities could be a way to elaborate sophisticated planning principles that will be applicable across the wider urban space. Knowing residents' values and priorities for the management of the place will be a vital step in being able to undertake such planning effectively and sustainably.

The Australian Householder Survey found that close to two thirds of residents agreed with the statement, '*I am very attached to the Adelaide Hills*', and that they also valued the scenic amenity and the lifestyle they experienced in the Mitcham and Onkaparinga Hills. For 73 percent of respondents, conservation in the area surrounding Sturt Gorge Recreation Park had priority over urban development. These findings are supported further by other survey results that are consistent with strong place attachment, including having lived in the area for a long time and shopping locally. Results also suggest that personal well-being, environmental and aesthetical values have played a significant role in respondents' choices of residential location. For over 80 percent of respondents, space and privacy, peace and quiet, views, proximity to nature, relaxed lifestyle and leafy neighbourhoods were factors that attracted them to the location. The vegetation of the Mount Lofty Ranges is therefore identified as a seminal element in the positive relationship between residents and their location, and 67 percent of respondents indicated that the local vegetation was important to them personally. A very similar profile of high attachment and personal values also emerged from the Swiss Householder Survey sample of residents on the upper slopes of the Locarnese region. In this context, the self-estimation of attachment levels, the appreciation of the green spaces and the value of the forest were even more prominent than those encountered in the Australian context.

In the Australian Householder Survey, previous experience with bushfires was reported by 26.4 percent of respondents. One quarter of them indicated that their property was immediately adjacent to a large area of vegetation, and close to two thirds of respondents identified that the most likely

timeframe applicable to a high-severity bushfire incident would fall within 10 years. In this respect, females were found to be more likely to think that a dangerous fire would occur sooner. A significant relationship was found between those who thought a destructive fire would occur within 10 years and those who felt a strong connection to their location. Just over two-thirds of Australian Householder Survey respondents in the Mitcham and Onkaparinga Hills considered their property to be vulnerable or extremely vulnerable to bushfire. Importantly, that recognition of the exposure to the hazard was also associated with limitations in managing the risk, with close to a third of all respondents feeling that the bushfire risk management by emergency services, state and local authorities in their area, was 'poor or non-existent'. This result indicates a considerable degree of doubt in the authorities' capacity to adequately manage the perceived risk in SA, and stands in contrast to the Swiss survey results, where it was apparent that almost all of the respondents had an overwhelming sense of satisfaction with the work carried out by emergency services.

In the Australian Householder Survey the belief that any individual could have a personal influence over the bushfire risk level, or had the capacity to protect themselves, was found to be highest in those who were involved or participated in a community group. Across all age groups, escape routes in case of a fire were either rated to be poor or extremely poor. In fact, the poor quality of escape routes was found to be one of the issues that respondents liked least about their area. It was interesting that most residents were found to be aware of the bushfire risk, however most did not see the risk of bushfires as a reason to justify moving and relocating elsewhere. Families with children were significantly more likely than other households to say they had considered relocation because of the perceived risk. The survey results also provided evidence of the contrasting, and at times conflicting, priorities expressed by residents of high bushfire risk areas. As such, the survey found that 38.5 percent of respondents would like to see more forests in the Mount Lofty Ranges, and perhaps unsurprisingly, this group were predominantly those who rated their escape routes as satisfactory, and who also thought that they had some degree of influence over the fire risk through their personal actions. Perhaps this finding can be seen as an indication of individuals valuing their place to an extent where they are willing to discount the risks to augment those values. Despite evidence of strong hedonistic values, however, most respondents did put bushfire risk priorities ahead of forest management approaches directed at preserving or enhancing the attractiveness of the area. To reduce fire risk, a substantial group endorsed more clearing of native bush/scrubland than what is currently being achieved by state agencies and local government.



Overall, in both countries, survey results reveal a mismatch between respondents' views on landscape amenity and ecological values, and their view on local risk mitigation approaches. On one hand, there is a wish for more trees and more conservation areas, while on the other hand there appears to be widespread support for cutting trees to reduce fuel loads and the threat of bushfires. There is the impression, that respondents' aesthetic and environmental appreciation of the landscape is in discord with their perceptions of the risk, and that creates an almost paradoxical situation of diverging priorities, impossible to reconcile within the one space. A deliberative planning process focussed on environmental risk education, could initiate a discussion on the range of functions performed by peri-urban landscapes, and how specific management interventions will create trade-offs in relation to risk.

When Mitcham and Onkaparinga Hills residents were asked about their intended behaviour for a day with a forecast of 'catastrophic' fire danger, again responses presented a troubling picture. Despite the potentially disastrous impacts of a severe fire and the perceived vulnerability of their properties, most respondents indicated approaching days rated as 'catastrophic', with attitudes diametrically opposed to official safety guidelines. As such, almost three quarters of the survey respondents indicated opting for either a 'business as usual' or a 'wait and see' approach. The socio-demographics of those respondents who would, in the case of an emergency, be facing a highly complex and problematic last minute self-evacuation, draws attention to vulnerability levels of particular groups, especially retirees. Results reveal that on those days that are potentially critical for bushfire risk, only just over a quarter of those aged 65 or more would adopt approaches endorsed by emergency services such as leaving the day before - a concerning result in the light of the considerable public safety concerns surrounding last-minute evacuations during bushfire emergencies.

In Australia, there is still considerable research that needs to consider both the planning and the individual capacity to prepare and respond effectively in the case of a bushfire. The issue of a clear misalignment in the environmental narratives and meanings used by different groups in high risk contexts is raised in the literature (Beilin *et al.* 2013). The problematic result identified regarding intended behaviour on catastrophic fire danger days highlights the way residents' values and priorities can diverge from the rationale of the idealised risk response. When logically, older residents could be seen as one group that should comply as closely as possible with safety recommendations, in fact they are often the least likely to self-evacuate, probably because it is more difficult or inconvenient for them to do so. Processes of engagement and participation hold the potential to overcome discrepancies and misunderstandings that might arise between technical and layman knowledge in residents and professional emergency services personnel (Reid *et al.* 2018). It is possible to argue that

successful consultative partnerships present an opportunity to address and bridge such potentially catastrophic incongruities.

Especially within peri-urban areas, emergency management authorities currently deem the lack of bushfire preparedness among residents as problematic. For example, a tendency to rely too much on fire-fighting agencies is common for residents, which contrasts directly with the state and national approaches to hazard management, which are intending to transfer more of the responsibility for bushfire preparedness and response to the householder. The Australasian Fire and Emergency Services Authorities Council (AFAC), bluntly states that:

‘People should be allowed and encouraged to take responsibility for their own preparedness and safety and to make their own decisions on how they will respond to a threat of bushfire’ (AFAC 2012, p.3).

‘Additionally, fire-fighting resources are likely to be allocated where they will be most effective at protecting lives, not necessarily where property losses are most likely. Fire-fighting resources are unlikely to be allocated to property infrastructure and community assets that cannot be defended safely’ (AFAC 2012, p.5).

Given the conflict between people’s actions and policy, and in association with changing local environmental conditions, more people will be living in areas that the CFS or other agencies will not be able to protect or will deem too dangerous to protect during a serious bushfire. Ideally, collaborative planning approaches could offer a chance for differing perspectives to be considered on what is deemed to be a reasonable plan for a very hot summer’s day with high winds in the Mount Lofty Ranges, or during a bushfire event itself. For example, in a deliberative forum, the emergency service personnel and the residents with concerns such as ‘nowhere to evacuate’, could meet and discuss possible solutions. That approach is already being undertaken by the CFS, but a translation of residential concern into land-use, transport or environmental planning remains limited.

This same concern regarding a lack of awareness raising and capacity building exists in other parts of Australia. For example, one of the key recommendations of the Victorian Bushfire Royal Commission (Victorian Government 2010, p.352), pointed to bushfire preparedness as a shared responsibility at all levels, across agencies, between government actors and with the community. Successful community engagement programs, where fire-fighters interact with community members to promote fire safety education, and provide an understanding of the risks, and also the roles of fire agencies, were put in place across many fire prone communities in Australia following this lead (Frandsen 2011). As shown

in Table 7.1, the South Australian residents' perceptions of risk and values and attachment levels of respondents differ from the Swiss situation.

**Table 7.1 Survey values and risk perception as expressed by respondents in Australia and Switzerland**

	Australia	Switzerland
<b>Attachment to place</b>	Strong	Very strong
<b>Environmental values</b>	Very strong	Very strong
<b>Concern</b>	<ul style="list-style-type: none"> <li>• Prioritise bushfire risk reduction before attractiveness of the area as a forest management approach</li> <li>• Escape routes, poor egress from the suburbs in case of an emergency</li> </ul>	<ul style="list-style-type: none"> <li>• Urban sprawl and noise</li> <li>• Poor public transport</li> <li>• Forest fires and gravitational hazards as the most significant natural hazards threatening the home</li> </ul>
<b>Risk estimation</b>	Elevated risk perception	Low risk perception
<b>Behaviour</b>	Problematic	Highly dependent on agencies

Source: Australian and Swiss Householder Surveys, 2015.

The results from the upper slopes of the Locarnese region in Switzerland suggest quite a different context for residents' perceptions of environmental risk and value. In that case, urban sprawl and noise as well as poor public transport were the issues that dominated the list of concerns regarding their local area. Forest fires and gravitational hazards such as landslides and rockfalls were signalled as the most significant risks threatening resident's homes on the forested slopes. Despite acknowledging the potential destructive impacts of environmental hazards on their place of residence, less than a quarter said that they had thought about moving away and relocating elsewhere. Some two thirds of Swiss household respondents signalled a complete lack of knowledge of the fire-fighting infrastructure used to combat wildfires in their municipality. This result could imply low levels of personal responsibility amongst respondents concerning the issue of wildfire risk, suggesting a strong reliance on the relevant agencies to mitigate risk. However, survey results do suggest a very high level of satisfaction with the work of fire-fighters in Ticino, especially with the specialised mountain fire-fighters.

Despite being aware of existing risks, the respondents of the Swiss survey appear to perceive a low degree of threat to their particular residence from environmental hazards. This perception contrasts with a growing scientific consensus that hazards such as wildfire, landslides, rock fall and floods are increasing in parts of Switzerland (Pezzatti *et al.* 2016; Matasci *et al.* 2017). A 2016 review by FOEN on the way Switzerland is dealing with natural hazards identified a need for targeted communication on these increasing levels of environmental risks to individual properties, in order to raise the awareness amongst the general population, as well as industry and government actors (FOEN 2016). The Swiss survey identified that Locarnese respondents recognise the potential for hazards to impact on their lives, but are not seeing the necessity to respond personally to that risk. This disjuncture in Switzerland and Australia between residents' risk perceptions and actions is simply supporting a more widely recognised concern across the globe.

### **7.3 Spatial planning in a highly deliberative context**

South Australians are about to embark on a new planning reality that includes statutory requirements for substantial community and stakeholder input and consultation. That increase in civic engagement as stipulated by the 2018 Community Engagement Charter (under the Planning, Development and Infrastructure Act 2016), and mandated for amendments in State Planning Policies, Regional Plans, the Planning and Design Code, Design Standards and Infrastructure Schemes, includes a range of potential community engagement and consultation approaches (State Planning Commission 2018, p.4). According to the Charter, people will be able to contribute to planning decisions in a novel and more flexible way, using both direct interaction and visualisation technologies. These changes in approach are designed as a way of strengthening the planning process by overcoming the evident inability to effectively transfer research outcomes and community sentiment into planning practice (Albrechts 2010). As stated in the charter, the 'views and aspirations of communities' are set to be included to 'foster better planning outcomes' and to 'establish trust in the planning process and improve the understanding by communities of the planning system'(SA Community Engagement Charter 2018, p.3). While planners will engage with the population to identify their views, the real step-change for planning could potentially lie in an extended mandate for broadening the conversation on risk, especially if there is an explicit effort to promote a community environmental hazard discourse.

The episodic and seasonal characteristics of the bushfire hazard in south-eastern parts of Australia, make it difficult to sustain the interest of the population outside of peak risk periods. Residents are less likely to consider the fire risk during the cooler and wetter winter-months. Yet, as discussed earlier, climate models are showing a move towards altogether new trends in bushfire weather, with the hazard becoming a near-constant risk in many places. As New South Wales Rural Fire Service (RFS) Deputy Commissioner Rob Rogers said when commenting on fire-bans brought forward to August in 2018:

‘It's certainly extremely dry, [...]. It's three months since the end of the last fire season and now we're back into it again’ (Hannam 2018, n.p.).

Unfortunately, the nature of the bushfire risk in a drying climate is such, that an intermittent and sporadic attention to the human safety concerns may no-longer be enough. Unpredictable, extended fire-risk seasons are already occurring, and emergency service agencies are dealing with the complex task of communicating a new safety message relating to a changing risk that is increasingly difficult to predict. As suggested in the literature, full acknowledgement and a concerted pro-active response to the risks associated with living in high-bushfire risk peri-urban areas, is still generally low amongst the community (Eriksen and Gill 2010; Paton and Eriksen 2013; Whittaker *et al.* 2013; McLennan *et al.* 2019; Strahan *et al.* 2019). The question on how to close the gap between the risk and the knowledge and mitigation practices in the population, or how to convince residents to do the right thing, is still not fully resolved.

A comprehensive deliberative process could encourage residents of high bushfire risk areas to engage with the topics surrounding bushfire hazard at a deeper level. In turn, this has the potential to strengthen the community ties seen as a crucial part in fostering positive mitigation and safety behaviour – what Habermas (1984) refers to as the social room of public interaction. Participative planning processes do however not stand in a social and institutional vacuum, and must be considered within existing participative forms of democracy and norms of behaviour. One of the big unresolved questions in this field lies in the identification of mechanisms capable of translating the theory of deliberative planning into successful examples of public participation. Should, for example, the formal processes of elections or plebiscites incorporate the direct democratic processes, or should it remain a softer engagement processes of informal local meetings and roundtables? Whichever, for participatory planning to function effectively, current political platforms must be utilised and extended. That is why a significant focus of this research has been on exploring examples of

democratic governance structures, institutions and practices from Switzerland that could help to facilitate the required communication and exchange between actors in an Australian context.

Switzerland offers an example of a highly deliberative governance system within a context of significant environmental risk, working as a contrasting juxtaposition to the Australian situation. As outlined, the alpine country has a unique history of dealing with environmental hazards that has developed out of a culture of risk, where the governance and planning systems are imbued with the knowledge and awareness of risk. The nation-state in its 727-year history, has thrived despite the great challenges and constraints offered by the natural setting of mountains and lakes, in part because of its strong democratic traditions. A key cultural element which has enabled the democratic process to remain successful is that people have learnt to coexist with each other and with the extraordinary hazard levels present in its environment. Firstly, the research project interrogated respondents in the highly deliberative decision-making setting of Ticino in relation to their perceptions of the environmental hazards. Secondly, residents' relationships with the planning process, community involvement levels and knowledge of the planning were assessed and analysed. Finally, the research conducted in Switzerland, drew from the positive elements of deliberative planning and governance in relation to trust-building, inclusivity, legitimacy and the opportunities for collaborative learning with the aim of informing the developing participatory planning process in SA.

South Australian respondents perceived their knowledge of the planning system to be mostly low, with only one third having some knowledge of the system, and most of them reporting that they had not heard of any recent changes to the planning guidelines that would affect their local area. In addition, over half of the Australian household respondents (56%) felt they had no voice in planning issues concerning their local community. A regular interaction of citizens with issues of spatial planning and their involvement in the decisional process both demands, and is to a certain degree responsible for, an understanding and familiarity of the formal planning questions and processes. Signing a petition was by far the most frequently used method of expressing an opinion on local planning issues (35%); social media was the least utilised form of engagement. Thus, most South Australians are dependent upon 'soft' or informal political processes to make their voice heard. Table 7.2, provides a summary indicating that respondents in the Swiss survey gave a distinctly different picture of their perceived relationship with the spatial planning system, than respondents in the Australian Householder Survey.

**Table 7.2: Knowledge of the planning system and willingness to take part in spatial governance decisions as indicated by survey respondents in Australia and Switzerland**

	<b>Australia</b>	<b>Switzerland</b>
<b>Knowledge of the planning system</b>	Low	Very High
<b>Engagement/ participation in planning decisions</b>	Soft	Soft/ Hard
<b>On 'being heard' for planning issues in the local area</b>	Medium	Very low

Source: Australian and Swiss Householder Surveys, 2015.

In Switzerland, the forms of interaction involve formalised procedures and for that reason, citizens regularly grapple with the merits or faults of planning decisions as they exert their normal democratic rights. The tools of the Swiss political process include the Initiatives and the Referenda, which together with a regular call to the ballot box, form a process granting spatial planning issues a regular spot in the political and media limelight. Swiss citizens are given frequent opportunities to vote on framework decisions, including spatial planning and environmental management topics. By involving the population in the decisional process, the democratic process itself creates knowledge, ownership and realistic expectations with regards to the possibilities of the planning system, thus resulting in degrees of approval rarely seen elsewhere. The success of that normalised process is reflected in the Swiss survey results, where respondents were much more likely than the Australian respondents to think they had a knowledge of the planning system: 85 percent claimed to have some knowledge; 12 percent were unsure, and 3 percent estimated that they had in-depth knowledge of the planning system. The Swiss respondents were also found to be exploiting other forms of planning feedback beyond the formal voting system, showing that current levels of engagement on issues of spatial planning were being undertaken, with actions including signing a petition and writing to the mayor. In other words, the normalised, formal political process does not simply supplement for less-formalised mechanisms of community engagement.

Still, a surprisingly high proportion of respondents from the upper slopes of the Locarnese region indicated that they felt they had little actual influence over spatial planning issues concerning their local municipality or Canton. This is clearly indicative of a degree of dissatisfaction with spatial governance in the areas targeted by the Swiss Householder Survey. Several issues could potentially be at the source of that discrepancy between Swiss opportunities to engage with planning and the

perceived reality. Potential hypotheses include: the lengthy implementation process which sees a disjunct between any particular vote and the eventual tangible changes in spatial arrangements; or there may be a general sense amongst respondents that the voting process does not lead to any real changes at local scales, which in turn would lead to a sense of disaffection or cynicism. It is also possible that respondents were using the survey as an opportunity to vent their frustration over issues that might otherwise have been overlooked.

This considerable 'no voice' result in Ticino is a point of critical interest. Since the issue is directly relevant to the core reason for this thesis – to learn how the South Australian planning reforms could successfully include community perceptions to guide improvements in risk management - it will be discussed in some depth here. For planning theorists interested in engagement (Allmendinger and Tewdwr-Jones 2002), the issue of people's willingness to be involved in planning decisions is a vital concern, especially as engagement can quickly evaporate if there is a sense within the community that their inputs are not being considered, nor having any real impact. It raises the important question: what is the 'no voice' result from Switzerland telling us about the deliberative engagement processes for peri-urban planning? Clearly once expectations are raised within a population that their voice will be heard regarding planning decisions, people are then likely to get more upset than if they had never been given that chance. Clearly, where expectations are low, any positive sign of successful agency may be applauded. In contrast, in the Swiss situation, where citizens naturally expect that their point of view should be translated into real spatial outcomes, they will be disappointed if expectations are not met, and this has the potential to undermine the system.

For this thesis, the result raises a more specific question: how could a deliberative democratic process truly influence effective planning for environmental risk? Clearly, in the Swiss situation, there are detailed deliberative responses possible at the Federal and Cantonal level, but it seems to be far trickier for governance structures to incorporate residents' voices at the local scale – which impacts most on their daily lives. Published posthumously, in his work 'The Metamorphosis of the World: How Climate Change Is Transforming Our Concept of the World', Beck (2016) warns of the need for an evolution of democracy, as he asks how much environmental risk our democratic institutions and processes can withstand before its basic tenets start to come undone.

How much climate change can democracy endure? How much democracy does climate protection require? How is democracy possible in a time of climate change? Or, to put it even more bluntly: Why is the further development of democracy a *conditio sine qua non* for a world city cosmopolitan politics of climate change? These are extremely urgent questions (Beck 2016, p.123).



As environmental risks become personal through impacts at local levels, societal inability to truly enable democratic influences over local planning outcomes may present increasing challenges for governance into the future. This thesis does not fully respond to this challenge, but what it does do is highlight the need for experimentation in this space to learn how to achieve better, real outcomes for society. No-one has all the answers, so successful engagement must be tied to learning processes, and perhaps the real finding of this thesis is that in a context of the Risk Society, the new governance uncertainty must be made clear to all. As any reforms are initiated in the context of the new levels of risk, there will be limitations and failures, and participatory planning that is reflexive provides a better system to respond to those challenges, but does not provide a completely foolproof one either.

#### **7.4 Hazard education and communication through participatory planning**

Important issues are raised by the survey findings in both South Australia and Switzerland in relation to participatory planning. In particular, the results suggest that there are limitations in the process of engagement, and perhaps there is a point where it may be better not to create false hope through engagement if the results are not going to be applied. The literature also warns of limitations facing broad communicative practices or 'hyper-pluralism', and the difficulties associated with reconciling numerous perspectives when trying to act (Allmendinger 2009). Those limitations may become particularly poignant when authorities face increasingly complex problems around natural hazards issues, and when critical decisions need to be made or enacted quickly. In such critical situations, good and timely decisions are likely to be achieved through more hierarchical, rational scientific approaches rather than by diffuse decision-making processes. The ultimate example of this, being during a war or other catastrophic events, where in many cases all semblance of inclusivity or community deliberation in decision-making are bypassed. There also needs to be caution around brittle political processes that involve numerous stakeholders, which could be subjected to local power plays and inadequate representation. For that reason, community participation must be treated with caution, as it could harbour the potential for capture by interest groups, that in turn could lead to significant economic and political jeopardy (Brady and Webb 2013). Forester (1999, p.7, & p.9) urges us to view deliberative processes as: 'precarious and vulnerable achievements created on existing political stages' and 'hardly an ideal form of communication'.

Although there are constraints and limitations to deliberative planning, Swiss spatial planning in general enjoys great respect and ownership amongst the country's citizens, and partly as a result, democratic processes are granted higher political standing than is the case in other countries (Lendi 2012). This peculiar circumstance is dependent on a range of factors. The Swiss have invested in high-level planning skills and services within both public and private institutions, and the systems are strongly supported by the high quality of the legislative framework. However, according to Lendi (2012) and Muggli (2013), the real strength and acceptance of the profession derives from its willingness to engage, which is supported through the democratic-political impetus of the Swiss Federal system of governance. The direct democratic rights accorded to the different levels of government and to the population are identified as being the driving force behind regular innovation in the Swiss planning field (Auer *et al.* 2014). The system, despite its clear merits also generates potential procedural pitfalls. One could argue that the process of engagement creates risks for itself through its reliance on public participation and support. For example, the whole system could be delegitimised by the lack of voter involvement, with on average, participation rates in Swiss votes regularly lying below the 50 percent mark. In two recent examples, one referendum in 2018 saw participation reach 53.9 percent, while another in June 2018, saw only 24.6 percent voter turnout (FSO 2018). If the people are not willing to voice their opinion, then social licence for the Swiss spatial planning will be eroded.

One important recent and relevant example is provided by the successful Swiss 'Initiative on Secondary Homes' (2012), where the population was called on to express their views on putting a halt to the construction of secondary homes and apartments. On March 11, 2012, Swiss citizens voted to stop unrestrained development by asking for a limit of 20 percent to the overall proportion of secondary dwellings in any municipality. On January 1<sup>st</sup> 2016, the new law came into force, effectively limiting the capacity of municipalities from expanding into areas not already zoned for residential development. The secondary home issue especially touched the high amenity regions of the Swiss Alps, where rapid development has occurred over recent decades resulting in the 'betonification' (or coating in concrete), of the landscape and a subsequent loss of amenity. Land scarcity and landscape values were issues that were widely discussed in the weeks leading up to this 2012 referendum. Regional municipalities stood accused of putting short-term profits ahead of national interests, and of landscape preservation. Important issues were raised concerning the independence and the capacity of the planning system to create outcomes that are in the best interest of the wider population of Switzerland, rather than representing minority development interests. In this case, the deliberative planning system, where citizens have had a strong influence over decision-making, was able to

respond strongly and effectively to a perceived problem. The Swiss case study provides an example of an effective political system that has entrenched deliberative consultation methodologies into its everyday interaction with citizens.

The channels of the direct democratic governance process ensure that all decisions are consultative. The value and limitations of this complex and costly exercise are understood, especially when deeper levels of deliberation are sought. Within such a community engagement paradigm, the building of trust, collaborative learning, place-based planning are requirements identified as essential components of a risk-reduction approach (Champ *et al.*, 2012; Wachinger *et al.* 2012). However, the Swiss survey results show that the opportunity to engage does not necessarily translate into willingness to do so in the population and, as also stipulated in Fung and Wright (2003), certain groups within society are more likely to become resigned to a situation and less willing to engage. Certain segments of the population, especially those more vulnerable due to a range of socio-economic or demographic circumstances, can easily fall through the gaps and miss out on the opportunity to take part in the desired exchange and interactive process. As the public is not always keen to participate in democratic processes (see also Brady and Webb 2013), it must be established that the framework is attractive enough to encourage residents to engage with their wider community by first ensuring that their actions will be meaningful, and secondly by creating deliberative settings that are comfortable and facilitate exchanges, communication and learning. In doing so, a dialogue of risk reduction amongst the population, technical staff and other government actors can be normalised, and a risk culture would be created and/or maintained.

These lessons from a country like Switzerland that does not just see deliberative democratic processes as secondary to planning decision-making, could be increasingly important in any risk society as scepticism grows over elections as mechanisms for representation and deliberation around the world (Hill 2013). For democratic systems of governance to continue to operate effectively, societies will be less and less able to afford 'missing' or 'overhearing' more vulnerable segments of the population or, for that matter 'losing' groups that perceive that their involvement is meaningless. There are greater risk levels for the community at large when a significant segment of the population is left out of a meaningful and positive interaction with the decisional governance system. The building of trust, collaborative learning, and place-based planning within a community engagement paradigm, are essential components of a comprehensive risk-mitigation approach at a local scale.

Doubts over the practical applications of a truly open and inclusive planning system are being raised by many researchers. Although a planning system based on participation is seen as more sensitive to local needs and values (Healey 1997), some authors also emphasise the limitations of such systems based largely on collaborative practices and highlight the need for a technical autonomy for planners (Allmendinger 2009). In the context of increasing natural hazards such as forecast for SA, any indecisiveness in risk mitigation measures will need to be avoided. Allmendinger (2009, p.237) goes as far as calling postmodern planning an oxymoron, or a contradiction in terms. Always including the complexity of viewpoints into planning is seen to inevitably create an impasse in the decision-making process where an '[...] indeterminate, almost chaotic or helpless position [...]' (Allmendinger 2009, p.224), is the only likely outcome. There is also the prospect of a spatial planning system engaging only as a process of 'window dressing', which raises questions about the prospect of post-modern social engagement practices lacking the necessary checks and balances, whilst leaving the door wide open to coercion. In such a scenario, the collaborative approach is seen to run the risk of raising cynicism in the population, where:

'[...] a commitment to openness and communication will fail miserably if there is a lack of engagement with the real sources of power, and people will be willing to become involved only if there is a genuine chance that what they feel will have an impact. If not, disillusionment is likely' (Allmendinger and Tewdwr-Jones 2002, p.191).

A middle path, where planning is open to diverse viewpoints and perspectives, but also capable of efficient and decisive action linked to scientific knowledge and technical expertise, would require a blend of both the instrumental and communicative planning approaches (see Habermas' neo-modern theory discussed in Allmendinger 2009, p.239; Dryzek 1990). Such a transition in planning would also respond to Ulrich Beck's concern, articulated in his Risk Society Theory (2006), which raised the need for a fundamental step-change in the way risk is treated and acted upon, so that risk is not just acknowledged and assessed, but rather included as a central factor influencing other decisions. Equally, Hulme (2008) stipulated the need for a system where the awareness of risk and vulnerabilities become an integral part of planning practice and policy. The focus would be on a planning system capable of consensus and able to translate theory into action. Healey (1997) offers a pathway to just such a collaborative planning process. Her alternative conception of collaborative governance occurs within the formal institutions of government, where priority is given to the establishment of a:

'[...] soft infrastructure of relation-building through which sufficient consensus building and mutual learning can occur to develop social, intellectual and political capital to promote the co-ordination and the flow of knowledge and competence among various social relations coexisting within places' (Healey 1997, p.200)

In such a case, the pathway to generating consensus occurs through a deliberative process and uses existing channels to make the governance process accessible to influences from a broader sector of society. There are a range of relatively simple mechanisms to facilitate learning amongst residents about risk. Opportunities exist to foster greater disaster resilience through processes of 'informal education' such as community meetings and forums (Feng *et al.* 2018). The involvement of the public in community and interest groups or mini-populations, could both be 'used' as sounding boards, both directly and through new media forums, to fulfil the crucial role of educating the population, to building a safety culture and fostering disaster resilience (Wisner *et al.* 2004). As seen in the results and in wider literature on bushfire risk communication and management, the issue of increasing preparedness for residents through conventional information processes is not resolved. The message is not getting through and too many households continue to fail to adequately prepare and/or fail to respond appropriately in catastrophic risk situations (McLennan *et al.* 2012; McCaffrey *et al.* 2017).

## **7.5 A deliberative planning system for South Australia**

There are key messages here for SA as it works to reform its planning system. A set of circumstances specific to the high-risk area of the Mitcham and Onkaparinga peri-urban fringe, requires a targeted planning approach (Paveglio *et al.* 2018), able to respond to the specific circumstances required to protect people, infrastructure and environmental assets. The newly mandated engagement in the planning system should not be rolled out in a sectorial fashion within the high environmental risk context of the Adelaide peri-urban interface, without realising its role to inform the target population. For example, the CFS has already been working strongly to engage people on the issue of bushfire risk. The newly proposed 2018 SA Community Engagement Charter for planning should work in association with CFS and other stakeholder organisations, to expand on the success of that ongoing work. By inviting the population to become partners in a conversation across agencies on urban form, conservation and safety, there would be an opportunity to enable the constant regeneration and vigilance envisaged for good planning outcomes (Freestone 2012).

The acceptance of the inevitability of environmental hazards, such as wildfire, should also play an integral part in shaping settlement plans and design in the peri-urban interface (March and Rijal, 2015; Hughes and Mercer 2009).

Viewing fire as a natural and inevitable hazard should be central to most solutions, so we can anticipate its important positive and negative effects on both human and natural systems (Moritz et al. 2014, p. 64).

The imperative is outlined as a change in mindset, and a move away from considering hazards as an 'unpredictable act of nature' (March and Rijal, 2015 p.2). As Gill (2005) argues, reducing the threat of bushfires with better hazard maps, fire exclusion and suppression is no longer enough to mitigate the growing risk of bushfires. No matter the management approach, the acceptance that the likelihood of large out of control fires is increasing, or part of a 'new normal', would be at the heart of the planning process. Furthermore, a concentration on land-use and zoning practices would become a priority action likely to achieve more positive results in high-risk peri-urban contexts (Moritz *et al.* 2014, p.64).

This is the major difference between the Swiss and South Australian case studies – the Swiss are prioritising responses to risk in their spatial planning, while this aspect appears to be only a minor component of the South Australian approach. Entire settlement layouts in Switzerland are organised to avoid or deflect environmental hazards – avalanches, landslides and rock-falls are shepherded away, or through settlements to avoid destructive impacts. Villages are placed in prominent positions on hillsides or in raised positions in valleys, so that flash floods will not impact them directly. Forests are used almost universally, to consolidate slopes that might otherwise slump and impact on townships or infrastructure. As Pfister (2009) notes, even in Switzerland it is evident that land-use planning was less directly informed by risk during the modern era, when technical and instrumental rationalities were seen as sufficient to manage the hazards. For example, it was found in the Swiss survey that more development was occurring in inappropriate places, and the terraced vineyards of the Locarnese slopes, that traditionally served as buffers between the forest and the villages, are being lost due to urban expansion and encroachment. Nevertheless, there are many examples in Switzerland where risk management is more important than economic development as core elements of planning decision-making. In contrast, South Australian spatial planning is not making the same type of decisions to avoid or mitigate the bushfire risk, and that needs to change with the growing risk of bushfires. Yet, the natural hazard risk will be increasingly difficult to control, and the goals of planning must respond to those new levels of risk and anticipate that severe events are going to happen, and become the 'new normal'. Adelaide has spread out from a central core in a manner that has prioritised the consumption of space at the potential cost of its long-term sustainability, but a new culture of risk would challenge the assumptions at the base of that development approach.

An example of this point emerges from the South Australian case study. After years of community protests, the Blackwood Park land division development situated in Craighburn Farm was approved by

the South Australian Environment, Resources and Development Court in January 1995 (City of Mitcham 2016). Over twenty years later, the new land subdivision's final development stage is nearing completion, abutting directly a large vegetated conservation space. As a result, a significantly larger number of houses adjoin the forested slopes of Sturt Gorge Recreation Park and its Grey Box woody grasslands, a State and National endangered ecological community. Residents of these new developments, as well as those of the earlier subdivisions included in the Australian Householder Survey, are now expressing concern about perceived vulnerability of their property to bushfires, and the lack of adequate escape routes from the bushland type setting. By prioritising relationship building with the public (Moritz *et al.* 2014, p.58), more nuanced planning outcomes could be achieved to meet the needs of this complex situation, and help minimise the detrimental effects of future blazes on the ecosystem and the community. Interactive and iterative processes of risk management involving all stakeholders are identified as effective approaches to advance risk governance and preparedness (Wachinger *et al.* 2012). Working with stakeholders in a participatory manner in the context of environmental hazard-risk planning and management will be necessary to achieve several fundamental aims: fostering knowledge and personal agency in the participating public; information 'from the source' becomes available to authorities as they engage with residents; and a building of trust can occur between authorities and residents (Wachinger *et al.* 2012).

The literature does also show that a process of deliberation involving the public provides benefits that extend beyond a simple answer to a planning problem. Forester (1999, p.114) describes how, within spatial planning practice deliberative processes ignite a deeper type of learning that goes beyond a simple exchange of ideas, and which is enacted 'through transformations of relationships and responsibilities, of networks and competence, of collective memory and membership'. By engaging citizens and offering opportunities for exchanges, there is the potential to educate more comprehensively by re-configuring social relations and interactions. In other words, the exchange, to be truly deliberative, does need to be of a particular nature:

[a] particular kind of communication that is non-coercive, involves reflection, strives to link particular claims to more general principles, and to reach those with different frames of reference' (Dryzek 2013, p.1).

What theorists emphasise in deliberative democracy research is the need to engage deeply and openly, to make space for learnings that would otherwise be lost, and to seize opportunities that would be wasted if the setting and the rules of interaction were inadequate – all of these elements could lead to a failed opportunity to yield 'the fuller promise of participatory processes' (Forester

1999, p.130). Under ideal circumstances, participatory planning approaches can have multiple benefits including: educating the public; informing governing bodies and emergency services personnel of specific local needs and perspectives; and adding legitimacy to any decision made based upon these additional perspectives. These circumstances include infrastructure and governance systems and adequate funding models for the local, community level of governance, to allow for the mechanisms and settings that facilitate exchanges about the issues that count most for residents. Decisions around personal safety from bushfires that residents face in peri-urban areas are complex and in some cases involve a substantial level of skill and knowledge to resolve. Deliberation offers residents opportunities to voice their concerns on spatial matters that are important to them, and a chance to engage with issues of environmental hazard and value to a deeper, more meaningful level, by making participants aware of their own knowledge or deficiencies and prompting them to learn. At all levels, structures and processes must enable deliberative interactions and communications in order to promote community education.

Another example provides some important insights in relation to this discussion. After decades of alerting hills residents of approaching bushfires, the bushfire warning sirens were removed from Blackwood due to a funding shortage (Bond 2018). Interestingly, several respondents had talked about the sirens in their responses to the 2015 questionnaire. These respondents felt, that the sirens were a key element that contributed to their understanding of the bushfire risk in the Blackwood region. The emergency alert sirens were abandoned without community consultation, and replaced with pagers and electronic alert messages as they were cheaper. Acts such as this, which alienate some local residents from their traditional means of risk awareness, illustrate the danger of discrepancies and misunderstandings that could arise from the different value sets and priorities, technical and layman knowledge that were raised by Beilin *et al.* (2013). Interestingly, at the same time, Switzerland has just completed its upgraded and extended siren network to 4000 units, and this has created a seamless national emergency alert system throughout all municipalities in the country (FOCP 2009).

## **7.6 Conclusion**

Bushfire risk mitigation is a field where growing societal complexity and climate uncertainty are challenging the capacities of the planning system to reduce risk. The implications for governance are huge and new forms of engagement and participation processes are required. Collaborative planning based on a communicative rationality (see Dryzek 1990) is a growing component of the planning discourse. Planning for peri-urban spaces of high environmental risk will require detailed technical



knowledge on bushfire risk management, which can only be provided by highly competent experts in the emergency services field, but it will increasingly need to be applied in combination with detailed local site knowledge. This will also entail guidance from residents who are both educated on risk prevention and have their own plans to respond in disaster scenarios. Ways to facilitate an exchange of information and expertise in a dynamic process of re-evaluation allowing different players to inform one-another will need to be sought (MacCallum 2010). Collaborative planning strategies could offer officials and emergency services actors the social room to enable such a multi-directional exchange and education between all stakeholders, to offer avenues for improved spatial outcomes, and to abate risk levels in bushfire prone areas. The important lesson from this research is that in spatial contexts of high value and risk, the engagement process must run in conjunction with safety/bushfire advice and education campaigns. First, there must exist a consistent exchange and collaboration between risk managers, communicators and planning actors. Secondly, the dialogue between authorities initiating the consultative process and the residential communities that are being consulted, must consist of an exchange of information running in both directions.

# CHAPTER 8

## CONCLUSION

### 8.1 Introduction

This chapter highlights the key findings and presents a brief summary of the implications of the research. The problem of planning for risk is initially outlined within the theoretical context. Subsequently, the chapter is structured according to the research questions and discusses the survey responses given by residents living in the peri-urban areas of the Mount Lofty Ranges of South Australia and of the Locarnese region of Switzerland. Finally, the study's limitations and recommendations for future research are presented.

The peri-urban area is a dynamic space with substantial resource and conservation potential. In Australia, it is also a transitional and multi-functional space of conflicting interests and risk of environmental hazards. The country has a long history of experiencing and fighting serious bushfires in peri-urban areas. In SA's recent history, the loss and grief associated with bushfires was felt keenly during the 2015 Pinery and Sampson Flat fires (CFS 2017). The expansion of settlements into forested areas, a revegetation of settled spaces formerly cleared of vegetation for predominantly agricultural purpose, and the effects of climate change are impacting upon bushfire risk levels in Australia and globally. Climate forecasts anticipate conditions with a higher frequency of longer and hotter dry spells that are likely to make such large fires more probable for southern Australia. In SA, and globally, how planning responds to the changing socio-ecological circumstances will be fundamental to enable places and communities to thrive and be safe in the future. Comprehensive prevention strategies are needed to achieve improved resilience in communities living in bushfire prone areas. This opens the debate for new approaches to better assess risk and improve plans to avoid recurrent catastrophes, especially amongst the growing peri-urban populations.

Environmental risks, together with anthropogenic risks have been identified as the defining characteristic of our time. In a large body of work, Ulrich Beck (1982; 1992a; 1992b; 2003; 2017) stipulated that both the risk itself, and the way western societies deal with the reality of risk, will increasingly explain our existence and define a new type of social reality: a Risk Society. In other words,

societies are increasingly busy experiencing and dealing with the risks they themselves created. Reflexivity is the process identified as the way individuals and organisations act within such a context, while relying less on traditional modes or patterns. As a result, an operational crisis is emerging in society, where communicative practices, governing bodies and infrastructure planning are struggling to deal with the new levels of risk. The dominant institutions and processes are a creation of a modern rationale, that is largely aimed at taming and overcoming nature, including environmental hazards. As a result, a discounting of risk can occur, that is related to a conception and bounding of risk through modern scientific and technocratic approaches. Reflexive modernisation represents a course of action aiming to re-engage society with the new risk levels, and deal with the impacts of climate change, resource depletion, and economic stagnation. Societal risk needs to be better understood and governance structures and responses made to reflect the actual risk levels societies face.

Deliberative planning approaches for spaces of high ecological and amenity value, within high-environmental risk in peri-urban spaces are of interest here. The aim of the thesis has been to establish the extent to which participatory planning practices offer a pathway to a new interactive and discursive planning effort aimed at providing legitimate, authentic, and consequential spatial outcomes for peri-urban areas, within a context of elevated risk of environmental hazards. This is achieved by surveying residents' perceptions of value and environmental risk in the peri-urban place where they live, and by assessing the way residents interact with their local spatial planning system.

## **8.2 Summary of findings based on the research questions**

There are three main aims of the research and the discussion below outlines how the results and subsequent analysis have enabled the development of some meaningful conclusions.

### **8.2.1 Socio-ecological dynamics within peri-urban areas exposed to environmental hazards and of high amenity and conservation values**

The dominant environmental values and risk perceived by Australian and Swiss respondents of the peri-urban fringe were identified as being very similar and focussed on environmental, hedonistic-type aesthetic values. In both places, individuals had chosen to live in the location for the visual landscape attributes and the associated sense of peace and connectedness to nature. In Australia, despite the valorisation of the natural attributes of the landscape dominated by trees and native vegetation, the perception of the potential threat of bushfires was high, and the clearing of trees for

risk mitigation was widely supported, despite many residents wanting more trees. In the Swiss context, respondents were aware of the potential risk wildfires represent for their home amongst a range of environmental hazards experienced on the upper slopes of the Locarnese region. Most Swiss respondents were in favour of removing trees close to homes to create buffer zones to mitigate risk. There was concern expressed about the current lack of removal of unsafe trees and clearing of dead wood in the local forests, however a majority were satisfied with the current extent of the forests in Ticino. Thus, in both places, residents were aiming for a balance between retaining local environmental values and mitigating risk.

Clearly different perspectives between the two surveys did however emerge in relation to the level of trust respondents had in authorities in charge of wildfire risk mitigation. In Switzerland respondents almost universally believed that authorities effectively managed the hazard risk around wildfires, while in Australia close to one third of respondents felt the current bushfire risk management was 'poor or non-existent'. This result highlights the distinctly different wildfire risk levels for the research sites discussed in the method, and is the reason why a direct comparison between the two sites was never intended. The result might however also show a sense amongst SA respondents that irrespective of competence levels, the risk in the peri-urban region around Sturt Gorge Recreation Park is such, that emergency services would struggle to successfully deal with a serious bushfire situation. Aside from providing an insight into respondents' risk estimation, these results can be seen as a reflection of the lack of more formal engagement processes in planning and hazard management in SA and Australia in general, targeting the resident population of the peri-urban.

An investigation on how these perceptions of risk impact on respondents' behaviours in Australia revealed that despite a high estimation of the risk, there were dangerous tendencies in relation to catastrophic fire days. The survey found that those most vulnerable were also most likely to approach a catastrophic fire warning day with a 'wait and see' approach. In the Swiss context, survey responses suggested a mostly passive approach to risk, with high levels of trust assigned to emergency services. In both cases, the study of a possible relationship between resident perceptions of environmental values and those relating to risk of hazards did not yield any clear patterns. However, in both places, people were aware of the risks of environmental hazards, and recognised that the peri-urban was not simply an attractive place, but also a place of dangers. In fact, an interesting finding was a growing awareness that the peri-urban represents a physical manifestation of a transition, where tensions of modernity, nature and tradition play out across time and space. That complexity makes planning very

difficult and failures and compromises are inevitable - that is why residents must play a part in decisional processes along the planning journey.

Respondents were asked about their perceptions of value and risk to inform policy for sustainable development outcomes during an era of enhanced environmental risk. Some people will always make either bad or unsafe decisions in the complex and critical circumstances associated with environmental hazards, and this is impossible for agencies or researchers to anticipate at the level of the individual. Nevertheless, broader community scale research such as this, and academic work engaged in socio-spatial learning approaches suggest, that knowledge drawn from residents through deliberative and consultative processes is unique, as it is inextricably linked to the context where it is generated (Natarajan 2017). As such, this type of knowledge can provide vital local insights and help identify critical issues for actors engaged in risk mitigation work. The review of the literature undertaken for this project would suggest that this is a field that is not sufficiently considered in current governance and planning policies. Critically for this thesis, this type of input could be one of the significant transformations, or step-changes required for planning systems dealing with contexts of elevated environmental risk.

For the Australian research, the dynamic forces and the physical components characterising peri-urban spaces were identified as economic drivers pushing housing development into areas of considerable bushfire risk; conservation and amenity forces driving a push for more trees to be planted in the Mount Lofty Ranges region, which can contribute to increasing risk levels. The flammability of the native Australian bush was also identified as a critical element shaping the physical risk elements of this space. In the Locarnese Region of Switzerland, similar economic, amenity and ecological drivers emerged. Furthermore, the gravitational force impacting on the steep slopes was identified as a significant physical component characterising this peri-urban space. Trees planted and protected for their 'protection function' play an immensurable role in consolidating and fixing the slopes, reducing the risk of landslides, rockfalls and flooding. Conversely, with the progressive abandonment of agricultural areas and the subsequent reforestation, the forest also holds a recognised risk of forest fires, increasingly prominent due to the impacts of climate change. In both locations, there is evidence for increased risk driven by both natural and anthropogenic forces impacting the highly dynamic peri-urban fringes in both the Mount Lofty Ranges and in the Locarnese region.

It is clear that the dynamic nature of the peri-urban space proves a challenge for planners and emergency services. The planning literature calls for distinct approaches set to identify and address the unique challenges presenting here. In Australia, in the context of the Mount Lofty Ranges peri-urban space, the return of native vegetation to what was previously dominated by grassland, and even the return of the forest in the suburbs, is one such challenge. In Ticino, on the south-facing slopes above Lake Maggiore the peri-urban development is occurring primarily at the expense of former agricultural land. In a traditional setting, terraced vineyards cultivated in areas immediately adjacent to the settlements also assumed a buffering safety purpose. Currently, housing and forest are increasingly intermingling, thus contributing to changing the environmental risk situation.

### **8.2.2 Deliberative planning strategies for safer spatial outcomes in peri-urban areas of elevated bushfire risk**

The inherent value of the peri-urban space is increasingly being recognised and planning policies aimed directly at this space were identified during this research. In the Mount Lofty Ranges for example, one standout element was the recognition within the new Planning, Development and Infrastructure Act (2016), of the value of the peri-urban agricultural production zones in SA. Legislation intended to safeguard horticultural and viticultural areas on the urban fringe of Greater Metropolitan Adelaide (SA Planning Portal 2018), delineates the Environment and Food Production Areas (EFPAs), and imposes restrictions on re-zoning for residential development to be restricted within these protected areas from 2019 (State Planning Commission 2017). In Switzerland, the outcome of the 2012 popular 'Initiative on Secondary Homes' will impact on peri-urban spaces, especially in the high-amenity municipalities of the Alpine regions. Here the 2016 law resulting from the citizen-driven initiative regulates the proportion of housing a municipality can allocate to secondary homes. This particular case raises important questions about a planning system's capacity to produce outcomes that are in the best interest of the wider population, and generating outcomes where long-term amenity-led landscape values prevail over short-term economic gain.

The research initially set out to look at aspects of ecosystem vulnerability and conservation priorities arising at the peri-urban fringe, and their inclusion in current urban planning concepts and approaches. However, these aspects of the broader topic were not fully pursued, and yet the surveys found that in many cases conservation aspects are neglected or simply overlooked. In the Australian context for example, the endangered ecological communities of the Grey Box grassy woodlands found in Sturt Gorge Recreation Park, are increasingly under pressure from neighbouring developments. In many cases, housing now directly abuts the vegetation of the Park and the vegetation forms a

contiguous canopy into the suburbs with no breaks or buffer zones. Respondents in the area indicated that they attribute significant value to the native vegetation, and that they support forest management directed at removing non-native species and enhancing the attractiveness of the area. The forest management priorities that were given the highest levels of support by respondents however, were those engaged in reducing bushfire risks. These attitudes were reinforced by an existing right to clear native vegetation up to 20m from the house, which raises important questions on the legitimacy of the more recent housing developments in the Mitcham Council area of the Mount Lofty Ranges. Similarly, in Switzerland residents expressed views that strict conservation spaces should be further expanded, while also being in favour of removing trees close to houses to create a buffer zone with the forest. In both places an impasse arises where many residents appear to have conflicting priorities, with wishes for management of the environment to reduce risk expressed at the same time as desires for the retention of important ecological values.

The thesis also set out to enquire about the relationship respondents had with the spatial planning system. The survey asked respondents to gauge their understanding of the land-use planning system. Results indicated very different views on this issue in the two separate national contexts. In the Australian case, most respondents reported having no familiarity with the South Australian planning system, and over half perceived having 'no voice' in any planning issues concerning their local community. In contrast, within the Swiss context, a high 85 percent claimed to have some knowledge of the planning system. However, four out of every five respondents perceived having no voice in the spatial planning issues concerning their local municipality or Canton. Respondents' expectation levels play a role in the results relating to what it means to be heard, and on having their views count in the spatial decision-making process. Although in Australia, respondents' expectations in this regard are low, in the Swiss case the much higher opportunities for participation through democratic channels, appear to leave respondents feeling they should be able to make a difference, especially at the local level where the political consultation process is not as formalised as it is at the Federal level. Respondents' lived experience in this case, appears not to meet expectations, and as a result, there appears to be a sense of dejection, perhaps also contributing to the well-recognised issue of voter apathy. Importantly, as indicated in the literature, consultation does not necessarily imply deliberation (Dryzek 2000; Johnston 2014). This 'no voice' result highlights the importance of mechanisms, even within the parameters of a direct democratic context such as Switzerland, which ensure a consequential inclusion of views. Only deliberation is capable of inducing reflection on the preferences that participants hold. Engagement in planning for areas of elevated environmental hazards and of high amenity and scenic value will have to be of a deliberative nature. Only then, the necessary exchange and education process will be able to progress. A successful deliberative context is reliant

on trust and implies a valorisation of interactions between actors. Swiss survey results would suggest that spatial planning, especially at the local, municipal level, is not achieving this level of engagement with residents. The important learning here applies to the definition of the engagement terminology. Within Switzerland, when citizens vote on spatial planning issues, their contribution is binding. Habermas (1984) claims that when issues are put to the people, they entail a collaborative rationality resulting from the engagement of citizens with the issues that are being debated, and the creation of the social license for deliberation. However, not all democratic processes do spontaneously create a deliberative process.

The role participation plays in the future of SA's planning decision-making framework for high-risk peri-urban contexts should continue to rise, given the anticipated risk levels for these areas of SA. Emergency services and first responders must continue to deliver their important safety messages through engagement channels such as community forums. An instrumental planning approach to bushfire contingencies must continue and be extended, to face the new levels of risk presented by more frequent unseasonable fire weather or prolonged drought situations. However, the potential for a further decline in individual responsibility and a spread of indifference and apathy amongst citizens is real and should be considered. Beck (2016) very pertinently asked how much climate change democracy could endure. The research conducted in this thesis would suggest that as long as democratic contexts continue to make citizens feel that they have a voice, and that their concerns are being heard, then there is hope for sustainable outcomes within a future of increased environmental risk.

If the public chooses not to contribute to the highly complex and costly processes of engagement and deliberation, all attempts at formal deliberation will be in vain. It is vital therefore, that planning procedures provide those who participate with evidence of clear impact in the landscape resulting from real deliberation and engagement. There exists a real opportunity for the newly designed and still developing planning system in SA to implement such deliberative processes of public engagement that lead to tangible change. This must be part of every spatial planning decision, to accommodate the emerging culture of risk associated with a growing awareness of the hazards associated with the forested areas of the Mount Lofty Ranges. For example, in areas of high risk such as the peri-urban spaces of the Mitcham and Onkaparinga Hills around Sturt Gorge, learning through the planning process provides vital opportunities for residents to develop their knowledge of the types of challenges that they will face in the future. This process of engagement through deliberative planning could be particularly important in the context of the broader risk management approach, which is



currently so dominated by decisions derived from technical and scientific expertise. During bushfires everyone loses. However, informed and aware residents that know what they are likely to encounter will be far more able to respond effectively as individuals. Beyond that, they would also be able to understand the management and infrastructure used to mitigate that risk. For example, they would understand the need to manage fuel loads in the forest and the purpose of planners providing adequate evacuation routes. Deliberation in planning is not only for better planning outcomes, it also enables communities to manage risk more effectively.

### **8.2.3 Learning planning lessons from international comparisons**

The similarities and differences between the peri-urban fringe in the Mount Lofty Ranges and the Locarnese region are reflected in the responses obtained from the householder surveys. At times, the results from the two countries were surprisingly similar, perhaps showing the parallels in ideals and values that exist across the Western world. One question posed in this thesis was to know whether it is useful to develop a methodology that contrasts two such case-study areas to inform academic knowledge and planning outcomes. Switzerland is a unique country for its setting of high environmental risk, and its even more unique direct democratic approach to the governance of the nation. Juxtaposing SA's experiences with planning for risk with those in Switzerland, provided important opportunities for contrast. In this case, the approach was enabled by the unique experiences and skills of the researcher who had lived almost half of her life in each of the two places, spoke all relevant languages fluently, and had been trained as a geographer in both contexts. The case study approach provided valid insights into the merits and potential problems of democratic deliberation to generate ideas to inform SA planning. The approach also developed important new knowledge on how planning for risk could evolve in the future.

### **8.3 Limitations of study and recommendations for future research**

There were broad differences in the sampled populations from the two places. For example, almost all homes in Australia were owned by the resident, while in Switzerland many homes were rented. There were also similarities in the demographic characteristics of the two samples. For both surveys, there were a significant representation of retirees. The older age of a large proportion of respondents was identified as an anthropogenic element with the potential to contribute to vulnerability levels. This socio-demographic aspect of the samples also draws attention to the non-probability sampling method chosen for this research that limits the opportunities for extending generalisations to the

broader population. Although only a small sample was obtained from a much larger population in the two areas, the analysis of their perceptions nevertheless provided important insights into how people are conceptualising value and risk in the two places. Furthermore, by combining the quantitative survey data with knowledge drawn from background materials and policy documents and stakeholder interviews, the arguments developed from the analysis of the sample data were contextualised spatially and temporarily to allow for broader, collective arguments to develop from the research findings.

The study sites were chosen because both places offered important similarities of forested peri-urban spaces at elevated risk of natural hazards. The SA case is one of the highest bushfire risk areas on the fringe of the city of Adelaide, which also is experiencing increasing suburban expansion. Simultaneously planning reforms in SA are exploring opportunities for new levels of citizen engagement in deliberative planning processes. The country of Switzerland has led the world in formalising such deliberative planning process and the Canton of Ticino is experiencing new wildfire risk-levels that are now raising awareness of how landscape needs to be used as a tool to mitigate evolving risks. Together, the two case studies provided excellent opportunities for some comparisons but also mutual learning. Some of the cross-cultural aspects of this research presented some significant research challenges. All aspects relating to language and cultural context required local knowledge and linguistic proficiency in Italian, German and Swiss-German. Within the multi-lingual region of Locarno, there were some challenges associated with producing research tools in several languages suited to the specific context. In this case, that limitation became apparent from respondent feedback by phone soon after the Swiss survey had been mailed out. The limitation was overcome by providing all recipients access to a German version of the questionnaire in the form of an electronic link on a subsequent reminder postcard, as well as the Italian and English version that were made available at the start. This example highlights just one of the challenges associated with research conducted in more than one language, but also highlights the advantages of undertaking fieldwork in areas well known to the researcher. Social science methodologies often involve elements of cultural sophistication and compromise required to generate data from complex social environments. Where the researcher is able to understand the local socio-cultural context, and respond appropriately to any problems that arise, any such disruption can be overcome to produce sound research.

Future investigations could take this research in several directions. Environmental risk situations no longer seem to fit the approaches to planning that are being undertaken in either place. For example, temporal aspects of bushfire risk appear to be changing rapidly, and in some cases, the conventional

seasonal clues are no-longer indicative of the need for the timeliness of agency capacity or community awareness. New year-round bushfire seasons involve an altogether new understanding of risk. Research on the actual implementation of deliberative planning practice was not undertaken here, but would be a logical avenue for interrogating the processes in greater depth. For example, it might be possible to work more closely in association with governance organisations as they implement participatory planning for risk mitigation. That type of social learning would provide insights into the opportunities and potential pitfalls of the engagement processes themselves for effective planning.

Another direction that the research could be taken would be to substantially increase the scale of the surveys at the basis of this thesis, to more comprehensively understand how different people in different places understand and engage with risk. Larger samples would also allow for a comprehensive investigation of how residents perceive collaborative approaches could achieve better outcomes. Part of the development of a greater understanding of deliberation might involve the researcher working closely with local council and cantonal authorities to fully understand how planning engages communities on risk, how they use that knowledge and how they work to improve their deliberative processes. As mentioned, this thesis did not attempt to make the case studies directly comparative. Actually, that is probably very difficult to achieve across distinctly different international locations. Nevertheless, rather than one place learning from another, as was largely achieved here, future work could try and make the surveys more directly comparable in two or multiple locations either within the one country or across national boundaries.

Trust in organisations is a vital component of successful deliberative planning. If trust is lost, people will disengage and will not be willing to discuss their hopes, fears and actions. A willingness to contribute such personal insights or even their time for outcomes that will benefit a greater good, requires people to believe that their efforts are going to lead to real outcomes. Targeted research could focus on individuals or groups who are already working closely in conjunction with planning authorities or emergency services to identify what motivates them to work for collective goals and what leads to the best outcomes. As identified by Habermas (1984), these positive deliberative outcomes are closely linked to the capacity authorities have to generate and maintain a social room for people to come together and develop outcomes that everyone will be willing to accept.

Deliberation is partly about education – it educates authorities about residents’ understanding of their places to inform reflexive responses to risk, and in this case, it also educates residents about risk. Both groups learn what could be achieved to manage risk, and how capacities could be developed to assist

people to prepare, respond and recover effectively from natural hazards. Further research could be undertaken into such processes of social learning, including community-led bushfire-risk reduction strategies, to work out how people learn from each other in different settings and in relation to different forms and levels of risk.

## **8.4 Conclusion**

The first aim of this research was to determine possible relationships between amenity/conservation values and perceptions of environmental hazards on risk mitigation behaviours in local residential populations on the peri-urban fringe. This aim was met through the analysis and subsequent discussion of the survey data from fieldwork sites in the Mount Lofty Ranges of SA and in the Locarnese region of Switzerland. In both places, the elderly and young families are valuing their forested residential areas but many are not fully identifying the new risks that are emerging to those same landscapes, or when they do, are not responding with new behaviours or support for planning that reflect the recognised risk levels.

The second aim was to appraise the potential for participatory planning strategies in educating the population about socio-ecological risk and in shaping effective policy and planning in peri-urban spaces of high environmental risk. This aim was met by using the Swiss case study, set in its highly deliberative democratic context, and juxtaposing those survey findings with the results obtained from the Australian case study. It is clear that in Switzerland there is a greater trust in and support for local authorities, and that is probably the most significant outcome of the deeper processes of engagement – that the Locarnese perceive that they understand the planning systems and value the associated risk management approaches by local authorities very highly.

The third aim set out to understand to what extent planning for environmental risk in one context can be informed by the approach taken in a different place with different social and environmental contexts. This aim was met by considering the primary data in association with information obtained from background materials and policy documents for each separate country and location, which together generated a sufficient spatial and temporal context for the interpretation of research findings. The achievement of this aim also involved a careful assessment of the limiting factors within this specific research approach. The Swiss planning context is embedded within a more sophisticated culture of risk management and also a very formal deliberative democratic setting. Even then, the high

level of engagement opportunities does not translate into large numbers of people taking up those opportunities, nor does it appear to make them feel that their contribution is altering local planning outcomes. In Australia, people are used to handing over governance to their representatives, and similar conceptions relate to planning, where people have a sense that planning authorities are professionals with particular skills in integrating issues and in designing and enacting spatial plans. Whether that assumption holds, was not supported by the survey results, but neither could it be expected that South Australians would rapidly wish to embrace local deliberative planning approaches to anything like the same scale as is present in Switzerland.

More broadly, this research fulfilled its aims by applying Beck's work on societal risk which emphasises the need for transformational governance and restructuration to the findings from case studies of suburban development around Sturt Gorge Recreation Park in the Mount Lofty Ranges and on the steep south-facing slopes of the Locarnese region. The findings from this research suggest that deliberative planning systems do offer new opportunities for linking residents' perceptions of landscape value and risk to spatial planning outcomes in the peri-urban fringe, but people will need to strongly engage and support the new approach. More engagement at all levels will not necessarily translate into better planning. For that to be achieved, people must be supported to understand the new levels of emerging risk and their co-responsibility to participate in guiding the solutions. Habermas (1984; 1989) and Dryzek (1990; 2000; 2009) emphasise the importance of communication to truly enable transformations in society. Until society learns how to more effectively work in unison for better outcomes for our places, it is destined to be chasing failures brought about by the impacts of environmental risks – that conclusion is not just relevant for the case studies here or for the bushfire hazard, it is becoming the determining concern of our time.

This thesis investigated the channels of participative planning and engagement in two different peri-urban areas in Australia and Switzerland undergoing rapid change, with different cultural contexts and governance arrangements. There is a metaphor that can be used to illustrate the engagement paths for environmental risk management identified in the two countries. Switzerland appears to have established a super-highway of engagement where citizens can utilise the channels of the direct democratic governance structure to engage with Federal and Cantonal governance and the planning decision-making process. By comparison, and in sharp contrast to the dynamic and comprehensive system seen in Switzerland, citizen deliberation and engagement in Australia appears to run on unsealed country tracks at a more laid-back, leisurely pace, largely dependent on the capacities of the driver to undertake the journey of deliberation. Up until recent times in Australia, the process of

consultation and engagement with the population existed but was rare, convoluted, elitist and mostly haphazard. The planning reform that is underway in SA is set to change this, hopefully for the better with engagement and consultation an integral part of its approach. There are good lessons to draw from successful actions by the CFS, but SA will also need to engage with residents to alter their cultures of risk in order to make people realise that their participation is needed for effective local spatial and environmental planning.

# APPENDICES

## Appendix 1: ETHICS APPROVAL



RESEARCH BRANCH  
OFFICE OF RESEARCH ETHICS, COMPLIANCE  
AND INTEGRITY

LEVEL 7, 115 GRENFELL STREET  
THE UNIVERSITY OF ADELAIDE  
SA 5005 AUSTRALIA

TELEPHONE +61 8 8313 5137  
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CRICOS Provider Number 00123M

26 November 2014

Professor G Hugo  
School: School of Social Sciences

Dear Professor Hugo

**ETHICS APPROVAL No: H-2014-258**

**PROJECT TITLE: Demographic change, biodiversity conservation and bushfires:  
planning for sustainable futures within peri-urban regions of  
Mediterranean Australia and France**

The ethics application for the above project has been reviewed by the Low Risk Human Research Ethics Review Group (Faculty of Humanities and Social Sciences and Faculty of the Professions) and is deemed to meet the requirements of the *National Statement on Ethical Conduct in Human Research (2007)* involving no more than low risk for research participants. You are authorised to commence your research on **26 Nov 2014**.

Ethics approval is granted for three years and is subject to satisfactory annual reporting. The form titled *Project Status Report* is to be used when reporting annual progress and project completion and can be downloaded at <http://www.adelaide.edu.au/ethics/human/guidelines/reporting>. Prior to expiry, ethics approval may be extended for a further period.

Participants in the study are to be given a copy of the Information Sheet and the signed Consent Form to retain. It is also a condition of approval that you **immediately report** anything which might warrant review of ethical approval including:

- serious or unexpected adverse effects on participants,
- previously unforeseen events which might affect continued ethical acceptability of the project,
- proposed changes to the protocol; and
- the project is discontinued before the expected date of completion.

Please refer to the following ethics approval document for any additional conditions that may apply to this project.

Yours sincerely

PROFESSOR RACHEL A. ANKENY  
Co-Convenor  
Low Risk Human Research Ethics Review Group  
(Faculty of Humanities and Social Sciences and Faculty  
of the Professions)

ASSOCIATE PROFESSOR PAUL BABIE  
Co-Convenor  
Low Risk Human Research Ethics Review Group  
(Faculty of Humanities and Social Sciences and Faculty  
of the Professions)



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CRICOS Provider Number 00123M

**Applicant:** Professor G Hugo  
**School:** School of Social Sciences  
**Project Title:** Demographic change, biodiversity conservation and bushfires: planning for sustainable futures within peri-urban regions of Mediterranean Australia and France

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The University of Adelaide Human Research Ethics Committee  
Low Risk Human Research Ethics Review Group (Faculty of Humanities and Social Sciences and Faculty of the Professions)

**ETHICS APPROVAL No:** H-2014-258 **App. No.:** 0000019520

**APPROVED for the period:** 26 Nov 2014 to 30 Nov 2017

Thank you for your responses dated 27.10.2014, 14 and 26.11.2014 to the matters raised.

Approval is given on the condition that participant documents and materials translated into French are submitted prior to this component of the research taking place.

This study is to be conducted by Mrs Annette Bardsley, PhD student.

**PROFESSOR RACHEL A. ANKENY**  
Co-Convenor  
Low Risk Human Research Ethics Review Group  
(Faculty of Humanities and Social Sciences and Faculty  
of the Professions)

**ASSOCIATE PROFESSOR PAUL BABIE**  
Co-Convenor  
Low Risk Human Research Ethics Review Group  
(Faculty of Humanities and Social Sciences and Faculty  
of the Professions)



## Appendix 2: AUSTRALIAN HOUSEHOLDER QUESTIONNAIRE

*A delicate balance: lifestyle, conservation and fire risk in the Adelaide Hills*



### • YOUR CONTRIBUTION

Let your opinion on planning for bushfire and the local environment be heard

### • COMPLETING THE QUESTIONNAIRE

Complete this survey on paper or ONLINE  
[www.surveymonkey.com/s/PBBA](http://www.surveymonkey.com/s/PBBA)

### • RETURNING PAPER QUESTIONNAIRE

Please return your completed questionnaire with the provided envelope by :

**Tuesday the 31 of March 2015**

### • RESEARCHER CONTACTS

Dr Dianne Rudd - Lead Researcher  
[dianne.rudd@adelaide.edu.au](mailto:dianne.rudd@adelaide.edu.au)  
+61 8 8313 4109 and  
Annette Bardsley - PhD Student  
[annette.bardsley@adelaide.edu.au](mailto:annette.bardsley@adelaide.edu.au)

## BUSHFIRE RISK MANAGEMENT AND BIODIVERSITY CONSERVATION SURVEY

Dear Resident

We are inviting you to participate in a survey of your experiences and expectations in relation to planning in your local area. Researchers are interested in finding out about residents' opinions of the management approaches to both, biodiversity conservation and bushfires risk in their area. Participation is voluntary and all information collected will remain confidential.

**Complete  
Online**

<https://www.surveymonkey.com/s/PBBA5051>

Enter this code on the webpage

We recognize that some individuals and their families have been affected by bushfires and we sincerely apologise for any distress receiving this survey may cause.



**First, some questions about where you live**

1. What is your home postcode?     Suburb / town name: \_\_\_\_\_
2. For how many years have you lived in this suburb/ town? \_\_\_\_\_
3. In what suburb/ town did you live just before you moved here?  
\_\_\_\_\_

4. What were some of the key factors that made you LEAVE the place where you lived previously? Please provide one answer for each point. Where 1 = Not very important, 5 = Very important, and DK = don't know / not applicable.

Statements	Not very important				Very important	Don't know / not applicable
Commuting time	1	2	3	4	5	DK
Access to services	1	2	3	4	5	DK
Bushfire risk	1	2	3	4	5	DK
Real estate values	1	2	3	4	5	DK
Work opportunities	1	2	3	4	5	DK
Social isolation	1	2	3	4	5	DK
To raise a family	1	2	3	4	5	DK
Traffic congestion	1	2	3	4	5	DK
Access to schooling	1	2	3	4	5	DK
Cost of living	1	2	3	4	5	DK
Noise	1	2	3	4	5	DK
Other (please specify): _____	1	2	3	4	5	DK

5. Do you own, rent or manage this property where you live now?  
Own (with or without a mortgage)  Rent  Manage
6. If known, in what year or decade was your house built? \_\_\_\_\_
7. Is it your primary/main residence?  
Yes  No

*A delicate balance: lifestyle, conservation and fire risk in the Adelaide Hills*

8. a) Please indicate how important each of the following reasons were in your decision to live where you are now. Please provide one answer for each statement. Where 1 = Not very important, 5 = Very important, and DK = don't know / not applicable.

Statements	Not very important					Very important	Don't know / not applicable
	1	2	3	4	5	DK	
Views	1	2	3	4	5	DK	
Relaxed lifestyle	1	2	3	4	5	DK	
Escape from urban life	1	2	3	4	5	DK	
Leafy neighbourhood	1	2	3	4	5	DK	
The diversity of plants and animals	1	2	3	4	5	DK	
To be part of a friendly community	1	2	3	4	5	DK	
Peace and quiet	1	2	3	4	5	DK	
Good environment in which to bring up children	1	2	3	4	5	DK	
Proximity to nature	1	2	3	4	5	DK	
To enjoy outdoor recreation	1	2	3	4	5	DK	
Clean air	1	2	3	4	5	DK	
Space and privacy	1	2	3	4	5	DK	
To be near public transport	1	2	3	4	5	DK	
Investment opportunity	1	2	3	4	5	DK	
Access to services	1	2	3	4	5	DK	
Family history/ connections to the location	1	2	3	4	5	DK	
Affordability of property	1	2	3	4	5	DK	
Cost of living	1	2	3	4	5	DK	
Close to my work	1	2	3	4	5	DK	
Family reasons	1	2	3	4	5	DK	
Other (please specify): _____	1	2	3	4	5	DK	

b) What do you like most about where you live? \_\_\_\_\_

\_\_\_\_\_

9. How would you describe the garden on your property?  
Please choose the **one option** that best describes your garden.

- Cottage or flower garden
- Native or wildlife garden (e.g. shrubs, native bushland)
- Forest (dominated by trees)
- Lawn / grass / grassland
- Minimal vegetation (e.g. live in a unit or townhouse)
- Mixed garden including elements of all of these

*A delicate balance: lifestyle, conservation and fire risk in the Adelaide Hills*

10. a) Is your property immediately adjacent to a large area of vegetation?

No  please go to b) Yes  please go to c)

b) Approximately how close is the nearest large area of vegetation to your house?

Tick more than one box if applicable.

One house block away  Across a road, railway or other break   
 100– 300m away  300 – 600m away   
 600 – 1000m (1km) away  More than 1km away (Please go to Q.11)

c) Is it predominantly grassland, shrubs or forested land?

Grassland  Shrubs  Forest

d) Is this vegetated space a conservation (protected) area?

Yes  No  Unsure

e) To your knowledge, has this vegetation ever burned?

Yes  please go to f) No  please go to Q.11 Unsure  please go to Q.11

f) When was it burnt? \_\_\_\_\_

g) What type of burn was it? (e.g. bushfire, prescribed burn) \_\_\_\_\_

11. a) What are some reasons that might persuade you to MOVE AWAY from where you live now? Please provide one answer for each statement. Where 1 = Not very important, 5 = very important, and DK = don't know / not applicable.

Statements	Not very important				Very important	Don't know / not applicable
Commuting time	1	2	3	4	5	DK
Access to services	1	2	3	4	5	DK
Bushfire risk	1	2	3	4	5	DK
Real estate values	1	2	3	4	5	DK
Work opportunities	1	2	3	4	5	DK
My friends live elsewhere	1	2	3	4	5	DK
Family reasons	1	2	3	4	5	DK
Traffic congestion	1	2	3	4	5	DK
Access to schooling	1	2	3	4	5	DK
Cost of living	1	2	3	4	5	DK
New housing developments nearby	1	2	3	4	5	DK
Noise	1	2	3	4	5	DK
Other (please specify): _____	1	2	3	4	5	DK

b) What do you like least about where you live? \_\_\_\_\_

Now we are interested in how you relate to the place where you live

12. **FACT:** People's relationships to a place affect their decisions regarding bushfire preparation and biodiversity. Please indicate to what extent you agree or disagree with each of the following statements about the region where you live. Please provide one answer for each statement. Where 1 = Strongly disagree, 5 = Strongly agree, and DK = don't know / not applicable.

Statements	Strongly disagree					Strongly agree	Don't know / not applicable
	1	2	3	4	5		DK
I am very attached to the Adelaide Hills	1	2	3	4	5		DK
The vegetation of the Adelaide Hills is very important to me	1	2	3	4	5		DK
Native species are more important than exotic species	1	2	3	4	5		DK
We should prioritise urban development over conservation	1	2	3	4	5		DK
The way settlement is planned in Adelaide Hills supports conservation	1	2	3	4	5		DK
The more people that live in this area, the less satisfied I am	1	2	3	4	5		DK
I would like to see more forest throughout the Adelaide Hills	1	2	3	4	5		DK
Forest management should focus on reducing bushfire risks	1	2	3	4	5		DK
Forest management should focus on removing non-native species	1	2	3	4	5		DK
Forest management should focus on the attractiveness of the area	1	2	3	4	5		DK

13. a) Would you say your feelings towards this place change depending on the season?

Yes  please go to b)

No  please go to Q.14

b) Please describe in a few words which feelings you link to these seasons here where you live:

Winter \_\_\_\_\_

Summer \_\_\_\_\_

14. a) Do you take part in any formal or informal local community group such as walking, gardening, drama, playgroup, church, sporting club, service club (Lions, Rotary), friends of..., Facebook groups, etc.?

Yes  please go to b)

No  please go to Q.15

b) If so, please list which one(s) \_\_\_\_\_  
 \_\_\_\_\_

15. How often do you use the shops and services local to your area?

Most days  At least once a week  At least once a month  Irregularly  Never

Next, we are interested in your experience with, and concerns about vegetation and fire risk management

Starting with vegetation and land management

16. a) Is the native vegetation in your area important to you?

Yes

No

b) In your opinion, is the native vegetation around your local area important for...

Please provide one answer for each statement.  
Where 1 = Strongly disagree, 5 = Strongly agree, and DK = don't know / not applicable.

	Strongly disagree					Strongly agree	Don't know / not applicable
Education	1	2	3	4	5	DK	
Recreation	1	2	3	4	5	DK	
Harvesting of wood or other products	1	2	3	4	5	DK	
Bird watching	1	2	3	4	5	DK	
Bushwalking	1	2	3	4	5	DK	
Walking the dog	1	2	3	4	5	DK	
Bike riding	1	2	3	4	5	DK	
Clean air and water	1	2	3	4	5	DK	
Jogging	1	2	3	4	5	DK	
Beautiful landscape	1	2	3	4	5	DK	
Future generations	1	2	3	4	5	DK	
The diversity of plants and animals	1	2	3	4	5	DK	
Other (please specify) _____	1	2	3	4	5	DK	
_____	1	2	3	4	5	DK	
_____	1	2	3	4	5	DK	

17. How often do you use the native bush/recreation spaces in your local area?

Most days  At least once a week  At least once a month  Irregularly  Never

18. How much influence do you think people like yourself can have in protecting local plants and animals?

None  Not very much  Some  A lot  Unsure

19. What would you say is the most important environmental issue for your area?

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*A delicate balance: lifestyle, conservation and fire risk in the Adelaide Hills*

20. In your opinion, how important are the following characteristics of the forests in your area?

Please circle the relevant answer for each element, where 1 = Not very important, and 5 = Very important

	Not very important					Very important
Being native to Australia	1	2	3	4	5	
Being weed-free	1	2	3	4	5	
Being attractive	1	2	3	4	5	
Providing shade	1	2	3	4	5	
Providing species diversity	1	2	3	4	5	
Including endangered or rare species	1	2	3	4	5	
Providing opportunities for me to see or hear wildlife	1	2	3	4	5	

21. In your opinion, how effective is the conservation of the vegetation in your local area?

Extremely good  Good  Satisfactory  Poor  Extremely poor  Unsure

22. **FACT** Bushfire risk management sometimes involves difficult decisions about vegetation.

In your opinion, how important should the conservation of plants and animals be when considering bushfire risk prevention measures?

Extremely important  Important  Unimportant  Unsure

23. Please indicate to what extent you agree or disagree with each of the following statements regarding forest management.

Please provide one answer for each statement.

Where 1 = Strongly disagree, 5 = Strongly agree, and DK = don't know / not applicable.

Regarding vegetation within my local council area, I believe...

Prescribed burning undertaken for conservation is acceptable

Strongly disagree				Strongly agree	Don't know / not applicable
1	2	3	4	5	DK

Vegetation clearance to reduce fire risk is acceptable

1	2	3	4	5	DK
---	---	---	---	---	----

Residents should only be allowed to plant Australian native species

1	2	3	4	5	DK
---	---	---	---	---	----

Comments: \_\_\_\_\_

*A delicate balance: lifestyle, conservation and fire risk in the Adelaide Hills*

24. a) Are you involved in an environmental organisation that is helping to manage the environment in your area?

Yes  please go to b)      No  please go to Q. 25

b) Which one(s)? \_\_\_\_\_

And now continuing with fire risk management

25. **FACT:** Bushfire risk management includes, amongst other things, prescribed burns to reduce fuel loads, mowing, slashing, maintaining buffer zones and fire breaks, citizen education, etc. How do you rate the current management of bushfire risk in your region?

Extremely good     Good     Adequate     Poor     Non-existent     Unsure

26. Did you check with your local council what the bushfire rating of your property/ land was before buying/renting or before thinking of starting to build?

Yes       No       Unsure       N/A

27. Do you think new homes in high bushfire risk areas should have mandatory fire-fighting equipment installed?

Yes       No       Unsure

28. a) Have you ever had your house or property damaged or destroyed during a bushfire?

Yes  please go to b)      No  please go to Q.29

b) When? \_\_\_\_\_

Comments \_\_\_\_\_

29. Please tell us more about your previous experience with bushfire, if any: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

30. Which timeframe do you consider the most likely for a major bushfire to happen in your town of suburb?

Within 1 year     Within 5 years     Within 10 years     Within 30 years     Never



*A delicate balance: lifestyle, conservation and fire risk in the Adelaide Hills*

31. What do you do on a declared catastrophic fire day? Please select the answers which most reflect your actions.

- Business as usual
- I always evacuate
- I don't follow emergency services advice, I make up my own mind as to whether it is time to leave
- I wait and see
- I stay until there is a fire
- I stay and prepare to defend, enacting my fire plan

Other (please specify) \_\_\_\_\_

32. How vulnerable do you think your property would be in the event of a major fire?

Extremely vulnerable  Vulnerable  Not very vulnerable  Unsure

33. How much influence do you think people like yourself can have in reducing bushfire risk?

None  Some  A lot  Unsure

34. a) Can you recall one particular event that made you act to prepare your house and family for the event of a bushfire?

Yes  please go to b) No  please go to Q.35 Don't know  please go to Q.35 N/A

b) What might this event be? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Next, we are interested in your experience with, and thoughts on planning

35. What, in your opinion, makes your local area attractive to live in? \_\_\_\_\_

\_\_\_\_\_

36. What, in your opinion, are the major problems with your local area? \_\_\_\_\_

\_\_\_\_\_

*A delicate balance: lifestyle, conservation and fire risk in the Adelaide Hills*

37. **FACT:** Town planning is defined as the planning and control of the construction, growth, development of a town or region.

a) Have you heard about any recent changes to planning guidelines that will affect your area?

Yes  please go to b)    No  please go to Q.38    Unsure  please go to Q.38

b) If so, which one(s)? \_\_\_\_\_

38. For the future planning of your local area, which aspects listed below would you like to see improved/extended?

Please provide one answer for each statement.

Where 1=too much already; 3=About right

5=Much more needed

	Too much already		About right		Much more needed
Recreation areas	1	2	3	4	5
Set aside/strict conservation areas	1	2	3	4	5
Re-zoning for new housing development	1	2	3	4	5
Agricultural production areas	1	2	3	4	5
Removal of invasive weeds	1	2	3	4	5
Transport infrastructure	1	2	3	4	5
Clearing of native bush/scrubland to reduce fire risk	1	2	3	4	5
Other, please specify: _____	1	2	3	4	5
_____	1	2	3	4	5

39. How would you rate the escape routes/ access from your house in case of a fire?

Extremely good     Good     Adequate     Poor     Extremely poor     Unsure

Comments: \_\_\_\_\_

40. a) Do you feel there is something the council, State or Federal governments could do to make you feel safer in relation to reducing the risk of bushfires here?

Yes  please go to b)    No  please go to Q.41    Unsure  please go to Q.41

b) If so, what would that be? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Not much more to go...

*A delicate balance: lifestyle, conservation and fire risk in the Adelaide Hills*

41. a) Do you feel you have a voice in the planning issues concerning your local community?

Yes  *please go to b)*      No  *please go to Q.42*      Unsure  *please go to Q. 42*

b) By what means have you been able to express your opinions regarding planning decisions for your local community?

Community forum       Social Media       Rallies/Protests       Signing a petition

Newspaper       Other  *Please specify:* \_\_\_\_\_

42. Do you feel you are familiar with the South Australian planning system?

Extremely familiar       Some knowledge       Not at all familiar       Unsure

43. a) In the time you have lived at this address, has there been a major change that has improved your quality of life in this area?

Yes  *please go to b)*      No  *please go to Q.44*

b) If so, what would that be? \_\_\_\_\_  
\_\_\_\_\_

44. a) There has been significant new housing development in the district. Could you tell us what major changes you have observed?

\_\_\_\_\_

b) How do you feel about the recent housing developments?

\_\_\_\_\_

45. If you were granted one wish to re-arrange your suburb, what would you do?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Finally, some questions about you**

46. I am: Male  Female

47. Age range:

18 – 24 years <input type="checkbox"/>	40 – 44 years <input type="checkbox"/>	60 – 64 <input type="checkbox"/>
25 – 29 years <input type="checkbox"/>	45 – 49 years <input type="checkbox"/>	65 + years <input type="checkbox"/>
30 – 34 years <input type="checkbox"/>	50 – 54 years <input type="checkbox"/>	Prefer not to answer <input type="checkbox"/>
35 – 39 years <input type="checkbox"/>	55 – 59 years <input type="checkbox"/>	

48. Which category best describes your household?

Couple with dependent child/ren	<input type="checkbox"/>	Couple only	<input type="checkbox"/>
Couple with non-dependent child/ren	<input type="checkbox"/>	One person household	<input type="checkbox"/>
Couple with dependent and non-dependent children	<input type="checkbox"/>	Group household	<input type="checkbox"/>
One parent with dependent child/ren	<input type="checkbox"/>	Other household type	<input type="checkbox"/>
3 generation household	<input type="checkbox"/>		

49. How many people usually live at this address?

50. What is your nationality?

Single nationality \_\_\_\_\_

Double nationality \_\_\_\_\_ and \_\_\_\_\_

51. What is your country of birth? \_\_\_\_\_

52. If you were born overseas, what year did you arrive in Australia?

53. Which of the following best describes the industry in which you work (if applicable)?

Accommodation and Food Services	<input type="checkbox"/>	Business	<input type="checkbox"/>
Agriculture, Forestry and Fishing	<input type="checkbox"/>	Retail or Sales	<input type="checkbox"/>
Arts and Recreation Services	<input type="checkbox"/>	Public Administration	<input type="checkbox"/>
Education and Training	<input type="checkbox"/>	Trade	<input type="checkbox"/>
Health Care and Social Assistance	<input type="checkbox"/>	Mining	<input type="checkbox"/>
Manufacturing or Construction	<input type="checkbox"/>	Other	<input type="checkbox"/>
Nature conservation	<input type="checkbox"/>	N/A	<input type="checkbox"/>
Professional, Scientific or Technical	<input type="checkbox"/>		

54. What is the highest level of education you have completed?

- |   |                          |                            |                          |
|---|--------------------------|----------------------------|--------------------------|
| Some secondary                            | <input type="checkbox"/> | Tertiary degree or diploma | <input type="checkbox"/> |
| Secondary (Form 6 / Year 12 / HSC / SACE) | <input type="checkbox"/> | Postgraduate               | <input type="checkbox"/> |
| Vocational / Technical / Trade            | <input type="checkbox"/> | Other                      | <input type="checkbox"/> |

55. Which of the following best describes your yearly household income range, *before* any deductions are made for tax or other purposes?

- |                   |                          |                    |                          |                      |                          |
|-------------------|--------------------------|--------------------|--------------------------|----------------------|--------------------------|
| Nil income        | <input type="checkbox"/> | \$40,000-\$79,999  | <input type="checkbox"/> | 200,000-239,000      | <input type="checkbox"/> |
| \$1-\$9,999       | <input type="checkbox"/> | \$80,000-\$119,999 | <input type="checkbox"/> | 240,000 or more      | <input type="checkbox"/> |
| \$10,000-\$39,999 | <input type="checkbox"/> | \$120,000-199,999  | <input type="checkbox"/> | Prefer not to answer | <input type="checkbox"/> |

56. What is the postcode of your normal place of work or study (if applicable?)

57. Do you have any other thoughts regarding planning for bushfire risk prevention and biodiversity conservation?

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58. We are hoping to map the information in this survey against bushfire risk.

If you feel comfortable doing so, please tell us the closest intersection to your house:

\_\_\_\_\_  
*(Please name the 2 or more streets that intersect each other closest to your house)*

Are you happy to participate in a follow-up survey interview for this study? Yes

If YES, what is the best way for us to contact you?

Email \_\_\_\_\_

Phone \_\_\_\_\_

Please return the completed survey using the self-addressed, prepaid envelope supplied.

If your envelope has been mislaid, completed surveys can be returned to:

Annette Bardsley  
Geography, Environment and Population  
The University of Adelaide  
Adelaide, SA 5001

How to contact the researchers:

- Dr Dianne Rudd, Senior Lecturer School of Geography, Environment and Population, The University of Adelaide  
Email [Dianne.rudd@adelaide.edu.au](mailto:Dianne.rudd@adelaide.edu.au) / Phone (08) 83134109
- Annette Bardsley, PhD Candidate, School of Geography, Environment and Population, The University of Adelaide  
Email [annette.bardsley@adelaide.edu.au](mailto:annette.bardsley@adelaide.edu.au) / Phone 044 8068915

Thank you for your time and thoughts

## Appendix 3: SWISS HOUSEHOLDER QUESTIONNAIRE

*Un equilibrio delicato: stile di vita, pericoli naturali e tutela dell'ambiente nel Locarnese*



- **IL SUO CONTRIBUTO**  
Non esistono risposte giuste o sbagliate. E' la Sua opinione sulla gestione dei boschi e dei pericoli naturali nel Locarnese che c'interessa.
- **COMPLETARE IL SONDAGGIO**  
Completate questo sondaggio su carta o ONLINE inglese sul sito:  
<https://www.surveymonkey.com/r/Locarnese>
- **RITORNARE IL QUESTIONARIO**  
La preghiamo di ritomarci il questionario compilato tramite la busta allegata o ONLINE entro il:

**27 Novembre 2015**

- **RICERCATORI**  
Annette Bardsley - Studente di dottorato  
[annette.bardsley@wsl.ch](mailto:annette.bardsley@wsl.ch)  
044 739 26 96  
Dr Marco Conedera - [marco.conedera@wsl.ch](mailto:marco.conedera@wsl.ch)  
091 821 52 31

### STUDIO SULLA PERCEZIONE DEI PERICOLI NATURALI E LA GESTIONE DEI BOSCHI

**Completa Online in Inglese**

<https://www.surveymonkey.com/r/Locarnese>

Falls Sie Hilfe zum Ausfüllen des Fragebogens möchten, wenden Sie sich bitte an:

Annette Bardsley 044 739 26 96

Stimato Inquilino/Proprietario

La invitiamo a partecipare a questo sondaggio sulle sue esperienze e aspettative riguardo la pianificazione territoriale nella regione del Locarnese. La ricerca è condotta da ricercatori presso l'Istituto federale di ricerca WSL e l'Università di Adelaide in Australia. La partecipazione è volontaria e tutti i dati raccolti verranno gestiti con assoluta riservatezza e anonimato.

Istituto federale di ricerca per il bosco, la neve e il paesaggio WSL

THE UNIVERSITY of ADELAIDE

Per cominciare, alcune domande sul suo luogo di domicilio

1. Qual' è il suo codice d'avviamento postale (CAP)?
2. Da quanti anni abita a questo indirizzo? \_\_\_\_\_
3. Qual' era il suo luogo di residenza prima di trasferirsi a questo indirizzo? Non Applicabile   
 CAP della località:

4. a) Nella seguente lista, la preghiamo di attribuire un valore da 1 a 5 ai motivi che hanno influenzato questa scelta di domicilio. Non Applicabile

Pregliera di cerchiare una sola risposta per ogni affermazione.

Dove 1 = *Non molto importante*, 5 = *Molto importante*,

e NS = *Non So / Non Applicabile*

Affermazioni	Non molto importante				Molto importante	Non So / Non Applicabile
Vista	1	2	3	4	5	NS
Stile di vita rilassato	1	2	3	4	5	NS
Sfuggire all'ambiente urbano	1	2	3	4	5	NS
Vicinanza alla natura	1	2	3	4	5	NS
Vicinanza al posto di lavoro	1	2	3	4	5	NS
Qualità del vicinato	1	2	3	4	5	NS
Pace e la tranquillità	1	2	3	4	5	NS
Bel posto per crescere una famiglia	1	2	3	4	5	NS
Vicinanza dei trasporti pubblici	1	2	3	4	5	NS
Per svolgere attività ricreative all'aperto	1	2	3	4	5	NS
Aria pulita	1	2	3	4	5	NS
Opportunità di realizzare un investimento	1	2	3	4	5	NS
Accesso ai servizi sociali, sanitari e alle comodità	1	2	3	4	5	NS
Legami di famiglia e personali alla località	1	2	3	4	5	NS
Motivi familiari	1	2	3	4	5	NS
Altro (specificare per favore): _____	1	2	3	4	5	NS

- b) Per questo luogo di domicilio, quali sono gli aspetti che apprezza di più?

\_\_\_\_\_

5. Questo luogo di domicilio è di proprietà sua (o della sua famiglia) o è in affitto?

Di proprietà propria (famiglia)  Affitto

6. a) Lei o la sua famiglia possiede una residenza secondaria (Monte, cascina o casa di vacanza)?

Sì  No  *proseguire con 7.*

b) Se sì, indichi per favore il nome della località \_\_\_\_\_

c) In media, quante settimane all'anno passa nella sua residenza secondaria? Non Applicabile   
\_\_\_\_\_ settimane.

7. a) A che distanza dalla sua abitazione si trova uno spazio verde naturale (prato, vigne, bosco)?

Barrare più di una casella se necessario.

10 – 100 m di distanza

100 – 300 m di distanza

300 – 600 m di distanza

600 – 1 km di distanza

Al di là di una strada, ferrovia, o altra interruzione

Più di 1 km (*Preghiera di passare a 8*)

c) Di che tipo di vegetazione si tratta? Barrare più di una casella se necessario.

Prato

Vigne

Boscaglia

Bosco/Foresta

d) Questo spazio verde è incluso in una zona di protezione della natura?

Sì

No

Non so

e) A sua conoscenza, c'è mai stato un incendio in questo spazio verde?

Sì  *proseguire con f)*

No  *proseguire con 8.*

Non so  *proseguire con 8.*

f) Quando fu questo incendio? \_\_\_\_\_

g) Da che cosa è stato causato questo incendio? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



8. a) Nella seguente lista, la preghiamo di attribuire un valore ai motivi che potrebbero spingerla a CAMBIARE luogo di residenza. Prego di cerchiare una sola risposta per ogni affermazione. Dove 1 = *Non molto importante*, 5 = *Molto importante*, e NS = *Non So / Non applicabile*

Affermazioni	Non molto importante					Molto importante	Non so / Non applicabile
	1	2	3	4	5		
Tragitto al lavoro	1	2	3	4	5	NS	
Accesso ai servizi sociali, sanitari e alle comodità	1	2	3	4	5	NS	
Rischio d'incendio della vegetazione	1	2	3	4	5	NS	
Valore degli immobili	1	2	3	4	5	NS	
Opportunità di lavoro	1	2	3	4	5	NS	
I miei amici vivono altrove	1	2	3	4	5	NS	
Motivi familiari	1	2	3	4	5	NS	
Traffico/ ingorghi	1	2	3	4	5	NS	
Accesso alle scuole	1	2	3	4	5	NS	
Costo della vita	1	2	3	4	5	NS	
Costruzione di nuove residenze nel vicinato	1	2	3	4	5	NS	
Rumore	1	2	3	4	5	NS	
Pericoli naturali	1	2	3	4	5	NS	
Altro (specificare per favore) _____	1	2	3	4	5	NS	

b) Quali sono gli aspetti che apprezza di meno del luogo dove vive? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Ora ci interessiamo al modo in cui Lei interagisce con gli spazi verdi vicini al suo domicilio

*Un equilibrio delicato: stile di vita, pericoli naturali e tutela dell'ambiente*

9. **PRECISAZIONE:** *Il tipo di relazione che una persona sviluppa con un luogo può influenzare le sue decisioni e i suoi atteggiamenti rispetto alla gestione del territorio.*

Le chiediamo di indicare in che misura è d'accordo con ciascuna delle seguenti affermazioni rispetto alla località dove vive.

Pregliera di dare una sola risposta per ogni affermazione.

*Dove 1= Non sono assolutamente d'accordo,*

*5 = Pienamente d'accordo, e NS = Non So / Non applicabile*

Affermazione	Non sono assolutamente d'accordo				Pienamente d'accordo		Non so / Non applicabile
	1	2	3	4	5	NS	
Il Locarnese mi sta particolarmente a cuore	1	2	3	4	5	NS	
Ritengo che gli spazi verdi del Locarnese sono molto importanti	1	2	3	4	5	NS	
Le vigne sono più importanti dei boschi	1	2	3	4	5	NS	
Dovremmo dare priorità allo sviluppo urbano al posto della tutela dell'ambiente	1	2	3	4	5	NS	
Il piano regolatore comunale garantisce la tutela del patrimonio naturale	1	2	3	4	5	NS	
Con ogni aumento della popolazione in Ticino, mi ritengo meno soddisfatto	1	2	3	4	5	NS	

10. a) I suoi sentimenti riguardo a questo luogo cambiano a seconda della stagione?

Sì  *proseguire con b)*

No  *proseguire con 11.*

b) Si prega di descrivere in poche parole, quali sentimenti collega alle seguenti stagioni per il suo luogo di residenza:

Inverno \_\_\_\_\_ Primavera \_\_\_\_\_

Estate \_\_\_\_\_ Autunno \_\_\_\_\_

11. a) Partecipa oppure è membro di un' associazione o un gruppo, anche non formale (escursionismo, teatro, sport, caccia, Facebook, comunità religiosa, cucito, WWF, ecc.) in questo luogo o legato a questo luogo?

Sì  *proseguire con b)*

No  *proseguire con 12.*

b) Se sì, la preghiamo di elencare di quale gruppo/i si tratta \_\_\_\_\_

12. Con quale regolarità frequenta le aree di svago (zone naturali, boschi, ecc.) nella regione?

Quasi tutti i giorni

Almeno 1 volta/ sett.

Almeno 1 volta/ mese

Irregolarm.

Mai

Ora ci interessiamo al suo interesse e alla sua esperienza/ preoccupazioni riguardo la gestione dei boschi

13. Ci sono abbastanza boschi in Ticino?

Secondo Lei, la superficie boschiva del Canton Ticino è...

Insufficiente (voglio più boschi)	Sufficiente (va bene com'è ora)	Esagerata (ci sono troppe superfici boschive)	Non so
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. a) Per Lei personalmente, il bosco nel suo comune di domicilio è importante?

Sì  No

b) Secondo Lei, il bosco nella zona in cui vive è generalmente importante per motivi di...

Preghiera di cerchiare una sola risposta per affermazione.

Dove 1= Non sono assolutamente d'accordo,

5= Pienamente d'accordo, e NS = Non So / Non applicabile

Affermazioni	Non sono assolutamente d'accordo					Pienamente d'accordo					Non So / Non applicabile
	1	2	3	4	5	1	2	3	4	5	NS
Educazione	1	2	3	4	5						NS
Protezione dalle valanghe e dagli scoscendimenti	1	2	3	4	5						NS
Raccolta della legna	1	2	3	4	5						NS
Osservazione della fauna	1	2	3	4	5						NS
Caccia/ Pesca	1	2	3	4	5						NS
Raccolta dei funghi e altri prodotti	1	2	3	4	5						NS
Bicicletta/ Rampichino	1	2	3	4	5						NS
Aria e acqua pulita	1	2	3	4	5						NS
Jogging	1	2	3	4	5						NS
Bellezza del paesaggio	1	2	3	4	5						NS
Generazioni future	1	2	3	4	5						NS
La biodiversità degli animali e delle piante	1	2	3	4	5						NS
Altro (specificare per favore) _____	1	2	3	4	5						NS
_____	1	2	3	4	5						NS



19. A suo parere, quali sono i problemi ambientali di maggior rilievo in questo comune?

\_\_\_\_\_

20. a) Prima di comperare/ prendere in affitto la sua presente abitazione oppure prima di costruirla, si è informato presso il municipio, o altro ente, sulla situazione dei pericoli naturali nella particella in questione?

Sì  *proseguire con b)*      No  *proseguire con 21.*      Non so       Non Applicabile

b) Se sì, in merito a quali pericoli? \_\_\_\_\_

21. Secondo Lei, quali sono i principali pericoli naturali che minacciano la sua abitazione?

Più risposte possibili.

- Valanghe
- Terremoti
- Esondazioni
- Incendi boschivi
- Frane
- Caduta di sassi

Altro (*preghiera di specificare*): \_\_\_\_\_

22. **PRECISAZIONE**: Da qualche anno il Dipartimento del Territorio rilascia il divieto assoluto di accendere fuochi all'aperto durante periodi di siccità prolungata per ridurre il rischio d'incendi boschivi. Come giudica l'efficacia di questi divieti assoluti nella gestione del rischio d'incendi boschivi?

Estremamente efficace	Efficace	Abbastanza efficace	Inefficace	Non so
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Commenti \_\_\_\_\_

23. a) E' a conoscenza di infrastrutture adibite alla lotta contro gli incendi di bosco nel suo comune?

Sì  *proseguire con b)*      No  *proseguire con 24.*

b) Se sì, indichi di quali infrastrutture antincendio si tratta \_\_\_\_\_

24. In generale, si ritiene soddisfatto dall'organizzazione antiincendio e dal modo in cui i pompieri intervengono nel caso di incendi in Ticino?

	Sì	No	Non so/ Non Applicabile
Bosco	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cascina/ Monti	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Casa abitativa	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Commenti: \_\_\_\_\_

25. a) Quali sono le sue esperienze vissute di incendi boschivi in Ticino? \_\_\_\_\_

\_\_\_\_\_

b) Quali sono le sue esperienze vissute di incendi boschivi altrove? \_\_\_\_\_

\_\_\_\_\_

26. a) Ha mai subito danni o distruzione della sua abitazione o edifici annessi, per causa di un incendio boschivo?

Sì  *proseguire con b)* No  *proseguire con 27.*

a) In che anno? \_\_\_\_\_

b) In che luogo? \_\_\_\_\_

Commenti: \_\_\_\_\_

27. Lei o qualcuno della sua famiglia, fa parte di un corpo pompieri in Canton Ticino o altrove?

Sì  *proseguire con b)* No  *proseguire con 28.*

Se sì, da quanto tempo? Da \_\_\_\_\_ anni.

Qual'è la funzione che questa persona svolge di consueto nel suo ruolo con i pompieri?

\_\_\_\_\_

28. Secondo Lei, quanto tempo passerà prima che un incendio boschivo capiti nelle sue immediate vicinanze, o almeno all'interno del suo comune?

Entro 1 anno  Entro 5 anni  Entro 10 anni  Entro 30 anni  Mai  Non so

*Un equilibrio delicato: stile di vita, pericoli naturali e tutela dell'ambiente*

29. A suo parere, le attività di gestione che Lei svolge negli spazi verdi di sua proprietà (gestione selve, gestione vigneti, pulizia giardini, ecc.) hanno un influsso sulla riduzione del rischio d'incendio boschivo?

Non Applicabile  Nessun influsso  Un po'  Molto  Non so

30. Secondo Lei, si dovrebbe permettere di eliminare gli alberi in alcune aree ad alto rischio d'incendio in prossimità di insediamenti per creare delle zone tampone prive di foresta?

Sì  No  Non so

Commenti: \_\_\_\_\_

**Ora ci interessiamo alle sue opinioni ed esperienze riguardo alla gestione del territorio**

31. **PRECISAZIONE:** *La pianificazione del territorio si occupa di studiare e regolamentare i processi di gestione del territorio e di valutarne le conseguenti dinamiche evolutive.*

A suo parere, quali sono i maggiori problemi pianificatori nella zona in cui vive?

\_\_\_\_\_

32. a) E' al corrente di cambiamenti recenti avvenuti nelle direttive di pianificazione territoriale che potrebbero avere un impatto sulla regione dove vive?

Sì  *proseguire con b)* No  *proseguire con 33.* Non so  *proseguire con 33.*

b) Se sì, quale/i? \_\_\_\_\_

33. a) A suo parere, ci sarebbero delle misure che l'Amministrazione Federale, Cantonale o Comunale potrebbe intraprendere per far sì che Lei si senta più protetto rispetto ai possibili pericoli naturali in questa zona?

Sì  *proseguire con b)* No  *proseguire con 34.* Non so  *proseguire con 34.*

c) Se sì, di quali misure si potrebbe trattare? \_\_\_\_\_

\_\_\_\_\_

**34.** Per quanto riguarda la pianificazione futura della sua regione, a Suo parere, quali aspetti elencati sotto richiedono un miglioramento o necessitano di essere estesi?

Pregliera di cerchiare una sola risposta per ogni affermazione.

*Dove 1= Ne esistono già troppe, 3= più o meno giusto,*

*5= Necessita maggiore miglioramento/ estensione*

	Ne esistono già troppe			Livello adeguato			Necessita miglioramento/ estensione
	1	2	3	4	5	6	7
Zone di svago/ ricreative	1	2	3	4	5	6	7
Zone protette (ad alto livello di protezione)	1	2	3	4	5	6	7
Zone edificabili per nuovi sviluppi edilizi	1	2	3	4	5	6	7
Zone agricole per produzione alimentare	1	2	3	4	5	6	7
Infrastrutture di trasporto (strade, ferrovie, ecc.)	1	2	3	4	5	6	7
Vigneti	1	2	3	4	5	6	7
Zone di pascolo	1	2	3	4	5	6	7
Altro (specificare per favore) _____	1	2	3	4	5	6	7
_____	1	2	3	4	5	6	7

Ora non manca più molto

**35.** a) Da quando abita a questo domicilio, ci sono stati degli sviluppi nella gestione del territorio che hanno aumentato la sua qualità di vita?

Sì  *proseguire con b)*      No  *proseguire con 36.*      Non so  *proseguire con 36.*

b) Se sì, di quale/i si tratta? \_\_\_\_\_

\_\_\_\_\_

**36.** a) A suo parere, Lei personalmente ha voce in capitolo sulle decisioni di pianificazione territoriale nella sua municipalità / cantone?

Sì  *proseguire con b)*      No  *proseguire con 37.*      Non so  *proseguire con 37.*



**Un equilibrio delicato: stile di vita, pericoli naturali e tutela dell'ambiente**

b) In che modo Lei personalmente è stato/a in grado di esprimere la sua opinione (oltre ad un referendum) nelle questioni di pianificazione per il Locarnese? Barrare più di una casella se necessario.

Social Media  Manifestazione  Petizione  Articolo di giornale

Lettera al Sindaco  Altro  (*preghiera di specificare*): \_\_\_\_\_

37. a) Negli ultimi decenni in Ticino sono state costruite molte nuove villette e residenze abitative. Ci può dire in quali luoghi Lei ha osservato grossi cambiamenti? Non Applicabile

\_\_\_\_\_

b) Come valuta questo sviluppo delle zone residenziali in Ticino?

\_\_\_\_\_

38. Se potesse esprimere un desiderio per riorganizzare il Locarnese, cosa farebbe?

\_\_\_\_\_

\_\_\_\_\_

39. Ritieni di avere una certa familiarità con il sistema di pianificazione territoriale del Cantone?

Grande familiarità  Una certa familiarità  Nessuna familiarità  Non so

**E per la parte finale, i dati socio-demografici**

40. Genere: Maschile  Femminile

41. Età:

- |                                       |                                       |  |
|---------------------------------------|---------------------------------------|--|
| <input type="checkbox"/> 18 – 24 anni | <input type="checkbox"/> 40 – 44 anni | <input type="checkbox"/> 60 – 64 anni              |
| <input type="checkbox"/> 25 – 29 anni | <input type="checkbox"/> 45 – 49 anni | <input type="checkbox"/> 65+ anni                  |
| <input type="checkbox"/> 30 – 34 anni | <input type="checkbox"/> 50 – 54 anni | <input type="checkbox"/> Preferisco non rispondere |
| <input type="checkbox"/> 35 – 39 anni | <input type="checkbox"/> 55 – 59 anni |  |

**42. Tipologia familiare**

- |   |   |
|---|---|
| <input type="checkbox"/> Coppia con figlio/i a carico             | <input type="checkbox"/> Coppia                         |
| <input type="checkbox"/> Coppia con figli non-a carico            | <input type="checkbox"/> Nucleo domestico di 1 persona  |
| <input type="checkbox"/> Coppia con figli a carico e non-a carico | <input type="checkbox"/> Nucleo tipo convivenza/gruppo  |
| <input type="checkbox"/> Genitore singolo con figlio/i            | <input type="checkbox"/> Altro tipo di nucleo domestico |
| <input type="checkbox"/> Nucleo domestico di 3 generazioni        |   |

43. Di solito, quante persone abitano a questo indirizzo?

**44. Cittadinanza**

- Nazionalità singola (appartenenza a un solo paese): \_\_\_\_\_
- Doppia nazionalità: \_\_\_\_\_ e \_\_\_\_\_

45. Qual' è il suo luogo di nascita ? \_\_\_\_\_

46. Se nato all'estero, in che anno è arrivato in Svizzera?

**47. Settore d'attività professionale (se in pensione indichi l'ultimo settore in cui ha lavorato)**

- |   |  |
|---|--|
| <input type="checkbox"/> Turismo, alloggio e ristorazione                 | <input type="checkbox"/> Amministrazione aziendale           |
| <input type="checkbox"/> Agricoltura, silvicoltura, caccia e pesca        | <input type="checkbox"/> Vendita al dettaglio                |
| <input type="checkbox"/> Attività artistiche, sportive, d'intrattenimento | <input type="checkbox"/> Servizio pubblico                   |
| <input type="checkbox"/> Istruzione e formazione                          | <input type="checkbox"/> Attività commerciali                |
| <input type="checkbox"/> Sanità e socialità                               | <input type="checkbox"/> Attività estrattive (cava, miniera) |
| <input type="checkbox"/> Attività manifatturiere e costruzioni edili      | <input type="checkbox"/> Attività scientifiche e tecniche    |
| <input type="checkbox"/> Protezione dell'ambiente                         | <input type="checkbox"/> Altro:                              |
| <input type="checkbox"/> Attività casalinghe                              |  |

**48. Tra quelli elencati, qual è il titolo di studio più elevato da Lei conseguito?**

- |  |   |
|--|---|
| <input type="checkbox"/> Licenza di scuola elementare                            | <input type="checkbox"/> Licenza universitaria      |
| <input type="checkbox"/> Licenza di scuola secondaria (media/ magistrale/ liceo) | <input type="checkbox"/> Post-diploma universitario |
| <input type="checkbox"/> Diploma di istituto tecnico/ professionale              | <input type="checkbox"/> Altro:                     |

49. Quale delle seguenti fasce di reddito corrisponde al reddito annuo complessivo della sua economia domestica (reddito imponibile prima della tassazione) ?

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Senza reddito     | <input type="checkbox"/> CHF 80,000-119,999  | <input type="checkbox"/> CHF 200,000-239,000       |
| <input type="checkbox"/> CHF 1-39,999      | <input type="checkbox"/> CHF 120,000-159,999 | <input type="checkbox"/> CHF 240,000 o più         |
| <input type="checkbox"/> CHF 40,000-79,999 | <input type="checkbox"/> CHF 160,000-199,999 | <input type="checkbox"/> Preferisco non rispondere |

50. Ci sono altre osservazioni riguardo questo tema di ricerca che vorrebbe offrire a questo punto?

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Sarebbe disposto a partecipare in un colloquio dopo aver compilato questo sondaggio? Sì  No

Se Sì, quale sarebbe il miglior modo di contattarla?

Email \_\_\_\_\_

Telefono \_\_\_\_\_

La preghiamo di ritornarci il questionario debitamente compilato usando la busta affrancata allegata.

Se dovesse aver smarrito la busta, il questionario può essere ritornato a:

Annette Bardsley, Istituto Federale di Ricerca WSL

Zürcherstrasse 111

CH-8903 Birmensdorf

Come contattare i ricercatori :

- **Annette Bardsley**, The University of Adelaide e WSL Birmensdorf,  
Email: [annette.bardsley@wsl.ch](mailto:annette.bardsley@wsl.ch) / Telefono 044 739 2696
- **Dr. Marco Conedera**, Istituto federale di ricerca WSL, Bellinzona  
Email: [marco.conedera@wsl.ch](mailto:marco.conedera@wsl.ch) / Telefono 091 821 5231
- **Dr. Dianne Rudd**, Geography, Environment and Population,  
The University of Adelaide, Australia, Email: [dianne.rudd@adelaide.edu](mailto:dianne.rudd@adelaide.edu)

La ringraziamo per il suo contributo

## APPENDIX 4: AUSTRALIAN SUREY PARTICIPANT LETTER

### PARTICIPANT INFORMATION SHEET FOR RESIDENTS

**PROJECT TITLE:** Demographic Change, Biodiversity Conservation and Bushfires: planning for sustainable futures within peri-urban regions of Mediterranean Australia and France

**PRINCIPAL INVESTIGATOR:** Dr Dianne Rudd - Geography, Environment and Population, The University of Adelaide

**STUDENT RESEARCHER:** Annette Bardsley - Geography, Environment and Population, The University of Adelaide

**STUDENT'S DEGREE:** Doctor of Philosophy, The University of Adelaide

Dear Participant,

You are invited to participate in a survey of your opinions on the risks of bushfire, the values of biodiversity and the planning opportunities to manage those issues in your area.

#### **What is the project about?**

This project is comparing two different regions with similar areas of high biodiversity conservation value, high bushfire-risk and also increasing population pressures in the Adelaide Hills and in France. The purpose of the project is to establish how people relate to the natural environment and to determine how safe they feel in relation to the threat of bushfires in their local area. As such, researchers are interested in finding out about resident's opinions of the management approaches to both, biodiversity conservation and bushfires risk in their area. Also of interest, are the reasons that motivate people to move in or out of your area. This information may be used to help inform future planning strategies for the Adelaide Hills. Your contribution will ensure that resident's opinions on current and future planning of the local environment will be included in this comparative study between Australia and France.

#### **Who is undertaking the project?**

This project is being conducted by Annette Bardsley under the supervision of Doctor Dianne Rudd. This research will form the basis for the degree of Annette Bardsley at the University of Adelaide.

#### **Why am I being invited to participate?**

This household was selected to participate in the survey as a result of its location close to a significant naturally vegetated area.

#### **What will I be asked to do?**

One individual of this household aged 18 years and over is being asked to complete this survey. The person filling out the questionnaire has the opportunity to participate in a follow-up interview to expand upon the topics covered by the survey.

#### **How much time will the project take?**

Completing the survey requires just 25-30 minutes of your time. This is a one-off survey, however, we are looking for volunteers willing to help us further in our research by agreeing to participate in one single follow-up

interview. At the end of the questionnaire you will be asked if you consent to participate in one follow-up interview.

**Are there any risks associated with participating in this project?**

We recognize that some individuals and their families have been affected by bushfires and we sincerely apologise for any distress receiving this survey may cause. If you or someone you know should need emotional support in relation to this issue, contact the Beyondblue Helpline on 1300 224636.

**What are the benefits of the research project?**

Information you provide will help us advance our understanding of how residents value the place where they live, why they live there and how they deal with the risk if bushfire. These findings will help inform the planning process and also support effective decision-making for the periphery of urban settlements.

**Can I withdraw from the project?**

Participation in this project is completely voluntary. If you agree to participate, you can withdraw from the study at any time.

**What will happen to my information?**

The answers in this questionnaire will be treated with absolute confidentiality and the identity of the respondents will not be identified nor will personal results be divulged. The survey data will be elaborated and stored in a digital form for seven years on the researcher's personal PC and on a nominated server at the University of Adelaide where all PhD research data is kept. The hardcopies of the questionnaire will then be destroyed. The research results will be published as part of an academic thesis that will be made available at the University of Adelaide. It is expected that academic publications will result from this research.

**Who do I contact if I have questions about the project?**

Should you have any further questions or concerns regarding the research please contact Dr Dianne Rudd via email on: ✉dianne.rudd@adelaide.edu.au or on ☎+61 8 8313 4109 or Annette Bardsley via email on: ✉annette.bardsley@adelaide.edu.au.

**What if I have a complaint or any concerns?**

The study has been approved by the Human Research Ethics Committee at the University of Adelaide (approval number H-2014-xxx). If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the Principal Investigator, Dr Dianne Rudd. Contact the Human Research Ethics Committee's Secretariat on phone (08) 8313 6028 or by email to hrec@adelaide.edu.au. if you wish to speak with an independent person regarding concerns or a complaint, the University's policy on research involving human participants, or your rights as a participant. Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

**If I want to participate, what do I do?**

To participate in the study, complete the questionnaire and send it back in the return envelope provided with the signed consent form.

Yours sincerely,

**ANNETTE BARDSLEY, BA GRAD DIP**

PhD Student/Research Officer

**DR DIANNE RUDD, POST-GRADUATE CO-ORDINATOR**

Lead Researcher/PhD Supervisor

## Appendix 5: SWISS SURVEY PARTICIPANT LETTER

### FOGLIO INFORMATIVO PER IL SONDAGGIO INTITOLATO

#### *“Un equilibrio delicato: stile di vita, pericoli naturali e tutela dell’ambiente nel Locarnese”*

Stimato Partecipante,

La invitiamo a partecipare a un sondaggio di opinione sui pericoli naturali e sull’opportunità di gestire tali problematiche territoriali nella fascia peri-urbana del Locarnese.

#### **Di che cosa tratta il progetto?**

Questo progetto si prefigge di analizzare due regioni caratterizzate da elevati valori di biodiversità, esposizione ai pericoli naturali e crescenti pressioni demografiche quali le Adelaide Hills in Australia e il Locarnese in Svizzera. Le differenze di clima e di pericoli naturali tra le due regioni non si prestano ovviamente a un confronto diretto. In questo caso, l’obiettivo è quello di analizzare come le persone nei due contesti si sentono legate e come interagiscono con gli spazi verdi e le zone boschive vicino al loro luogo di residenza e che percezione hanno degli eventuali pericoli naturali.

Per il caso specifico del Locarnese, lo studio si interessa pure delle motivazioni della scelta del luogo di abitazione e dell’opinione della popolazione sulla gestione e la salvaguardia della biodiversità, la gestione dei rischi naturali (particolarmente il rischio d’incendio boschivo) come implementata dai livelli amministrativi. I dati raccolti potranno contribuire ad un ulteriore miglioramento delle strategie di pianificazione del territorio. Il Suo contributo è fondamentale per garantire un buon grado di rappresentatività dell’opinione di tutta la popolazione residente.

#### **Chi gestisce questo progetto di ricerca**

Questo progetto è svolto da Annette Bardsley sotto la direzione della Dr.ssa Dianne Rudd (Università di Adelaide in Australia) e in collaborazione con il Dr Marco Conedera (WSL Bellinzona). Il progetto costituisce la base per il conseguimento del titolo di dottore di ricerca (PhD) presso l’Università di Adelaide, in Australia da parte di Annette Bardsley.

#### **Perché mi viene chiesto di prendere parte a questo progetto?**

La sua economia domestica è stata selezionata per partecipare a questo sondaggio per la sua ubicazione a prossimità di una zona boschiva nella fascia peri-urbana Locarnese.

#### **Cosa mi verrà chiesto di fare?**

La persona alla quale è stato recapitato il questionario, oppure una persona maggiorenne appartenente alla sua economia domestica, è invitata a compilare il questionario. Compilando il questionario la persona avrà, se lo desidera, l’opportunità di partecipare a una susseguente intervista adibita all’approfondimento dei temi visti nel questionario.

#### **Quanto tempo necessita per compilare il questionario?**

Compilare il questionario richiederà circa 25-30 minuti del suo tempo. Il sondaggio si esaurisce con la compilazione del formulario. Siamo tuttavia cercando volontari disposti a contribuire ulteriormente, accettando di partecipare a un’intervista di approfondimento una volta compilato il questionario. A questo proposito avrete la possibilità alla fine del questionario di rispondere positivamente alla domanda se acconsentite al partecipare a questa intervista.

#### **Quali sono le ricadute di questo progetto di ricerca?**

Le informazioni raccolte in questo sondaggio contribuiranno a migliorare le conoscenze sulle motivazioni della scelta dei luoghi di residenza e sull'atteggiamento della popolazione nei confronti dei rischi legati ai pericoli naturali.

**Cosa sarà fatto dell'informazione da me fornita?**

L'identità delle persone a cui è stato spedito il formulario non viene rivelata. Le risposte al questionario vengono trattate con assoluta riservatezza e anonimato. Le copie cartacee del questionario verranno distrutte e il sondaggio online verrà cancellato. I risultati della ricerca saranno pubblicati come parte di una tesi accademica, accessibile tramite l'Università di Adelaide, mentre i relativi dati elaborati saranno salvaguardati in forma digitale per sette anni sul PC personale del ricercatore e tramite il server d'archivio presso l'Università di Adelaide, dove tutti i dati risultanti da ricerche di dottorato sono archiviati. I risultati del lavoro di ricerca saranno anche pubblicati su riviste scientifiche.

**Chi devo contattare se ho domande riguardo a questo progetto?**

Se dovesse avere ulteriori domande concernenti questo progetto, si prega di contattare Annette Bardsley via email: ✉[annette.bardsley@wsl.ch](mailto:annette.bardsley@wsl.ch), oppure il dottor Marco Conedera dell'istituto di ricerca federale WSL via email: ✉[marco.conedera@wsl.ch](mailto:marco.conedera@wsl.ch).

**Cosa faccio se dovessi avere delle reclamazioni?**

Lo studio è stato approvato dal Comitato Etico per la Ricerca Umana presso l'Università di Adelaide (numero di omologazione H-2014-258). Se esistono problemi legati a una vostra partecipazione, o se desidera esprimere una preoccupazione o reclamo riguardo al progetto, la preghiamo di consultare Annette Bardsley via e-mail: ✉[annette.bardsley@wsl.ch](mailto:annette.bardsley@wsl.ch) oppure telefonando al 044 7392696. Qualsiasi reclamo o preoccupazione sarà esaminato pienamente e trattato con riservatezza, e l'esito Le sarà comunicato.

**Se desidero partecipare, cosa devo fare?**

Per partecipare allo studio, compilate il questionario e inviatecelo nella busta di ritorno fornita. Se desiderate compilare il sondaggio in inglese online, lo troverete sul sito: <https://www.surveymonkey.com/r/Locarnese>

Cordialmente

**ANNETTE BARDSLEY, BA GRAD DIP**

Studente PhD/ Addetta alla Ricerca

**TITOLO DEL PROGETTO DI RICERCA:**

Cambiamento demografico, salvaguardia della biodiversità e pericoli naturali: pianificare per uno sviluppo territoriale sostenibile in zona peri-urbana in Australia e in Svizzera.

**TIPO DI LAUREA: Dottorato di Ricerca (PhD), The University of Adelaide, Australia**

- STUDENTESSA RICERCATRICE  
Annette Bardsley, Geography, Environment and Population, The University of Adelaide, Australia & Istituto Federale di ricerca WSL, Birmensdorf e Bellinzona
- RICERCATORE IN SVIZZERA: Dr Marco Conedera, Istituto Federale di Ricerca WSL, Bellinzona

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