More-than-human knowing, showing and sharing in human/landscape fire relationships

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MORE-TAN-HUMAN KNOWING, SHOWING AND
SHARING IN HUMAN / LANDSCAPE FIRE
RELATIONSHIPS

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By

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Abstract

Focusing on Australians of settler heritage, this PhD shows how an evaluation which adopts and refines a more-than-human conceptual framework can generate deep understandings of human /fire /land relationships with implications for land and fire management, training, policy and academic research.

The research was initially commissioned to evaluate the Hotspots Fire Training Program (Hotspots) which seeks to train landholders in New South Wales in the sustainable management of landscape fire. In commissioning the evaluation, Hotspots staff were seeking to provide funding bodies with substantive evidence that the program achieves its objectives and to identify ways in which the program could be improved. In order to respond to these expectations, this thesis includes a utilisation, or service, evaluation focusing on the success of Hotspots within the framework defined by staff members (Appendix A). However, this approach privileges the views of program staff and funding bodies about what constitutes success and may limit the relevance of the evaluation beyond its immediate context. Alternative approaches, such as pluralistic evaluations, begin with the lives of the human participants, seeking to understand how the program is positioned within their lives and whether or not it is relevant to them. Yet even the complexities of human experience may not be sufficient to understand the ways in which a training program is entangled in fiery relations. In other research fields, recent more-than-human research has shown the complex ways in which the bio- (including human), geo- and atmo-spheres are inextricably entangled. Such insights have important implications for research into, and understandings of, human /fire /land relationships.

Until recently, almost all fire training projects working with non-indigenous Australians framed fire as a hazard, failing to acknowledge the much more complex role of fire within the Australian material / cultural environment. This is now changing but, with notable exceptions, current projects working to encourage sympathy with the potential benefits of fire provide a scientific and legislative education in using and managing fire in the landscape. This is in-keeping with an Australian history in which
the ‘ways of knowing’ attributed to settlers and their descendants, and the laws and culture created around these assumed ways of knowing, have tended towards the ‘modern’.

Historical and contemporary evidence suggests that this may not tell the whole story about the dynamic relationships of non-indigenous Australians with landscape fire, however. As Australia struggles to come to terms with its cultural and environmental history and seeks to work towards a more just and sustainable future, there is evidence to suggest that its current inhabitants of non-indigenous heritage may be open to different ways of knowing landscape fire. Rather than viewing knowledge as a solely cerebral, or even human social process, this thesis suggests that fiery knowledge develops as human minds and bodies are challenged by multiple, multi-directional, more-than-human relationships continually generating change and demanding responses within fire-prone environments.

Whilst landholders are learning to co-exist with landscape fire through observation, experimentation and adaptation, researchers, staff members of training organisations and policy-makers frequently spend much less time actively engaging with land and fire and far more time in environments which demand forms of accountability amenable to measurement and control such as journal papers, highly structured workshop plans and policy documents. Perhaps as a result, institutional responses to human co-existence with landscape fire have largely focused on abstracted sciences of fire and fire management, the logics of planning and response and the building of ever more complex resources and infrastructure. These approaches do have their place but represent just one of many ways of knowing fire. Thus, the main body of this thesis draws on the potential of conceptual paradigms which look beyond the human and human agency to explore how fire training programs weave into and through broader human / landscape fire entanglements and to consider the implications and potential outcomes of promoting different ways of knowing landscape fire.
Candidate’s Statement

I, Amanda Edwards, declare that this thesis, submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Health and Society, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Amanda Edwards

August 2016
Statement of Authorship

The journal articles in this thesis were written under an agreement between Amanda Edwards and the principal supervisor, Associate Professor Nicholas Gill, that the thesis by compilation format be used. The journal article submissions that constitute Chapters 2-6 of this thesis (outlined below) are based on research carried out by the PhD candidate, Amanda Edwards, during the period of candidature. Amanda designed the study and collected, analysed and interpreted data. Amanda is the lead or only author of all journal article submissions in this thesis and wrote the first draft of each manuscript before responding to the editorial suggestions of her co-author, Nicholas Gill, where relevant. Amanda has been solely responsible for submitting each manuscript for publication to the relevant journals.

Chapter 2  Amanda Edwards and Nicholas Gill (Accepted with minor revisions) On being shown fire through rain – further thoughts on more-than-human methods Area

Chapter 3  Amanda Edwards and Nicholas Gill (In press) Fiery Entanglements: Changing landholder understandings of the agency of fire Environment and Planning D: Society and Space

Chapter 4  Amanda Edwards and Nicholas Gill 2015 Divergent Approaches to Resolving Pressures on NRM and DRR Programs: A Case Study of Sustainable Fire Management Training Geoforum 65 213-221

Chapter 5  Amanda Edwards and Nicholas Gill (In preparation for publication) Towards a common framework for understanding more-than-human community resilience to risk: extending the hidden-value trade-off model Journal of Environmental Planning and Management

Chapter 6  Amanda Edwards (In press) Reflecting on more-than-human ghosts at the research encounter Cultural Geographies
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Chapter 1 Introduction, Aims and Overview

1.1 Introduction and evolution of the thesis: from evaluation to fiery relations

Focusing on Australians of settler heritage, this PhD shows how an evaluation which adopts and refines a more-than-human conceptual framework can generate deep understandings of human/fire/land relationships with implications for land and fire management, training, policy and academic research.

The PhD was initially commissioned to evaluate the Hotspots Fire Training Program (hereafter referred to as Hotspots) which is an initiative run in partnership by a non-government organisation (NGO), the Nature Conservancy Council of New South Wales (NCCNSW), and a government agency, the Rural Fire Service of New South Wales (RFS). Hotspots emerged out of the growing recognition amongst non-indigenous Australians\(^1\) that whilst fire can be catastrophic for individual organisms, including humans, it can act as a crucial regenerative force for the wider environment (Griffiths 2001). People need to respond to bushfires but fire can also be actively used to reduce risk to life and property and to manage for biodiversity outcomes. Through two-day workshops in rural communities in New South Wales, Hotspots seeks to train landholders, primarily of settler heritage, in the sustainable management of fire in the landscape and has the following objectives:

1. “Objective 1: On-ground fire management is informed by the best available fire ecology research and operational knowledge.
2. Objective 2: Landholders and land managers gain knowledge and skills to engage in practical and sustainable fire management - and plan and implement together strategies across landscapes”\(^2\) (Hotspots Fire Project Online:a).

\(^1\) It is believed that indigenous Australians have long-recognised the positive aspects of landscape fire as discussed further in Section 1.4 Knowing Fire.

\(^2\) There is a third objective – sustainable fire regimes are recognised in and are part of relevant regional, state and national policies and programs – however this is a longer-term objective and was never intended to be part of the evaluation.
The PhD study was funded by the Bushfire Cooperative Research Centre (Bushfire CRC), which encourages effective utilisation of research through a formalised collaboration between End Users and Researchers. The Bushfire CRC website explains that:

“The Research Utilisation Plan includes the formalisation of engagement with end users, through the Lead End User... The establishment of Lead End User representatives from a Bushfire CRC partner organisation is an innovation that is intended to provide a much stronger integration of end user needs into the research projects...” (Bushfire CRC Online)

For this project, the End Users were the staff members of the RFS and NCCNSW running the operational side of the Hotspots program. In commissioning the evaluation, Hotspots staff were seeking to provide funding bodies with substantive evidence that the program achieves its objectives and to identify ways in which the program could be improved. At first sight, this focus would seem to encourage the use of a utilisation-focused model of evaluation (Patton 1997) which works with program staff to identify very specific program aims and attempts to measure results against these criteria. However, there are limits to utilisation-focused evaluations, with important implications for understanding the Hotspots program and its positioning within the development of knowledge about fire in the landscape in New South Wales.

Both of the Hotspots objectives refer to “knowledge” with the first objective emphasising specific forms of knowledge. Promotional and training literature reveals that Hotspots considers that the “best available operational knowledge” is that possessed by the RFS and the “best available fire ecology research knowledge” is that produced by scientists from formal research institutions (Hotspots Fire Project Online:a). Thus Hotspots promotes a very specific approach to the framing and management of landscape fire which is mediated through human constructions such as aerial photographs, vegetation classifications and PowerPoint presentations (Hotspots Fire Project 2011). Alternative approaches to fire training do exist, however, including programs which are similarly ‘top-down’ but encourage landholders to
engage more directly with land and fire rather than artefactual representations and challenge ‘human/nature’ dualisms and ways of knowing, and being, ‘nature’ (Kosciuszko2Coast 2012, see discussion in Chapter 4). Other approaches are theoretically possible, although not currently widespread in Australia (McLennan Online), such as deliberative processes which open up discourse to “difference, otherness and indeterminacy” (Chilvers 209:404) and regard expertise as being “reproduced in local contexts rather than a property of certain actors” (Landström et al 2009:1618). Thus the first Hotspots objective invites questions: Are some forms of landscape fire knowledge more legitimate than others? Is the knowledge possessed by some groups more legitimate than that possessed by other groups? How are different fire knowledges used and promoted by fire training organisations and to what effect?

The second objective pertains to the transfer of knowledge about fire as, through Hotspots workshops, landholders are expected to “gain knowledge and skills”. The program lasts just two days in each community, however. Although Hotspots is central to the lives of staff members and the evaluators, it is only fleetingly experienced by participant landholders and is just one many influences on their relationships with landscape fire. Previous research has investigated what non-indigenous landholders do with and about fire (Halliday et al 2012), how they perceive wildfire risk (Eriksen and Prior 2011) and their responses to the burning of public land (Gill 1994) and Aboriginal fire practices (MacLean 2009) but research into existing landholder conceptualisations of and relationships with landscape fire is very limited, particularly as these relate to nuanced issues such as temporal and spatial scale and the agency of humans and others within fiery entanglements. Thus the second objective also invites questions, such as: Outside of training programs, how does knowledge about fire develop? From whom or what do non-indigenous Australian landholders learn about fire? What happens when different knowledges interact?

As mentioned, this research was financially supported by the Bushfire Cooperative Research Centre (Bushfire CRC). This organisation, now replaced by the Bushfire and Natural Hazards CRC, also sought to “build knowledge” (Bushfire CRC Online) in relation to fire and the risks associated with fire in the Australian landscape by pooling
information from individual projects across a range of disciplines including chemistry, ecology, economics, education, law, medicine, physics and psychology. There are numerous challenges to sharing knowledge across disciplines, however, not least the fact that they have different priorities and operate within different ontological frameworks, particularly with regard to ‘human / nature’ relations. Evaluations rooted in these different disciplines would produce rather different perspectives on the Hotspots program and this invites questions about how knowledge about fire and fiery relations is produced in the academic context and how this can be made relevant to policy. These questions include: How do researchers come to understand fiery relations? What guides the selection of information for inclusion in social science research projects about landscape fire? What commonalities are shared by the knowledges produced in different disciplines? How can a coherent approach to understanding and managing fire, land and risk be developed across disciplines?

In the light of all of these questions, restricting the evaluation of Hotspots to a utilisation-focused approach would risk privileging the views of staff and administrators of one program about what constitutes ‘success’ in the context of a fire management program (see Kushner 2000), potentially leaving alternative framings of fire, human/’nature’ relations, risk and knowledge creation unexplored. These issues might be addressed by adopting a pluralistic (House 1993), democratic (MacDonald 1985) or personalised (Kushner 2000) approach to the evaluation. Rather than restricting the evaluation to program and staff perceptions of goals and achievements, these approaches begin with the lives of the human participants, seeking to understand how the program is positioned within their lives and whether or not it is relevant to them (Kushner 2000:xiii, see also MacDonald 1985). In contrast to a utilisation-focused evaluation, which defers to program staff, administrators and decision-makers in defining criteria for assessment of ‘success’, a pluralistic, democratic or personalised evaluation encourages investigation of other human interpretations of the meaningfulness of programs. Indeed, as noted by Kushner:

“Program evaluation voicing the concerns of individuals (and groups of individuals) can be an instrument for giving pause to policies that seek to apply universal treatments. Here is an alternative to the ‘service’ notion of evaluation.
There are times ... when the most useful outcome of evaluation is the overwhelming of decision making with the complexities of human experience...” (Kushner 2000:11-12).

The complexities of *human* experience may not be sufficient, however, to understand the ways in which a training program is entangled in fiery relations. Fire represents one of the most obvious, dynamic and insistent manifestations of more-than-human agency. Fire, the bio- (including human), geo- and atmo-spheres are inextricably entangled in a range of complex, intricate ways as shown, for example, by the shift from landscape scale burning to contained fire in the world’s cooler, wetter regions, leading to the industrial revolution (Pyne 2001:168-169) and the Anthropocene (Clark 2012). Fire is at once a single event and a gathering together of entwined trajectories which have weaved their way through history and pre-history; in the case of fire in the landscape, these trajectories include fluctuations in climate, atmospheric CO₂ composition and the structural, floristic and genetic composition of vegetation (Franklin 2006). From a spatial perspective, influences on landscape fire range from a single, carelessly discarded cigarette or spark from a lawnmower, to plate tectonics and Milankovitch cycles.

Looking beyond the human, and human agency, opens up the potential of more-than-human conceptual frameworks and methodologies to contribute to the evaluation. In addition to observing and interviewing humans in relation to their interactions with non-humans, a more-than human evaluation might also focus on fire and related non-humans as subjects rather than objects (see, e.g. Hall 2011, see also Head et al 2014), call attention to the specificities of the agency of fire (Lulka 2009) and / or emphasise the processes, trajectories and mutual becomings inherent within human / fire / land relations (Bawaka Country et al 2015, Ingold 2006, 2008). This represents a very different approach from currently and historically dominant understandings of the relationships between settler Australians and landscape fire (see Sections 1.4 and 1.5) and has the potential to provide novel and useful insights to those working to develop theory and practice in the areas of more-than-human philosophy, evaluation and land and fire management.
As mentioned, in commissioning this PhD, Hotspots staff were seeking to provide funding bodies with substantive evidence that the program achieves its objectives and to identify ways in which the program could do so more effectively. The report to Hotspots addressing these issues can be found in Appendix 1. However, the research expanded beyond the specific aims of a single sustainable fire management training program to consider how the program is positioned within the much wider context of Australians of non-indigenous heritage, including landholders, trainers and researchers, developing, sharing and promoting different experiences of fire and human / landscape fire relationships. These latter concerns form the body of this thesis and are explored through a series of articles for publication which constitute Chapters 2 to 6.

The thesis is presented as a compilation of articles written for publication, rather than as a monograph, because in each Chapter fiery entanglements are made visible from a different vantage point. Chapters 2 and 6 develop, refine and reflect on the methodologies and methods used by more-than-human researchers exploring fiery relations. Chapter 3 focuses on the ontological and epistemological underpinnings of landholder knowledge whilst Chapter 4 examines the ontological and epistemological underpinnings of different training programs. Chapter 5 addresses the development of a coherent approach to integrating a more-than-human perspective into interdisciplinary understandings of human / fire / land relations. Thus, each of these Chapters contributes to the development of knowledge in different aspects of more-than-human theory and methods and / or to the development of knowledge about learning, training and policy in the context of landscape fire. This is in addition to the unique contribution of the thesis as a whole to the development of a more-than-human approach to evaluation (see Chapter 7 for further discussion of these issues).

Presenting the thesis in this way does create some repetition of material, particularly in relation to theory, methodology and methods and descriptions of the Hotspots project. Thus, whilst the remainder of this Chapter provides further information to support the reader’s understanding of the papers and the links between them, I have endeavoured to avoid overlap by restricting the presentation of information to that which cannot be found elsewhere.
I begin with a clarification of the Research Aims and Questions in Section 1.2 and follow this in Section 1.3 with a brief description of the history and evolution of the Hotspots project and its structure. Section 1.4 presents a review of historical and contemporary knowledge and practice relating to landscape fire, in particular drawing out the differences between more abstract, scientific understandings and more-than-human, relational frameworks. This leads into Section 1.5 which further addresses why the research is pursued through a relational framework and how this manifests through the methodology and methods used in each of the following chapters. Section 1.6 outlines the remaining chapters in the thesis.

1.2 Research Aim and Questions

The overarching aim addressed by this thesis is to show how an evaluation which adopts and refines a more-than-human conceptual framework can be used to generate deep understandings of human /fire /land relationships with implications for land and fire management, training, policy and academic research.

In addressing this aim, I ask questions relating to methodology, ontology, epistemology and research communication within more-than-human fiery entanglements as follows:

1. In the absence of well-established methodologies and methods, how can the social-scientist become sensitised to more-than-human entanglements during research?
2. How does the fire and land-related knowledge of Australian landholders of settler heritage, both long-term farmers and rural in-migrants, evolve through embodied, enminded interminglings with more-than-human others?
3. How do organisations and programs ‘engaging’ with landholders conceptualise landscape fire and to what effect?
4. How can understandings of human / landscape fire relationships which incorporate conceptualisations of more-than-human agency be integrated with understandings from human-centric disciplines and thus advance
understandings of training programs, policy and practice amongst non-academics and academics within different disciplines?

5. What guides the selection of information for inclusion in research on more-than-human fiery relationships?

6. How can the research results be communicated in ways that reflect the dynamic complexity of more-than-human relationships?

Each of questions 1-5 is explored separately, in Chapters 2-6 respectively. Question 6 is explicitly explored in Chapters 3 and 6 which depart from traditional academic writing in an attempt to acknowledge the lively dynamics, and evoke the affective dimensions, of more-than-human relationships (see Lorimer 2010:239).

I now present a brief description of the background and structure of the Hotspots program in order to provide further context for the thesis.

1.3 The Hotspots Fire Project

Hotspots began its operational life in 2003 as a three-year pilot project supported by a $2 million grant from the government funded New South Wales Environmental Trust. This Pilot Stage saw the establishment of a partnership approach, through which the RFS and NCCNSW are responsible for operational and strategic management of the project overseen by an Advisory Committee, and the development of the educational model of a two-day workshop centred on scientific and legislative approaches to fire management. More detailed descriptions of the workshop structure and activities can be found in Chapter 3. Stage Two of the project followed from 2006 to 2009, when the Environmental Trust granted the NCC a further $600,000 which was supplemented by $1,167,000 in funding through the RFS. This period saw the development of a long-term strategic plan, program logic and a Monitoring, Evaluation, Reporting and Improvement (MERI) framework (see Figure 1). Stage Three came when the RFS received recurrent funding to deliver Hotspots workshops as a result of the Victorian Bushfires Royal Commission and this funding continues to date.
The partnership between the RFS and the NCCNSW is key to the operational management of the project. Superficial consideration of the two partners running Hotspots suggests that they have little in common. The RFS is a government agency which was created to fight bushfire and keep it away from humans and human-built assets. It is sometimes referred to as being paramilitary in nature (e.g. Baxter-Tomkins 2011) as it reflects the practice of military organisations in its communication models, operating procedures and the hierarchy of command (Nelson 2005:93-94). In contrast, the NCCNSW is a non-government environmental organisation that is an umbrella body for environmental NGOs in NSW but also runs its own programs and campaigns (Nature Conservation Council Online:a). It has a long history of supporting the use of fire to maintain or improve biodiversity, and is referred to disparagingly by its opponents as an organisation of “greenies” (see, e.g., Devine Online, Downrigger Shop Online). Nonetheless, over the course of this research, staff members from the two operating partners reflected very similar, pragmatic approaches to Hotspots. Both foreground the need for ‘science’ to lead the model of fire management used by landholders and both are driven by externally defined targets in their search for project outcomes, such as the numbers of people attending workshops.

Both the RFS and NCCNSW recognise that there are benefits to the partnership. The link with the NCCNSW enables the RFS to gain access to many people who might be reluctant to engage with the ‘men in uniform’ from the RFS; equally the NCCNSW gains access to a huge network of RFS volunteers. The project also benefits from its association with an Advisory Committee which is made up of representatives from the following organisations who are variously able to provide expertise, resources and legitimacy to Hotspots:

- NCCNSW (operational partner)
- Rural Fire Service (operational partner)
- Forestry Corporation
- NSW Farmers
Figure 1: MERI Framework for Hotspots

Immediate
- Synthesise fire ecology for sustainable fire management at a catchment level
- Develop educational materials for sustainable fire management at a catchment level
- Develop and deliver landholder/land manager sustainable fire management training program
- Engage relevant regional, State and National stakeholders for integrated planning

Shorter Term
- 5 years
- Guidelines for best practice sustainable fire management is adopted and used
- Landholder and land managers' knowledge, skills and engagement on sustainable fire management is improved
- Sustainable fire management plans are developed and implemented

Longer Term
- 20 years
- On-ground fire management is informed by leading edge fire ecology research
- Landholders and land managers have the knowledge and skills and are engaged in working together on fire management at a landscape level
- Appropriate fire regimes are planned and implemented

Aspirational
- Maintain and/or restore cultural values
- Maintain and/or enhance production values
- Restoring appropriate fire management into the landscape to maintain, enhance and/or reestablish biodiversity values
- Communities across Australia understand and respect the role of fire in the Australian bush

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3 Figure provided by Lana Andrews, Hotspots Program Coordinator, RFS, from a presentation for RFS NCC Hotspots Team, September 2011.
Hotspots is part of the Community Planning section at the RFS. The RFS Coordinator of Hotspots oversees the operational component of the project and the RFS also employs three ongoing Environmental Officers, or Facilitators,\(^4\) who are responsible for all aspects of workshop delivery, including:

- identifying suitable workshop areas. The facilitator first identifies a region of high risk and high biodiversity using existing data on, for example, fire history and vegetation types sites, before visiting the region to ground-truth the data and refine the specific workshop area;
- identifying members of local RFS brigades and land management organisations, such as NPWS and Forests NSW, willing to assist in organising and presenting the workshops. These contacts are used to identify a landholder who is willing to allow his or her property to host a demonstration burn of around one or two hectares during the workshop. This burn is designed to show participant landholders how fire can reduce risks to people and property and achieve ecological benefits;
- recruiting participant landholders through a combination of posters displayed in community areas such as shops and schools, promotional materials posted through letter boxes, door-to-door personal invitations and contact with the members of local fire brigades;
- making arrangements regarding the venue and catering;
- facilitating and presenting at the workshop.

\(^4\) During part of the evaluation period, two temporary Environmental Officers / Facilitators were also employed.
At NCCNSW, the Hotspots project sits in the Healthy Ecosystems section which manages programs and projects focusing on fire management, invasive species control and restoration of wildlife habitat (Nature Conservation Council Online). The part-time NCCNSW Hotspots Coordinator supports the delivery of Hotspots as well as being involved with planning and strategy, and the NCCNSW employs a part-time Research and Publications Coordinator. In addition, the NCCNSW employs two Hotspots Ecologists who:

- assist the facilitators in assessing the suitability of identified sites for the demonstration burn;
- develop the Ecological Site Story which briefly describes the geological, physical and biological features of the potential burn-site and surrounding locality, along with a summary of its general and fire history and the expected benefits of burning;
- contribute to the delivery of workshops by leading talks and guided walks and providing informal advice on plant identification and ecological monitoring.

As can be seen in Figure 2, by November 2015 Hotspots had conducted 73 workshops across NSW, from Grady’s Creek on the Queensland Border down to Wyndham, near the Victoria border. The majority of workshops were held within 150 km of the coast, however several were held further inland around Orange, Bathurst and Dubbo, and one at Rankin Springs in the heart of the Murrumbidgee Irrigation Area (note: this is the only workshop not shown on the map for scaling reasons). The vast majority of Hotspots workshops are conducted within areas in which prescribed fire has recently been shown to reduce the area burnt in later unplanned fires (Price et al 2015:2238, see next section). However, a very small number of workshops fall outside of these areas and it may be that Hotspots chooses to revise its working area as a result of this recent research.
Figure 2: Map showing locations of workshops (excluding Rankins Springs) conducted by Hotspots as of 10/11/2015

(Hotspots Fire Project Online:b)
In 2012 and 2013, the number of landholders attending each workshop ranged from 5 to 56, with both the mean and the median number of landholders attending sitting around 27 (from internal data provided by Hotspots).

In the next section, I present a review of historical and contemporary knowledge and practice regarding landscape fire in Australia.

1.4 Knowing Fire

In Australia, human knowledge of landscape fire and practices relating to fire management has been subject to recurrent shifts and fluctuations throughout history, particularly in recent centuries. Summaries of the extensive history of human relationships with fire in Australia can be found in Clode (2010), Franklin (2006), Gammage (2011) and Pyne (1998, 2006) however there is considerable debate around this subject, not least in terms of the role played by indigenous people in shaping vegetation through their use of fire (Mooney et al 2011). There is greater consensus about the increase in landscape fire over the past two hundred years, pointing to the role of European settlers in changing fire regimes. Mooney et al. suggest that “...changes in biomass burning in the last 200 years may have been exacerbated or influenced by humans” (Mooney et al 2011:28) and Oliveras and Bell (2008:31) report that:

“European colonization brought a new fire regime, with burning applied in a similar way as it was in Europe⁵, ranging from one extreme of burning large areas to clear land for farming to the other extreme of continual suppression around populated areas. In some areas, the amount of bush burned annually was considerably decreased from previously applied fire regimes... Since the second half of the 19th century, fires escaping from pastures and farms combined with

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⁵ The notion of a “European way” of using fire should be approached with some caution, however, because of the spatial and temporal variability of fire regimes across Europe and the fact that little is known about human influence on fire across much of the continent. See, e.g., Wallenius et al (2011) and Niklasson et al (2010).
high fuel loads in the surrounding forests often were catalysts for a series of extensive wildfires…”

In Australia, European settlers were granted individual parcels of land through legislation such as the NSW Wales Crown Lands Acts 1861 and frequently fire was used to clear these properties for agriculture, buildings or to prevent bushfire (Whelan et al. 2006). Many of these European settlers worked their properties primarily for the benefit of their own families, suggesting that there may have been differences between Aborigines and European settlers in the spatial scale of land and fire management operations. Gammage (2011:3) believes that, like the colonists, Aborigines managed land:

“…at a local level. Detailed local knowledge was crucial. Each family cared for its own ground, and knew not merely which species fire or no fire might affect, but which individual plant and animal... Knowing which plants animals prefer let them burn to associate the sweetest feed, the best shelter, the safest scrub.”

However, although each family cared for its own ground, Aboriginal clans appear to have worked together over large areas, often with allies up to several hundred kilometres away, to ensure that resources were sustainable even during flood and drought (Gammage 2011:3-4).

Whatever the facts relating to fire practice, there appear to have been fundamental differences between the First Australians and many of the European settlers in their conceptualisations of and ways of knowing landscape fire. Aboriginal understandings of fire pre-1788 are thought to have been rooted in a relational ontology which recognises other-than-human agency and emphasises connectivity (Gammage 2011, Langton 1998). In contrast, early Anglo-Celtic settlers in the 18th, 19th and 20th centuries had no knowledge of, or historical connection with, this new land and, for many, understandings of landscape fire were forged in the drive to ‘civilise’ the native landscape (Gammage 2011). However, these blanket distinctions between Aboriginal people and settlers conceal complexities, context-specific differences, crossovers and more-than-human movements within fiery relationships. Even during the early period
of colonisation, some European settlers sought more holistic, connected relationships with land and fire (Gammage 2011, Ch. 11). Similarly, relationships between fire and many Aborigines were disrupted by the forced separation of people from the land, although there is evidence to suggest that conceptually these relationships may have proved surprisingly resilient (Head 1994).

Just as there is debate about the history of human / landscape fire relations, debates also rage regarding contemporary co-existence with fire. In the Australian context, much of the conflict has been framed as a trade-off between fire management to reduce risk to people and the built environment, and fire management to maintain biodiversity. Many agencies have attempted to resolve this conflict by zoning land into, for example, Asset Protection, Strategic Fire Advantage, Buffer, Land Management and / or Fire Exclusion Zones (Conroy 2011). This can still provoke controversy, however, as an insensitively placed fire break or access road in an Asset Protection Zone can have severe consequences for flora and fauna. In some cases, agencies adopt annual area targets for ‘hazard reduction’ burning across ‘treatable land’ (i.e. that which is not in a fire exclusion zone). For example, following the 2009 bushfires which caused the deaths of 173 people in Victoria, it was recommended that the State of Victoria should “fund and commit to implementing a long-term program of prescribed burning based on an annual rolling target of 5 per cent minimum of public land” (Victorian Bushfires Royal Commission, 2009: Recommendation 56). The aim of this recommendation is to reduce the severity of future wildfire but its simplistic nature has attracted criticism from all sides (La Trobe University Online, The Wilderness Society Online). Annual area burn targets fail to address issues of fire intensity and spatial variability in the sensitivity of the land and take no account of the fact that “it is relatively cheap and easy to burn away from populated areas but this achieves nothing in terms of reducing the hazard to people and property” (York 2011). Indeed, recent research has shown that across large areas of South East Australia most ‘hazard-reduction’ burning achieves very little in terms of reducing risk to humans. In a study of unplanned fires over the past 25 years, Price et al (2015) conclude that in 26 of the 30 bioregions of South East Australia (an area of 2.0 million km2 comprising of Victoria, New South Wales, the Australian Capital Territory and South Australia), “prescribed burning is likely to have very little effect on subsequent
extent of unplanned fire, and even in regions where leverage occurs, large areas of treatment are required to substantially reduce the area burned by unplanned fire” (2015:2234). The four bioregions where prescribed fire does appear to have an inhibitory effect are all in the high-rainfall, forested areas of the Great Dividing Range which experience less severe fire weather and relatively more frequent fire and which have higher maximum fuel loads (Price et al 2015:2237). These authors conclude that in all other bioregions of SE Australia, using prescribed fire is likely to be effective only if conducted in the immediate vicinity of human-built or valued assets where it may assist in facilitating ease of suppression (Price et al 2015:2241, see also Price and Bradstock 2010, 2012).

In the high rainfall, forested bioregions of SE Australia where hazard reduction burning appears to have some impact, support has been growing for the idea that it is possible to combine reduction of risk to humans and property and biodiversity conservation at single sites. For example, Jurskis et al. believe that “perceived conflicts between human and environmental protection are largely unreal” (2003:363) and suggest that both objectives can be achieved with ‘cool’ prescription burning that reduces the intensity of future wildfire in an approach that reflects traditional Aboriginal practice.

Even when fire management is firmly focused on ecological outcomes, disagreement remains about the specificities of these aims. For example, biodiversity is itself a contested concept, in terms of both its social production (Bowker 2000, Nazarea 2006, Whatmore 2002) and its usefulness as a measure of ecosystem health. In reality, due to the impracticalities of measuring the total biodiversity of even a small site, regulations, policies and practices tend to focus on specific taxonomic groups (Jurskis 2003). Clarke observes that “Ecological fire management in Australia is often built on an assumption that meeting the needs of plant species will automatically meet the needs of animal species...” (Clarke 2008:385) and Bell laments the lack of research into fungi thus:

“Despite their huge diversity and unquestionable functional significance, little is known about the taxonomy, biology and ecology of Australian fungi. As a
consequence, even less is known about the effect of fire on fungal communities” (Bell 2010:10).

Thus, current practice of using fire to ‘maintain biodiversity’ actually means using fire to maintain the existence of relatively few known species. Citing studies by other researchers, Jurskis et al (2003) point to the dangers of this approach, observing that moving the focus from invertebrate taxa to ant species (York 1999, York 2000), or from woody shrubs to all vascular species (State Forests, unpublished data), leads to very different conclusions about impacts on biodiversity.

Just as there is debate about what to conserve, there is also debate on how to go about it. Fire-prone biomes in Australia range from cool temperate and tropical forests, through temperate and arid woodlands, to tropical savannas. As suggested by the work of Price et al (2015) discussed above, research shows that different factors influence fire behaviour in each biome. For example, “Fire in woodland communities (dry climates) is limited by growth of herbaceous fuels (biomass), whereas in forests (wet climates) limitation is by fuel moisture (availability to burn) and fire weather” (Bradstock 2010). Within each biome, fire frequency thresholds have been developed for different vegetation types (Bradstock and Kenny 2003, Edwards and Russell-Smith 2009) and these are widely used to inform fire management in the ACT and NSW. However, like area burning targets, fire frequency thresholds are accused of being too simplistic, particularly because of their failure to incorporate variations in the intensity of fire. Interactions between fire frequency and fire intensity are largely unknown but have important consequences. In one known example, high intensity fire can destroy the canopy of Alpine Ash (Eucalyptus delegatensis), whilst low intensity fire would leave mature individuals still capable of seeding. The resulting trajectories of vegetation patterns and structure would clearly be different in each case (Doherty 2011).

Human knowledge about, and relationships, with landscape fire are increasingly influenced by the proliferation of technology to observe, record and precipitate changes in fire events and all that precedes and flows from them. Both scientific research into fire and fire management practice are increasingly abstracted from the land, as GIS
(Gibson et al. 2015) and modelling (Cruz et al. 2008; Keane et al. 2013) play an expanding role in interpreting and predicting fire behaviour and in the planning of human response strategies. This displacement of knowledge relating to fire is reflected in the formalisation of fire brigades. In the past, wildfires were frequently attended to by groups of local farmers gathering together on an ad-hoc basis. Although small, localised brigades remain, these are now directed from urban areas which allows for concentrations of technology and co-ordination of fire management across large areas. Indeed, the headquarters of the Rural Fire Service of New South Wales is in Sydney, the largest city in Australia.

Set against the background of this formalisation, abstraction and externalisation of practice, policy, research and resources, however, is growing concern that non-indigenous Australians are failing to get to grips with the agency of the bio-geo- and atmospheres in relation to landscape fire. Some academics, landholders, NGOs and land managers are calling for debate, policy and practice around fire to develop and incorporate deeper, more connected and locally nuanced understandings of the wider entanglements within which fire moves. Griffiths expresses concern that the use of the word “unnatural”, which is frequently employed in relation to major bushfires, denies “the very nature” (2009:35.2) that sustains communities and the fact that such fires “will come again, with or without climate change, with or without arsonists” (Griffiths 2009:35.2). Williams laments the “temporal pinpointing” (2014:88) of major bushfires expressed in the naming of Australian bushfires after single days such as Black Saturday, Ash Wednesday and so on, and suggests that there is a “need for greater attention to (the) enduring temporality in the landscape” (2014:93) of fire events to enable us to “exist with them as the constantly excessive, if also contingent and dynamic, manifestations of a material life-force that we all share” (2014:93). Eriksen and Hankins fear the loss of Indigenous fire knowledge and practice that recognises the interrelated and interdependent aspects of fire in the landscape (2014:1289). And Head (2011 Online) reminds us “how inextricably humans have become embedded in earth surface and atmospheric processes”, suggesting that it is time to start searching “for mechanisms of connection, rather than simple correlation” in seeking to reconceptualise “human relations to the more-than-human world”.
Anyone seeking to gain knowledge of fire and to use fire in the landscape thus enters a highly contested field in which history, practice and even the ways in which humans should know fire are hotly debated. Yet every year, thousands of people are faced with the urgent need to rapidly develop knowledge of, and new relationships with, landscape fire. Human demographics are shifting in rural areas of New South Wales, as in the United States, Europe and other areas of Australia, as increasing numbers of people seek recreational, aesthetic and other lifestyle changes (Abrams et al 2012; Argent et al 2010). Whilst these rural in-migrants frequently intend to engage in responsible environmental management, or stewardship (Gill et al 2010; Mendham et al 2012), they are rarely experienced farmers and appear to differ from farmers in their relationships with land (Cadieux and Hurley 2009; Klepeis et al 2009), knowledge (Cooke and Lane 2015) and other people (Urquhart and Courtneym 2011; Yung and Belsky 2007). Many have limited, if any, experience with fire in the landscape and reportedly “establish knowledge, attitudes, beliefs and values relating to wildfire via second-hand information from, for example, neighbours, friends, family, the media, environmental groups or fire agencies” (Eriksen and Prior 2011:612-613; see also Eriksen and Gill 2010). This focus on the human social context of learning may be misleading, however, as research suggests that experiential learning, or learning by doing or through labour (Barber et al 2014), is prominent, perhaps dominant, in human relationships with land (Berkes and Turner 2006, Cooke and Lane 2015, Palis 2006, Pannell et al. 2006). More generally, researchers within relational paradigms are now challenging the acquisition model of learning which focuses on the cerebral transfer of abstract knowledge between ‘rational’ human individuals (Plumb 2008, see also Archer 2000), in favour of a learning-as-dwelling model (Heidegger 1971, Plumb 2008) in which knowledge is created as human minds and bodies are challenged by material and social worlds and recalibrate and adjust together with these worlds in a mutually evolving trajectory (Ingold 2011a, 2011b, Plumb 2008, see also Chapter 4). It may be, then, that the relationships between non-indigenous Australians, and landscape fire have never been as ‘modern’ as is commonly assumed.

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6 Here I use the term ‘modern’ to describe a belief in supposedly ‘neutral rationalism’ and logic and the use of particular, reductionist techniques to find the ‘truth’ or single answer in the context of any particular question. In using this term there is a danger of re-inscribing the dichotomy between ‘modern’
In some areas of Australia, Aboriginal land managers and scientists are now working together using a “two-toolbox” approach to managing landscape fire, in which indigenous ecological knowledge and western science and technology are “valued equally” (Central Land Council Online, see also Burrows and Burbidge Online, CAEPR Online). However, until recently, almost all fire training projects working with non-indigenous Australians framed fire as a hazard (see Eriksen 2014, Fleeton 1980, Marston 1983), failing to acknowledge the much more complex, and often positive, role of fire within the Australian material / cultural environment. This is now changing but, with notable exceptions (see Chapter 4), even projects working to encourage non-indigenous Australians landholders to be sympathetic to the benefits of fire and the ways in which it might be used in property management have tended to focus on transferring abstracted information about formalised science, human-created technologies and legislation. This assumes that these landholders either already learn in this way or should learn in this way and is in-keeping with an Australian history in which the ‘ways of knowing’ attributed to settlers and their descendants, and the laws and culture created around these assumed ways of knowing, have tended towards the ‘modern’. However, as discussed, historical and contemporary evidence suggests that this may not tell the whole story about the dynamic relationships of non-indigenous Australians with landscape fire. As Australia struggles to come to terms with its cultural and environmental history and work towards a more just and sustainable future, this thesis explores whether its current inhabitants of non-indigenous heritage, including researchers, landholders and the staff of training organisations, are open to different ways of knowing ‘nature’, in particular landscape fire, and, if so, how these ways of knowing can be incorporated into research, policy and practice.

and ‘pre-modern’ or ‘amodern’. However, my point is rather to challenge this dualistic view, suggesting instead that whilst elements of learning, knowledge and relationships are commonly associated with ‘modern’ and ‘pre-modern’ or ‘amodern’ thinking, individual people or communities do not fit neatly into these boxes but rather position themselves differently at different times and in different contexts (see Latour 2013).
1.5 Theory, Methods and Methodology

1.5.1 Theoretical and Methodological Context

I work within a more-than-human, relational framework in this thesis for two reasons. Firstly, this allows me to move the evaluation from a focus on the ‘success’ of a single program, as defined by a relatively narrow group of people, to a broader understanding of how such programs, and evaluations, become within the wider context of human / fire / land relations. Secondly, whilst formalised science, abstraction and technology are important within human / fire / land relations – indeed, in crisis situations they currently save human and other lives – I wish to challenge the view that this is all there is to say about the relationship between settler Australians, fire and land (see Franklin 2006:555), and to explore more situated, experiential understandings of landscape fire which recognise the agency of the bio-, geo- and atmo-spheres and acknowledge the wider temporalities and spatialities within which human / fire / land relationships exist.

In recent decades, more-than-human frameworks have been gaining prominence across a range of disciplines, from geography, through cognitive science and artificial intelligence (Clark 1998) to physics. Calls for more-than-human ontologies are not new, however, even within “western” academic science. More than a century ago, the man regarded by many as the founder of ecology, Ernst Haeckel (1834–1919), rejected the concept of “a fixed differentiation between the ‘natural’ and the ‘social’” (Gross 2007). Similarly, in the early to mid-twentieth century, Aldo Leopold (1887-1948) made many statements in-keeping with more-than-human ontology, such as:

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7 A more-than-human, relational understanding can be identified in the quantum physics described by David Bohm. As noted by Keepin:

Bohm postulates that the ultimate nature of physical reality is not a collection of separate objects (as it appears to us), but rather it is an undivided whole that is in perpetual dynamic flux. For Bohm, the insights of quantum mechanics and relativity theory point to a universe that is undivided and in which all parts "merge and unite in one totality." This undivided whole is not static but rather in a constant state of flow and change, a kind of invisible ether from which all things arise and into which all things eventually dissolve (Keepin 1993 Online).
“...the individual (human) is a member of a community of interdependent parts...
The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land... In short, a land ethic changes the role of *Homo sapiens* from conqueror of the land-community to plain member and citizen of it” (Leopold 1949).

Although not always consistent, Leopold developed more-than-human interpretations of history in the belief that “Many historical events, hitherto explained solely in terms of human enterprise, were actually biotic interactions between people and land” (Leopold 1949). For example, he describes the agency of the plough, fire, axe and, in particular, bluegrass (*Poa pretensis*), in contributing to the colonisation of the cane-lands of Kentucky, and contrasts this with the situation in the Southwest where grazing by livestock brought weeds and soil erosion. Observing that, “the pioneers were equally brave, resourceful and persevering” in the Southwest, he speculates on alternative histories if bluegrass had not prevailed in Kentucky, asking:

“Would Boone and Kenton have held out? Would there have been any overflow into Ohio, Indiana, Illinois, and Missouri? Any Louisiana purchase? Any transcontinental union of new states? Any Civil War?” (Leopold 1949).

entirely non-human. Similarly, humanist and scientific explanations of events and phenomena, which separate human and ‘natural’ causes, are rejected in favour of analyses which explore entanglements (see Ingold 2008) within complex ‘nature-cultures’. These analyses frame ‘nature’ both as a material actor and a social construction (Demeritt 1994) and attribute agency to natural, other-than-human entities and processes. In this context, agency has less to do with the moral will or intentionality of individual subjects (see Winner 1993) than with the capacity to effect some sort of change. Thus, as noted by Lorimer, more-than-human approaches move beyond “the ontologies of humanism to draw attention to the diverse objects, organisms, forces and materialities that populate an emergent world and cross between porous bodies” (Lorimer 2010:238).

Discourses around more-than-human ontologies are not homogenous, however, and a key area of difference between them relates to the emphasis given to the dynamic nature of existence, that is the relative emphasis given to ‘objects’ versus ‘processes’ (Ingold 2011a:65). Early Actor Network Theory (ANT) was novel\(^8\), and controversial, in working the agency of both human and non-human ‘objects’ or ‘actors’ into theory. Initially developed by students of science and technology to explore how more-than-human entities influence the creation of scientific knowledge (Latour 1997 Online), Actor Network theorists trace assemblages of relevant ‘actors’, positioning these actors at discrete, individual ‘nodes’ within a ‘network’. However, Andrea Nightingale (2006) expresses concern that, despite the emphasis on more-than-human agency, in their eagerness to deconstruct ‘scientific’ data, theoretical trends such as ANT move nature-society geography away from engagement with the dynamic, physical, more-than-human processes that these data describe. Nightingale suggests that this is because the conceptualisation of ‘actors’ and ‘nodes’ within ANT focus on an object-based analysis rather than a process based analysis (Nightingale 2006:11). Bruno Latour goes to some lengths to define the term ‘actor’, suggesting that it might be replaced by ‘actant’ and claiming that it can include “any entity that modifies another entity in a trial” (Latour 2004:237). Even here, however, the emphasis is on an identifiable ‘entity’, thus

\(^8\) Although see comments on Leopold and Haeckel above.
emphasising its individual existence as distinct from its relations (see Coulson et al 1980).

In order to avoid any tendency to immobilise actants, many post-Actor Network Theorists working within Science and Technology Studies explicitly conceptualise objects as being ever open to negotiation, continually being made and remade in different locations by different human and other-than-human actors (Singleton and Law 2005, de Laet and Mol 2000). Similarly, Tilley (2007) and Miller (2007) stress the processual, relational nature of objects that are always in flux and this view is increasingly invoked across a range of disciplines. In some branches of feminist research, for example, individual humans are seen to “do” themselves and their values, knowledge and skills differently in different situations (Taylor 2006:8). This is not to suggest that there is no stability at all in the individual from one context to the next. There are “partial connections” (Strathern 1991: title) within the same actor; in any one context an individual is informed by and included in, but not reducible to, that same individual in a different context. Thus, individual human actors may be conceptualised as fluid and flexible, constantly re-working their identities through the acquisition of knowledge, skills and experience and the repositioning of values. It is important to note here that, within the feminist social science literature, emphasis has frequently been placed on the changing ‘social and cultural’ context, to the exclusion of the geographical and physical. Preston suggests that this is a serious omission, lamenting that “When geography is suddenly nowhere to be found, lost behind our social identities, as if we are socially but not in any respect physically and ecologically connected to the worlds in which we dwell, something important and perhaps ecologically critical has been left out” (Preston 2003:382). Research, including Preston’s own, shows that people do themselves differently in different geographical / physical contexts. For example, in Larsen’s study of environmental learning in Colorado, a reluctant teacher says about her neighbours, “...they’re city people. So they’re trying to learn things from me and I don’t feel all that confident in teaching them but I can show them around when we’re riding”. (Larsen 2011: Online). Physical and ecological relations clearly influence this rider’s doing of herself; outside on horse-back she finds the confidence to ‘teach’ her neighbours that she lacks in other contexts.
But how to compare the relational, processual nature of humans with that of other, more obviously ephemeral actants such as fire? Bennett suggests that “some actants are better described as proto-actants, for these performances of energies are too small or too fast to be things” (2010:viii). Whilst the performance of energies of landscape fire are rarely “small”, fire is, in itself, “fast” or short-lived and is, therefore, difficult to conceive of as an object. In a related discussion, Ingold suggests that the academic focus on the materiality of “things” stems from an emphasis on their consumption rather than production and proposes:

“... that we lift the carpet, to reveal beneath its surface a tangled web of meandrine complexity, in which – among a myriad other things – oaken wasp galls get caught up with old iron, acacia sap, goose feathers and calf-skins, and the residue from heated limestone mixes with emissions from pigs, cattle, hens and bees. For materials such as these do not present themselves as tokens of some common essence – materiality – that endows every worldly object with its inherent ‘thingliness’; rather, they partake in the very processes of the world's ongoing generation and regeneration, of which things such as manuscripts or house fronts are impermanent by-products” (Ingold 2007b:9).

For Ingold, then, objects are processes. This is reminiscent of Whitehead’s (1929) process view in which, according to Stables:

“...the immediate environment is not so much that which is lying around us as that which is happening around us, while the global environment is the sum total of cotemporaneous events. To take an example, let us consider the case of a rolling log. According to substance metaphysics, this is first—a log; second—in motion. According to process metaphysics, this is first—an event, second—involving duration of (a) movement and (b) a state of affairs recognized as a log (until it breaks up into splinters, or whatever)” (Stables 2007:58).

Fire is both a relatively short-lived phenomenon and the gathering together of cotemporaneous events, including sources of ignition as well as particular climatic and weather conditions. Going beyond the cotemporal, as mentioned, fire in Australia has
co-evolved over millennia with many plant species and shifts in tectonic plates (Franklin 2006). This draws us in to consideration of the wider ‘networks’ within which actors / actants are believed to operate in ANT. Again, the notion of a network evokes an image of a relatively static collection of separate (even if fluid) entities. In post-ANT relational research, the word network is frequently substituted by rhizome, originally coined by Deleuze and Guattari (1980); indeed, Latour notes that Actor Network Theory might just as well have been called “Actant Rhizome Ontology” (Latour 1999:19). The Oxford Illustrated Dictionary defines a rhizome as a “prostrate or subterranean root-lie stem emitting roots from the lower side and sending up leafy shoots from the upper surface” (Coulson et al 1980) and in using this word, researchers hope to capture the sense of shape-changing and of the ability to move across multiple sites (Austrin and Farnsworth 2005). For example, Robinson suggests that the rhizome analogy evokes an image of a connected “complex and laterally branching network, of irregular and unpredictable form, with no favoured or principle nodes or linkages” (Robinson and Maguire 2010:605). However, critics of ANT again suggest that networks, and even rhizomes (the multiple roots of which are, after all, tethered to particular spots), do not draw sufficient attention to the temporal dimensions of dynamic, co-emerging entanglements. As noted by Knappett (2007:23), “In that they may be dynamic and emergent, networks have a temporal as well as a spatial occurrence. As the network as a whole shifts and alters over time, so do the positions of each node within it.... Perspectives from materiality have perhaps paid too little attention to time.”

Ingold’s conceptual framework incorporates temporal considerations by moving away from a world made up of static nodes and networks towards a view of dynamic entanglements linked to other entanglements by flows of materials. He replaces the image of a network with that of a meshwork which he describes thus:

“The meshwork consists not of interconnected points but of interwoven lines. Every line is a relation, but the relation is not between one thing and another – between, say, an artefact here and a person there, or between one person or artefact and another. Rather, the relation is a line along which materials flow, mix and mutate. Persons and things, then, are formed in the meshwork as knots or
bundles of such relations. It is not, then, that things are entangled in relations; rather every thing is itself an entanglement, and is thus linked to other things by way of the flows of materials that make it up...” (Ingold 2007c:35).

In this framework, the focus is on pathways of existence since, as Ingold explains, “it is in (these) lines of movement, not as mobile, self-propelled entities, that beings are instantiated in the world” (Ingold 2006:14). Ingold contrasts this image of “wayfaring” (Ingold 2016:79), or lines weaving together within the fabric of the world, with a “transport” (2016:79) view, in which an entity moves from one point to the next and in which space and time are simply matters to be overcome between different points. The emphasis of analysis in the wayfaring view thus shifts from isolated points in a network to mutual more-than-human becomings that constantly interact in dynamic creation; in the wayfaring view, actors “never are – not isolated, not static, not known – but only become as they constantly emerge together” (Suchet-Pearson et al 2013:188, see also Ingold 2006:11-12, Thrift 1999, Whatmore 2002).

This has implications for understanding learning and Donovan Plumb (2010 Online) shows how Ingold’s transport / wayfaring analogy can be extended to this context. From a transport perspective, learning might be seen as the transfer of a commodity, or body of knowledge, from one point (or node), such as the mind of a teacher or a text, to another point (or node), the mind of the learner. This traditional transfer of information model has long been questioned by researchers and educationalists, in particular those who advocate experiential and / or social learning. For example, John Dewey criticises the model for its separation of human beings from nature and the human mind from the body, and for its insufficient acknowledgement of the ever-changing nature of existence. For Dewey, experience is a process of interaction through which a human being interacts with other things and forces, perceiving them on a precognitive sensory level but also reflecting on and feeling something about them. Learning occurs when experiences do not match expectations or intentions and the human is encouraged to imagine how these experiences and expectations might be brought into greater correspondence (Dewey 1897, 1966, Ziniewicz Online, see also Kolb 1984). However, whilst emphasising that nature is a whole of which humans are just one part, Dewey focuses on the human
social environment of learning. For example, the first sentence of his seminal declaration on education, “My pedagogical creed” (1897 Online) states, “I believe that all education proceeds by the participation of the individual in the social consciousness of the race.”

The social context of learning has been further developed by others who criticise the transport model for failing to pay sufficient attention to the wider contexts of learning. For example, Jean Lave and Etienne Wenger propose a theory in which learning takes place in a community of practice (Lave and Wenger 1991, Wenger 1998) which provides the social fabric for developing skills in a particular domain of knowledge of interest to the community. Again, Lave and Wenger identify interactions between humans and their wider environment as important components of learning whilst focusing on the human social environment. For example, they state that, “Theorizing in terms of practice, or praxis, … requires a broad view of human agency … emphasizing the integration in practice of agent, world, and activity” (1991:50) whilst stressing the importance of the “mutual engagement”, “joint enterprise” and “shared repertoire” (Wenger 1998:72-73) of the human community of practice.

In the theories advocated by Dewey, Lave and Wenger and others, then, learning is not seen as simply increasing, or changing, a static store of mental representations but as a process of interactions within groups of humans and between humans and other beings or forces. This leads towards a view in which learning occurs through multiple entanglements of living and non-living beings in the world. For Ingold and Plumb, it is these emergent entanglements that are of crucial importance and learning might thus be seen as a process of wayfaring, as described by Plumb, in which:

“…we bring the emergent, developing capacities of our bodies and the unfolding powers, regularities and unpredictability of nature and society into productive, creative relation. Because of our practical engagement in the world, both we and the world transform. The world of natural and cultural artifacts (sic) is diverted by our energies into new patterns that become the environment for subsequent engagements by us and others. At the same time, our own bodies are diverted by
our practices to develop new patterns and powers that become the basis for future engagements with the world” (Plumb 2008:74).

Again, the difference between the theories of Ingold and Plumb and previous theorists who have paid attention to the more-than-human contexts of learning lies in the consideration of temporalities. For Ingold and Plumb, the emphasis is very much on the trajectories or gathering together of more-than-human threads – on learning as journey – and the mutual emergence or becomings of learner and the environment within which s/he is a part (see Chapters 3 and 4 for further explanation).

This focus on wayfaring and emerging entanglements is relevant to fire and fiery relations. Fire is agential and profoundly relational. Indeed, as noted by Lesley Head “The agency of fire is very much an outcome of its relationships” (Head 2008:376). Yet, as noted earlier, it has been suggested that the perceived difficulty experienced by humans in learning to co-exist with landscape fire stems partly from a failure to appreciate the wider spatial and temporal scales over which fiery relationships stretch (Williams 2014:93). A focus on emergent entanglements draws attention to the trajectories of fiery relationships across a range of temporal and spatial scales, in the presence and absence of fire itself. It has also been suggested that humans struggle to fully accept the agency and relational extent of fire as much of the perceived difficulty in learning to co-exist stems from a failure to understand that humans cannot control every fire (Griffiths 2009, Howitt 2014). Within a more-than-human, relational framework, it is possible to explicitly address issues of ‘control’ as, within emerging entanglements, no single entity has consistent control over the trajectory of the whole; rather “agency is diffusely enacted...” (Tuana 2008: 189, see also Bennett 2010:23). A further benefit of adopting a more-than-human, relational framework relates to the fact that, if conceived of as a material object, most of the time in any single location landscape fire is simply not there. The presence of even human-planned and managed fires is unpredictable due to interactions between fire and local weather conditions and, during a PhD limited by funding, time and logistical constraints, achieving co-presence with landscape fire can, and did, prove difficult. Consequently, fire and fiery relations
are necessarily understood through their legacy and potential in the landscape, humans and other entanglements.

Understanding how knowledge about fire and fiery relations emerges within and outside formal training programs, and within the context of an evaluation, can thus benefit from the adoption of a more-than-human, relational framework but studies which are explicit about being both an evaluation and working within this theoretical perspective are rare. In one example, which is not strictly an evaluation but which is very much focused on management and outcomes, Shaw et al. (2010) use Deleuzian more-than-human ontology to compare the divergent strategies of two institutions charged with managing mosquito populations in Arizona. In Tucson, responsibility falls to the Pima County Health Department (PCHD) whilst in Phoenix, responsibility falls to Maricopa County Vector Control (MCVC). To summarise the authors’ detailed comparison of practice in the two institutions, the PCHD in Tucson use a “backyard, house-to-house, ecologically sensitive” (2010:383) approach combining public education with the detection and destruction of mosquito breeding sites as they arise. In contrast, the MCVC in Phoenix has a more proactive strategy, based around trapping adult mosquitoes, feeding data from traps into a geospatial database program and, when deemed necessary, dispatching trucks to spray problem areas with ultra-low volume insecticides.

The two institutions have very different staff profiles. In Tucson, the PCHD is primarily staffed by females from a public health background whilst at the MCVC in Phoenix, the majority of staff are male and have a biological sciences background. Shaw et al. note that it is “tempting” (Shaw et al 2010:386) to explain away the divergent strategies by reference to these personnel differences. However, in addition to pointing out the difficulties of separating “already coupled human–environment variables” (2010:386), they describe a number of other possible contributors to divergence, including the different climatic, topographical, economic and demographic characteristics of the two cities: Tucson has “more rainfall, lower temperatures, a ruttier topography, and a more eco-conscious population” (2010:387) than Phoenix which has “more people, traffic, money, lawns, reservoirs, and industrial agriculture” (2010:386). Furthermore, they suggest that the mosquito itself has played a role in differentiating strategies. In 2003-
4, in Phoenix, more than 350 people contracted West Nile Virus (WNV), a potentially fatal viral disease vectored by the mosquito. This resulted in the government coming under pressure to do something that “the public could see” (2010:387), a situation which was not observed in Tucson where just 7 cases were confirmed. Shaw et al. conclude that accounting for the difference in interagency strategy is not straightforward but “is the result of complex assemblages of human and nonhuman productions, including knowledge regimes, institutional settings, socioeconomic and political contexts, complex ecologies, and their emergent interactions” (2010:387).

Adopting a more-than-human, relational approach thus has implications for the processes and outcomes of evaluations. Frequently evaluators are expected to answer simplistic questions such as, “Does this project work?”, “Should it be expanded?” or “Are the funders getting value for money?” They are almost always required to measure the program against its objectives or against an externally imposed set of indicators. But, as mentioned earlier, the purpose of an evaluation is not only to provide funders with a justification for their investment, it is to describe what a program means to different actors, to explore how it disturbs relationships and to what effect. Unless the relationships emerging before, during and after, and within and surrounding a program are understood, there is very little to be gained from recommending or condemning its practice. For example, transferring the MCVC approach to Tucson on the basis of its impressive results in Phoenix could be disastrous. Furthermore, when policies, economies, land tenure and use, land tenants and climate are changing fast, a ‘static’ evaluation of any natural resource program could quickly become out of date. Adopting a more-than-human, and specifically a wayfaring, view of evaluation is, then, to explore how learning about fiery entanglements emerges and evolves, how training programs weave their way into the fabric of human / fire / land relations and, moreover, how the evaluation itself weaves into this more-than-human world.

Thus, in this thesis, I adopt a more-than-human, relational conceptual framework (Ingold 2007a, 2007b, 2007c, 2008, 2010, 2011, Head 2008, Online, Plumb 2008, Suchet-Pearson et al 2013) to direct attention towards the embodied, enminded, cultural, social, ecological and geographical / physical relationships that are mobilised in living,
learning, teaching, creating policy and telling research stories about landscape fire. One of the major challenges in planning research within such a framework is to find a point of entry into this emerging world. Each attempt to identify a starting point seems to drag discussion away from connectivity and motion towards disciplinary splits, specificity and temporal and spatial territorialisations (Massey 2005, Whatmore 2002). For example, more-than-human research into human / landscape fire relations straddles disciplines with different conceptions of reality itself. In general, in postmodern social sciences reality has been seen as being socially constructed or created in conjunction with human perceptions and reports of it. This contrasts with the scientific tradition, in which reality is usually perceived as being singular and definite, or “out-there” (Law 2004:65) existing independently of observers⁹. Law suggests that in the relational view, “there is two-way traffic” (2004:65) between these two versions of reality as:

“...out-thereness is not independent of practice in general, but only in particular. Though of course, since we are all somewhere in particular, situated, we do not notice the distinction very much... (Out-thereness) is not prior to practice in general but only in particular... In general, nothing is definite. Only in particular. And finally... we find singularity. We make it. We live within it. But singularity likewise is very specific, very local. And it includes multiplicity” (Law 2004:65).

In order to admit both versions of reality into this research story, and to provide thick descriptions of situated, particular realities whilst also forming the generalisations expected of both evaluations and academic productions, two case studies formed an important part of my methodological approach. Fire training programs act within and upon these case study areas within a complex of relationships stretching from the deep past to the future and from the immediately local to the global. However, it is necessary to bound the research to keep it manageable, thus I focus on three “domains of entanglement” (Ingold 2006:14) within the case studies: landholdings (and, in particular, sites of native vegetation on the landholdings), fire training workshops and the work-

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⁹ Although, there may be more overlap between positions than is admitted, with individual scientists being more aware of alternative realities then they are given credit for and social scientists having more faith in the “rightness” of their worldview than they admit.
sites of those involved in fire training programs. It is inevitable that in each domain, some movements and entanglements are more likely to surface than others. In an attempt to ensure that these entanglements are not limited by a humanistic focus, researchers have tried shifting perspective between actors. For example, by moving his focus between people and plants, Hitchings finds himself moving from a perception of the human as a powerful garden designer “denying plants their individual existence”, to that of “contented ‘plantsperson’ working with a lively and dynamic set of non-human companions” (Hitchings 2003). This is not entirely ideal as, whilst relationships are invoked, the focus still sits with a limited number of actors. However, again with a mind to time and knowledge constraints, the need to be reasonable in demands on interviewees and human (researcher) capacity to remain constantly alert to each and every movement and entanglement, some form of bounding and focus is necessary. Thus in each domain of entanglement, I shift between a focus on the paths weaved by the primarily human to a focus on the paths weaved by the primarily non-human biogeo-physical and artefactual, always remaining alert to the connections between them.

The case study areas were chosen in conjunction with Hotspots and it was agreed that the workshops in the case study areas should:

- be conducted by different Facilitators and supported by different Ecologists
- be geographically distant from each other
- be in different bioregions
- engage participants from different communities (including amenity in-migrants, traditional farmers, commuters, tourism operators and so on)

Once these criteria had been met, the selection of case studies was somewhat opportunistic, depending on the timing of the workshop series. The two case study areas chosen were Mongarlowe in the New South Wales tablelands, and Grady’s Creek / Lodestone (hereafter referred to as Grady’s Creek) in north-east NSW. I now describe each of the case study areas in order to facilitate understanding of the “plenitude of different relations” (Thrift 1999:310) that contribute to the mutual trajectories of landholders, workshops, places, fire and research stories, before describing the methods
used in the case studies. Details of how the data were analysed are included in Chapters 2 to 6 and Appendix 1, therefore they are not repeated in this introduction.

1.5.2 The Case Studies

Mongarlowe, formerly known as Little River, is a small village of around 50 people situated on the Mongarlowe River about 13 km east of Braidwood. Sitting at an altitude of over 700 metres, the prominent geological features of the area are Devonian sediments and volcanic flows. Broad native vegetation formations include wet and dry sclerophyll forest, grassy woodlands, grasslands, heathlands and freshwater wetlands, and significant threatened flora include *Eucalyptus recurva* (Mongarlowe Mallee) and *Boronia rhomboides*.

Mongarlowe is the traditional land of the Yuin people. In 1852, gold was discovered at Mongarlowe and the population expanded considerably, with the majority of immigrants being of European or Chinese origin. Following a decline, the population expanded once more during the Depression, as people came to the area to distil eucalyptus oil. The legacy of goldmining and eucalyptus distilleries can still be seen in the landscape in the existence of dilapidated stills and the rutting of the ground which is pockmarked with old shafts.

Current residents of Mongarlowe and the surrounding area are diverse, being a mixture of farmers with a long history of living in the area, rural amenity in-migrants, commuters to Braidwood or Canberra, retirees and weekenders. Land uses include lifestyle blocks for conservation, recreation and hunting, agency managed conservation areas, and horticulture, beef cattle, sheep, native forestry and tourism operations. Various local events and projects (e.g. Two Fires Festival 2015 Online) suggest that the area attracts people who may be more aware of, and sensitive to, Aboriginal history and culture than is commonly expected of Australians of European heritage, and who may be more inclined towards artistic pursuits and conservation. The Hotspots Facilitator chose to
work in Mongarlowe “due to a combination of high risk (from bushfire)\(^\text{10}\) and high conservation value as well as the interested and cohesive community” (from information provided by Hotspots). The workshop series was hosted in the village fire-shed in early 2012 and the demonstration burn site was a 0.35 ha. plot on the adjacent 30 ha. leasehold.

The second case study was held in Grady’s Creek on the Queensland border, 36 km north of Kyogle. Geologically, the area is dominated by the Mount Warning caldera formed around 20 million years ago and basalt is the dominant surface rock with underlying sandstones. The valley is surrounded on the north, east and west by the Border Ranges National Park, which is internationally significant ecologically, being part of the Gondwana Rainforests of Australia which were awarded World Heritage Status in 1986. Broad native vegetation formations in Grady’s Creek include wet sclerophyll forest interspersed with sub-tropical rainforest in gullies and dry rainforest at lower altitudes (Lennon 2012:3). Tree species associated with the moister areas include flooded gum, tallowwood, brushbox, bangalow palm and hoop pine, whilst those associated with the drier areas include ironbark, red gum, grey gum and grey box. The topography is steep and many individual landholdings climb over 300 metres in altitude.

In the past, landscape fire has been encouraged in Grady’s Creek, initially by the indigenous inhabitants from the Bundjulung language group (Lennon 2012:3) then by European settlers. More recently it has been suppressed, firstly through the dispossession of Aboriginal people and then by pressure from National Parks and other groups. Extensive timber extraction, saw milling and clearance for agriculture have resulted in fragmentation of the native vegetation and facilitated infestations of weeds, most notably *Lantana camara* and *Ageratina adenophora*.

Current land uses in Grady’s Creek include cattle grazing, conservation, tourism-related activities such as bed-and-breakfast establishments and private native and plantation forestry. The specific purpose of running Hotspots workshops in this area was to encourage the restoration of habitat for the Eastern Bristle Bird, a species which is in

\(^{10}\) Despite its high risk status, the last wildfire known to have occurred in the area was in 1929.
danger of extinction due to a reduction in habitat, largely because of infestation of wet sclerophyll forest by shrubby weeds such as lantana.

To understand the ontological and epistemological underpinnings of the Hotspots fire training project in practice, I worked with a Hotspots Ecologist and a Facilitator throughout the Hotspots workshop series in the two case studies. In Mongarlowe only, I began by accompanying the Facilitator, Phil, and Ecologist, Kevin, to the area to observe the processes involved in identifying a demonstration burn-site, and to map the development of the Ecological site story. Sarah Whatmore observes that, frequently, in policy documents, consultancy protocols and investment decisions “all the uncertainties and provisos properly attached in the process of scientific knowledge production become erased and, in the terminology of Demoscience, ‘scientific and technical knowledge is presented in its final form’ in which ‘its certitude has been achieved’” (Whatmore 2009:595). My aim, therefore, was to draw out the uncertainties and provisos associated with the production of the Ecological Site Story, in order to identify the presences and absences therein.

At both Grady’s Creek and Mongarlowe, I accompanied the Facilitators as they recruited participants to the Hotspots workshops. This involved knocking on doors, introducing ourselves and explaining the purpose of the workshops. On these occasions, I paid particular attention to human social relations, identifying the types of knowledge mobilised and acknowledged by both Facilitators and landholders as they positioned themselves in relation to landscape fire.

Following the recruitment process, I requested landholders to walk with me through their properties as I sought to understand how their fire and land-related knowledge evolves through embodied, enminded interminglings with more-than-human others (Ingold 2011b, Plumb 2008). In addition to randomly selecting landholders from a list of workshop participants provided by Hotspots, I also purposively sampled. In order to broaden perspectives on landscape fire relationships in the Mongarlowe area, I worked with the leaseholder of the potential burn site, the Captain of the local RFS fire brigade and three employees of a natural resource management agency who were attending.
the workshops both as CMA representatives and local landholders (see Table 1). I also worked with a landholder who had made it clear during the recruitment process that he would decline the invitation to attend the Hotspots workshops. At Grady’s Creek, the workshops and demonstration burn were hosted by the managers of a bunkhouse style tourist property and I worked with the two managers of this property\(^\text{11}\). All other research participants were chosen randomly from a list provided by Hotspots of potential workshop attendees who had, at the time of the interview, been managing land for a decade or more (see Table 1). These participants were chosen given their longer experience of co-becoming with a fire-prone landscape.

Rather than using structured or semi-structured interviews when walking through properties, I elicited a conversational narrative (Grele 1998) to allow landholders to frame the discussion of their lived interminglings with more-than-human others. In addition to talking and listening to landholders, I also paid attention to non-verbal understandings, including the “embodied and performative nature of ... knowledges and practices” (Riley 2010:659) which reveal “the very tacit and experiential knowledge” farmers have of their farms (Riley 2010:658).

When shifting my focus back to the land itself, I maintained awareness that whilst areas of native vegetation on landholdings, and indeed, the landholding itself, may appear neatly demarcated on maps and be physically bounded by fences, roads, crop paddocks, water or buildings, or not at all, these boundaries are porous and leaky. Native vegetation areas do not exist as islands and may share pesticides and herbicides, flora and fauna (native and alien, desired and invasive), groundwater, atmosphere, climate and so on with the surrounding environment. Thus, rather than viewing them as closed ecosystems working towards some final, conclusive state, an awareness of relationships within and outside these domains drew my attention to:

> ...the interactions between slow-moving and fast-moving processes and between processes that have large spatial reach and processes that are relatively localized.

\(^\text{11}\) Management of the property changed between the first and second Hotspots workshop hence the research participant was different before and after the workshops.
Those interactions are not only nonlinear; they generate alternating stable states and normal journeys of biotic and abiotic variables through those states…” (Gunderson and Holling 2002:9).

Further reflections on my focus on the land can be found in Chapter 2.

I attended the Hotspots workshops in the case study areas as a participant storyteller (Kenney 2015:762)\textsuperscript{12}. In a relational approach the researcher is always viewed as a participant; as noted by Verran (2013:27), the “analyst is configured as an emergent part of the collective”. Telling a story about the collective is seen as a relational, rather than representative, practice and my story was about the social and material relations that generate knowledge within training courses about landscape fire. As such, I paid particular attention to the mobilisation of resources to support knowledge claims and creation, such as plants, maps, historical documents and Powerpoint presentations, and to the conceptualisations of ‘human / nature’ relations embedded within presentations given by Hotspots and agency staff. In addition, I sought to understand the human social interactions taking place by following the approach of Alphandery and Fortier (2010) who, when studying the negotiation of the EC Habitats Directive in local settings in France:

“...analysed the form and content of debate, trying to capture the process of interactions that took place. We were especially interested in the way the actors participating in the debates defined themselves and presented their practices, in those who remained on the sidelines, and lastly, in those who were absent altogether. We studied the subjects addressed, the arguments put forward and the conflicts and agreements arrived at under the effect or otherwise of a process of collective learning” (Alphandéry and Fortier 2010:765).

\textsuperscript{12} In the Geoforum Paper, Divergent Approaches..., I refer to myself as a participant observer, however I now believe I would be better described as a participant story-teller as described here.
<table>
<thead>
<tr>
<th>Gender</th>
<th>Approx. Age</th>
<th>Landholder or manager (L) / Agency staff (A)</th>
<th>Size of Property (Acres)</th>
<th>Employment Status</th>
<th>Property managed for</th>
<th>Pre-w/shop</th>
<th>Post-w/shop</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>40-60</td>
<td>L</td>
<td>32</td>
<td>Employed</td>
<td>Recreation</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>M</td>
<td>60+</td>
<td>L</td>
<td>100</td>
<td>Retired</td>
<td>Recreation</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>F</td>
<td>60+</td>
<td>L</td>
<td>100</td>
<td>Retired</td>
<td>Recreation</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>M</td>
<td>40-60</td>
<td>L</td>
<td>100</td>
<td>Self-employed</td>
<td>Conservation</td>
<td>Y</td>
<td>Y (x2)</td>
</tr>
<tr>
<td>F</td>
<td>40-60</td>
<td>L</td>
<td>100</td>
<td>Self-employed</td>
<td>Conservation</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>M</td>
<td>60+</td>
<td>L</td>
<td>100</td>
<td>Retired</td>
<td>Recreation</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>F</td>
<td>40-60</td>
<td>-</td>
<td>2</td>
<td>Employed</td>
<td>Recreation</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>F</td>
<td>20-40</td>
<td>13</td>
<td>0</td>
<td>Sick</td>
<td>-</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>F</td>
<td>20-40</td>
<td>L and A</td>
<td>40</td>
<td>Employed</td>
<td>Conservation</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>M</td>
<td>40-60</td>
<td>L and A</td>
<td>550</td>
<td>Employed</td>
<td>Conservation</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>F</td>
<td>40-60</td>
<td>L and A</td>
<td>500</td>
<td>Employed</td>
<td>Conservation</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>M</td>
<td>60+</td>
<td>L</td>
<td>100</td>
<td>Retired</td>
<td>Recreation</td>
<td>Y</td>
<td>Hotspots non-participant</td>
</tr>
<tr>
<td>M</td>
<td>40-60</td>
<td>L</td>
<td>1500</td>
<td>Self-employed</td>
<td>Cattle farm</td>
<td>Y</td>
<td>Hotspots non-participant</td>
</tr>
<tr>
<td>M</td>
<td>40-60</td>
<td>L</td>
<td>100</td>
<td>Informal economy</td>
<td>Conservation</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>F</td>
<td>60+</td>
<td>L</td>
<td>330</td>
<td>Retired / Self-employed</td>
<td>Conservation B and B</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>M</td>
<td>60+</td>
<td>L</td>
<td>330</td>
<td>Retired / Self-employed</td>
<td>Conservation B and B</td>
<td>Y</td>
<td>Hotspots non-participant</td>
</tr>
<tr>
<td>M</td>
<td>40-60</td>
<td>L</td>
<td>1643</td>
<td>Self-employed</td>
<td>Cattle farm</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>M</td>
<td>40-60</td>
<td>L</td>
<td>1000</td>
<td>Self-employed</td>
<td>Conservation</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>M</td>
<td>20-40</td>
<td>L</td>
<td>40</td>
<td>Unknown</td>
<td>Native animal</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>F</td>
<td>20-40</td>
<td>L</td>
<td>200</td>
<td>Employed</td>
<td>Conservation</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>F</td>
<td>20-40</td>
<td>L</td>
<td>200</td>
<td>Employed</td>
<td>Conservation</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>M</td>
<td>40-60</td>
<td>A</td>
<td>N/A</td>
<td>Employed</td>
<td>N/A</td>
<td>N</td>
<td>Y</td>
</tr>
</tbody>
</table>

13 This person attended the workshops as she was expecting to move onto her mother’s property of approximately 10 acres in the near future.
Approximately one month after the second and final day of the workshops, I visited landholders again. On this occasion I asked participants to describe in any way they wished their experiences of the Hotspots project and how it had impacted on their lives. Thereafter, the format became more closely aligned to that of the semi-structured interview (see Appendix 3 for broad guidelines to the subjects discussed in these interviews).

These two case studies formed part of a broader suite of methods as described in the next section.

1.5.3 Summary of additional methods

Throughout the PhD I conducted an ongoing review of academic and professional literature on landscape fire and land management, relevant Hotspots literature, RFS and NCCNSW (including project proposals, training materials, case studies, workshop evaluations, annual reports, web-sites) and literature on other NRM and fire initiatives in NSW. In order to familiarise myself with the Hotspots process and allow for comparison, I attended two workshops other than those in the case studies, one series in Kulnura, NSW on 30th March and 4th May 2012, and the first day of the workshop series at Budgong, NSW on 13th April 2012. I attended Training the Trainers events at Mittagong, NSW on 12th and 13th September 2011 and at Queenbeyan, NSW on 17th and 18th January 2013, and a Hotspots Committee meeting in Sydney on 12th March 2013.

I interviewed Hotspots staff directly involved with the project, RFS HQ staff with management responsibilities for these staff but no direct involvement in the project and Hotspots Committee members (see Table 2 for a list of research participants). These interviews took place at workplaces in order to gain insight into how the knowledge, skills and values reported by these research participants are influenced by embodied, enminded experience in place. As noted by Ingold:
“Simply to exist as sentient beings, people must already be situated in a certain environment and committed to the relationship this entails. These relationships, and the sensibilities built up in the course of their unfolding, underwrite our capacities of judgement and skills of discrimination, and scientists – who are human too – depend on these capacities and skills as much as do the rest of us” (Ingold 2011b:25).

I sought to generate a discussion directed as much by the participants as myself but these interactions became semi-structured interviews rather than conversations (see Appendix 4 for a rough guide to the interview schedule). Although this was not my original intention, it is an appropriate reflection of the expectations of interviewees and, more broadly, of relationships within these formal workplace settings. However, ongoing more informal interaction with Hotspots staff members, including phone, email and face-to-face contact at various fire related events, helped me to gain further valuable insights into the history and operations of Hotspots.

Table 2: Research Participants: Hotspots Staff and Committee Members

<table>
<thead>
<tr>
<th>Position</th>
<th>Organisation</th>
<th>Relationships with Hotspots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager Community Planning</td>
<td>Rural Fire Service</td>
<td>Manager of Section within which Hotspots is located and Committee member</td>
</tr>
<tr>
<td>Director Community Resilience</td>
<td>Rural Fire Service</td>
<td>Director of Section</td>
</tr>
<tr>
<td>Hotspots Co-ordinator</td>
<td>Rural Fire Service</td>
<td>Employee</td>
</tr>
<tr>
<td>Ecologist</td>
<td>NCCNSW / University of Wollongong</td>
<td>Former NCCNSW Hotspots employee / Current committee member</td>
</tr>
<tr>
<td>Policy Manager</td>
<td>NSW Farmers</td>
<td>Committee member</td>
</tr>
<tr>
<td>Economics and Rural Affairs</td>
<td>Committee member</td>
<td></td>
</tr>
<tr>
<td>Senior Team Leader</td>
<td>Department of Environment and Climate Change (NSW)</td>
<td>Committee member</td>
</tr>
<tr>
<td>Native Vegetation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I conducted a survey of approximately 500 landholders participating in Hotspots workshops from 2010 to 2013. Whilst this survey was a central plank of the evaluation delivered to Hotspots, the body of this thesis focuses on information generated through other methods and therefore no further details of the survey are included here. The interested reader is directed towards Appendices 1 and 5 for further information on the survey and the Hotspots evaluation.

Finally, during the course of my work with Hotspots, another fire training project working with landholders, the Traditional Land Management Project (TLMP) of the Kosciuszko to Coast Program (K2C), came to my attention which I felt could a useful comparison to Hotspots. Due to funding constraints, my engagement with this program was limited to a review of project literature, telephone interviews with the voluntary former president and the paid facilitator, attendance at a workshop and individual and group discussions with the contracted workshop leader and six attending landholders.

1.5.4 Ethical Considerations

Evaluations enter into a unique ethical space. Organisations or partnerships offering a service are used to being in a position of control over issues considered and decisions taken within the context of that service and to setting the guidelines for relationships between all parties engaging with the service (Kushner 2000:151). Evaluations displace that position, exposing service-providers to considerations which go beyond the issues which they have identified as relevant or important, and revealing and questioning their judgements on the issues which they have embraced. Moreover, in the context of landscape fire – an issue which provokes high emotion in Australia – publicly revealing the opinions and practices of participants in programs may risk creating or exacerbating disharmony within communities.

Kushner (2000:151-184) writes at length on ethical considerations in evaluations and, in particular, on the “multiple ethical traps” (2000:153) confronting the evaluator. Observing that as all stakeholders do not share “a consensus view on how to relate to
the evaluation” (2000:154-184), Kushner notes that evaluations create an ethical space which “is not neutral and nor can it be impartial with respect to particular stakeholders: we can never be fair to all” (2000:152). An apparently straight-forward ethical intention might be to maintain the well-being of all participants, for example, but this pushes the evaluator into a very difficult position if the service provided is revealed to be doing harm to individuals or communities. The evaluation can say nothing, thus allowing the harm to continue, or say something, potentially affecting the wellbeing of program staff. Thus, evaluators are often faced with a choice between different ethical positions, each of which might be considered reasonable and defensible (see 2000:153).

Kushner’s ethical perspective on evaluation deals only with the human dimension and this is usually the only dimension considered by University Ethics Committees for research in the social sciences. However, as mentioned in Section 1.5.1 above, western writers and researchers have sought to extend ethical considerations beyond humans at least since Aldo Leopold argued for a “land ethic” (see also Bennett 2010, Callicott 1999, Marshall 1993). It is important to note that advocates usually do not aim to substitute environmental ethics for our existing obligations to humans but rather add to them. Thus the evaluator adopting a more-than-human relational perspective on a program is presented with an even wider range of possible ethical positions from which to select.

In negotiating an ethical pathway through this research, I place considerable emphasis on the independence of the evaluation. Whilst this may initially seem to be a self-serving position, it is important to understand the charged atmosphere surrounding human / landscape fire relationships in Australia which could render any evaluation vulnerable to being diluted or torn apart by stakeholders with different interests. Stakeholders were made aware of the independence of the evaluation through email correspondence, spoken discussions and information sheets. The only exception to my commitment to independence relates to Chapter 6 which offers a particularly detailed look at the geographies, histories, hopes and expectation of one landholder. As the information about this person’s life goes beyond that which would normally be expected to be revealed in this context, I requested the landholder’s permission to write an article.
of this nature before commencing it and gave him the opportunity to make changes before publication, although he chose not to do so. The only other deviation from standard ethical procedures for university social sciences relates to my commitment to remaining open and receptive to more-than-human becomings, accepting non-humans as guides and sources of information and paying close attention to more-than-human relationships.

In other respects, the research follows ethical procedures which might be seen as standard in university research, including providing information sheets to all interview participants, giving them the option of being quoted under their own name or a pseudonym in research products, providing the opportunity for them to look at the research products before publication, allowing the right to withdraw at any time without penalty and obtaining signed consent forms. All Chapters were sent to landholder interviewees requesting comments before publication.

I now briefly describe the remaining chapters in this thesis, outlining the links between them and offering a brief summary of their results.

1.6 Chapter outlines

As a British migrant to Australia, with extremely limited direct experience of fire in the landscape and a small amount of experience modelling post-fire vegetation recovery data from the North York Moors, this project required that I develop my own knowledge and understanding of fire and fiery relations. Three factors pushed me towards seeking to gain this knowledge from human experts and human created resources such as books and web-sites. Firstly, as mentioned, landscape fire, particularly bushfire, is a fairly uncommon event. Secondly, despite moves to incorporate “new modes of investigation” (Gibbs 2014:207), such as embodied research methodologies, in the humanities and social sciences it is difficult to shake off the sense that PhD researchers should be continually engaged in cerebral activity, either alone or with other humans. Finally, methods for understanding non-humans such as fire as anything other than
“background components of human-centred landscapes” (Pitt 2015:49) are still in the nascent stages of development (see also Head and Atchison 2009, Head et al 2014, Richardson-Ngwenya 2013, Whatmore 2006). The empirical research for this research was conducted during a period of greater than average rain in SE Australia however, which forced me to look beyond narrowly-conceived ideas about who or what can contribute to knowledge production (Bastian 2014) in relation to landscape fire. Weather is a very active agent mediating relationships between fire, humans and land and, on my visits to landholdings and potential burn-sites, the weather drew my attention towards an alternative way of understanding the more-than-human world. In Chapter 2, I show how a non-human guide – rain – facilitated the development of my knowledge of landscape fire and its relationships and, in doing so, I contribute to the development of novel research approaches to exploring more-than-human entanglements in the humanities and social sciences.

In Chapter 3, I move on to landholder understandings of fire. Using data co-produced with six Grady’s Creek landholders who had, at the time of the interviews, been managing land for around a decade or more, I show how dwelling in fire-prone environments contributes to understandings of scalar complexities, agency and control in relation to landscape fire. This Chapter also argues that immersion within fire-prone environments influences ways of knowing land and fire by moving landholders away from cerebral understandings, developed in different environments with very different challenges, towards learning through physical engagements with their land.

These findings might be expected to have implications for programs seeking to train landholders in the use and management of landscape fire and Chapter 4 examines how knowledge around landscape fire is conceptualised, created, shared and negotiated during the development and implementation of training programs. I compare the approach taken by Hotspots, which educates landholders in the scientific and legislative aspects of fire with the aim of persuading them towards particular decisions, with the approach taken by the K2C TLMP project, which aims to develop new ways of knowing and being that recognises the mutually entwined trajectories of embodied humans, fire and land. I suggest that training programs can influence not only what landholders do
with their land but also their ways of knowing human / landscape fire relations, and emphasise the importance of explicit consideration of these issues by training organisations, funding bodies and policy makers.

Chapter 5 draws on the information gathered for Chapter 4 and explores how ontological insights into practice and policy might be shared with academics, policy makers, funding bodies and others operating within different disciplines. This Chapter shows how the hidden-value trade-offs model, developed in governance and legal contexts to clarify the competing values inherent within conceptualisations of shared responsibility for fire management, can be applied within the context of Hotspots. I then go on to suggest how the model can be adapted and extended to provide a common framework for understanding approaches to more-than-human community resilience across legal, governance, land management and scientific contexts.

In Chapter 6 I come full circle, exploring again how more-than-human entanglements have influenced the construction of this research story. Previous work conceptualising relationships within the research process has identified the contribution of both past and present human social relationships to the development of research stories, however reflection on (bio)physical, geographical, artefactual and other more-than-human influences has been limited to those which are co-present in research encounters. Using the example of a single research encounter with a landholder, I adopt a creative non-fiction approach to highlight how materially absent and frequently unacknowledged more-than-human relationships influenced the trajectory of my research.

Chapter 7 begins by reflecting on the novel contribution of each Chapter to academic and other knowledges. I then move on to discuss how the contribution of the thesis as a whole goes beyond the individual Chapters to show how an evaluation which follows more-than-human pathways in relation to fire-prone environments can provide a unique perspective on training programs and the fire-prone environments they travel through.

Chapter 7 then brings the thesis to a close by suggesting possible directions for future research. The first of these focuses on the fact that the months, indeed years, that
academic papers spend in review and production can mean that by the time publications appear researchers, landholders, training programs and policy have moved on. I suggest that more creative ways of reporting evaluations, such as novels, might be explored in order to convey this sense of never-starting, never-finishing pathways. My second suggestion also relates to non-traditional approaches to applied research, encouraging a move towards a situation in which more-than-human relational evaluations of programs are requested as one of the approaches of choice by organisations that seek deep understanding of the pathways of programs within communities. Finally, I urge research into ways in which land and fire management programs can contribute to reconciliation between Indigenous and non-Indigenous Australians.

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Chapter 2 On being shown fire through rain – further thoughts on more-than-human methods

This chapter is the article accepted with minor revisions for the journal Area as Edwards A and Gill N On being shown fire through rain – further thoughts on more-than-human methods. The focus in this Chapter is on my efforts as a researcher, with very limited experience of landscape fire, opening up to different ways of knowing fiery relationships.

Just as fire training programs weave their way into fiery entanglements, so does an evaluation and an evaluator needs to choose a direction in which to set out through these multiple, dynamic, complex and intricate relations. However, this presents an immediate challenge in that, whilst theory relating to more-than-human, relational approaches has been developed and refined (see Section 1.5.1), methodologies and methods to access and appreciate “nonhuman forms of intelligence and expertise” (Lorimer 2010:239) are still in the infant stages (Head and Atchison 2009, Lorimer 2010, Pitt 2015, Richardson-Ngwenya 2013, Whatmore 2006). In the past, methodologies in the social sciences have tended to rely on text, with ontological and epistemological consequences. Buller observes that speech “is held by many as the quintessentially unique and exclusive human quality” and others suggest that is this that has allowed Others to be the “silent objects to human subjects” (Buller 2015:375, see also Taylor 2012, Urbanik 2012). Whilst speech remains an important aspect of understanding fiery entanglements in this thesis (see remaining Chapters), if it is not to be relegated to the role of object, the agency and process of fire – how it moves through the world, what it does, and the nature of its affects14 – must be understood and this understanding can be enhanced through the use of additional methods.

14 I use the word “affects” here in the sense used by Lorimer (2008:379): “An affect encompasses both the material properties of an organism and the forces that flow between different beings.” Similarly, Gilles Deleuze (1988:27) explains “If you define bodies and thoughts as capacities for affecting and being affected, many things change. You will define an animal, or a human being, not by its form, its organs, its functions and not as a subject either; you will define it by the affects of which it is capable.”
Mirroring animal ethnography (see Lestel et al 2006), direct observation offers one possible approach to developing a deeper understanding of fire, however, as observed in the introduction, most of the time landscape fire is not present. Even when it is, close observations are inhibited by safety considerations. Thus large-scale landscape fires are usually observed at a distance, through video, or through tracking methodologies such as GPS models which provide useful information about the spatial behaviour of fire. However, such methods privilege the visual over other sensory understandings. This is an important limitation as perhaps the most salient aspects of the agency of fire in terms of its affects and effects relate to heat and the noxious gases emitted, rather than its visual characteristics.

One of the main reasons for the absence of all types of landscape fire during my research was the presence of rain. And just as rain prevented the ignition and movement of fire, so it impeded the progress of my own physical body, at times literally stopping me in my path. Whilst this was initially a source of frustration it encouraged me to pause and consider the agency of rain and its insistence on weaving its way into this story. This, together with the recognition that visual and oral / aural routes to understanding fire need to be supplemented with other sensory understandings, encouraged me to consider what might be learned from seeking to understand fire through rain. Thus, this Chapter examines how rain weaved itself into my relationships with fire as I set out on my path through the evaluation.
ABSTRACT

In this paper, we contribute to the development of methods in the humanities and social sciences by exploring a novel approach through which the novice researcher might come to understand more-than-human entanglements. Our topic is fire and fiery relationships but rather than being guided solely or primarily by human experts, or by fire itself, we come to fire and fiery relationships through another non-human – rain – and ask how rain might guide the novice researcher’s attention towards the materiality of fire and its relationships. Given that the ‘natural’ sciences already investigate non-human subjects and relationships (Head 2011), we also ask what purpose using non-human guides might serve within both research and training in the post-humanities.

2.1 Introduction

More-than-human geography seeks to understand human life as “closely entangled with that of nonhumans” (Pitt 2015:48, see also Whatmore 2006), directing attention towards new research subjects, including fauna (Kirksey and Helmreich 2010), flora (Head and Atchisen 2009, Pitt 2015) and quasi-species (Lowe 2010), and complex assemblages involving living and non-living parts (see, for example, Bennett 2010). This turn within the ‘post-humanities’ (Head 2011) has generated interest in the development of new methods through which to study these research subjects and their tangled relationships. For example, in a recent article in this journal, Hannah Pitt suggests that if we are ever to get away from treating non-humans as anything other than background components of human-centred landscapes, we need to move away “from methods centred on talk, to get closer to engagements with specific (non-humans)” (Pitt 2015:49, see also Head and Atchison 2009, Whatmore 2006).

In an attempt to move forward with this project, Pitt uses theory developed by Ingold to investigate the possibilities of the researcher as novice being inducted into knowledge by both human and non-human expert guides. Pitt notes that:
“Ingold’s version of learning is conducive to geographic interest in nonhumans because all kinds of beings – fungi, rocks, birds – guide the novice’s attention. Knowledge is not confined to humans, hence plants might share their expertise in being plants” (Pitt 2015:50; see also Ingold 2000, 2011, 2013).

In this paper, we extend these ideas by exploring a novel approach through which the novice researcher might come to understand more-than-human entanglements. Our topic is fire and fiery relationships but rather than being guided solely or primarily by fire itself, or by fire-fighters, land-managers, indigenous peoples or other human experts, we come to fire and fiery relationships through another non-human guide – rain. We ask how rain might share expertise, guiding the novice’s attention towards the materiality of fire and its relationships. Given that the ‘natural’ sciences already investigate non-human subjects and relationships (Head 2011), we also ask what purpose using non-human guides might serve within research and training in the post-humanities.

2.2 Repositioning fire, humans and weather

As has frequently been observed, fire is a profoundly, and obviously, relational event. Lesley Head summarises the situation thus:

“If there is one example of an entity ... that is neither simply natural nor social but something else and beyond, it is fire. The agency of fire is very much an outcome of its relationships – with Aboriginal igniters, managers and extinguishers; with fuel load in different vegetation communities; with temperature, humidity and wind conditions” (Head 2008:376).

Humans and fire have been closely entangled for millennia; as Bond and Keeley (2005:387) remind us, “Fire is ... a significant evolutionary force, and is one of the first tools that humans used to re-shape their world”. Fire has been used by humans to clear forest for agriculture, ranching and charcoal production (Righi et al 2009); improve visibility for hunting and encourage regrowth for grazing (Tacconi and Ruchiat 2006);
shape ecosystem structure, reduce insect pests and diseases, and provide materials for basketry (Anderson 1999); reduce the risk of fires in fire-prone shrublands (Baeza et al 2003) and manage and conserve heathland (Janovský et al 2010). But fire is not a passive element in this relationship. Whilst humans use fire to change land, fire has also had a profound impact on humans, to such an extent that Pyne concludes that “the prevalence of humans is largely attributable to their control over fire” (1997:4). Wrangham argues that the introduction of cooked food into the diet increased human brain size due to greater calorific absorption (Wrangam 2009), and fire has had a profound impact on human social relationships, for example, through the building of shelters for fire which draw some people together whilst excluding others (Fernandez-Galiano 2000, 5; Clark and Yusoff 2014, 217) and through the geographically uneven distribution of fossil fuels (Mitchell 2011).

Just as humans and fire are inextricably entangled, so are fire and the atmosphere. Fire can be ignited by lightning, stoked by hot, dry winds and quenched by rain but fire also creates its own winds and shoots particulate matter into the atmosphere, effectively cloud-seeding (The Human Touch of Chemistry Online). Humans enter this picture in simple and obvious ways, for example through using fire as a protection against cold weather and by lighting fires that influence the weather, either incidentally or deliberately (Eriksen and Hankins 2014:1293). But the relationships between fire, weather and humans are also more complex, profound and long-term. For example, Pyne suggests that it is no accident that the industrial use of fire emerged from North West and Central Europe, an area notable for its year-round rainfall and cool temperatures (2001:168-169). The shift towards contained fire has resulted in a reduction of broadcast fire around the world (Pyne 2001, see also Clark and Yusoff 2014) and altered the composition of the atmosphere with implications for climate. This has had impacts on human individuals, for example, through health issues, and at the societal level, for example, in increasing demands on emergency services (Mitchell 2011).

Noting that terrestrial fire and biological life have a shared chemistry, Clark and Yusoff (2014:203) argue that, “Fire is a force that links everyday human activities to some of
the most powerful energetic movements of the Earth”. Nonetheless, many humans remain reluctant to relinquish the notion that they are somehow separate from Earthly processes and phenomena, preferring to figure the world “as a wilderness alien to us” (Cohen and Trigg 2013:80). In the context of fire, whilst many indigenous peoples share(d) Mason’s view that fire has control “over all the land, its people and natural resources” (Parks Victoria 2003:45), many ‘modern’ humans appear to be resistant to the idea that they may not be entirely separate from, and in control of, fiery relations (Griffiths 2009, Howitt 2014, but see Chapter 3 for further discussion). Clark and Yusoff suggest that this resistance stems from “a generalized unwillingness to view human collective life in terms of its deep imbrication in geological process: a reluctance, in particular, to conceive of these geologic processes as subtending biological possibilities” (2014:210).

The post-humanities question these resistances and reluctances, requiring both novice and experienced researchers to acknowledge that humans are inextricably embedded in biological, geological and atmospheric processes and encouraging them to work towards dissolving the human/nature boundary. This is no easy task, not least because these researchers are seeking to decentre the human in a context in which human impacts on the environment have only recently gained acceptance and “the battle to include humans in conceptualisations of nature is not yet won” (Head 2011, Online). It is perhaps unsurprising, then, that “fantastical new methods” (Richardson-Ngwenya 2013:293) are being sought through which to explore the agency and vitality of more-, or other-, than-human relationships. However, these new methods themselves may reinforce the human/nature binary. Kirksey and Helmreich warn against “making our forays into the non-human a search for ever stranger positions from which to carry out this project” and taking “otherness to be the privileged vantage from which we defamiliarize our ‘nature’” (2010, 561). A more profitable approach to enabling novice researchers to unsettle the human/nature binary may be to “search for mechanisms of connection” (Head 2011 Online) which humbly acknowledge our shared biology, chemistry and history.
2.3 Research Approach

This research was originally commissioned to evaluate the Hotspots Fire Training Project which is an “education and training model for sustainable fire management practices that protect biodiversity and cultural values, while at the same time providing protection for life and property” (Rural Fire Service Online). Hotspots training is conducted through two-day interactive workshops with landholders, incorporating Powerpoint presentations, field visits and observation of a controlled burn. Further details of the training courses and the wider Evaluation Methods can be found in Chapter 4 and Appendix 1.

The research expanded beyond a utilisation model of evaluation, however, to focus on the development of fiery relationships more generally and, in particular, on what it means to ‘know’ fire. Following Pitt (2015), we might have looked to fire itself to be an expert guide in our quest to understand fire and its relationships, and certainly this is the approach taken by many landholders (see Chapter 3). However, opportunities to learn about broadcast fire from fire were limited during the research, not least because rain interfered with, and changed the direction of, almost every stage of the training program and research. The fieldwork was conducted during a La Nina event. A global phenomenon, La Nina refers to the extensive cooling of the central and eastern tropical Pacific Ocean and wetter than average conditions in Eastern Australia. The parallel limiting of fire, trainers and researchers throughout this period led us to consider how rain might guide our understanding of fiery relationships through an exploration of our shared trajectories. We had already begun to consider links between human/rain and fire/rain trajectories through our reading. For example, in the following quote Ingold writes of human wayfarers but he might equally be writing of fire:

“...we do not so much traverse the exterior surface of the world as negotiate a way through a zone of admixture and interchange between the more or less solid substances of the earth and the volatile medium of air... As inhabitants of this zone we are continually subject to those fluxes of the medium we call weather” (Ingold 2010:5122).
As part of the evaluation of Hotspots, one of the researchers conducted participant observations of the workshops and engaged in property walkabouts with individual landholders around one month before and one month after the workshops. The intention on these walkabouts was to engage with landholders and with the materiality of the landholding in order to come to a deeper understanding of fire and its relationships within the landscape and the humans within that landscape. During these walkabouts the weather guided an emergent methodology which encouraged us to pay more attention to what fire does and is. Our aim here is not to anthropomorphise fire but to describe how a non-human guide, other than fire itself, enabled us to gain insight into these issues before discussing the advantages and potential pitfalls of this approach.

2.4 Learning about fire through rain

Rain affected multiple aspects of the research in the field, frequently, and literally, causing one of the researchers to change direction and move to another place. For example, when a flooded river made it impossible to reach her overnight accommodation, she was forced to turn up the hill and find a bed elsewhere. It changed the time spent in each place, causing the researcher to linger longer in some areas – for example, fords which might or might not be too deep to cross and which required slow, painstaking negotiation and / or perilous leaps – and to rush through others. And as she walked through landholdings conducting interviews, the rain affected her body, literally changing her shape, for example, by wrinkling the exposed skin on her fingers.

Rain affected the outcomes of the research, co-constructing the conversations on walkabouts. For example, rain forged a bond between the researcher and one participant as they struggled to boil a kettle on a reluctant fire under a square of suspended corrugated iron (see Chapter 6 for further information on this research encounter). In conjunction with the difficulties of audio recording in the rain, the “interview” during this hour shifted to a discussion on a wide range of topics that apparently had little to do with fire and land management, yet revealed a great deal
about the positioning of the fire training course within this participant’s life. This experience was not unique; when unable to reach her intended accommodation because of the flooded river, the researcher stayed instead with two of the other research participants, Martha and Laurie. They were joined by Tom, another research participant, and his wife and rescued kangaroo joey, who were also unable to reach their home. This extended period of enforced intimacy with research participants changed relationships, enabling the researcher to gain a much deeper understanding of the complex relationships and challenges to land and fire management in the area. In this way rain directly influenced the outcomes of the research.

These human relationships with rain have clear parallels with the relationships between rain and fire. Rain changes the shape of fire, its direction, the time it spends in a place, the outcome of each fire event. Sensitised to the impact of rain, as she walked different landholdings the researcher noted areas where fire might be slowed or turned by collected rain, such as in creeks and dams. She mused on the challenges to fire presented by shallow, south-facing slopes which hold rain long after it has been released by steep, north-facing slopes. She observed the embodied legacy of complex relationships through deep time between plants, rain and fire in the brush-box (*Lophostemon confertus*), bangalow palm (*Archontophoenix cunninghamiana*), Antarctic beech (*Nothofagus moorei*), and Eucalyptus trees (see Franklin 2006).

It could be argued that, had the rain not been so insistent, it might have been ignored by the researchers. However, the absence of rain over extended periods is as dominant in fiery relationships as its presence; every crackle of dry tinder underfoot reminds the sensitised walker in an Australian drought of the potential for bushfire. Fire is clearly an event, a happening. But the absence of fire is also a process, or entanglement, which involves rain and the memory of rain, stored within plants, soil and atmosphere. Even in drought conditions, using rain as a guide would bring insights that might otherwise be missed.
2.5 Learning about human / fire relationships through rain

Thinking through rain guided us towards particular perspectives on the evaluation, encouraging a focus on the interaction between non-humans and the structures and procedures of the training program. As described in Chapter 4, the program was a resource intensive assemblage which allowed for very limited flexibility in its timing. For example, it was intended that a demonstration broadcast burn should be held in the afternoon of the second day of every workshop but this proved impossible more than half of the time due to wet weather. In some areas, this had profound consequences for the future trajectory of fire; for example, at one site rain prevented the demonstration burn and permission for the Rural Fire Service (RFS) to burn the site in future was later rescinded. The reasons for this are complex but the salient point for this paper is that the combination of rain and the rigidity and complexity of the program influenced human relationships (between the landholder, local villagers, the RFS and the training course) and the fire trajectory of the land. In other areas, many participants were frustrated by the cancelled demonstration burns. Whilst this may, ironically, have been a valuable lesson about the human role in fire / weather relationships it also negatively influenced the opinions of some people about the training program. Thus the weather directed the evaluation towards examination of the structures, procedures and high resource dependency of the program.

Remaining alert to the lively agency of rain enabled the researcher to tune in to human experts as they described their relationships with fire. As she listened to stories of landholders battling bushfires, desperately hoping that the rain would come to change the outcome, she came to understand better the ways in which they position themselves not as controllers of fire, but as “small parts of a complex entanglement in which the locus of control is constantly, and sometimes unpredictably, changing” (Chapter 3). Frequently having to make spontaneous decisions to complete fieldwork within an allotted time brought the researcher greater understanding of landholders’ frustration with fire-related regulations which blanket an entire state with a fire-ban in response to conditions in one distant part of that state, and greater sympathy with their calls for flexible regulations that recognise the spatial and temporal capriciousness of weather.


2.6 Discussion

Throughout this research, rain provided way-markers (Pitt 2015:50) that guided us towards particular ways of perceiving fire and fieryness, human/fire relationships and the training program. Writing on the methods used in post-humanist research, Richardson-Ngewenya notes that in order to “get at ‘the vital’” it was important to cultivate “a vitalist geographical imagination that was receptive and open to the liveliness of materialities and the significance of relational becomings...” (Richardson-Ngewenya 2014:297). We found that remaining receptive and open to a nonhuman guide (rain) beyond the immediate nonhuman of interest (fire) fine-tuned our sensitivities to biological (including human), atmospheric and other physical processes.

If one of the aims of the post-humanities is to decentre the human, it may seem counter-productive to draw parallels between fire and humans. However, we argue that in considering how human researchers and fire are comparable (but not the same) in their weather-mediated negotiations through the landscape, we encourage humble acceptance of our position within nature (which includes ‘living’ and ‘non-living’ events, processes and forces). We share with Suchet-Pearson et al the view that:

“In discussing what it means to see humans as one small part of a broader cosmos populated by diverse beings and diverse ways of being, including animals, winds, dirt, sunsets, songs and troop carriers, we argue for a way of knowing / doing which recognises that ‘things’ can only come into ‘being’ through an ongoing process of be(com)ing together. They are never static, fixed, complete, but are continually emerging in an entangled togetherness” (Suchet-Pearson 2013:185-186).

Thus, rather than guiding us to an understanding of fire as a separate entity, we found that using rain as a non-human guide drew our attention to fiery relationships and to the ways in which we are all – humans, fire, plants, animals, rocks, training programs, evaluations and research papers – entangled, emergent and continually subject to change.
We know, of course, that water quenches fire, just as Pitt (2015) relays nothing new when informing us that plants respond to sunlight, have a wide range of seed dispersal mechanisms and (most) need well-aerated soil. Daily observations tell us these things. Moreover, researchers in the ‘natural’ sciences investigate and describe other-than-human subjects, processes and relationships; ecological sciences focus on relationships between organisms, and between organisms and the abiotic environment, whilst atmospheric sciences explore and model the complex processes influencing climate at macro and micro scales. In the context of fire, user-friendly predictive tools, such as the McArthur Forest and Grassland Fire Danger Meters, have been created to give even a relative novice an understanding of the chances of a fire starting, its rate of spread, intensity and difficulty of suppression. These measures include the elements (fuel, oxygen and temperature) found within the simple fire triangle taught in high schools but also draw in considerations such as long-term drought, recent rainfall, relative humidity, temperature and wind speed. Whilst these can give general indications of the likelihood of fire starting and a broad guide to its likely behaviour across a large area, researchers modelling the behaviour of specific fires include a multitude of other elements such as slope, canopy and changes in wind direction.

We might join Pitt (2015:54), then, in asking what post-human disciplines can add to scientific understandings of nonhumans such as plants and fire? Over a decade ago, Andrea Nightingale (2006) warned that, in their eagerness to deconstruct ecological data, Actor Network Theorists and political ecologists showed a tendency to ignore the dynamic, physical processes that these data describe. It is certainly true that even the most complex scientific models barely touch on the myriad more-than-human elements and processes operating across vast temporal and spatial scales that influence and constitute fire events. However, if scientific models are necessarily limited, maintaining a relational perspective can be even more challenging when humans are brought into the picture whether through training courses, political life or in research in the humanities or social sciences. As noted by Jane Bennett:

“A sense for the material powers within and around us is not easy to maintain today. We’re pretty good at detecting them at the level of scientific analysis, but
find it hard to remain alive or alert to matter-actions when it comes to questions of society, politics, agency, literature, or environmentalism. Our habit, rather, is to quickly forget encounters with nonhuman agencies and to over-feel the efficacy of human intention and desire” (Bennett 2013:107).

We suggest that the using nonhuman guides other than the ‘subject’ of interest encourages us to keep more-than-human agency front and centre when researching human society or politics, evaluating training courses for landholders and farmers, or reflecting on how we come to know what we know in research. In this case, we became aware that, in designing and developing courses, training organisations often think deeply about the transmission of information from human to human, and how this can be facilitated through human-developed resources such as books, maps and Powerpoint displays, but allocate less attention to the potential influence of more-than-human agency on the outcomes of training and to the potential of non-human guides to be used as a stimulus for learning rather than simply being an object of study (see Chapter 5). In this example, if the weather had been recognised as an active agent in the likely outcomes of the training program from the start a more adaptable program, which allowed for more flexibility in responses to non-human intervention, might have emerged.

2.7 Limitations of this approach

Pitt began her research with the intention of using non-human guides (plants) to understand what it is to “be plant” (2015:54) but at the conclusion of her paper worries that “People still loomed large and my understanding of plantiness remains limited” (54). It might be argued that whilst we certainly gained some insights into fieryness, we remain largely focused on fiery relationships. We argue that this is no bad thing. In more-than-human research, tensions remain between materialities and becomings and in treating nonhumans as guides there is a danger of encouraging their ‘thingliness’. These tensions have been discussed in environmental studies at least since Whitehead (1929) sought to emphasise a process view of life on earth. However, the timescales on which
weather operates bring a unique, ever-changing perspective on materialities. Ingold explores the complexities of incorporating weather into a “material” world of landscape and artefacts when asking:

“How about sunlight? Life depends on it. But if sunlight were a constituent of the material world, then we would have to admit not only that the diurnal landscape differs materially from the nocturnal one, but also that the shadow of a landscape feature, such as a rock or tree, is as much a part of the material world as the feature itself. For creatures that live in the shade, it does indeed make a difference... When the fog descends, and everything around you looks dim and mysterious, has the material world changed, or are you just seeing the same world differently?” (Ingold 2007:3-4).

Rain, or weather more widely, acted as an excellent guide to how the material world is continually changing for people, fire, plants, rocks, or whatever is the subject under study, and reminded the novice researcher of the complex, multidirectional, agentic nature of biological, geological and atmospheric processes within which we (humans, fire and rain) are entangled.

2.8 Conclusions

This research has shown how nonhumans other than the subject of study itself can guide novice researchers towards particular understandings and interpretations of more-than-human entanglements. Rain affected the outcomes of the training program, preventing demonstration burns and thereby changing relationships between human participants and influencing opinions of the program. It affected the outcomes of the research, by changing the length and nature of researcher / landholder interactions and the direction of conversations, increasing researcher sensitivity to the scale and complexity of relationships between human research participants, fire and weather, and forcing the researchers to consider how the structure and resourcing of the training program interacted with humans and others to produce particular outcomes. It would
have been possible to ignore these effects, or relegate them to a regretful footnote about the difficulties of conducting and observing the training course due to the inclement weather, but remaining open to the possibility that nonhumans could be expert guides ensured that related insights were not overlooked.

Drawing parallels between the effects of rain on the human researcher (and her actions) and fire (and its actions) drew the researchers into considerations of the shared history and chemistry of humans and fire. The multiple entangled relationships continually generating change and demanding responses reminded us that it is difficult, if not impossible, to study ‘entities’ separately from their physical and biological (including human) relationships and that ‘being’ fire, plant, weather or human is a continual, emergent process of becoming together in a more-than-human world.

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Chapter 3 Fiery entanglements: Changing landholder understandings of the agency of Fire

This chapter is the article Edwards A and Gill N (in press) Fiery Entanglements: Changing Landholder Understandings of the Agency of Fire Environment and Planning D: Society and Space.

As explained in Chapter One, whilst exploring the multiple entanglements within human / fire / land relations in this thesis, I shift my focus between the pathways weaved by the non-human bio-geo-physical and artefactual and the pathways weaved by the human. Following my exploration of the agency of a more-than-human element – rain – in enhancing understanding of fire and fiery relations in Chapter 2, my focus now moves to landholders of settler heritage. These people are targeted by many sustainable fire management training programs, hence understanding their existing relationships with fire is an important part of any evaluation and this Chapter explores how landholders living with the immanence of bushfire conceptualise human / fire / land relations before any direct involvement in Hotspots or other training programs. Whilst the focus on this Chapter is on human understanding, it must be emphasised that the pathways of landholding, landholder and landscape fire are relational and connected, with each responding to the movements of the other. Through ‘management’ activities, the landholder intervenes in, and responds to, the forces and flows at play within the landholding. Thus, ‘managing’ the landholding can be viewed as a practice of weaving, “in which practitioners bind their own pathways or lines of becoming into the texture of material flows comprising the lifeworld” (Ingold 2010:91).

Ingold would suggest that it is through the binding of these pathways, or repeated, active engagements in the environment, that landholders learn (2010, 2011, see also Plumb 2008). Conceptualising learning in this way provokes the question of whether landholder knowledge is thus restricted to the very local or localized (see Cooke and Lane 2015). Similarly, recognition that human processes and responses to them are measured in days, months or years, with an entire human lifespan spanning no more
than 80-100 years, draws attention to the fact that there are temporal limits to the lines travelled by ‘individual’ humans. This leads to questions about the capacity of landholders to appreciate and apprehend fiery relationships that extend well beyond the Cartesian boundaries of the landholding, or related evolutionary and geological processes that can be measured in thousands of years. This Chapter explores these issues and suggests that, in fact, the lines of movement of landholders through and beyond the landholding attunes their attention to the spatial and temporal extent and complexity of fiery relations.

Ingold also writes that learning occurs through the attuning, or educating, of attention (see Gibson 1996:254, Ingold 2011b:354) and this invites consideration of the role of non-human agency in developing learning and knowledge. As landholders move within the landholding, they tune in to the elements of the environment that are significant at particular times and places. However, just as it is impossible for an evaluator to be aware of all possible forces and flows influencing a fire training program, landholders are only peripherally, if at all, aware of many of the forces and flows present on their landholding. Parker notes that:

“Instead of picking up invariants that are wholly present, an organism is tuned to resonate to the invariants that are significant for it as a result of ‘hands-on’ training in everyday life, an ‘education of attention’. Other elements may be there, but a person...moving through what becomes their taskscape will not experience them all. Different aspects of landscape will afford themselves at different times, depending on whether the organism is ‘fine-tuned’ to pick them up” (Parker Online).

Landscape fire is very good at attracting human attention and fine-tuning the human organism to its potential, particularly in hot, dry conditions when awareness of spatially or temporally displaced landscape fires combines with the crackle of dry twigs and leaves underfoot to signal the possibility of dramatic change for human and landscape. Such signals have the potential to challenge any illusions landholders might possess that through ‘managing’ their landholding they are ‘in control’ of its trajectory thus this paper examines how landholders conceptualise agency and control within this context.
Traditionally in social science, primary data is presented in the form of short, illustrative quotes or snippets from interviewees. In this Chapter, I supplement this approach with an extended narrative based on a conversation with one landholder, in order to maintain the sense of connection between temporal and spatial forces operating at different scales.
ABSTRACT

Around the world, debates over how to manage and adapt to bushfires (or wildfires) are increasingly prominent as more and different people, many of whom have little or no experience with landscape fire or land management, inhabit fire-prone environments. But bushfire events represent only the most visible aspect of complex entanglements which operate across huge temporal and spatial scales and over which humans have very limited control. In this Chapter, we focus on how Australian landholders of settler or migrant heritage understand scalar complexities and agency and control within human/fire/land entanglements. In view of the fact that the learning styles of landholders new to rural areas have been developed in different environments with very different challenges, we also ask whether immersion within rural, fire-prone environments influences ways of ‘knowing’ land and fire.

3.1 Introduction

In Australia, the USA and elsewhere, bushfires (or wildfires) burst into human consciousness by threatening, and sometimes consuming, life and property on a broad scale. Debates about how humans can manage and adapt to bushfires are increasingly prominent; for example, it has been stated that “No subject related to land management in Australia generates more heat or less light than fire” (Blake 2003:120, cited in Halliday et al 2012:206). These debates are complicated by the fact that, as rural demographics change, more and different people, many of whom have little or no experience with landscape fire or land management, are inhabiting fire-prone landscapes (Eriksen and Prior 2011). Moreover, the ways in which these people learn about land and fire management frequently differ, at least initially, from those of long-term inhabitants in rural areas. It has been suggested that these differences in learning styles are due, at least in part, to the “property centric” (Cooke and Lane 2015:46) orientation of relative newcomers which contrasts with the more social positioning of long-term farmers who have a “collective interest in maintaining productive rural landscapes” (2015:49, see also Eriksen and Prior 2011).
Unlike rural in-migrants, bushfire does not recognise property boundaries. And bushfire events themselves represent only the most visible aspect of complex entanglements which operate across huge temporal and spatial scales. These entanglements include, amongst a multitude of other actors, land topography, weather and climate, plant responses to stress, the persistence of weeds, human prescribed landscape fire, planning decisions, legislation and funding for emergency services. Traditionally, many indigenous peoples have maintained a relational ontology around fire that has evolved over millennia of co-existence and recognises the fragility of human control over fire events (see Head 1994, Gammage 2011, Langton 1998, Miller and Davidson-Hunt 2010, Verran 2002). Whilst paying some attention to Aboriginal relationships with fire, however, attempts within wider Australian society to develop new cultures to enable “co-existence with fire” (Howitt 2014) have tended to focus on the science of fire and fire management, the logics of planning and response and the building of ever more complex fire institutions and resources.

In recent years, academics informed by indigenous and other perspectives have called for debate, policy and practice to incorporate understanding of the broader relationships within which bushfire moves, swells and recedes (Griffiths 2009, Franklin 2006, Howitt 2014, Langton 1998, Maclean 2009, Williams 2014). In particular, concern has been expressed that wider Australian society is failing to get to grips with issues of scale (Griffiths 2009, Howitt 2014, Williams 2014) and the shifting patterns of control (Griffiths 2009, Howitt 2014) inherent within these relationships. This paper addresses these concerns by asking how landholders who “live the question” (Rilke, 1993: Letter 4) of how to co-exist with the immanence of bushfire on a daily basis understand issues of scale, agency and control in this context. In view of the potential clash between the reported property-centric orientation of recent in-migrants and the massive temporal and spatial scales influencing fiery entanglements, we question whether landscape fire and its associated relationships can be active agents in the development of understandings of scalar complexities. We also ask how ‘dwelling’ (Ingold 2011) in an environment in which, as one reviewer of this paper wrote, “physical agencies and dynamisms are often brutally insistent”, influences understandings of control within human/nature relationships. Finally, we consider whether immersion in fire-prone
environments influences the learning styles of in-migrants which have developed in different environments with very different challenges.

These topics have received very limited attention up to now. Extensive research has been conducted into the relationships between Aboriginal peoples, fire and land including those living traditionally and those whose lifestyles have been fundamentally disrupted by the ‘modernisation’ of Australia (e.g. Edwards et al 2008, Gammage 2011, Haynes 1985, Head 1994, Jones 1969, Langton 1998, Russell-Smith et al 2002, Vaarzon-Morel and Gabrys 2009, Yibarbuk et al 2001). Comparisons have been made between the burning practices of Aboriginal landholders and managers and scientists (Verran 2002), and between Aborigines and pastoralists (MacLean 2009). Opinions have been sought from landholders of settler heritage on Aboriginal burning (MacLean 2009) and the burning of publicly owned land (Gill 1994). Yet whilst research has been undertaken into how landholders of settler heritage perceive wildfire risk (Eriksen and Prior 2011) and, more broadly, what they know and do about and with fire (Halliday et al 2012), we have been able to find no research which explicitly allows these landholders to voice their understandings of spatio-temporal scales, complexity and control within human/fire/land entanglements. Furthermore, whilst previous research (Eriksen and Prior 2011) suggests a shift in landholder relationships with landscape fire over the first decade of owning a rural property, there has been limited inquiry into the processes involved in this shift.

It is important to address these gaps for two main reasons. Taking seriously the proposal to move beyond an “undifferentiated, colonial sense of the ‘bush’” (Griffiths 2009:35.5) in developing new fire cultures requires that we pay detailed attention to situated, eco-social relationships. Empowering local residents and their ecological knowledge requires that we first understand their relationships with fire and the processes by which relationships and knowledge evolve.

Secondly, from a pragmatic perspective, private landholders are increasingly being co-opted into landscape scale plans to enhance community safety and environmental values such as biodiversity and water quality (Lockie and Higgins 2007). The ‘shared
responsibility’ approach recommended by the Victorian Bushfires Royal Commission (2010:352) and adopted by fire-fighting organisations across Australia expects that landholders actively manage their land to reduce risks of bushfire to people, property and the wider environment. Understanding how landholders conceptualise their relationships with fire will provide insight into their likely willingness to be co-opted into these landscape scale projects and the most appropriate approach to outreach and education.

3.2 A Note on Terminology

Throughout this paper we use the term “fiery entanglements” to describe the socio-biogeophysical complex which incorporates prescribed fire and bushfire, the abiotic environment, including topography, weather and rocks, living organisms such as humans, other animals, plants and fungi and human social, political and cultural relationships. We use this term to highlight interdependencies and dynamic interrelationships and the fact that each apparently separate ‘element’ within these entanglements cannot be isolated nor extricated without affecting the whole (see Ingold 2008).

“Country” is another term which draws attention to interdependencies and interrelationships. In this paper it is used not in the sense of a nation or state with its own government (Hsu et al 2014:370) but rather goes beyond land and / or government to incorporate “social, environmental and cosmological relations” (Hsu et al 2014:371). Country...

“...encompasses humans as well as waters, seas and all that is tangible and non-tangible and which become together in a mutually caring and multi-directional manner to create and nurture a homeland” (Bawaka Country et al 2013:186).

Originally an Australian Aboriginal concept, Country implies ideas of embeddedness and belonging and as such its appropriation by settler Australians has political implications. Whilst we cannot speculate on its use by landholders within our research, we
occasionally use this term in this paper ourselves in a respectful attempt to move beyond ‘human / nature’ dualisms and recognise the complexity of more-than-human entanglements.

The word “agency” has multiple meanings, some of which are concerned with the moral will or intentionality of individual human subjects and others with the powers expressed by ‘proto-bodies’ (Bennett 2010:29-31). It is beyond the scope of this article to delve too deeply into this discussion, hence a relatively simple definition will suffice in which agency is seen as “the capacity to make something new appear or occur” (Bennett 2010:31).

We use the term “non-human” rather than the more cumbersome “other-than-human” despite the fact that ‘non-human’ can appear to deny ‘human / nature’ interdependencies. Whilst many of the relationships within contemporary Australian fiery entanglements are influenced by human driven processes, some, such as the current position of Australia within broad climatic zones, and notwithstanding anthropogenic climate change, are not. Rather than tie ourselves in lexical knots we use the term ‘non-human’ but do so with the view that the ‘non-human’ is rarely entirely not human (see Suchet-Pearson et al [2013:189] for a discussion of the challenges of using the English language to express relational ontologies).

3.3 Unbounding Fire

Landscape fire has been the subject of several environmental histories that reach back millions of years to describe the northern migration of Australia away from its Gondwanan relations, its leaching, drying and increasing susceptibility to fire, and the shift in vegetation from rainforest to sclerophyly (Franklin 2006, Griffiths 2001, Pyne 1998). Scholars dwelling on more recent history (Flannery 1994, Gammage 2011, Head 1994, Langton 1998) have detailed and speculated on the relationships between Aborigines, Europeans, vegetation and landscape fire, revealing complex more-than-human entanglements with patterns of slippery, shifting agency. This research has
highlighted gaps in both popular and academic understandings of human co-existence with landscape fire and the need for new understandings which blend social, cultural and scientific dimensions (Howitt 2014).

One area identified as deserving greater scrutiny relates to a perceived popular focus on human time-scales with a resulting neglect of the much greater temporalities and periodicities that influence landscape fire. For example, Franklin states that “It seems clear that the (human) social times of specific forest policies, management plans, fire events, and resource use are often out of kilter with the longer term ecological and glacial times over which ... trees and forests are active and influential” (2006:574). Temporal incongruities often arise because the focus of discussion, policy and practice is fixed on bushfire events and fire risks to human life and property rather than the wider entanglements within which these events and risks are situated (Griffiths 2009, Williams 2014).

In contrast to this temporal specificity, the spatial framing of fire events is often very broad in Australian popular culture. Whilst memorials may be located at specific sites, bushfires themselves are frequently named for the state (e.g. the Victorian bushfires) within which they occur (Williams 2014:88). Some researchers bemoan the spatial generalisations which dominate discussions, observing that in seeking to manage our relationships with landscape fire, we need to look for local solutions. For example, Griffiths (2009:35.5) suggests that:

“We need to abandon the idea of a national fire plan and develop ecologically, sensitive, bioregional fire survival strategies. We need to move beyond an undifferentiated, colonial sense of ‘the bush’ as an amorphous sameness with which we do battle, and instead empower local residents and their knowledge of local ecologies.”

In addition to calling for greater recognition of the scalar dimensions of fiery entanglements, researchers have expressed concern that many people remain unwilling to relinquish the idea that humans cannot always control landscape fire. For example, Griffiths states that “It is hard for humans to accept that nature can overwhelm culture”
and notes the use of military metaphors in fire-fighting which “conspire to make us believe that we can beat fire, somehow” (Griffiths 2009:35:4). Landscape fire is a particularly complex issue in that humans have greater capacity to influence not only the outcomes of events but also the nature of the actual event itself when compared to other ‘natural’ events such as earthquakes. However, this capacity in relation to landscape fire is still limited and variable; as observed by the Independent Hazard Reduction Audit Panel NSW (2012:6), “hazard reduction does not prevent or eliminate bush fires. Similarly, once a bush fire ignites and takes hold suppression operations will not always be able to extinguish it, particularly in extreme bush fire weather conditions.”

Understanding the nuances of this message can be challenging for new migrants to fire prone areas. Cooke and Lane report that, on finding that their understanding of ecological processes and land management “informed by prior urban lifestyles” has limited relevance in rural contexts, many landholders “turn to experiential learning” (Cooke and Lane 2015:43). Most of this learning takes place on property, and is dependent on observation of biophysical responses to human actions (2015:48). Cooke and Lane suggest that this, combined with an pre-existing desire to “be the autonomous custodians of a patch of land” (2015:46), may lead landholders to focus on very bounded spatial and temporal understandings of ecological processes. Major bushfire events have the capacity to brutally challenge such spatial and temporal bounding, but the periodicities of such events make property-based experiential learning about bushfire sporadic or unlikely. However, prescribed fire is more common and we suggest that this, combined with living with the threat of bushfire events, may have the potential to extend landholder horizons beyond property boundaries and beyond relatively short-term observations of biophysical responses to human actions.

3.4 Methods

This research was conducted in the course of an evaluation of a fire training project in New South Wales, Australia, which involved case studies, workshop observations, a
questionnaire survey and interviews with landholders and staff members from land management agencies and NGOs. The research was conducted in 2012 and 2013 in partnership with the NSW Rural Fire Service and the Nature Conservation Council of New South Wales. The paper draws on data from two interviews, or conversations, held with each of six landholders before and after fire training workshops were conducted in Northeast New South Wales. These landholders were chosen randomly from a list of potential workshop attendees who, at the time of the interview, had been managing land for around a decade or more. Previous research (see, for example, Eriksen and Prior 2011) and our own survey data (See Appendix 1) suggest that after ten years landholders are more likely to be more positively disposed towards the benefits of both wildfire and hazard reduction burns than those who have more recently migrated to rural areas. Thus we worked with landholders who had managed property for ten years given their longer experience and greater opportunities to connect with land and fire.

The landholders range in age from their early forties to late sixties and have lived in the area from 2 to 50+ years. All but one of the six participants chose to attend the workshops. They represent a range of landholder experiences: Phil and Robert were raised on the land they are now farming; Martha and Laurie run a guesthouse on their property; and Kenny and Tom maintain their properties primarily for conservation and / or recreation. They also represent a range of income streams: Martha, Laurie and Robert are primarily dependant on their properties for their income but the other interviewees are not and one of these is an active participant in the informal economy. Two of the interviewees regularly conduct prescribed burns on their landholdings in order to reduce the risks of wildfire to people and property, to maintain or enhance biodiversity and / or to manage weeds. One of the other landholders intends to conduct a prescribed burn in the near future but the other three have no plans to do so. The landholdings are all in an area of steep terrain and dominant vegetation includes wet sclerophyll and subtropical rainforest, with dry rainforest on steeper, drier slopes. Five of the landholdings border a National Park.

Most of the conversations took place partly in the landholder’s home and partly when walking or driving around the landholding. Rather than using a structured format, the
aim was to elicit a conversational narrative (see Grele 1998) to allow landholders to identify and articulate issues of importance to them. Moving around the landholding brought direct interaction with soils, flora, fauna, topography, weather and so on for both researcher and landholder, allowing “...the lifescape of the methodology to overlay and seep into the lifescape of the farm, giving access to ... often more hidden, non-verbalized understandings” (Riley 2010:659). The total conversation time with each landholder was between 120 and 350 minutes.

Conversations were audio recorded and transcribed verbatim. Individual landholder stories were then created which focus on issues identified by the researcher as being of common interest to all landholders through multiple listenings to, and readings of, the interviews. Each is a seamless narrative constructed from actual quotes / stories told by a single landholder. Editing was restricted to facilitating ease of reading. Presenting research through narrative is not uncommon in disciplines such as Education (Knowles et al 2008, Knowles and Cole 2008) and Psychology (see, e.g., Howard 1991) and, as noted by Wylie (2005:237), “forms of narrative – memoir, montage, travelogue, ethnography – are being used both within and beyond academia as creative and critical means of expressing post-humanist philosophies of place”. These narratives are often autoethnographic but alternative narrative approaches have been adopted. For example, Dare et al created a composite narrative drawn from multiple community engagements around plantation forest management, in the belief that doing so “enables the reader to embed themselves in the described situation, allowing the story to bring the key themes to life” (Dare et al 2011:1154). It is our belief that adopting a narrative approach, rather than relying solely on “static quotes”, draws attention to the dynamic spatialities and temporalities associated with fiery entanglements.

The next section begins with the narrative of one of the landholders, Phil, who now farms part of the property he was brought up on and has extensive experience with fire, and continues by considering how the other landholders’ stories and comments relate to Phil’s narrative.
3.5 Results and Analysis

3.5.1 Phil’s Story

I’ve had experience with fire. Worked for (National) Parks down south, and fire was basically all we did. Wildfires, hazard reductions – that place is always on fire. Long before that, my father used to light fires off the back of a horse. We were all very pro National Park and we had grazing all through that area but we lost that, the National Park was all about rainforest conservation. And they didn’t like fire incursions into their park and came down very hard on us about burning. There was a lot of talk about legal liabilities, and making fires stop at property boundaries is just impossible in this country.

Newcomers blew in to town. The way the Rural Fire Service works – it’s a social thing. If a person does a thing they don’t like, he’s in the out-group, not part of the team. So between Parks, the blow-ins and the RFS (Rural Fire Service), the burning stopped. And we’d had 100 years or so of logging, so between the logging, the drought and no burning the forests were really degraded. You could see it in the trees, loaded with seed, dripping with seed, putting everything into reproduction. “We’re close to death, this is our evolutionary sort of lottery. Put all the seed out. We’re gonna win this one.”

At the end of the drought a series of dry storms came through – bang, bang, bang – lit all these fires, crowning and whatever. Wiped the slopes clean of the last 150 to 200 years, killed everything except the bloodwoods. Never seen anything like it. The fire went through brush box palm gullies that I would have thought would be completely wiped but three weeks later I went back up there and there’s a bloody green shoot bursting out the top of a bangalow palm. And one of the greatest benefits of that fire was an enormous seedling recruitment of sclerophyll canopy species. Rainforest regeneration as well – surprisingly.

It was amazing. It changed my ecological understanding of this area. You do not understand the evolutionary tolerances of these species until you see them go through something like that. And it really boils down to the fact that gene fixation for a lot of these species occurred hundreds of thousands of years ago. That’s when the really major species ecology was fixed, in that extreme fire regime. You had low sources of ignition
so you’d just get these catastrophic fires. You’ll get aboriginal burning and other sort of disturbance going on but it’s those events that occur infrequently that are absolutely profound. They set the structure for wet sclerophyll forest in this area. Define refugial boundaries between wet sclerophyll and rainforest.

Hard to get the RFS to see it that way. Too busy fire-fighting – not managing a process but locked in conflict. Locked in asset protection mode, they’d no sense that this might have been the most valuable ecological event in their lifetime. Hell, at the time even I thought it was a disaster. But you need to understand what you’ve got there. Extreme drought coupled with an absolute optimal recruitment event – extreme fire followed by five inches of rain. Could you ask for a better regeneration event? It’s that coupling thing together, it’s just been repeated through history for millions of years and we just wanna come along and disrupt the whole thing. Way I see it, nothing’ll change until we get the fear out the way. We need fear – stops us doing stupid things – but we can’t plan, can’t manage, can’t legislate based on fear. Especially not fear of something so elemental. And that’s one of the things I’ve come to understand, that we really need to have long-term planning for these extreme wildfire events from an ecological objective.

Last ten years there’s been a big turnaround on fire. Rampant Bell Miner Dieback’s\(^\text{15}\) woken people up a bit. Parks have come round now – I’m burning again and I’m doing it together with Parks. I’ve got to admire them really, for changing their attitude. Anyway, I’ve no choice but to work with them, I’ve got a six kilometre boundary with the Park that climbs 300 metres in altitude and crosses a handful of gullies. It’s totally artificial, there’s no natural place for a fire to stop. Now fire comes into my land from the Park, I let it run and they do the same for me.

There’s an awful lot of good intention out there, people want to give due respect to native plants and animals. The whole National Parks movement has been driven by that but the complex argument is missing. Locking areas up might be ok for refugial type environments but some areas are dependent on large-scale processes. Fire’s a classic

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\(^{15}\) Bell Miner Associated Dieback refers to eucalypt dieback associated with psyllid infestation. This is frequently associated with high numbers of bell miner birds which, due to their aggressive territorial behaviour, drive away insectivorous birds that would otherwise control insect numbers (see http://www.bmad.com.au/about.html).
example. Those fire paths out of the alpine ash forests (in Victoria, Australia) have been going on since the year dot. The ecology of alpine ash is completely driven by the big fires, wouldn’t exist without them. I always thought that wasn’t the way it works up here with the wet sclerophyll, but it is. And people think, “Oh, that’s a lovely ridge, I’ll get a beautiful view if I build there”, right in the middle of a fire path. They completely change the fire trajectory for that side of the hill. And that fire path not only affects them, it affects where the fire’s gonna go in future.

3.5.2 Scalar Considerations

Throughout this monologue Phil weaves stories which reveal a cluster of relationships operating across a range of temporal and spatial scales. Phil draws extensively on history and pre-history in his references to gene fixation “hundreds of thousands of years ago”, Aboriginal burning, 100 years of logging, the decision by “Parks” to come “down very hard on” landholders who allowed fire to run into the National Park in the nineteen eighties, and the severe drought of the early 21st century. These issues were also referenced by the other interviewees. For example, Martha suggests that recent changes in vegetation may reflect the deep history of the area:

Martha: And the type of forest is constantly changing... Even Bell Miner Dieback – OK, it’s exacerbated with the climate – but I still think that’s part of the cycle. Because there’s areas where the gums are dying because of bell miners but there’s rainforest coming up underneath (our italics).

A more recent influence on landscape fire was mentioned by all of the interviewees. During the late 19th to early 20th Century, this area was extensively logged by Europeans, with hoop pine and cedar being the most sought after species (National Parks 2001). This had implications for the species composition and structure of the forest and all of the research participants believe that this impacted heavily on fire relationships in the area. Laurie explains:
Laurie: I mean if we were able to go back a hundred and fifty years and prevent any weeds coming into this area and we were able to prevent the degree of logging that was carried out over that period then we would have a totally different environment – one which would not be so susceptible to fire.

Most of the landholders appeared less certain about the relationship between fire and the Bundjalung Aboriginal people, whose home was in these forests before, during and after the period of logging. Phil has keen interest in indigenous fire management and spends time researching and reading around the subject. Of the others, all believe that indigenous peoples burned land in some parts of Australia, however whilst Laurie and Martha think it highly unlikely that this area had been burned by Bundjalung people because it was a “moister rainforest type area”, the others are open to the possibility but have no firm belief either way. All agree that settler farmers had a substantial impact on the trajectory of fire in the area, due to government policies which gave financial incentives to farmers who cleared land. Clearing was frequently achieved through burning, and long-term residents of this area indicate that burning continued to be a regularly used method of land management until the creation of the National Park in the mid-1980s. At this time, the decision was made by “Parks” (the National Parks and Wildlife Service) to cease burning in the area and to encourage others to do so. Whilst there has since been another reversal of policy, with staff now burning the National Park again, many landholders believe that the earlier decision has had profound consequences for the trajectories of landscape fire in the area. Robert complains that the cessation of burning caused the regrowth of shrubby vegetation such as Crofton weed (*Ageratina adenophora*) and Lantana (*Lantana camara*) to such an extent that:

Robert: (Human prescribed) fire’s a thing of the past. To be honest, it’s just nearly impossible. If it got away and got up on that mountain, there’s nothing to stop it now. It’d burn down everybody’s place... It’s twenty years down the track too far.

These landholders, then, show awareness that landscape fire events are temporary phenomena in the life of a much larger entanglement that operates across a range of temporal scales. Moreover, they appear to recognise the disconnect between the timescales commonly focused on by humans in response to fire events and the much
longer biophysical timescales influencing landscape fire, as shown, for example, by Phil’s comments on the need for planning for extreme wildfire events to recognise ecological time-scales.

These landholders also show awareness that the influences on landscape fire ‘events’ operate across a range of spatial scales. For example, Robert describes a recent incident in which he set a fire on his land. On his way back to his house he had a brief discussion with a tourist who was concerned that the fire would burn into the National Park. Despite being reassured that the fire “can’t go nowhere”, the man later phoned the fire brigade and Robert was then contacted:

Robert: So I get back up the hill, and there’s the brigade from (W) and another one from (W) and they couldn’t even find the smoke. This fella here on the hill rang triple zero on his mobile phone. And the brigades have come a hundred ks, they’ve gotta put it out. What chance you got? Soon as they see the smoke they ring the fire brigade and that puts pressure on everybody, right?

Robert acknowledges the complexities of this situation. He explains that people who are unfamiliar with this area “panic soon as they see smoke” but they don’t understand local humidity, wind speed and fuel loads in the same way that he does. He acknowledges the pressure on the fire brigades that have come 100 kilometres and need both to justify their journeys and to ensure that they will not have to return to the scene because of a genuine need to do so. Other participants also mentioned the impact of issues relating to the spatial distribution of fire brigades, lamenting the days when fires were managed by local landholders coming together to investigate and, if necessary, act upon any reports of unexpected smoke without the need for intervention from outside the area.

Robert returns to the theme of spatial complexities when expressing frustration about the difficulties of implementing locally appropriate practice under the law in a state that covers more than 800 000 square kilometres. He explains that:

Robert: It just gets dry enough that you could get a burn and we’ve got a total fire ban. I know there’s areas down south that need it but it’s too broad. They bring in a total fire ban for Northern New South Wales and we can’t get a burn to happen.
Robert is not alone in drawing attention to the need to find local solutions to co-existing with fire, with all landholders questioning the wisdom of state-wide regulations. Phil also emphasises the need to localise human action when discussing a fire-management course he recently attended. Complaining that there was too much discussion of generic principles rather than “site-specific” issues, Phil states with some frustration, “We’re not just doing an introductory course here, we’re dealing with a threatened species.” All of the landholders describe the “impossibility” of containing landscape fires at property borders, showing awareness of the need to develop landscape scale strategies for co-existing with fire and discussing the complexities of reaching agreement on such strategies in view of the number and heterogeneity of landholders involved.

Whilst recognising the need for local strategies, landholders do extend their understanding of influences on landscape fire beyond the parochial, for example when speaking of the “dependence” of the alpine ash forests on “large-scale processes”. Robert draws in global scale issues when reporting on the impact of timber markets on the vegetation (“fuel”) on his property. In the recent past, Robert logged and sold flooded gum (*Eucalyptus grandis*) from his property at the rate of around “four load(s) a month”. However, he is now struggling to find a market because the demand for local wood has “just about wound up at the moment.” When asked whether local subdivisions and accompanying rural in-migrants might provide a market, Robert responds, “Ah, it’s just all imported stuff” in the new houses. Competition from this cheap, imported wood makes it difficult for Robert to justify the time and cost of extracting trees and this has a consequent impact on the quantity and type of fuel on his property.

In speaking of co-existence with landscape fire then, landholders repeatedly reference complex entanglements which operate across a range of scales. Whilst calling for legislation and land management policy and practice to recognise the specificities of local situations, they also encourage greater recognition of the impact of large-scale regional and even global processes on landscape fire.
3.5.3 Complexity and Control

Despite their shared tendency to recognise the scalar complexities of human/fire/land relationships these landholders cannot be viewed as a homogenous group sharing a pure ontology. The main way in which they appear to differ is in the extent to which they draw attention to non-human agency beyond the role that it plays in supporting or thwarting their intentions. All landholders have intentions for their land, even if these are to ‘leave it be’, and at some point all of the interviewees evaluate fire in terms of its capacity to support these intentions, particularly in the context of the invasive plants lantana (Lantana camara) and Crofton weed (Ageratina adenophora). For example, Todd explains:

Todd: Lantana will absolutely overrun a place in 5 years. If they get to the point where they say (prescribed fire’s) got to be once every ten years or every 8 years, it’s just too far apart to be used as a tool for weed control because the shit grows behind you as you kill it.

All of the landholders believe that fire could support their land management visions, subject to the right legislative, climatic and fire conditions, but for most landholders this is not the whole story. Phil is most explicit in acknowledging that the power of non-human agency extends far beyond relationships with humans. Indeed, Phil pushes humans to the periphery, explaining that “You’ll get aboriginal burning and other sort of disturbance going on but it’s those (wildfire) events that occur infrequently that are absolutely profound.” In Phil’s view, humans can certainly “disrupt” and “change” fire trajectories but ultimately non-human agency is more powerful, and positively so.

Like Phil, Robert has detailed scientific and experiential knowledge of the land; his property of 1500 acres has been in the family for over a century. Although the language he uses is different, he is sympathetic to people who talk about biodiversity and knows “where they’re coming from”. However, Robert is far more inclined to reference non-human agency in terms of the extent to which it impedes or supports his intentions. For example, he states, “We used to burn (that paddock) years ago. It’s a good paddock.
Cattle used to be beautiful.” He describes certain plant species as “rubbish” and his distress is clear when this “rubbish” expands in ways he deems inappropriate:

Robert: We can see it getting overgrown. It’s a shame to see it going the way it has. Most of it’s just Crofton weeds and rubbish... Country’s got in a hell of a mess... Those people there with those blocks, they couldn’t give a stuff what grows on it... Most of ’em you can’t even walk over it.

These sentiments echo those of many Aboriginal people, for example, participants in Lesley Head’s research who felt similarly challenged by “dirty country” (Head 1994:176) which limited access by foot and vehicle and access to game. Robert wants access across land which he sees as productive and fire offers a useful, if blunt and temperamental, tool through which to achieve these aims. He explains that, “We used to keep it all pretty clean with fire. That was our spraying machine.” However, whilst he does talk about land management in terms of human control Robert is fully aware of the fragility of that control. Toggling between the agency of humans and other-than-humans, he expresses frustration that legal structures fail to acknowledge the complex relationships between fire, plants and humans that ebb and flow over time:

Robert: You can’t guarantee – you can put in a fire break, you can do what you like with dozers and gear, but you can’t put a thing in there to say, right, that’s it, fire proof. You can put breaks in, and that’s only if you have the time and the money, but in this country a brush box tree can burn for bloody six months. Fall over right at next door\textsuperscript{16} and you’re still responsible. Even when you get a permit, it’s your name on that permit.

Like Robert, Kenny has also been dependent on manipulating plants in order to earn a living, training as an ornamental horticulturalist and working in a large European city before buying his property of 100 acres. Kenny speaks about fire and land management as “a game of snakes and ladders”; a game in which his own desires and intentions are constantly being challenged by “natural” forces. The game is something to be experienced rather than viewed as a source of frustration. The fact that he will rarely,

\textsuperscript{16} i.e. into a neighbour’s garden and start a fire
and only ever briefly, be in control of the direction taken by fire on his property appears
to be accepted by Kenny as inevitable. This position is shared by Tom who observes that,
“We don’t control fire – we change it but we don’t control it.”

Martha believes that there are benefits to fire. She explains that “If you want to keep a
particular type of vegetation and stop it regenerating and shading out the grasses which
the bristle birds want well you’ve ... got to do it by fire because you can’t do it by hand.”
Her husband, Laurie, is more inclined to see fire primarily as a force that thwarts his
intentions. He describes a fire in 2001 that “took out” 300 acres of their property as “...a
disaster. And what we saw come back after the fire were weeds, not what we wanted.”
Laurie is fearful of the power of fire. He explains that they have:

Laurie: 1700 metres of boundary on the west side with the National Park. No
fences, no containment lines, so any fire that we are party to – or from our property that
goes into the National Park – potentially can destroy insurmountable areas of forest.

Laurie does recognise that landscapes are “constantly evolving” however he maintains
attachments to specific plants and plant configurations and sees fire primarily as
damaging, not creative.

Overall, these comments by landholders are consistent with the belief that humans are
just small parts of a complex entanglement in which the locus of control is constantly,
and sometimes unpredictably, changing. Even Robert, who refers to fire as his “spraying
machine” and has the most experience using landscape fire to manage his land, accepts
that it is temperamental and will make its own accommodations within the landscape.
Phil embraces the power of the non-human to prevail, whilst Laurie believes fire to be
an enemy that we should seek to tame albeit that our efforts will frequently be futile.
For others, including Kenny who plays “snakes and ladders” with non-human actors, the
lack of central control just is. In this way he appears to share Ingold’s view that, in the
end, “the world will go its own way regardless” (Ingold 2006:18).

This understanding of the locus of control does not mean that these people believe they
have no influence at all on the trajectory of fire in the landscape but it does guide
acceptance of their own limitations. For example, several interviewees mention that in
the highly productive areas of Northern New South Wales, it is not actually possible to maintain fuel at levels that would really minimise the risk and potential damage of fire across an entire property. Laurie states that he and Martha are “just doing what we can, given what we have both financially and physically”. These landholders recognise that, to a large extent, where and when fire starts and how it runs is dependent on relationships of such complexity that humans can only comprehend them as chance. A slight shift in wind direction, the forecast rain that doesn’t come, the subdivision that offers no break to a fire, the planning decision that allows a house to be built on the ridge and the fact that the emergency services did not let the last wildfire run were all cited by one or more of these landholders as contributing to the trajectory of landscape fire in the area. Thus these landholders see no value in blaming individuals when this huge, unwieldy entanglement bursts into human consciousness by threatening (and sometimes consuming) land, structures or lives. As Phil states:

Phil: You can’t just say it’s all just the landholder’s responsibility because fire sits within a social context that’s outside of the farmer’s control. Farming is just part of this whole social process that’s part of a colonial domination of the landscape. To say, you know, the farmer has more responsibility beyond a simple statement of involvement is kind of stupid. It’s like we’ve set up all this land as farming, as a way of extracting value out of the landscape, and then you’re gonna blame the person who’s got his name on the deeds if anything goes wrong? Then you don’t really understand what the hell you were doing setting up agriculture in these contexts in the first place.

3.5.4 Living the Questions

Immersion in fire-prone environments influences not only the understandings of landholders but also the ways in which they come to ‘know’ land and fire. Phil explains that landholders get information about the environment, “...just by being around, going about your business. It’s no labour, it’s just what happens,” and this accords with other research on learning styles of long-time landholders (Armitage et al 2009, Knapp and Fernandez-Gimenez 2009). Our research suggests that, for landholders new to managing
land, immersion in rural environments encourages a shift away from a tendency to rely on knowledge gained through more cerebral learning in urban social or political contexts towards learning through physical engagement and experimentation. As Kenny reports:

Kenny: I feel like when you first move out into the environment if you’re gonna be a greenie type and all that, in the beginning you’re normally a bit more extreme. You know, it’s black and white and that’s against the rules, and with time I’m realising that it’s a more organic type of process, not black and white, it’s a work in progress...

Before moving to a fire-prone area, Kenny identified with a particular community and this influenced his approach to land management but he increasingly depends on physical engagements and experimentation to gain ‘knowledge’ of his land. Martha’s approach to learning has also evolved through immersion in this rural, fire-prone environment. Martha explains that when she bought her property she was an observer – a painter – who believed that “the bush could look after itself”. Over time, however, she came to question this belief and her relationship with her land became much more active as she responded to *Lantana camara* incursions across paths and tracks, feral cats killing native birds, wind-blown trees blocking creeks and, particularly, a bushfire. Learning became a process which was no longer dominated by book-learning or observation but by practical, physical interaction with the land. For Martha and other interviewees, the process of dwelling in these environments transforms not only the knowledge and skills of landholders but also the ways in which they come to learn.

This supports findings by Cooke and Lane that there is a transition towards experiential learning when amenity migrants first move to rural properties (2015:48). Cooke and Lane conclude that because the learning process is “bounded by experience in the property space”, learning can become “resistant to information and advice that (comes) for (sic) outside this space” (2015:50). However, we suggest that, in the context of landscape fire, the landholders in our research continue to seek information from human and non-human beings beyond property boundaries. As described above, all of the landholders mentioned the influence of large-scale temporal and spatial processes on contemporary fire trajectories, having being provoked by experiences on their own properties to gather information through physical interaction with, observation of and
reading about the wider environment. Furthermore, all of the amenity in-migrants (Martha, Tom, Laurie and Kenny) repeatedly referenced information passed on to them from landholders more experienced with fire in the area, which they appear to review in a spirit of constructive criticism, rejecting parts and retaining others in the context of knowledge gained through other sources. Thus, whilst there are definite shifts in the balance of information from different sources, for example, from cerebral approaches to physical engagements, and from advice from ‘green’ or other communities to that obtained from local landholders, these in-migrants have not become closed to information from beyond their property boundaries. We suggest that prescribed fire, bushfire and the threat of bushfire forces considerations of wider relations, pushing landholders to extrapolate from their property-based learning to develop a deeper appreciation of the much larger scale considerations involved in fiery entanglements.

3.6 Discussion

Overall, the landholders interviewed for this research appear to be across Howitt’s recommendation “to consider the need to rescale questions of coexistence with fire” (2014:61). All highlight the links between landscape fire and current, historical and pre-historical events from, for example, the “gene fixation” that occurred hundreds of thousands of years ago, through the logging of the forest a century ago and the actions of National Parks decades ago, to the breeze that carries fire from a road to the top of a hill in a couple of seconds. Whilst catastrophic events certainly focus attention on fire, these landholders maintain awareness of the rhythms and periodicities beyond these events and live their relationships with fire long before and after the flames are licking at smoke-darkened skies. Similarly, landholders recognise the range of spatial scales influencing landscape fire. They are frustrated by the lack of locally driven nuance in legislation, education and practice around fire: Robert bemoans the lack of differentiation in fire policy and legislation between northern and southern NSW, whilst Phil feels disenchanted by the lack of specificity in fire education programs. However, they also recognise that influences on fires can be spatially displaced, for example through global timber markets.
The views of these landholders are also broadly consistent with an understanding of humans as just small parts of fiery entanglements in which the locus of control is constantly, and sometimes unpredictably, changing. In this sense they may be seen to share the views of Cohen and Trigg (2013:84) that:

“Humans are not lonely actors or masters of the ecosystems they inhabit. Human relationships with active materialities engender complicated narratives of living together in a difficult world, one in which the future may not be easy to discern but the prospects are numerous: an ethics of composition rather than imposition.”

Howitt suggests that the most challenging issue in fire management is that of failure to coexist and asks “How do we know if we are failing to adapt – except retrospectively in the wake of catastrophe?” (2014:63). But our research suggests that these landholders who have lived on the land for more than a decade consider that what is catastrophic for individual human beings may not be catastrophic for the wider landscape. They believe that much of the biota of Australia has been primed over millennia to appreciate and be nourished by fire (Williams 2014:91). They do acknowledge that much can be done to reduce the risk of bushfire to humans, through localising fire legislation, improving fire science and warning systems, improving practice relating to subdivision, planning and property sales and educating newcomers on the benefits of “clean Country”, and are clearly doing what they can to promote their own chances of survival.

But, in speaking of “snakes and ladders”, the fact that it’s possible to “change fire” but not “control it”, and the “impossibility” of making fires stop at spatial or temporal boundaries, these landholders judge that even their best efforts will never guarantee them the role of undisputed controller of fire. They accept that sometimes nature will overwhelm culture and that some human death and injury, and loss of property, is an inevitable if painful factor of co-existence. They recognise that living in fire-prone environments is inherently risky, and becoming more so as a result of changes in the physical and social structure of their region.

These conclusions may seem at odds with research done into community perceptions of fire. We suggest this may be for two reasons. Firstly, much of the academic research and all of the high profile Royal Commissions into community “perceptions” of fire are
conducted as post-mortems following major bushfire events. At this time people are grieving and feelings are raw, and the research frequently focuses on how lives and / or property could have been saved. Secondly, our research deliberately focuses on landholders who have actively been managing land for more than a decade. Howitt (2014) suggests that the push for evidence demanded by scientific approaches to fire management has led to difficulties in living with uncertainty in our relationships with landscape fire. However, rather than, or in addition to, reading and listening to ‘experts’ on how to co-exist with the immanence of fire, our participant landholders have been impelled to physically engage with the land and develop skills of experimentation to adapt to the forces inherent in this dynamic situation. Over time, these engagements and experiments lead to reflection which ultimately shifts understandings of complexities and uncertainties.

Over recent years, attention has been brought to the diversity of rural communities and the failure of NRM policy, education and research to fully recognise this diversity (Agrawal and Gibson 1999). In the context of fire, Eriksen and Prior warn against assuming fixed distinctions between groups such as “‘locals’, ‘tree-changers’, weekend warriors’, fire fighters’, ‘greenies’ and ‘rednecks’, (as) the situation is more complex than that” (2011:619). The stories of our landholders, all of whom have managed land for a decade or more, support Eriksen and Prior’s suggestion that some of the diversity within and between these groups depends on time spent living in fire-prone environments, with a common trajectory towards understanding fire as creative and complex. Time of immersion in these environments may help to explain why landholders may have very different views, for example, on the emergence and evolution of, and appropriate responses to, issues such as Bell Miner Dieback.

Despite commonalities, however, there are differences in the conceptualisations of landholders which confound attempts to model a simple relationship with time. Engagement with fire and land management may differentiate between fit and healthy humans and those with more limited physical capabilities or chronic health conditions (see, for example, Tham and Bell 2008). Financial considerations may limit the receptiveness, activities and thus the opportunities for evolution of those in more
marginal economic circumstances. Some landholders, whether commercial farmers or recent rural migrants, continue to strongly identify with particular human communities regarding what constitutes “responsible and moral” (Gill et al 2010:318, see also Gill 2014) use of their land. For example, notions of good farming and the symbolic value of particular land management practices (see Burton 2004) may influence receptiveness to messages from Country relating to fire.

Nonetheless, we argue that immersion in fire-prone environments encourages progression towards an understanding of the complex spatial and temporal dimensions of fire, and the uncertainties and paradoxes involved, and this would seem to support the suggestion of Griffiths that in developing strategies for co-existence with fire we need to “...empower local residents and their knowledge of local ecologies” (Griffiths 2009:35.5). The dynamic nature of this knowledge, and its evolution through the mutually entwined trajectories of humans, fire and land, has potential implications for interventions, policy and practice. For example, how might beginning with ideas of immersion affect both the nature and timing of interventions to develop local understandings of fire? And what might be the implications for inclusive governance (McLennan and Handmer 2014) across a range of fields, from emergency management of wildfire to management of wider fiery entanglements which include issues such as rural subdivision (Bond and Mercer 2014)?

3.7 Conclusions

In Australia, learning to co-exist with landscape fire has largely focused on the science of fire and fire management, the logics of planning and response and the building of ever more complex resources and fire institutions. What may be obscured by these activities, and by much of the debate about fire, are the ways in which some settler Australians are learning to co-exist within fiery assemblages by experimenting and adapting to fire and through the gentler accretion of experience on Country. For these people, fire is transformative not only in the dramatic ways we commonly imagine but also in its ability to expand human understanding of temporalities, spatialities and issues
of control. Thus, immersion in fire-prone areas has the potential to shift the nature of learning itself; encouraging landholders to physically engage with their land whilst simultaneously pushing their considerations of ecological processes beyond property boundaries and beyond short-term observations.

Around the world, fire regimes are shifting and fire-prone environments are becoming increasingly densely populated. Our findings challenge views embedded within some aspects of fire management and planning which position the local as limiting and characterised by an absence of knowledge and awareness. This challenge is not through an uncritical celebration of the local, nor through an understanding of the local as a static body of knowledge. Rather it is through an enhanced appreciation of how localised spatial scales and broader temporal scales reside in and constitute each other through relationships with fire, producing knowledge, skills, and dispositions suited to living with the immanence and actuality of fire.

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Chapter 4 Divergent Approaches to Resolving Pressures on DRR and NRM Programs: A Case Study of Sustainable Fire Management Training

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We have seen in Chapter 3 that moving through whilst remaining “alive” (Ingold 2011a) to what is going on in their fire-prone landholdings brings changes to the learning trajectories of landholders and to fiery relationships, thus fire training organisations must weave their way into a world in which fiery relationships are always already in the making. This Chapter explores how two different programs engage in this journey, showing how different fire knowledges are used and promoted and to what effect.

In traditional non-indigenous education, developing a teaching or training curriculum has frequently been seen as a process which involves identifying a standardised set of learning aims and outcomes and specifying content and pedagogical approaches (Ross and Mannion 2012:304). The emphasis in these approaches is on the body of knowledge to be learned and the nature of its transmission, rather than on the experiences, sensations and movements of participants within an always already emerging world. Hackett notes that, “embodied, tacit ways of knowing and experiencing the world... (are) not well-accounted for in dominant models” (Hackett 2016:169), whilst Ingold suggests that traditional approaches to curriculum development view the learner as an “exhabitant” rather than an “inhabitant” of the earth (Ingold 2011a:111). However, alternative understandings of curriculum are emerging which emphasise the experiential, evolving and experimental nature of the learning journey (Aoki 2005, Biesta 2004, Gough 2007, Osberg et al 2008, Ross and Mannion 2012). From a wayfaring perspective, if learning occurs through movement, action and interaction with more-than-human flows and forces, then a training program should provide the opportunity to engage in the practice of particular skills. Thus trainers would seek to immerse the
novice in geo-physical, artefactual and social environments “which afford selected opportunities for perception and action...” (Ingold 2011b:354). Similarly, if training is viewed as an “education of attention” (Gibson 1996:254, Ingold 2011b:354), it is the trainer’s role to attune the novice to shared actions and experiences within these environments and to the knot(ting)s of relationships relevant to the subject of study. As the emphasis is on experience and movement, rather than on transmission of a body of information, the outcomes may be much more difficult to predict. This is in-keeping with Yakhlef’s suggestion that, “Learning and knowledge are emergentist phenomena; non-controllable and unpredictable outcomes of interactions between sets of heterogeneous, social and material agencies...” (Yakhlef 2008:288). Although these conceptualisations of learning and teaching are novel within the western academic tradition, they are more common amongst indigenous peoples. As will be seen in this Chapter, Australian Aboriginal people frequently stress the link between knowledge and practice; for example, Mason et al state that “There is no distinction between Knowledge and Practice - Knowledge is learnt through Practice” (Mason et al, 2013 Online).

There are, however, challenges to the development of training programs based on an emergent, experiential view of learning. Some of these relate to the learning experiences of trainers themselves which means that they are more likely to adopt traditional mainstream approaches to learning, training and curriculum development and may struggle to conceptualise alternative approaches. However, there are also external pressures, such as the demands on programs to achieve identifiable, numerically-determined outcomes to convince funders that they are making a difference. In the context of natural resource management and disaster risk reduction programs, there are legislative, moral and insurance-related financial constraints which put pressure on landholders to quickly develop the capacity to take responsibility for cross-tenure issues, such as fire and biodiversity, and also inhibit the capacity of training providers to encourage practice-based learning during programs.

This Chapter shows how two training programs weave their way into fiery entanglements, exploring how their ontological and epistemological underpinnings
influence the paths they navigate through legal, moral, educational, social and other expectations.
ABSTRACT

In the contexts of natural resource management (NRM) and disaster risk reduction (DRR), landholders are increasingly expected to take responsibility for issues which extend beyond property boundaries. Numerous programs are being developed to train landholders to meet these expectations, however the ontological underpinnings, goals and outcomes of these programs can be radically different. Using sustainable fire management as a case study, we compare a modernist approach to training, which educates landholders in the scientific and legislative aspects of NRM and DRR with the aim of persuading them towards particular decisions, with a relational framework which aims to develop ways of knowing and being that recognises the mutually entwined trajectories of embodied humans, fire and land. Each of these programs initially appeals to different landholders but we suggest that learning styles are malleable and that training has the potential to guide not only what landholders do with their land, but also their ways of ‘knowing’ human / fire / land relations. We discuss the circumstances in which each program might be most appropriate and conclude by emphasising the importance of explicit consideration of these issues by training organisations, funding bodies and policy makers.

4.1 Introduction

Programs working with private landholders in the areas of natural resource management (NRM) and disaster risk reduction (DRR) come under conflicting pressures. On the one hand, they are expected to respond to increasing demands for landholders to conduct immediate, externally-prescribed, relatively large-scale activities in relation to issues which cross property boundaries, such as fire, floods, biodiversity and water quality. On the other hand, academics and natural resource managers are calling for landholders to develop greater sensitivity to more-than-human agency and the complexity of ‘human / nature’ relations through personal observation, experimentation, adaptation and reflection, beginning with small-scale, localised activities.
Using sustainable fire management (SFM) as a case study, this Chapter explores how two training programs in South East Australia, both of which work with landholders of settler heritage who have limited experience of managing land and fire, respond to these pressures. These programs are the Hotspots Fire Training Project, run by the Nature Conservation Council of New South Wales (NCCNSW) and the New South Wales Rural Fire Service (RFS), and the Traditional Land Management Practices (TLMP) program of Kosciuszko to Coast (K2C) which is supported by a range of government and non-government organisations. Very different conceptualisations of human/fire/land relations are embedded within these programs and we examine how these understandings influence recommendations for sustainable fire management and approaches to teaching and learning. We compare the modernist framework of Hotspots, which uses scientific argument to persuade landholders to adopt an abstract approach to SFM grounded in representations of nature derived from contemporary ecological and bushfire management frameworks, with the relational framework of K2C, which resists the separation of humans and ‘nature’ in teaching and learning and emphasises the mutually entwined trajectories of humans, fire and land. In examining the interactions between these programs and landholders, we ask whether it is possible for training to influence not only what landholders do with their land, but also their ways of ‘knowing’ land and fire. We consider what each approach offers and how they differ before discussing the circumstances in which each program might be most appropriate. We conclude by emphasising the importance of explicit consideration of these issues by training organisations, funding bodies and policy makers.

### 4.2 Context

Following the Royal Commission into severe bushfires in Victoria, Australia, in 2009, there has been a push towards “shared responsibility” for community safety during bushfires. This has been variously defined but in the Commission’s words, “Shared responsibility would create a situation in which the State, municipal councils, individuals, household members and the broader community all contribute to mitigating bushfire...
risk... each of these groups must accept increased responsibility for bushfire safety in the future...” (Victorian Bushfires Royal Commission 2010:352). At the same time, following the dismantling of statutory marketing boards and other bodies that collectivised risk, governments in Australia have encouraged individual landholders to take greater responsibility for the management of issues such as soil erosion, water quality and ecological resources (Lockie and Higgins 2007). Thus in both DRR and NRM contexts, landholders are increasingly expected to take action and some degree of responsibility for issues which extend beyond property boundaries.

The complexities of these expectations as they relate to landscape fire cannot be underestimated. Fire sits within multifaceted relationships which operate across extraordinary spatial and temporal scales (see Chapter 2, Griffiths 2009, Howitt 2014). These complexities are currently being intensified by the changing demographics of communities in rural and peri-urban environments in Australia (Abrams et al 2012), as amenity-led in-migrants relocate from cities to places where the human influence on the environment is less immediately apparent. Many of these new landholders have limited knowledge, skills and experience with which to make decisions about NRM and DRR issues that cross property boundaries (Eriksen and Prior 2011), and our interviews show that they may also lack the physical capacity at both bodily and infrastructure levels to address them. Numerous training programs have been developed to address perceived gaps in these areas.

Until recently, most of the fire training programs aimed at private landholders in SE Australia, and much research into relationships between non-indigenous communities and fire, framed fire primarily as a hazard (Eriksen 2014, Fleeton 1980, Marston 1983). The success rate of these programs has been limited; Andrew Stark, Chief Officer of the Australian Capital Territory Rural Fire Service (RFS), recently stated that the community engagement efforts of the RFS had been given a “big, fat F” by researchers funded by the Bushfire Cooperative Research Centre.\(^1\) In recognition of the limited success of

previous efforts, and in line with increasing evidence of the co-evolution of fire and much of the Australian biota (Franklin 2006), several programs have sought to reframe training in ways that recognise the perceived benefits of fire, particularly in relation to the health of Country\(^{18}\). The two fire training programs described in this paper work primarily with landholders who have little or no experience of using fire to manage land, with the intention of transforming knowledge and skills and encouraging pro-active use of fire to benefit flora, fauna (including humans) and the built environment. Participant landholders are located within broad metaphysical / epistemological traditions in their wider lives and are connected with fire through a range of domestic practices, the media, personal experiences, second-hand knowledge and so on (Eriksen and Prior 2011). Nonetheless, landholders inexperienced with managing and burning their own land are rarely steeped in knowledge or practice traditions relating to fire and land. Thus these programs play an important role in developing understandings of what it means to dwell (Heidegger 1971, Ingold 2011b) within human / fire / land relationships. Yet despite their apparent commonality in purpose, there are considerable differences in the nature of the sustainable fire management (SFM) promoted by these two programs, and in the understanding of how people learn, and these differences are reflected in wider debates around human/nature relations as described below.

### 4.3 Fire, Land, and Learning

Around the globe there has long been conflict between fire management to reduce risk to people and the built environment, and fire management to reduce risks to the health of Country and to maintain biodiversity (Driscoll et al 2010; Morrison et al 1996). SFM works from the premise that it is possible to meet both DRR and NRM objectives (see, e.g. New South Wales Government 2003) however two distinct operational ontologies can be identified.

\(^{18}\) Country is a term which is commonly used by Aboriginal Australians but is also used by some Australians of settler heritage. It is used here to expand the meaning of land, or the environment, to embrace people, stories, memories, plants, animals, land-forms, seasons and ephemeral phenomena such as weather and fire.
The first of these approaches is frequently referred to as prescribed burning, or the “scientific form of land management firing” (Verran 2002:731). This system applies a fire ‘prescription’ to an area of land based on fire-frequency thresholds which have been pre-determined for different types of vegetation (Bradstock and Kenny 2003, Kleijn et al 2003). In Eastern Australia, fire frequency thresholds are usually based on the Keith Classification System, within which the vegetation of New South Wales and the Australian Capital Territory (an area in excess of 800000 km²) has been organised into 99 broad vegetation classes within 12 formations (Keith 2004). Each of these has a corresponding fire frequency threshold stipulating a minimum and maximum interval between burning (Bradstock and Kenny 2003, Kenny et al 2003). For example, in sclerophyll grassy woodland, it is recommended that the minimum interval between fires should be five years and the maximum interval 40 years.

Although this approach is widely accepted within the scientific community, it is not without criticism. Concerns include the failure of fire frequency thresholds to incorporate variations in the intensity of fire (Doherty 2011), and of both vegetation classes and fire frequency thresholds to take into account influences other than fire, such as drought, grazing and flooding (Hunter 2006). Some researchers and land managers question the emphasis on vegetation classes at the expense of other kingdoms such as fungi (Bell 2011) and animals (Clarke 2008). One of the authors of the original guidelines for fire management expresses concern about the ways in which they are being used and emphasises the limitations of focusing on the “numbers” involved in fire frequency thresholds. She explains:

“Limitations of the approach (the focus on flora, data gaps, data currency and reliability) were discussed in the report. As was the need to consider spatial extent, variability, other fire regime elements, local expert knowledge, regional variation, accurate fire history mapping, monitoring, and defining fire management goals” (Kenny 2013:1).

Nevertheless, many managers remain committed to fire management through these guidelines, notwithstanding recognition of gaps in the data. Further research is being done in order to address these gaps and it is the belief of some researchers that we are
at a threshold in the scientific understanding of fire through the application of remote sensing, modelling and the aggregation of records (Bradstock 2011). However, a fundamental tension exists between this approach which seeks ever more data with which to produce abstract guidelines for management, and a relational approach that demands more intimate, localised, emergent human/fire/land relationships. For example, Victor Steffensen, creator of the Traditional Knowledge Revival Pathways program which seeks to record and strengthen the traditional knowledge of Australian Aborigines, believes that sufficient information to guide fire management already exists “in the land”. He advises land managers to “Get out there first and see what’s there: plants, animals, whether the land’s a little bit sick...” and explains, “When it comes to managing Country you can’t go, ‘Oh yeah, we’re gonna burn in six years’. You’ve got to be out there reading Country, out there every year”. This situated approach to SFM is traditionally associated with indigenous peoples and is dependent on the development of an intimate relationship between individual humans, fire and an area of land over time and the recognition of other-than-human agency (Eriksen and Hankins 2014, Langton 1998, Miller and Davidson-Hunt 2010).

These divergent approaches to SFM reflect wider debates around human / ‘nature’ relations. Researchers working within posthuman / relational paradigms in NRM have criticised the dominant environmentalist approach, or Caring for Country, for adopting a controlling perspective in which humans assume themselves to be at the helm of complex socio-ecological systems as they take on the role of protector of an environment which has become “an object of concern” (Ingold 2006:19, original italics). These researchers seek to dissolve the separation between humans and ‘nature’, privileging concepts such as co-emergence and complexity. They challenge NRM theory and practice to direct more attention to other-than-human agency and to recognise the mutual well-being of humans and Country, thus encouraging an ethic of Caring as Country through which “we live, think, act and attend as part of the world, rather than distinct from it” (Suchet-Pearson et al 2013:188). Similar developments are taking place

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within the field of DRR. For example, in seeking to enhance human survival during bushfires, Griffiths (2009) recommends that local knowledge and local residents be empowered, whilst Howitt calls for recognition of the “messy boundaries between human and non-human others” as we re-imagine coexistence with fire “in terms of recognition, respect, adaptation and a shift in how we think about the terms on which human societies coexist with things” (Howitt 2014:61). Evidence for the benefits of developing a relational understanding of risk is given by Kulatunga (2010), who reports on how embodied understandings of more-than-human agency, positioned within current and historical human / ‘nature’ relationships, enabled members of the Moken community in Thailand to make the life-saving decision to move away from the sea immediately before the Indian Ocean Tsunami in December 2004.

Relationships between humans and their environment are also being examined in the field of knowledge and learning. Here, researchers working within relational paradigms have challenged the acquisition model of learning through which abstract knowledge is seen to be incorporated or transferred into the rational mind of a human individual isolated from an external nature before being applied to the world (Plumb 2008, see also Archer 2000). Many scholars criticise the failure of this model to recognise the human collaborative context within which learning takes place (Lave and Wenger 1991, Schusler et al 2003), suggesting that a social model more accurately represents the process of learning. However, whilst theories of social learning acknowledge human social, economic and political forces, they rarely reference the geographical, physical or artefactual environment within which learning takes place (Preston 2005:374) and which itself may be altered during the learning process (Ingold 2011b). This more-than-human context is important to the theory of learning-as-dwelling (Heidegger 1971, Plumb 2008), in which learning is not seen as an accumulation or assimilation of knowledge but occurs as we:

“…attune our skills and sensibilities to the forces and powers of our material and social world. As we weave ourselves into existence, we detect when our thoughts, our words, our movements, and other deeds run against the grain of the world demanding recalibration and adjustment…” (Plumb 2008:76)
According to adherents of learning-as-dwelling, these recalibrations and adjustments leave traces in the physical and social worlds, extending learning from within the rigid boundaries of a single individual or exclusively human social environment and repositioning humans within ‘nature’ by acknowledging the reciprocal relationships involved in their mutually evolving trajectories. Moreover, the model pushes understandings of experiential learning (Kolb 1984) to fully embrace changes in bodies, including neurological systems (Ingold 2011b, Plumb 2008). This requires a shift from the notion of learning as a cerebral process which involves “a type of ‘dialogue’ between people and the landscape over time” (Cooke and Lane 2015:44, our italics) towards a perspective in which an embodied, enminded being-in-the-world learns through engaging with and in an environment which is simultaneously coming-into-being (Ingold 2011b).

We now outline the methods used in our research, before describing two sustainable fire management programs and highlighting how positioning around the human/’nature’ dualism influences their approaches to SFM and to teaching and learning.

4.4 Methods

This research was conducted as part of a PhD project from March 2011 to August 2014 which was initially commissioned to conduct an in-depth evaluation of the Hotspots Fire Training Project (Hotspots). This evaluation combined a review of Hotspots literature, two detailed case studies (one in Palerang and one near the NSW / Queensland border), participant observations of two other workshops and staff training days, interviews with committee members and a survey. Further details on methods and research participants can be found in Chapter 1 and Appendix 1.

The case studies involved participant observations of the two workshop days at each location. These observations focused on engagements between humans, and between human and other actors (such as fire, plants, weather and paper and other resources) in the context of learning. In addition, semi-structured interviews were conducted with
landholders around one month before and after their attendance at Hotspots workshops, and on one occasion only with landholders who chose not to attend. Initial interviews with landholders were usually conducted whilst walking around the interviewee’s property in order to encourage landholders to identify issues and relationships which they viewed as important to land and fire management. Two of the agency staff, one of whom was also a landholder, were interviewed at their place of work. The second interviews focused on the Hotspots training and its impact and landholders were initially asked to share any information which they felt would be relevant to the evaluation before being guided by more structured questions. Interviewees were randomly selected from a list of people whom Hotspots had invited to attend the workshops and all agreed to be interviewed. Table 3 shows the number and gender of interviewees. Landholders ranged in age from 40 to around 70 years and all had lived locally for at least 5 years. The median area of land managed by interviewees was around 100 hectares, although two females managed less than 2 hectares and 2 males managed over 1000 hectares.

Table 3

Number of interviewees and Occasions on which they were interviewed

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Type of Interviewee</th>
<th>Interviewed Pre-Hotspots</th>
<th>Interviewed Post-Hotspots</th>
<th>Interviewed on another occasion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palerang</td>
<td>Hotspots Participant Landholder</td>
<td>4 Female</td>
<td>4 Female</td>
<td>1 Male¹</td>
</tr>
<tr>
<td></td>
<td>Hotspots participant landholder and agency staff member</td>
<td>2 Female</td>
<td>2 Female</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hotspots non-participant landholder</td>
<td>2 Male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSW / Queensland border</td>
<td>Hotspots Participant Landholder</td>
<td>2 Female</td>
<td>2 Female</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hotspots agency staff member</td>
<td></td>
<td>1 Male</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hotspots non-participant landholder</td>
<td>1 Male</td>
<td>1 Male</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>20 (8F, 12M)</td>
<td>18 (8F, 10M)</td>
<td></td>
</tr>
</tbody>
</table>

¹The male interviewee was interviewed for a third time, and the female for the first time, several months after the second interview because a demonstration burn had subsequently taken place on their property.
Analysis of interviews, observations and Hotspots literature was an iterative process which involved moving from one form of data to the other as themes relating to learning within human / fire / land relationships emerged. Interviews were audio-recorded and transcribed. These were listened to five times and transcripts were read 5 times, as it was considered important to understand each landholder’s “whole story”. Audio and video recordings of workshops were also listened to and / or watched five times. On the basis of recurrent explanatory categories which emerged from our deep engagement with the data, relevant discussions from the workshops were transcribed and both these discussions and interview data were coded using NVIVO 10.

The survey could be completed on paper or online, using Survey Monkey. Invitations to complete the survey were sent by Hotspots to over 500 landholders participating in workshops across New South Wales between 2010 and 2013, however several of these were returned to sender due to incomplete or incorrect email or postal addresses. 167 completed questionnaires contained sufficient information to be included in the analysis, which represents a response rate of just over 35 % of around 470 participants believed to have received a request to complete the survey. The survey was analysed using Microsoft Excel.

As the evaluation of Hotspots proceeded, we became aware of the K2C TLMP project, which also seeks to engage landholders proactively with fire and operates within a very different conceptual and operational framework, and considered that this alternative approach to training could offer a useful comparison with Hotspots. Due to funding constraints, our engagement with the TLMP program was limited to a review of project literature, interviews with the voluntary former president and the paid facilitator of K2C, participant observation of a workshop, and individual and group discussions with the workshop leader and 6 participating landholders. As a result, we are not in a position to offer a detailed evaluation of the K2C program. However, our research concerning this program enables us to illuminate better some of the underlying assumptions, operational constraints and potential outcomes of different training approaches.
4.5 Description of Projects

The Hotspots Fire Project

The Hotspots Fire Project, jointly managed by the NCCNSW and the RFS, is steered by a Committee which includes representatives from a range of organisations including government agencies, member organisations (such as New South Wales Farmers) and academic institutions. The general purpose of Hotspots is to “assist private landholders and public agencies in managing fire for the protection of life and property while at the same time ensuring healthy, productive landscapes in which biodiversity is protected and maintained” (Hotspots Fire Project, Undated). This assistance is provided in the form of a training program for landholders conducted on two days which are held one to two months apart. The majority of the participating landholders are of settler heritage but Hotspots has also worked with Aboriginal land councils and first generation immigrants.

On the morning of the first day, landholders are greeted at a built venue, usually a rural fire-shed or community hall, which is decorated inside and out with Hotspots and RFS signs. Several uniformed people are present, including employees from Hotspots, the RFS and local agencies such as the Forestry Corporation of NSW and the NSW National Parks and Wildlife Service. Following refreshments, landholders are invited to sit at desks to watch PowerPoint presentations introducing Hotspots before walking or driving to one to three field sites. One of these sites is a potential demonstration burn-site for which a detailed ecological site story outlining flora, fauna, cultural values and fire history has been prepared in advance by a Hotspots Ecologist. Landholders then return to the indoor venue for another PowerPoint presentation which relates to principles of fire ecology and is more or less generic across New South Wales. After lunch they are provided with an aerial photograph of their property and guided through the completion of individual fire management plans. These plans require landholders to mark the photograph or overlays with features such as infrastructure, water, fire history and vegetation (categorised by Keith class and identified through remote sensing with help from Hotspots staff and representatives from agencies such as the National Parks and Wildlife Service). Landholders then partition their land into “management units” and
identify management actions for these units based on the fire frequency thresholds determined for the vegetation classes on their property.

The morning of the second day begins with presentations on fire behaviour and the legislation required to conduct burns. Participants then travel to the demonstration burn-site where Hotspots and agency staff present the fire management plan for the site and demonstrate tools for assessing weather, fuels and topography. In the afternoon, weather and other fire-related conditions permitting, the landholders observe a planned burn on the demonstration site. If the burn cannot take place, workshop leaders describe fuel loads, weather and other aspects of prescribed fire in more detail.

Hotspots seeks homogeneity and standardisation across all workshops. Through a 110 page *Guide to Facilitators*, workshop leaders are given step-by-step instructions on how to prepare and deliver each of the two day workshops. This guidance is very detailed, with precise timings and, in parts, advice on what facilitators might say. For example, the document suggests that, on handing out information kits, the Facilitator should describe the publications thus:

“*This is your take home record of the information provided at today’s training day. The details on RFS regulations are outlined in the two RFS publications included in your kit... The site story sheets are your record of what we looked at in the field this morning. The Forests NSW maps of the district are your record of the available documented fire history in the region*” (Hotspots Fire Project 2011:28).

Training is delivered across New South Wales by three facilitators and two ecologists.
The Traditional Land Management Project run by Kosciuszko to Coast

An alternative approach to fire training is taken by the Kosciuszko to Coast (K2C) project. K2C is managed by 13 partners including government agencies, community and membership groups, and a not-for-profit business. However, K2C employs just one ongoing member of staff, the Facilitator. K2C contracts a Ngarigo elder, traditional land manager and scientist (Mason et al 2013), to share his knowledge, skills and experiences through the Traditional Land Management Practices (TLMP) Project, thus setting an understanding of fire within the wider context of traditional indigenous approaches to land management. Rather than working with different communities for two days, this project works with the same group of landholders over two years, moving from property to property to discuss different aspects of land management, including fire. More than 50 properties were visited between 2012 and 2013 and, again, the majority of the landholders are of settler heritage.

Landholders attending a K2C fire management workshop drive directly to the private property on which the burn is to take place. Here, the contracted elder, the K2C facilitator and landholders engage in discussion around the practical and spiritual history of fire, current practical considerations and its particular purpose at this property. All people present are then invited to participate in lighting and controlling the fire or fires. Burns are conducted slowly, sometimes just one plant at a time, and repeated burns may take place in the same area within the same year, to facilitate activities such as seeding or weed management. There is an emphasis on the different needs of individual plants; for example, it is advocated that bark is singed off or removed from smooth bark trees above grass height.

Throughout the workshop, the leader challenges modern understandings of the human/nature dualism. For example, he explains that, through the use of fire, humans can “remind the tree of who he is, remind him to grow straight” and that, through their behaviour, “the animals will tell (landholders) when to burn”. Indeed, the leader attributes control to non-human forces within human/fire/land relationships, writing that “these natural elements, wind, rain, fire...have, and always will have, control over all the land, its people and natural resources” (Parks Victoria, 2003:45).
The leader shares his learning and experience through story and observation, explaining that the workshops will include show-and-tell, with “more show than tell”\(^\text{20}\). There is no pre-arranged script and landholders are encouraged to find their own answers to fire management questions as described by one participant:

“Rather than tell us what to do, Rod posed two questions: which is the most flammable plant here, and do you burn the most flammable first or last? The issue is not what are the right answers to these questions but how you observe and learn the answers for yourself” (Goonrey 2012:7).

A booklet written to accompany the project emphasises that in traditional Aboriginal societies, “There is no distinction between Knowledge and Practice - Knowledge is learnt through Practice” (Mason et al 2013). In keeping with this philosophy, the workshops put greatest emphasis on “learning by doing”, encouraging landholders to actively engage with their land. For example, it is suggested that landholders might:

“... set a small fire and observe what happens. Then go on to set other small fires over several weeks which put into practice what you have observed. These small fires cover only a few square metres at a time and it may take several weeks to burn the area in a pattern which makes sure the valuable plants and animals of the rocky knoll are not damaged. Burn and watch it; come back; watch what is there; learn about it. Then don’t burn for a few years; just observe and learn” (Goonrey, 2012:7).

The low staffing and resource-dependency allows the K2C workshops to be quickly postponed to alternative dates if the weather or other material considerations prevent a burn. Whilst the workshops do share an identity through the style of knowledge-sharing, the lack of a fixed agenda means that all aspects of individual workshops can be tailored to the local situation.

\(^\text{20}\) All quotes from workshop observations unless otherwise credited.
4.6 Divergent Approaches

Both the Hotspots and K2C TLMP training programs are to some extent, ‘top-down’ approaches which are initiated and developed by agency staff and engage an ‘expert’, or ‘experts’, from outside the local community to facilitate landholder learning about fire. Neither program is explicitly committed to collecting information on the existing knowledge and / or practice of landholders (see Gaillard and Mercer 2012), but rather with sharing stories, cultures and practices embedded in contexts which are, to varying degrees, alien to the landholders with whom they are engaging. The programs share some similarities in that they seek to promote prescribed fire as a potentially positive force and the booklet designed to accompany the K2C project observes that it is not necessary to choose between traditional Indigenous practices or ‘modern’ land management practices (Mason et al 2013:15). Nonetheless, we suggest that there are considerable differences between the projects.

Whilst the Hotspots workshops seek to revive a practice – the use of fire as an integral part of land management – with roots in both pre-C18th Australia and earlier settler use of fire, they do so from within a very different framework. Viewing space remotely from above during the planning process renders ‘nature’ inert; as Shaw et al explain, it “freezes complex spatial and temporal approaches into a two-dimensional plane that (can) be cellularized, enumerated and manipulated” (Shaw et al 2010:380; see also Dixon and Jones 1998). Floral and faunal diversity is amalgamated into large classes and, as aerial photography primarily focuses on canopy species, relationships are glossed over or extrapolated from abstract knowledge of ‘similar’ sites in different places. This is not to suggest that other-than-human agency and relationships are ignored within Hotspots workshops; as in all fire training programs, much discussion takes place around the roles of ‘fuel’ (vegetation), wind, humidity and temperature in fire behaviour. However, this recognition of agency is selective and pre-determined in advance, and within the workshops, “(T)he power of human cognition to eventually determine and predict the natural world is largely left unquestioned... the enlightenment assumption of human control over nature remains...” (Hinchliffe 2001:186).
This approach reflects the institutional context through which Hotspots has grown which prioritises immediate, decisive action in relation to wildfires, habitat destruction and high rates of species extinctions. One of the two managing organisations, the RFS, is described on its own website as “the world’s largest volunteer firefighting organisation” (http://www.rfs.nsw.gov.au/about-us/history). As employees of the RFS, employed part-time on the Hotspots project and part-time in a regulatory capacity, the facilitators of Hotspots workshops are fire-fighters whose primary role is to control or contain fire and keep it away from people and built assets. Whilst individual facilitators do consider fire in its wider environmental context, and all are legally bound to attend to environmental considerations when burning, they are representatives of a fire-fighting organisation which has a particularly strong identity in the way that it works with, and against, fire.

This identity is evident in that, whilst requesting landholders to engage with the idea of fire, and with paper representations of land and fire, the RFS seeks to retain control over practical aspects of fire management both during and after the Hotspots workshops. This restricts landholder interaction with fire to observing expert demonstrations and landholders themselves are physically static throughout most of the workshops. Workshop leaders do encourage landholders planning burns on their own land to look for organisms which might need protection from fire, such as hollow-bearing trees, but by recommending that burns planned are assessed and conducted by the RFS they remove the onus to identify such organisms from the landholder. Indeed, whilst it is not clear whether, or how often, this actually happens, it would be possible for landholders to go through the entire process of planning and completing a burn without ever actually visiting their land. Thus, the Hotspots workshops promote the idea that landholders can plan or make worlds before or without actually living in them (Ingold 2011b).

This approach sits within an acquisition framework through which learning takes place in formal settings where exposure to ‘knowledge’ is managed by an expert ‘educator’. An abstract body of information is presented as a fait accompli in a cerebral approach to learning which separates human mind from body and from engagement in the world (Plumb 2008:67, see also Archer 2000). The guiding motivation for this approach is that
when rational landholders are provided with objective facts about fire, they will absorb and process this information mentally and so form appropriate management decisions (see Plumb 2008:66).

In contrast, during the K2C workshops fire-planning emerges through engagement with the land itself and is spatially localised and temporally dynamic. Rather than freezing or objectifying Country, the workshop leader explicitly and repeatedly attributes powers of agency to non-humans, including animals, plants, wind and fire. The emphasis is on working with fire and the land, not from the privileged position of Controller but as one element within a dynamic, mutually dependent world of relationships. Learning is conceptualised as an emergent process through which both humans and the world are transformed by fire and guidance extends across species boundaries. Through the emphasis on learning by doing, landholders engage their bodies with the land, bending to inspect plants, raking around the bases of trees, and lighting, tending and extinguishing fires at different scales. These experiences are repeated as landholders move from property to property, working with fire in different places and conditions.

Plumb notes that, within the constraints of our genes, our bodies and neurological systems are sufficiently plastic to adjust and adapt as a consequence of physical engagements with the world, explaining that:

“Even at the level of our bodies, our engagements at one moment produce changes whose traces both constrain and enable our responsiveness in our next moment of engagement. Our bodies remember what has transpired before and this memory tunes our interactions” (Plumb 2008:76).

The TLMP project offers many opportunities to engage with fire throughout the lifetime of the project, which encourages continual growth and adaptation and the development of embodied skills and memories within landholders.

Landholders are not, however, “passive recipients” (Pannell and Vanclay 2011:29) of training programs and we now discuss some of the interactions between the two workshop programs and participants. It is outside the scope of this paper to offer a detailed evaluation of these programs, however interested readers may like to refer to
the evaluation of Hotspots (Appendix 1) and the TLMP Project Summary (Mason, Robertson and Van Dyke 2013). Here we describe some general results before focusing on landholder interactions as they relate to understandings of human/nature relations.

### 4.7 Interactions with landholders

Changing practice in relation to controversial issues is an incremental process which can take many years (Measham 2013), however, in terms of their own objectives, both of these programs have already achieved outcomes. The survey of Hotspots participants reveals that amongst the 167 respondents, there is a net gain of at least 32 landholders applying for non-pile (or broad) burns to be conducted on their properties, 112 landholders developing, or actively planning to develop, fire management plans for their properties and 49 landholders contacting, or intending to contact, fire management agencies. Outcomes for the K2C project are harder to pin down, both because of our more limited engagement with this project and because of the complexities of exploring the evolution of the entwined trajectories of human bodies, including neurological systems, and Country. However, it is significant that K2C initially expected to have nine to twelve interested land managers but over two years worked with the owners of more than 50 properties, with most sustaining their interest throughout the program. Whilst burns have not been conducted on all of these properties, fire has been a central feature of the training throughout (Mason et al 2013). Discussions with participants attending the observed workshop suggest that, although the approach is challenging, regular participants feel rewarded with increased understanding of the interrelationships between humans, fire and land and the ability to better “read Country”.

Both programs are voluntary, and therefore self-selecting, hence it is unsurprising that many participants are receptive to the messages they give. This is particularly true for the K2C project as a number of workshops were held initially in which it was explained that in signing up for the TLMP training landholders would be engaging with indigenous practices and knowledge systems and they might find some of the concepts challenging. Despite this, and the increased exposure to Aboriginal cosmologies and practices as they
relate to land and fire in this area of Australia in recent years, the former president of K2C states that a small number of landholders struggle with the ontological shift required of them. He suggests that those who drop out of the program reject the approach as “unscientific” and find the language and concepts articulated to be too “foreign” to them (Geoffrey Robertson, pers. comm., February 2012).

Participants in the Hotspots program are more diverse. Whilst it is clear from promotional literature that the workshops will engage with SFM, the framework within which learning will take place is less clear. Furthermore, the shorter time commitment required by the project is likely to result in the participation of more landholders who are merely curious rather than actively committed to using fire to manage land. Evidence from the surveys suggests that the project is most effective for landholders who are relatively new to managing land and to the area in which they are now residing. For example, the median time living in the local area was in the range 6-10 years for those who intended to begin using fire on their land post-workshop, compared with 16-20 years for landholders who had never burned and had no intention of burning after the workshops. For many of these people, it appears to be the simplicity of the Hotspots approach that is attractive and programs are particularly successful when focusing on a very specific goal, such as conserving a single endangered species (Appendix 1:35, John Allen, Hotspots facilitator, pers. comm. 2014).

More experienced landholders whose ways of knowing and inhabiting human / fire / land relationships are already attentive to local, dynamic more-than-human interactions appear to feel more challenged by the abstract, number-driven approach to fire management recommended by Hotspots. For some, these challenges primarily relate to the application of generic fire prescriptions to local situations. For example, Summer is a member of the local fire brigade but was passionately opposed to burning the demonstration burn-site at her workshop, stating, “I’m not against fire per se, I just think there are so many other disturbances (here).” Rachael was resistant to the same burn because she felt that the site offered good habitat for animals. She explained:

    Rachael: (The burn site) was right next door to an area that was still recovering from a burn and the rest of it was up against houses – so it was quite a small patch
but the only remaining bit that had decent cover in it. So in terms of invertebrates, lizards, frogs, all that sort of thing there was nothing over there for them and pretty soon there was going to be nothing over here for them...

Some landholders questioned the prescriptive approach more generally, especially the credibility and usefulness of classification systems. For example, Andrew felt that “the idea of doing classification by vegetation types isn’t really practical” because of the difficulties of slotting complex, living systems into pre-defined boxes (see Hearn et al 2011). In view of this, and the fact that changes in vegetation class can have dramatic consequences for recommended fire frequency thresholds, Andrew felt that it would have “been more useful to have learned more about plant, animal and microbial relationships”.

These statements relate primarily to concerns about SFM operational approaches and reflect debates in the academic literature. However, another common area of disquiet for interviewees related to the limited attempts to encourage the development of a living relationship with fire during the workshops. At one of the case study sites, all of the interviewees bar one experienced burner agreed that active involvement in a small burn would have been preferable to watching a demonstration. As Tom put it, “I can see value in that. I can’t see value in the spectator sport side of it.” This suggestion was not explicitly explored in interviews in other areas but one agency staff member in Northern New South Wales and a local brigade captain in Palerang themselves volunteered the idea that the best way to learn about land and fire is to physically engage with burning. For example, Jack, who somewhat disparagingly described the Hotspots workshops as “science out of the classroom”, explained:

Jack: If you start small you get the understanding. And then go again. And if you need to go bigger, later, well go a bit bigger. After a period of time – it could be months, weeks, years – and you’d be quite happy if you saw the need – you could walk around a coupla hectares all by yourself and set it all alight because you’ve had that experience.
At first glance, these landholders might be understood to be making simple statements about their own preferred “learning styles” (Eriksen and Prior 2011:616, Kolb 1984). However, closer examination of the contexts within which these statements are situated shows that these interviewees view the Hotspots workshops as a missed opportunity to encourage all landholders to move away from predominantly cerebral learning towards a more practical, embodied understanding of fire. Such a shift would require plasticity within individual learning styles which is little explored in the NRM / DRR literature. However, if, as Eriksen and Prior state, “LEK (Local Environmental Knowledge) is a way of construing the world rather than an accumulation of facts” (2011:613), then changes in LEK could be associated with changes in learning styles. This is supported by evidence from our interviews that with increased time living in a rural, fire-prone environment, landholders move away from more cerebral approaches to learning about land management, and identification with particular communities (such as the “green” community), towards learning through physical engagement and experience (The Authors under review, Cooke and Lane 2015). In suggesting that landholders should have been encouraged to develop more active, physical relationships with fire, our interviewees appear to believe that it is possible to shift learning styles through training projects and that training programs should not simply reflect landholder learning styles but should also recognise their potential to guide landholders towards particular ways of knowing human/nature relations.

4.8 Discussion and implications

Despite sharing some similarities, there are considerable differences in the conceptualisation of the ‘human/nature’ dualism at the root of these two training programs, and these are reflected in, and promoted through, approaches to SFM and to learning. In the context of disaster risk reduction, and in particular ‘shared responsibility’ for bushfire safety, each of these programs might be considered to have advantages and disadvantages. Much research has been, and is being, conducted into the most effective types of, and channels for, emergency communications and warning messages to rural inhabitants (e.g., Martin and Rice 2012), and the extensive technology available to state
emergency organisations will always be an important force in communications about potentially dramatic events. However, encouraging landholders to be self-reliant and ‘read’ Country, as they develop physical capacities and embodied memories relating to human/fire/land relationships, could ultimately empower them to work more creatively and productively with ‘nature’ during fire emergency situations. In contrast, a more prescriptive approach risks implying that successful co-existence with fire requires only a managed transfer of ‘objective’ information into the heads of rational landholders. This seems to go against evidence that landholder ‘knowledge’ of fire and natural resource management emerges with and through engagements with Country (see Chapter 3, Cooke and Lane 2015, Eriksen and Prior 2011). Focusing on representation and the transfer of information does little to develop the embodied, enminded (Ingold 2011b) memories and capabilities that would allow landholders to develop sensitivity and responsiveness to the agency of land and fire.

Changing relationships, developing physical and mental capacities and shifting learning styles take time, however. Many in-migrants are reluctant to engage immediately with fire-related issues on taking up tenure of a rural property and this situation can continue for several years (Eriksen and Prior 2011). Even when they do engage it can take years, if not decades, of observation, experimentation and adaptation to develop sensitive, responsive relationships with(in) Country. The median age of respondents to the Hotspots survey falls in the range 55 to 59 years and K2C participants at the observed workshop appeared to be of a broadly similar demographic. Our interviews suggest that many landholders of this age will move off property within the next decade or so due to ageing and associated difficulties managing large properties and / or increasing need for the services and infrastructure provided by towns and cities. Thus, just as some landholders are beginning to develop the capacities to engage in productive relationships with fire, they may move away from the environments through which these relationships have emerged.

In the meantime, there are risks to human lives and property. The Hotspots approach immediately increases the number of landholders preparing property fire management plans and the number of strategic burns conducted across relatively large scales.
Furthermore, the approach to fire planning is consistent with that of much larger agencies. Fire management plans provide a material record of works done and Hotspots are currently developing an online system which will allow landholders to upload details of their plans and works which can be integrated into local and regional planning. Provided that these details are kept up-to-date, they will provide the Rural Fire Service with immediate information about possible emergency access routes. In the short-term, then, the Hotspots workshops may well reduce the risks to landholders from bushfire.

There are also immediate risks to the health of Country, including threatened habitats and species. For example, the northern population of the Eastern Bristle Bird is extremely vulnerable; the Department of Environment and Heritage note that it is “likely to become extinct in nature in New South Wales unless the factors threatening its survival cease to operate” (New South Wales Government Online). Immediate, coordinated action is required in order to encourage habitat which would give this species a greater chance of survival. As mentioned, in many areas the ideal fire regime even for vegetation is often just a best guess, and the needs of animals are barely known at all. However, for certain species, such as the Eastern Bristle Bird, doing nothing will almost certainly lead to extinction. Moreover, the current recommended scientific prescriptions for burning bristle bird habitat are supported by third and fourth generation farmers, who testify that broadly similar burning practices up to the mid 1980’s coincided with greater numbers of target species. For this bird at least, encouraging large-scale prescription burning in the short-term may be the only path which offers any hope.

Each threatened species is set within wider relationships, however, and the complexities, limitations and costs of single species conservation approaches are well documented (Flather et al 1998, Courchamp et al 2003). One risk with the prescriptive approach to sustainable fire management is that in order to prevent the immediate loss of known threatened species and to reduce risk to human life and property, programs will continue to propagate the view of humans as Controller of ‘nature’, and ‘nature’ as consisting of objects that can be rearranged according to human whim (Ingold 2006:14). In the past this approach has failed both DRR and NRM. For example, in the late C20th
farmers near the Border Ranges National Park were strongly advised by scientists and land managers to stop burning bristle bird habitat in the belief, based on evidence from other regions, that long breaks between burning were required to maintain this vegetation type. It is now thought that in this very productive area, the ideal interval between fires may be much lower than initially believed and these farmers are now being asked to reinstate their practice, often by the very same scientists or land management advisors who asked them to stop in the first place. Unfortunately, some of the farmers interviewed for this research fear that it is now too late to start burning again as the cessation of fire has resulted in large-scale weed invasions and the potential of fire to get out of control as there are no longer sufficient breaks to prevent it escaping.

Assessing what approach to take when developing and delivering NRM / DRR training can involve difficult political decisions. In some circumstances it may be considered desirable to differentially target different landholders. With people who are likely to have long-term relationships with(in) Country it may be more important to challenge the ‘human/ nature’ dualism and develop new ways of knowing and being. With people likely to be only temporarily immersed in local assemblages, it may be considered more appropriate to simply provide management prescriptions. Targeting different approaches to different situations may be considered unpalatable, not least because there are clear implications for community cohesion. However, it is important to note that in the current situation programs already have divergent operational ontologies, the implications of which have not necessarily been considered by funders and policy-makers.

It is important to note also that there are wider political implications of adopting ‘modern’ approaches to sustainable fire management training. For example, Eriksen and Hankins warn that a dynamic, relational view of burning practice, through which both land and people are transformed and which is central to indigenous human/fire relations in Australia and North America, is currently threatened by “Eurocentric, hierarchical and patriarchal colonial notions” (2014:1289) of fire management. Certainly this is not the intention of Hotspots staff members – project partners are involved elsewhere with efforts to revive Aboriginal fire practice – however, it is a
potential side effect of a program which encourages participants to view ‘nature’ as inert and separate from humans rather than encouraging them to physically engage in the tangle of relationships found in a dynamic, interdependent world.

4.9 Conclusions

In both DRR and NRM contexts, landholders are increasingly expected to take action and some degree of responsibility for issues which extend beyond property boundaries and numerous programs are being developed to train landholders to meet these expectations. Our case studies suggest that the ontological underpinnings, and thus the goals and likely outcomes, of these programs can be radically different. Some work within a modern framework to educate landholders in the scientific and legislative aspects of NRM and DRR with the aim of persuading them towards particular decisions, whilst others aim to develop new ways of knowing and being which position humans as nature and recognise the importance of physical interaction with(in) Country. Whilst each of these programs initially appeals to different landholders, we suggest that learning styles are malleable and that training has the potential to guide landholders towards particular ways of knowing human/nature relations.

Each of these programs has advantages and disadvantages in terms of reducing risks to humans, property and land. It is difficult to argue against the benefits of a locally informed citizenry that is alert and responsive to the needs of both humans and Country. However, when financial and human resources are limited, and the human population of rural areas transient, it may be perceived that the priority is to reduce the immediate risks through prescriptive approaches. It is important that practitioners and their funders consider their priorities in different circumstances and recognise the implications and potential outcomes of the different ontological foundations to NRM and DRR programs.
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Chapter 5 Towards a common framework for understanding more-than-human community resilience to risk: extending the hidden-value trade-off model

This chapter is the article Edwards A and Gill N Towards a common framework for understanding more-than-human community resilience to risk: extending the hidden-value trade-off model, currently in preparation for publication. Until this point in the thesis, the focus has been on research activities located in the fire-prone environments inhabited by landholders but these activities are deeply entangled within the wider context of policy-making and legislation around humans and landscape fire. In order to consciously extend the relevance of the evaluation beyond academia and beyond the landscapes, landholders and training organisations involved, it is useful to consider how the knowledge emerging through the thesis can interact with other knowledges to create new pathways through policy and legislation.

Weaving a path into and through policy and legislation presents an immediate challenge: governance is usually seen as a human-centred construct. As I discuss in this Chapter, in recent decades, government policy around human / landscape fire relations has focused on the roles of different human individuals and communities in taking responsibility for reducing risks from landscape fire. Over the years, the allocation of responsibility has shifted from government agencies to households and individuals before settling on the current model in which responsibility is shared across human society. However, ‘shared responsibility’ is a contested concept with multiple interpretations, particularly concerning relationships between control over and choice within communities at risk and between the risks to individual humans and risks to broader communities. The theoretical model developed in governance and legal contexts and described in this Chapter seeks to clarify different understandings of

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21 Perhaps unsurprisingly, shared responsibility has been at the centre of debates about neoliberalism, being criticised by some as an offloading of responsibility from the state to private citizens (Hamilton 2012) and defended by others as encouraging virtuous collectivism (Petersen and Tjalve 2013, see also McLennan and Handmer 2014:22).
policy and practice relating to fire, land and risk management by making explicit hidden-value trade-offs between control and choice (or autonomy or agency), and between human communities and individuals (McLennan and Eburn 2015).

As we have seen in Chapters 2, 3 and 4, however, risk is an emergent property of complex, more-than-human entanglements. Whilst humans organise systems to manage the mitigation and adaptation of, and responses to, risks from landscape fire, the presence, pathway and legacy of fire in any particular spot at any particular time is the sum of so many entangled threads that these cannot be controlled or even predicted by humans. Nor is it certain that such control would be desirable. Regarding disturbances such as fires and floods as errant phenomena that humans should seek to control is increasingly viewed as a policy failure, with dire consequences for the becoming of sustainable more-than-human entanglements (see Chapter 3, Griffith 2009, Head Online, Howitt 2013).

The human-centric nature of the hidden-values trade-off model would appear to offer limited opportunities for engaging with ideas about non-human agency and the weaving and unravelling of more-than-human knots. However, moving away from approaches which focus on the roles of particular human groups towards a concept of shared responsibility as an emergent property of different risk management systems or situations (McLennan and Handmer 2014:7, see Section 5.2) has shifted the focus to the need to increase the resilience of communities, and here there is much greater capacity to extend the model to encompass the agency of bio-geo-physical elements and forces within more-than-human communities. Thus, this Chapter uses the information gathered in previous Chapters to extend the model beyond the human, so furthering the development of a coherent, cross-disciplinary approach to understanding policy and practice relating to fire, land and risk management.
ABSTRACT

Over recent decades, policies around disaster risk reduction have shifted towards a model in which resilient communities share responsibility for risk and risk management with emergency services and other government bodies. However, understandings of shared responsibility and community resilience are under-theorised and contested. For many landholders, land managers and academics operating within ecological and geographical disciplines, the concept of community resilience extends beyond the human to incorporate wider biological, geological and physical elements and processes. In this paper we question whether a theoretical human-centric hidden-value trade-offs model, developed in governance and legal contexts to clarify the competing values inherent within conceptualisations of shared responsibility, could provide a common framework for understanding approaches to more-than-human community resilience across legal, governance, land management and scientific contexts, and show how the model could be applied to a sustainable fire management training program.

5.1 Introduction

Over recent decades, policies around Disaster Risk Reduction (DRR) have shifted from so-called paternal\textsuperscript{22} approaches (McLennan and Eburn 2015) through which professional service agencies coordinated by government agencies sought to keep the public safe, through more autonomous approaches in which households and communities were deemed responsible for their own safety, to a distributed responsibility model in which responsibility is shared by the whole of society (COAG 2011:3, McLennan and Handmer 2012a:71-72). This move towards shared responsibility has been accompanied by a shift in focus from emergency “events” to the “exposed system or community” (McLennan and Handmer 2012a:73) and recognition of the need to “foster resilient communities” (McLennan and Eburn 2015:162). Understandings of shared responsibility and resilient

\textsuperscript{22} We use McLeannan and Eburn’s word, ‘paternal’, in this paper to denote a particular approach to responsibility – see below. We note its potentially pejorative connotations, but maintain its use for consistency in applying their framework.
communities are, however, under-theorised and contested in the context of hazard management (McLennan and Eburn 2015:162, McLennan and Handmer 2012b) and are separate, if overlapping, concepts.

In Australia, several organisations now report that they are ‘engaging’ with communities in order to increase resilience to ‘natural hazards’. Commonly, such engagement is conducted through workshops which aim, for example, to work with local communities on planning for bushfire or flooding (see Australian Government Attorney-General’s Department 2014 Online for an overview of programs). In these engagement interventions, the potential exists for tensions to arise between the desire to impose particular knowledge and action frameworks for understanding and managing risk on communities and the desire to encourage shared responsibility (McLennan and Eburn 2015). In the first part of this paper, we show how a theoretical model developed in governance and legal contexts that makes explicit hidden-value trade-offs between control and choice (or autonomy or agency), and between (human) communities and individuals (McLennan and Eburn 2015), can be applied to a sustainable fire management training program. We provide examples of the use of this model during different stages of program development and implementation, and consider how it could be helpful in encouraging organisations to develop coherent approaches which are consistent with wider governance and legal approaches.

For academics, landholders, land managers and others operating within ecological and geographical disciplines, the concept of ‘community resilience’ extends beyond the human to incorporate other elements within the biological, geological and physical environment (Clark 2011, Herman 2015), however. This is particularly relevant in the context of bushfire where myriad bio-geo-physical and social variables converge to influence both the risk embodied in the landscape and the character and consequences of any given bushfire event. Thus, the second part of our paper uses the approach detailed in the earlier section to show how it is possible to extend the hidden-value

23 Other initiatives include community resilience committees, curriculum-linked lesson plans for primary schools, the BEAR plan for school students which teaches calming strategies during emergency situations, and photography competitions (Australian Government Attorney-General’s Department 2014 Online).
trade-off model to encompass the agency and role of bio-geo-physical elements, and explores the extent to which this might facilitate understanding of ‘community resilience’. We acknowledge that there are many challenges to this approach and focus on the trade-off between control and choice (or autonomy or agency), as we believe this may be the more difficult of the two existing trade-offs to conceptualise outside of the human context. We also consider the benefits and challenges of adding a third value trade-off – human versus non-human – and outline two hypothetical scenarios which prioritise human and non-human, or environmental, wellbeing and are thus positioned at the mid, or ‘more-than-human’, point of this axis. Finally, we question whether hidden-value trade-offs could provide a common framework for understanding approaches to community resilience across legal, governance, community engagement, land management and scientific contexts.

5.2 Aim, Background and Research Methods

Our primary aim in this paper is to show how a human-centric theoretical model describing hidden value trade-offs in relation to responsibilities for risk can be extended to provide a common framework for understanding approaches to more-than-human community resilience. However, developing a common framework across disciplines which do not share ontologies, epistemologies and even, at times, language is fraught with difficulties. To meet these challenges and facilitate interdisciplinary understanding, we first apply the human-centric theoretical model developed by McLennan and Eburn to a concrete example of a training program seeking to encourage shared responsibility for sustainable fire movement. We then use this as a springboard to explore how the issues raised through this process can be used to show how more-than-human pathways might be brought into the model.

The training program used as an exemplar in this Chapter is the Hotspots Fire Training Program (hereafter referred to as Hotspots). Through workshops held in different locations across New South Wales, Hotspots trains individual landholders and land managers “to actively and collectively participate in sustainable fire management
planning and implementation” (Hotspots undated). The operational side of Hotspots is run as a partnership between a non-government organisation, the Nature Conservation Council of New South Wales (NCCNSW), and a government agency, the NSW Rural Fire Service (RFS). The program is guided by an Advisory Committee made up of representatives from government, non-government and member organisations working in land management in New South Wales.

The authors conducted an evaluation of Hotspots from 2012 to 2014. Our understanding of the program was developed through reviewing Hotspots literature, interviewing committee members and staff from the partner organisations and following two workshop series through from the identification of the project area to the end of the second workshop. Through the review of Hotspots literature, we sought to develop understanding of how relationships between humans, and between humans and ‘nature’, are conceptualised and operationalised by the Hotspots organisation. We extended this understanding through semi-structured interviews with four staff members of partner organisations, two directly involved in the Hotspots program and two with management responsibilities for Hotspots staff, and a further two committee members. These interviews covered a broad range of themes; those relevant to this paper related to current and historical governance, and moral and legal responsibilities, in the contexts of biodiversity, land management and landscape fire (see Appendix 3).

In addition, one of the researchers followed two workshop series, one in the Southern Tablelands and one in North East New South Wales, both of which lasted two days. In advance of the workshops in the Southern Tablelands, the researcher visited the proposed workshop area with one of the three Hotspots Workshop Facilitators and one of the two Hotspots Ecologists. The aim of this visit was to follow the development of the Ecological Site Story – a document produced by a Hotspots Ecologist which briefly describes the geological, physical and biological features of the demonstration burn-site along with a summary of its general and fire history and the expected benefits of burning. By following the production of the site story, the researcher sought to understand the processes through which knowledge is created and shared (Whatmore 2009) to understand better the relationships at the heart of the Hotspots program. The
researcher then attended the workshops as a participant story-teller (Kenney 2015:762). By placing herself “in the action... where the play or dance of agency takes place” (Franklin 2006:555), she sought to gain further insight into relationships between humans, and between human and other actors (including maps, fire assessment tools, flora, fauna and fire).

Analysis proceeded through an iterative process. Interviews were listened to five times and audio and video recordings of workshops were also listened to and / or watched five times. This allowed the researchers to gain impressions of the ‘whole story’ of the workshop before focusing on different themes which emerged as they moved from one form of data to the other. Relevant discussions from the workshops were then transcribed and these discussions, interview data and field-notes were coded using NVIVO 10.

We then applied the human-centric, hidden-values trade-offs model to the insights gained through our research process, focusing on the vision, development and outcomes of the Hotspots project and the processes of knowledge creation. Finally, we considered how a similar process can be applied in the broader more-than-human context.

We now discuss the background to shared responsibility before describing the hidden-values trade-offs model and applying it to the Hotspots program.

5.3 Background to ‘shared responsibility’

Despite its prominent place within DRR policy in Australia, the concept of shared responsibility is still open to multiple, sometimes conflicting, interpretations. A recent workshop attended by stakeholders involved in a professional, voluntary or personal capacity in risk management, identified a number of key themes linked to ‘shared responsibility’ (McLennan et al 2012). These themes include:
- Reducing government control and engendering trust in the capacity of local communities to design and own solutions to co-existing with risk
- Developing shared values relating to equity and the sharing of costs and benefits in relation to natural hazards
- Mainstreaming disaster resilience into all government decisions, including those made outside of the field of emergency management such as planning
- Honestly acknowledging the limits of existing agency capacity to respond in disaster situations
- Creating flexible structures and processes which can respond to change
- Sharing learning across different hazards

(Adapted from McLennan et al 2012:9-10)

After extensive research into the widely varying conceptualisations of shared responsibility implicit in the submissions of different stakeholders to the Victorian Bushfires Royal Commission, McLennan and Handmer conclude that:

“Shared Responsibility is best thought of as an emergent property of a complex disaster management system... This suggests that attempts to definitively map out or prescribe what Shared Responsibility in Australian disaster management ought to look like may be misguided. A more realistic alternative approach might be to focus on developing processes for stakeholders to collectively negotiate and engage in responsibility-sharing at the different levels and in the diverse settings where risk management takes place” (2014:7, our italics).

Processes of collective stakeholder negotiation imply the need for some level of participatory discourse and McLennan and Eburn note that, “There is increasing emphasis given to the premise that multiple legitimate viewpoints on risk can co-exist in society, and that risk management must therefore involve deliberation amongst parties that hold these multiple viewpoints” (2015:63, our italics). Many agency-run programs working to develop shared responsibility for risk management thus emphasise ‘two-way community engagement’ and ‘participatory processes’; indeed, it is difficult to find a program that does not claim that these, or similar, descriptors are part of their
organisational rationale. Yet, just as the concept of shared responsibility is contested, and despite decades of academic and practical discussion attempting to conceptualise different ‘engagement’ and ‘participatory’ approaches (Arnstein 1969; Buchy and Race 2001; May 2006; Renn 2006), these descriptors still conceal wide variations in organisational interpretations, rationale and practice (Cornwall 2008).

Differences in interpretations and expectations of two-way engagement and participatory processes came to light during our evaluation of Hotspots. Throughout the evaluation, the view of the researchers concerning the nature of relationships between program staff and participants differed from that of the Hotspots team. For example, in conference presentations, Hotspots staff placed the program at the extreme participatory end of participation spectra (see, e.g. Paterson and Carroll 2012), as the final choice of whether or not to burn lies with the landholder. However, as we describe in the next section, the evaluators observed few opportunities for participants to deliberate on the nature and management of risk or to collectively negotiate approaches to responsibility-sharing thus we felt the program fitted more closely with traditional education or extension approaches.

McLennan and Eburn (2015) argue that in legal and governance contexts it is essential to make explicit the political values hidden behind decisions relating to shared responsibility. From the perspective of individual participants (including staff) involved in risk management projects, making these values explicit should clarify expectations of relationships thus avoiding frustration and conflict (State of Victoria 2005:8). Programs that work with communities with the intention of educating and persuading them to support externally determined approaches to hazard reduction are likely to yield very different outcomes from programs which aim to bring new actors into deliberation, encourage questioning and generate new knowledge around local hazard management (Landström et al, McLennan and Handmer 2012a:73). Thus overt articulation of otherwise hidden values should facilitate the planning and funding of coherent regional and / or national strategies to develop capacity for shared responsibility.
We now consider the potential of hidden-value trade-offs to guide the design, development and implementation of engagement programs to encourage shared responsibility in the context of risk assessment and management.

5.4 Hidden-value trade-off theory

Focusing on legal and governance systems, McLennan and Eburn (2015) identify two sets of value trade-offs which “constitute core points of distinction amongst major value orientations in political philosophy that underpin very different ways of conceptualising the sharing of responsibility between governments and citizens” (2015:164). The first of these is between control and choice. McLennan and Eburn contrast a paternalistic approach, which involves a high degree of government control over citizens, with a liberal / libertarian approach in which there is a political preference for citizen autonomy (throughout their paper, McLennan and Eburn interchange the word “choice” with “autonomy”, “freedom” and “liberty” [2015:164]). As can be seen later in this Chapter, although not explicitly discussed in these terms by these authors, the trade-off between control and choice might also be framed as a trade-off between externalised (or centralised) versus localised (or decentralised) processes of knowledge creation, decision-making and action. Within the paternal approach these processes are conducted by persons external to the community at-risk, whereas within the localised approach they are conducted by the individuals or communities that are themselves at-risk.

The second of the value trade-offs identified is between public values and private interests. The authors contrast the communitarian approach, where the emphasis is on benefiting communities as a whole, with the individual approach, where the emphasis is on benefits to individuals. At times public and private values may overlap, for example, individuals reducing the vegetation, or ‘fuel’, on their properties may reduce the fire risk for neighbours. At other times, public and private values may be at odds, for example, a ‘controlled’ burn may reduce risks to the community as a whole but cause individuals to be inconvenienced or, indeed, put at risk due to respiratory conditions such as asthma.
McLennan and Eburn (2015) posit four hypothetical extreme scenarios for sharing responsibility for wildfire management between government and citizens and these are shown in Figure 3. However, they reflect that none of these scenarios is appropriate to all situations, suggesting that “the sharing of responsibility for wildfire management has to rest somewhere along the continuum” (2015:168) and that different scenarios will be relevant to different parts of the hazard management cycle. For example, they suggest that citizen autonomy may be prioritised when preparing for and recovering from major hazard events but in the response phase government control may be prioritised “because only governments will have the capacity for an immediate, coordinated and large scale response” (2015:168). Overall, however, they observe that the autonomous communitarian scenario most closely reflects Australian policy goals relating to shared responsibility (2015:166). This scenario is informed by a “highly localised, decentralised model of wildfire risk management” (166, our italics) within which “communities (are) free to make collective risk management decisions and determine their own priorities” (2015:166). Legislation is kept to a minimum within this scenario, although all but the most extreme decentralised scenario will operate within a national and/or regional legal framework which presents some constraints to activities. It is important to note that communities need not operate as entirely isolated, independent units as “government actors could support communities to build capacity with access to risk information, skills and resources as required” (2015:166). However, the information and skills required would be determined by or in negotiation with the individuals or communities-at-risk who would be active partners in local knowledge creation (Landström et al 2011).

Following an outline of our research methods, we describe the Hotspots workshops before considering how applying hidden-value trade-offs to the Hotspots fire training program, can highlight the choices to be made in interventions (see Pawson et al 2004:3) to encourage shared responsibility for risk management. Due to the complex and protracted nature of describing the application of the model to each and every decision

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24 Although, as pointed out by one reviewer of this paper, companies and industries also have the capacity to engage in large scale responses to hazard events.
and action made in the course of an intervention, we restrict our discussion here to the control / autonomy (externalised / localised) trade-off and draw out illustrative examples from the vision, development, implementation and understanding of outcomes of the project.

![Diagram showing trade-offs between control and autonomy]

Figure 3: Four hypothetical extreme scenarios for sharing responsibility for wildfire management between government and citizens

(McLennan and Eburn 2015:164)

5.5 Applying hidden-value trade-offs to Hotspots in the context of shared responsibility

Having evolved from one to two to three and back to two days, each Hotspots workshop is organised and led by one of three Facilitators assisted by one of two Ecologists. On the morning of Day One, participants meet at a community venue, such as a village fire-shed or hall, where they are invited to watch a Powerpoint presentation about fire ecology and listen to talks from the Facilitator, Ecologist and staff from other government agencies connected with land management. Participants also visit a potential demonstration burn-site where Hotspots and agency staff identify vegetation,
examine evidence of fire history and discuss site-specific issues and the purpose of the proposed burn. In the afternoon the Facilitator “walks participants through the Landholder Fire Management Plan” (Hotspots 2011:24) for the demonstration burn-site. Landholders are then provided with aerial photographs of their own properties and asked to complete Fire Management Plans on these photographs. This involves drawing on symbols to show infrastructure, water features, vegetation types (based on data obtained from remote sensing) and fire histories, before making a 12 month Action Plan relating to fire management. On Day 2, the facilitator talks through the landholder information packs. The demonstration burn-site is re-visited, where landholders observe demonstrations of risk assessment and the use of tools to calculate the fire danger index and fuel loads. In the afternoon, landholders observe a demonstration burn whilst listening to a “running commentary” (Hotspots 2011:53) on burn progress.

The Hotspots program was developed in, and is managed from, Sydney, the capital of New South Wales. In the process of developing the workshops, and within a particular scientific framework for sustainable fire management, program staff identified:

- the problem – risks to biodiversity, people and property from wildfire;
- the solution – prescribed burning; and
- the knowledge required to implement the solution – vegetation classification categories and fire frequency thresholds.

Program participants thus have limited input in terms of framing the issues, determining risk priorities or creating knowledge throughout the process of developing the workshops (Kellert and Mehta 2000, Mulrennan et al. 2012). The workshops run to a tightly scheduled agenda determined in advance and standardised across the project, and many aspects of the workshops resemble a formal schooling situation in which an Educator (in this case the Facilitator) controls the release of information to students. From the seating arrangements (see Chambers 2002:83), to the strict timings of presentations, to the burn which is conducted as a demonstration by experienced fire-fighters, the participants are largely positioned as recipients, rather than creators, of knowledge and information. The Agenda for Day One of the Hotspots workshops
explicitly states that 40% of the time should be allocated to “questions, discussion & other forms of audience participation”\textsuperscript{25} and this should be increased to 50% on Day Two. However, in three of the four workshop series observed by a researcher, the only time that “audience”\textsuperscript{26} (Hotspots 2011:87) participation even approached this proportion was during the guided walk on Day One and the development of fire management plans. Furthermore, the facilitators in these workshops welcomed “questions”, hence landholders were not in a position to initiate or direct discussion.

Overall, then, Hotspots staff members lean towards a paternal approach throughout the development and implementation of the project and offer participants limited freedom to direct or deliberate in workshops. There is limited negotiation with project participants about the nature of risk or the information and skills landholders feel they require to manage this risk. Thus, in the development of the workshops, and in the process of knowledge creation around landscape fire, Hotspots would be positioned towards the left hand side of the control / choice continuum in the hidden-value trade-offs model shown in Figure 3.

This understanding of the workshops appears to be supported by the wider vision of one of the project partners, the RFS, for the role of landholders in sustainable fire management. During an interview, in response to a question about the role of landholders in sustainable fire management, a senior RFS employee with management responsibilities for Hotspots staff described the relationship between landholders and RFS “experts” as being much like that between (western) doctors and patients. He explained:

\begin{quote}
RFS Employee: An analogy is what happens in medicine. Medicine is a science. Is this treatment the right treatment? The GP just makes a professional judgement based on their knowledge of the current level of research and understanding.
\end{quote}

\textsuperscript{25} From a logistics sheet emailed to all participants before the workshop in Palerang Shire.

\textsuperscript{26} The choice of wording itself gives an indication of the relationship between Hotspots and Agency Staff and other participants, with “audience” being defined as “group of spectators or listeners…” (Urdang 1979).
Whereas the patient just looks at it and says, the Doctor told me, that’s the answer."

Within this understanding of risk management, landholders have a definable ‘problem’ which they share with a representative of the RFS who then offers a ‘prescription’ to resolve this problem. They have very limited potential to contribute to policy and decision-making around sustainable fire management, as this employee explained:

RFS Employee: As far as the environmental safety side of things goes, it really is a specialist and complex area... I’m just baffled as to how anyone could complain. What an awesome service the government provides for them.

These views may not be shared by all of the Hotspots team, however throughout the evaluation several members of staff reported feeling disturbed by challenges from workshop participants who believe themselves to be knowledgeable about fire-ecology and local or regional fire issues but who are not compliant with Hotspots visions of sustainable fire management. One such challenge occurred at a workshop observed by one of the researchers. During the first day of the series, lively debate took place amongst participants about the benefits of burning an area which had been nominated for a demonstration burn during the workshop series. Due to weather conditions, the demonstration burn was cancelled and permission for the RFS to burn on a different occasion was later rescinded by the leaseholder who decided that alternative management approaches would be more appropriate. This opinion was formed after listening to arguments from different points of view, all of which recruited scientific knowledge, at the workshops. Nonetheless, the facilitator, other Hotspots staff and some of the participants were disappointed and frustrated by the outcome. A senior member of the RFS also referred to this and similar workshops when asked for his opinion on the success of Hotspots in an interview:

RFS Employee: Obviously the Hotspots program is a collection of individuals and I’m aware that there have been workshops where there have been unhelpful individuals within them – either private landholders or land managers – who have
other political agendas and they bring to that forum. They’ve been disruptive in those workshops.

These comments suggest that in the vision for shared responsibility held by this person with management responsibilities for Hotspots staff, government agencies would retain control of most of the decision-making and action, even during the hazard preparation stage. This surprised some workshop participants. At the time of the evaluation, Hotspots described their overall purpose as being “to enable landholders and land managers to actively and collectively participate in sustainable fire management planning and implementation” (Hotspots, undated:a). Some confusion arose at the workshops when it became clear that landholders are expected to be active primarily through contacting fire agencies and initiating requests to the RFS to conduct burns on their properties according to scientific prescriptions for fire management. Many landholders had expected to come out of the workshops with greater independence from government agencies to “actively ... participate in... fire management... implementation”. When one of the researchers discussed this mismatch between landholders’ expectations and experiences in a meeting with Hotspots staff, it was explained that the aim of the program was to enable landholders to engage with the “ideas” around sustainable fire management and, in particular – although not stated by Hotspots staff members – with ideas consistent with the specific scientific framework for fire management used by the RFS. This gap between expectations and experiences highlights the potential value of organisations making absolutely explicit where they sit in relation to control versus autonomy (or externalisation versus localisation), in order to avoid frustration and confusion by all parties. In terms of both the operation of workshops, and the wider vision for relationships between landholders and government agencies of related staff members, the Hotspots project appears to be positioned towards the left-hand-side of the control / choice continuum in the hidden-value trade-offs model.
Reflections on the application of hidden-value trade-offs to an engagement program in the context of shared responsibility

We have shown how a theoretical model which seeks to clarify the competing values inherent within conceptualisations of shared responsibility can be practically applied to a training program. The Hotspots program (not necessarily all of the individuals working within it) offers landholders limited autonomy in the design and implementation of the workshops. This approach to program development is indicative of the paternal vision of the program partners for shared responsibility in which landholders are deemed to possess insufficient expertise to deliberate on risk and risk management. Their primary role in a shared responsibility scenario is thus limited to requesting assistance from government agencies to conduct risk-reduction activities on the basis of information provided by bodies external to the community at-risk. McLennan and Handmer suggest that, “A program that increases safety outcomes but also increases people’s reliance on agency-controlled advice, information, warnings, or resources is not likely to ‘build disaster resilience within communities over time’” (2012a:73, see also Landström et al. 2011, Owens 2000). From this perspective, although a paternal approach could offer valuable information to a community about the processes involved and decisions made during a particular approach to sustainable fire management, it is unlikely, in itself, to lead to a situation in which individuals and / or communities are genuinely sharing responsibility for the framing and practical management of risk.

We do not suggest that there is anything wrong with this or any other approach to engagement and believe that each may have its place in different situations (see Chapter 4 and Cornwall 2008). However, we have described some of the confusions that can arise when hidden values are not made explicit and there is a resulting mismatch between project rationale and participant expectations. In particular, we have indicated the importance of engaging in explicit consideration of the trade-off between control and autonomy (or externalisation / localisation) and suggest that, in this case at least, the model offers an effective approach to clarifying relationships throughout the engagement process. We believe that the model could be particularly useful in encouraging internal consistency across the different stages of project development,
enabling organisations to trace their implementation practices and responses to outcomes back to their visions for shared responsibility.

Up to now we have focused on shared responsibility rather than community resilience. This is because, as noted by McLennan and Eburn, the fact that people use the same language does not mean “they are coming from the same starting point or will assess the costs and benefits of various policy options in the same way” (2015:168), and ‘community resilience’ has very different connotations within our own discipline of cultural environmental geography than in law or other human-centric disciplines. Within post-humanist ontology, risks such as fire, floods and extreme weather events, are deeply embedded within, and inseparable from, the wider environment (Howitt 2014), thus the notion of ‘community resilience’ includes but extends beyond humans to multiple actors within the bio-, geo- and atmosphere (Hermann 2015), as we now discuss.

5.6 Background to post-humanism and ‘community resilience’

Post-humanist, relational ontologies reject the idea that humans and ‘nature’ are separate, instead positioning humans as an integral, inextricable part of nature. In this view, more-than human ‘actors’ (such as humans, plants, animals, stones, weather and so on), are not viewed as distinct ‘things’ or ‘beings’ but rather ‘co-become’ (Bawaka Country et al 2013:187) through their mutual relationships. Every ‘thing’ is a tangle of relationships in perpetual flux; it is not “that things are entangled in relations; rather every thing is itself an entanglement” (Ingold, 2006). Acknowledgement of inter-connectivity and co-becoming reminds humans of the interrelationships between our own well-being and that of the wider environment (Suchet-Pearson et al., 2013) and challenges us to reject assumptions of control over a passive ‘natural’ world (Ingold 2006).

These ideas have implications for understandings of ‘community resilience’ to risk. Organisations such as UNDP are now explicitly linking “community and ecosystem
resilience” (UNDP Online) in relation to risk through tools such as Indicators for Resilience in Socio-ecological Production Landscapes and Seascapes (UNDP Online). The links between (human) social and ecological resilience have been theorised (Adger 2000, Walker et al 2004) and applied in numerous risk-related contexts from coastal disasters (Adger et al 2005) to climate change (Collier et al 2009). In the context of landscape fire, risks are not restricted to humans and human-built structures but extend to individual plants, trees, fungi and fauna (Clarke 2008, Driscoll et al 2010), and fire patterns and trajectories are themselves influenced by complex, entangled human/’natural’ elements and processes, such as vegetation composition and structure, long and short-term weather patterns, tenure systems and property markets (Howitt 2014:62). In recognition of these multiple, multi-directional relationships, Howitt urges us to “understand that our landscapes must be understood as simultaneously physical and cultural” (2014:63, our italics) if we are to develop policy which shapes our “capacity to live with uncertainty in our human-environment relations” (2014:63). Head observes that:

“A key contradiction persists: we maintain dual ways of talking about things (human impacts, human interaction with environment, anthropogenic climate change, cultural landscapes, social-ecological systems), while the empirical evidence increasingly demonstrates how inextricably humans have become embedded in earth surface and atmospheric processes. Agents of 'disturbance', such as humans and fire, must now be understood as a normal part of ecosystems, rather than an external influence” (Head Online).

Again, some degree of confusion arose between the Hotspots evaluators and program staff regarding the positioning of, and relationships between, humans and the wider environment in the engagement process. This is perhaps unsurprising because academics have the time and freedom to research and develop theory around more-than-human relationships, whereas organisations such as the RFS and NCCNSW operate within practical funding, legal and broader societal constraints which, whilst being more flexible concerning challenges to mainstream views of more-than-human relationships within programs targeting or run by Aboriginal Australians (see Chapter 4), tend to be
more restrictive in relation to programs targeting or run by broader Australian society. In view of the apparent mismatch between the importance placed on the coupled socio-ecological context of community resilience by some academics, indigenous people and others and the reluctance of mainstream policies and interventions to acknowledge this context, we now explore the potential to extend the model proposed by McLennan and Eburn to a more-than-human setting.

5.7 Hidden value trade-offs for community resilience

Within the model, the public / individual value trade-off can be extended to a more-than-human setting if we alter ‘public’ to ‘community’. A more-than-human communitarian scenario would prioritise, for example, the well-being of a community of flora and fauna and / or other biological (including human), geological or physical considerations over the damage to, or death of, some individual organisms during a hazard-reduction burn. In contrast, a more-than-human individual scenario would prioritise the well-being of individuals over that of the community, and this position would be adopted by individuals or groups opposing hazard burns on the grounds that they cause harm, or death, to individual animals, plants and trees.27

The control / choice trade-off is more difficult to interpret in the more-than-human context because modern ontologies do not allow for the idea that non-humans ‘choose’ their behaviour or have free will. However, as mentioned, McLennan and Eburn interchange the word ‘choice’ with ‘autonomy’, ‘liberty’ and ‘freedom’ throughout their discussion of hidden-value trade-offs (2015:64). Restricting the definition of autonomy to “freedom to determine one’s own actions, behaviour etc.” (Urdang 1979), and altering the value trade-off to control / autonomy, would allow for the admission of non-humans into the model even within modern ontologies, provided that control and

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27 This position was adopted by some of our interviewees during the evaluation of Hotspots (see Appendix 1).
autonomy are seen as relative concepts\textsuperscript{28}. An example of an extreme autonomous more-than-human scenario could be allowing a fire started by lightning to run without interference from any individual or group, perhaps for ecological or spiritual reasons (see, for example, Goonrey 2012). An example of a paternal more-than-human scenario could be National Parks initiating and controlling a burn in the belief that this would encourage regeneration of senescent vegetation.

A more nuanced, but potentially complementary, interpretation of the control / autonomy value trade-off would recognise the potential of the agency of the individuals or communities at risk to contribute towards better understanding of local risk situations. Adopting deliberative approaches which seek to understand local framings of risk could reveal, for example, that local people have more dynamic views of environmental futures than those proposed by external organisations, or could find evidence of support for the view that it is desirable to allow for and accommodate landscape fires which rage beyond human control (see Chapter 3, also Landstrom et al 2011). Similarly, a program focusing on the collection of local environmental knowledge would recognise the potential of local people to advise on adaptive strategies in local situations. In contrast, as we have argued in our earlier discussion on shared responsibility, interventions adopting a paternal approach towards humans at risk privilege knowledge which has been collected from individuals and communities in other, sometimes distant, places (see Verran 2002) and which is provided by individuals outside the community, perhaps supported by a small number of key local individuals such as RFS employees, over the knowledge of local individuals and communities at risk. We suggest that this trade-off between the use of external knowledge and the potential of local individuals and / or communities to contribute to understandings of risk can also be applied to the nonhuman world. Within this interpretation, the trade-off might best be seen as a tension between control by powers external to the individuals /

\textsuperscript{28} Whilst hard-line humanists might argue that plants can not determine their own actions, it is prudent to remember that this concept is also extremely complex in the case of humans who operate under a vast array of biological, physical and social constraints.
communities at risk and the agency of the at-risk individuals or communities themselves and now discuss this issue in the context of the Hotspots program.

5.8 Applying hidden-value trade-offs to an engagement program in the context of ‘community resilience’

In contrast to many previous fire management engagement programs, which have framed fire simply as a hazard to humans (Eriksen and Hankins 2014 review this tendency), the purpose of Hotspots is to encourage landholders to consider the pro-active use of fire to encourage resilience in more-than-human communities, that is, the aim is to provide benefits to both humans and the wider environment. Hotspots is a particularly interesting example because the operational part of the program is run by two quite different organisations: the RFS, which is a “firefighting” (RFS Online) organisation initially set up to keep fire away from humans and human property, and the NCCNSW, which “fights for nature” (NCCNSW Online, our italics). A promotional DVD about Hotspots describes sustainable fire management as a “shared vision”, however preliminary discussions at the beginning of this evaluation suggested that, although “joint agency perspective” is emphasised, the NCC crafts sustainable fire management around environmental benefits whilst the RFS focus is on reducing fire risk to humans and human constructions. Disjunctions are to be expected and are in-keeping with the view that actors within a network need not have the same interests, identities or investments, nor be enrolled in a network for the same reasons (Star and Griesemer 1989). The salient point here is that, overall, the focus within Hotspots centres on the resilience of more-than-human communities, even though the emphasis between humans and non-humans is continually shifting.

As we have described our perceptions of the ontology and epistemology underpinning the Hotspots program in relation to the relationships between humans and ‘nature’ in some detail in Chapter 4, we now provide a simple illustrative example of our application of the control / autonomy (externalised / localised) value trade-off to the Hotspots program.
In advance of delivering a workshop, the Ecologist conducts a selective census of the species present in order to assign particular vegetation (Keith) classes to the site which have been pre-determined through data gleaned from other sites distant in time and space. This information about the vegetation class(es) is then combined with historical records about fire in the area to develop a ‘prescription’ for the demonstration burn-site. This is a widely accepted ecological procedure but is, perhaps, less ‘objective’ than it might at first appear. For example, as one of the Ecologists who was struggling to identify a particular species of peppermint (*Eucalyptus spp.*\(^{29}\)) at a potential demonstration burn-site explained, the presence of one type of peppermint in this small area could push the vegetation into a different Keith class. Experiencing difficulties in assigning vegetation classes to complex floral communities is completely normal amongst ecologists; as the process of assigning vegetation to pre-defined classes requires “the artificial simplification and generalisation of ‘real-world’ features” (Hearn et al. 2011), there is considerable variation in the assignation of vegetation classes even amongst experienced professionals (Cherrill and McClean 1999, Hearn et al 2011). However, identifying vegetation types and allocating associated fire prescriptions in a limited time presents a considerable challenge to the Ecologists and this formalised procedure is very different from approaches which seek information or guidance from individual flora and fauna at the site itself about their wellbeing and likely contribution to risk, for example, by looking to the growth patterns of individual trees or the behaviour of local animals for guidance on when to burn (see Chapter 4).

The passivity afforded to non-humans in the scoping process is representative of the wider Hotspots vision for the role of ‘nature’ in sustainable fire management. Within this vision, fire management is planned by assigning land depicted in aerial photographs to vegetation classes, and matching these classes to pre-determined fire frequency intervals. Time since the last fire is determined through historical fire history data and all the numbers are combined and compared to produce a recommendation for burning. This approach is used by government fire and land management agencies across much larger areas but contrasts sharply with indigenous approaches to fire management.

\(^{29}\) *Eucalyptus spp.* are notoriously difficult to identify, not least because they frequently hybridise.
which, as mentioned above, recognise the agency of specific non-human individuals and communities in generating local knowledge and guiding decisions about fire management. The approach is also consistent with a position on the left-hand-side of the externalisation (control) and localisation (autonomy) continuum within the hidden-value trade-offs model.

Reflections on the application of hidden-value trade-offs to an engagement program in the context of more-than-human community resilience

Explicit consideration of externalisation / localisation within the more-than-human context provides insights into about the positioning of ‘nature’ in the Hotspots program. As mentioned, the program structure was developed far from the sites of implementation. Like humans within the paternal vision for sustainable fire management, locally situated non-human individuals and communities are of relevance primarily through the fact of their existence and their resemblance to other communities (or ‘idealised’ vegetation classes) elsewhere, rather than through the nuanced evidence they might provide about local community resilience to risk. Again our purpose here is not to judge the value of paternal or other approaches; in a world which is limited by time, money, human labour and other resource constraints the Hotspots program quickly provides people with information and assistance in developing fire management plans. Our point is rather to show how extending consideration of the trade-off between externalisation (control) and localisation (autonomy) to the more-than-human world directs attention towards human relationships with(in) the biological, geological and physical world. This forces consideration of how local information can integrate with information from outside (Griffiths 2009) and encourages reflection on the fact that risk is not restricted to humans but is a complex entanglement of more-than-human elements and processes.
5.9 Discussion and future directions for research

We recognise that for those steeped in legal and governance discourses, it may seem counterintuitive, if not absurd, to bring non-humans into what is currently a human-centric value framework for understanding shared responsibility. Within modern legal systems, non-humans are not usually the subjects of legislation in relation to risk management (although multiple examples exist where this is not true, for example, when a dangerous animal itself constitutes the risk and comes under an order to be put down, or where vegetation is deemed to present a fire risk and is ordered to be removed as in Section 63 of the Rural Fires Act [RFS Online]). Similarly, non-humans do not directly frame legislation (albeit that ‘nature’ has its own way of dispensing justice for inappropriate actions in relation to risk; indeed, the purpose of legislation around risk is to prevent humans becoming, or causing others to become, victims of this ‘natural justice’). It is understandable, then, that within the legal field the emphasis is largely human-centric.

Community resilience looks very different within human-centric legal frameworks and those of cultural environmental geography, however, and it is important to recognise that, to many working within these paradigms, it might be considered equally absurd to imagine that humans can be teased out from the multiple more-than-human relationships which contribute to resilience (Head Online). Indeed, here the main challenge to applying hidden-value trade-offs may lie in avoiding the “assumption of separate (human and natural) systems” (Head 2008:375) that exists even within work that explicitly acknowledges the socio-ecological context of risk. In this paper we have separated ‘humans’ from ‘others’ in order to illustrate how a model which is currently human-centric can be expanded into the more-than-human world. Ordinarily, however, it should not be necessary to make this separation; just as the control / autonomy trade-off can be considered in relation to human communities, individuals within those communities or some combination of the two, so it can be applied to humans, the environment or any combination thereof.
The fact that different struggles will be encountered in different fields does not preclude the use of the model across legal, governance, scientific and land-management contexts but rather underscores the need to make explicit the human / more-than-human / other-than-human setting within which the model is being applied. This begs the question of whether a third trade-off should be incorporated into the model (see Figure 4), to make explicit values relating to humans and the wider environment which are often simply assumed in discussions about community resilience. The addition of a third value trade-off could heighten awareness of the multiple, multi-directional more-than-human relationships that constitute risk, potentially influencing legislation. Equally, explicitly considering trade-offs between human / more-than-human / other-than-human values could serve as a reminder to those working with scientific models of risk that the role of humans cannot be ignored (see Head 2008). Even in the context of programs such as Hotspots, which prioritise both human and environmental wellbeing, the inclusion of a third value axis would highlight the constantly shifting trade-offs that result from a partnership between a “fire-fighting” organisation and an organisation which “fights for nature”.

![Figure 4: Hidden-value trade-off model with added human – non-human axis](image)
Figure 5 depicts and characterises two possible more-than-human scenarios, one of which values externalised control over more-than-human individuals and / or communities at risk and the other which values local autonomy. Learning and adaptation are seen as being key features of community resilience (Henly-Shapard et al. 2015, Resilience Alliance Online) thus we replace ‘decision-making’, which may be considered more relevant in the legal context of shared responsibility, with ‘knowledge and expertise’ and ‘action’. We join McLennan and Handmer in presenting scenarios which are “hypothetical extremes, each with their own stated and unstated assumptions” and acknowledge that, in reality, systems will be hybrids (2015:168). However, overt consideration of these value trade-offs reminds us of possibilities that are rarely considered in current hazard management approaches. For example, Goonrey cites Rod Mason when explaining that in some traditional Aboriginal societies:

“If a big fire came through, you leave it, let it go. Don’t try to stop it, just get everyone out of its way. Don’t put out natural fires; country did that or another entity. Never interfere with wind, lightning or rain” (Goonrey 2012 Online).

![Figure 5: Two hypothetical extreme scenarios for developing community resilience in more-than-human contexts](image-url)
It is unlikely that current Australian or other societies would be willing to relinquish control over their environment to this extent but it is useful to be reminded that for millennia this was normal practice. Furthermore, it brings alive the more subtle decisions which are frequently made; as noted by McLennan and Eburn, “comparing and contrasting these extremes exposes value trade-offs that are also made repeatedly in more moderate ‘real-world’ management contexts in less extreme and, commonly, less explicit ways” (2015:168). For example, it allows for acknowledgement of the potential of local more-than-human elements to contribute to the generation of knowledge around risk and forces consideration of assumptions about human control over ‘natural hazards’ such as fire.

There have been multiple calls for greater disciplinary cooperation to meet the global challenges of the future, many of which involve learning to co-exist with risk, but practical recommendations for action are rather more limited. Lesley Head (Online) notes that:

“For those of us who grew up with western thinking, the challenge of reconceptualising human relations to the more-than-human world is our most profound and important. It will not occur as a purely cerebral activity, but as a process of engagement with the dilemmas of everyday practice. To undo the destructive practices of modernity... we will need everything in the Enlightenment toolbox, science and arts included. But they will be most effective plunging into the river together, rather than attempting to bridge it.”

McLennan and Eburn begin their paper by contrasting the meaning of responsibility in the governance and legal systems, observing that “What the concept of responsibility means, and thus what are the challenges for sharing it between governments and citizens, looks somewhat different through the conduct of legal and governance processes” (2015:163). We argue that what community resilience means looks very different through the conduct of legal, governance, land management and scientific processes, and have here attempted to ‘plunge into the river’ to work towards a common framework for going beyond humans when making explicit hidden political
values. In doing so, we recognise the need for a shared vocabulary in relation to hidden-value trade-offs. Throughout this paper we have alternated the terms used for control, externalisation or centralisation, and autonomy, agency, localisation or decentralisation. Each has advantages and disadvantages. We suggest that further work is required to assess which of these terms is most meaningful to academics working across different disciplines, agencies and non-government organisations involved in engagement, and the human individuals or communities deemed to be, or identifying as, at-risk.

5.10 Conclusions

Applying the hidden-value trade-offs model to a sustainable fire management training intervention has the potential to clarify relationships between staff members and participants. At each stage of the project cycle, staff members might be encouraged to ask themselves whether they are pursuing a course which recognises the autonomy or agency of individuals and/or communities, or one which will leave control in the hands of government agencies and/or training organisations. This need not change the direction of the training but may avoid frustrations about outcomes. The advantage of using this model is that it could feed directly into wider frameworks for shared responsibility for risk management.

Currently, this model is human-centric, however, and thus might be deemed inappropriate for use in the context of community resilience by those who view resilient communities as complex entanglements of biological (including humans), geological and physical elements and processes. In this paper, we have shown how the model can be extended to more-than-human communities within engagement programs. Work remains to be done, particularly in terms of identifying the vocabulary which resonates with most people and deciding whether the model would work better with the addition of a human/environmental value trade-off or whether it is sufficient to apply the model as-is within the more-than-human environment. Overall, we believe the model has the potential to provide a common framework for understanding more-than-human
approaches to community resilience across legal, governance, community engagement, land management and scientific contexts, but encourage further experimentation.

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Chapter 6 Reflecting on more-than-human ghosts at the research encounter

This Chapter is the article which became Edwards A (In press) Beyond here, beyond now, beyond human: reflecting on ghostly presences in field research Cultural Geographies. In this Chapter, the focus returns to the processes of knowledge creation during research.

Throughout this thesis, I have followed the lines travelled by biological (including human), physical, geographical and artefactual entities and forces as they weave through fiery entanglements. These lines knot together at particular times and places, for example, as landholders move about their landholdings, as training organisations deliver workshops and as policy-makers seek to make sense of multi- and inter-disciplinary perspectives on co-existence with fire. As noted in Chapter 2, the evaluation also weaves its way into fiery entanglements, most obviously forming ‘knots’ during empirical field research. These ‘research knots’, or field encounters, have been a subject of reflection within qualitative research for many years, at times driving methodological and disciplinary innovation (see Introduction, this Chapter).

From a traditional social science perspective, empirical field research – whether it takes the form of observations, formal interviews, focus groups or other activities – is commonly viewed as a social process in which two or more humans think about, observe and discuss issues of mutual interest. The relational perspective I adopt in this thesis questions the meaning of both ‘social’ and ‘process’. Here, ‘social’ is not restricted to interactions between humans, but challenges the separation between humans and others to encompass a co-mingling of human minds and bodies with (bio)physical, geographical and artefactual forces and flows (Ingold 2010 Online). Similarly, ‘process’ stretches the temporal boundaries of research ‘events’ to consider how they emerge, together with the researcher, researched and research environment, through the gathering together of threads which extend backwards and forwards in time.
This Chapter focuses on one research ‘event’ – a conversation with a landholder as we walk through a landholding – to highlight how multiple more-than-human threads knot together in the dynamic creation of field research encounters and research stories. Echoing Chapter 3, I show how influences on the research event extend spatially beyond the boundaries of the landholding that is the research location, and temporally from geological processes happening thousands of years of years ago to future outcomes that are yet to happen and, indeed, may never happen at all. However, the reflexive researcher inevitably meets with the impossibility of following up all of the threads leading to and from the research event and here I attempt to show some of the ways in which some of the histories-geographies and imaginaries in the researcher, researched and research environment influence the research story.

In Chapter 3, in order to maintain the sense of connection between temporal and spatial forces operating at different scales, I experimented with an extended narrative based on a conversation with one landholder. In this Chapter, for the same reasons, I again break with the traditional approach to research writing and present a creative non-fiction (Barone 2008, Neilsen 2008) account of the field ‘encounter’ before discussing the implications of the issues raised therein.
ABSTRACT

The research encounter can be understood as an interaction between an individuated researcher positioned inside or outside a community or culture, a more fluid researcher testing and sometimes crossing the permeable boundaries of a shifting community, or an entanglement of dynamic trajectories. Within this last, relational, approach, previous work identifies the agency of multiple past and present human social relationships in the co-construction of the research story, however there has been limited reflection on (bio)physical, geographical, artefactual and other more-than-human entanglements. In this paper, I use a creative non-fiction approach to describe the processes, and challenges, involved in developing a dynamic, relational understanding of research encounters through an exploration of how (bio)physical, geographical, artefactual and other presences interact with ghostly geographies, histories and imaginaries in persons and places to influence the generation and analysis of research data.

6.1 Introduction

The research encounter can be understood as an interaction between an individuated researcher positioned inside or outside a community or culture, a more fluid researcher testing and sometimes crossing the permeable boundaries of a shifting community, or an entanglement of dynamic, more-than-human trajectories – a “simultaneity of stories so far” Massey 2005:54. In this paper, I contribute to efforts to describe the processes, and challenges, involved in developing a dynamic, relational understanding of field research through an exploration of relationships between the researcher, researched, research context and absent (bio)physical, geographical, artefactual and other entities or entanglements30.

30 Here I adopt the word “entanglement” as used by Ingold (2007) in which “Persons and things... are formed in the meshwork as knots or bundles of such relations. It is not, then, that things are entangled in relations; rather every thing is itself an entanglement, and is thus linked to other things by way of the flows of materials that make it up...” T. Ingold, ‘Writing texts, reading materials, A response to my critics’, Archaeological Dialogues 14:1 (2007), pp.31-38.
Previous work on relational understandings of the research process identifies the agency of multiple human relationships in the co-construction and storying of research encounters. These relationships include those between the researcher and research ‘participants’; other humans present during research, such as family (Burarrwanga et al 2012, Frohlick 2002); and absent humans, who may be characters from the researcher’s past (Doucet 2008, Gordon 1996, McMahon 1996), present or future, such as family, epistemic and epistemological communities (Doucet 2008) or future readers and reviewers of research outputs (Burarrwanga et al 2012:41-42). Recent work has shown a turn towards recognition of the agency of the (bio)physical, geographical and artefactual environment local to the area in which the research is being conducted, for example, Burarrwanga et al (2013) describe the agency of Bawaka Country in the co-construction of knowledge during the research process. I add to this discussion by suggesting that research interviews and ethnography are also co-constructed by entanglements which extend not only beyond the human but also temporally, beyond the present, and spatially, beyond the field location. These (bio)physical, geographical and artefactual entanglements, distantly removed in space and time and thus referred to in this article as ‘ghosts’, guide the observations and decisions made during the research process and motivate researcher choices around theoretical paradigms and research subjects (Jones 2015). As the number of relationships existing within any specific research encounter is effectively infinite, however, it is impossible for any researcher to process all but a tiny proportion of these relationships, still less to know enough to comment authoritatively on them. These issues are often overlooked in reports on research, hence I explicitly draw attention to them through a creative non-fiction report on a single research encounter.
6.2 Understanding relational research encounters

Research encounters have been a subject of reflection within qualitative research for many years, at times driving methodological and disciplinary innovation. For example, provoked at least in part by the ‘crisis of representation’ (Marcus and Fischer 1986) in anthropology, reflexivity has been important to the development of feminist and post-colonial critiques which question the neutrality and universality of research and move towards an understanding of knowledge as partial, specific and situated (Haraway 1991, Harding 1991, McDowell 1992). Much of the focus within reflexivity has fallen on the identity and positioning of the researcher as ‘Inside’ or ‘Outside’ the community or culture s/he is researching, and this continues to be a topic of interest across a range of disciplines (Hellawell 2009, Kelly 2014, Rubin 2012). For many years, researcher positionality was largely seen as being dependent on *a priori* fixed characteristics such as the citizenship, ethnicity, language, religion or gender of the researcher (Ergun and Erdemir 2010, Ganga and Scott 2006). However, many scholars question the relevance, value and accuracy of these characteristics. Observing that “individuals have not a single status but a status set” (Merton 1972:22), Merton suggests that “all of us are both Insiders and Outsiders in various social situations” (1972:41). Thus, many qualitative researchers abandon the Insider / Outsider binary and position themselves on a spectrum, allowing for fluidity and movement within the spectrum. For example, feminist researchers such as Madge promote the idea of “multiple selves” (Madge 1993:296), presenting a dynamic view of research identities which can be “manipulated, promoted, resisted, negotiated and accepted” (1993:296) through the research process. More recently, Eppley “re-conceptualizes” researcher identity “not as a fixed and binary positioning, but an unsettled, tenuous positionality situated within a continuum” (Eppley 2006:1, see also Ergun and Erdemir 2010 and Grahame and Grahame 2009). In these understandings, the emphasis is on the permeability of boundaries, border crossing and hybridisation (Kelly 2014, Wegener 2014).

Understanding researcher positionality as constantly fluctuating has encouraged greater scrutiny of the complex relationships influencing research encounters (Kusow
Embedded within the conceptualisation of researchers as Insiders or Outsiders, lies a belief that there is an entity (culture, community or) inside, or outside, which it is possible for another entity (the researcher) to sit. Moreover, positioning a researcher in relation to another individual, culture or community suggests that it is possible to have full knowledge of the researcher, researched and research context, thereby risking the very understanding of knowledge as partial, specific and situated that reflexivity is designed to question (Rose 1997:305). Thus much feminist, post-colonial and other research has moved towards a relational perspective which encourages us to abandon even fluid and changeable boundaries or borders. Instead each entity or entanglement in the research interaction is viewed as being ever-open to negotiation. As noted by Hart, “Instead of starting with a presumption of pre-existing bounded entities – whether spatial, social or individual – a relational approach attends explicitly to ongoing processes of constitution” (Hart 2002:296 cited in Kelly 2014:248).

This shift to an understanding of the research encounter as “a bundle of trajectories” (Massey 2005:119) or “simultaneity of stories-so-far” (2005:54) extends the temporal scale and admits relationships with absent others, or ghosts, into the range of influential entanglements. Several researchers reflect on how human characters from the past, frequently from childhood, impact on research interactions, interpretations of those interactions and the stories which are ultimately told in academic theses, journals and books (Doucet 2008, Gordon 1996, McMahon 1996). These ghost relationships may awaken a “sympathetic openness” (Doucet 2008:76) to research participants, however, as warned by Doucet, this position may change as research progresses (Doucet 2008:76). Similarly, Burarrwanga et al suggest that research may be influenced by relationships which are not yet in existence but might be expected to arise in future, for example with reviewers and readers of the outputs of research, including academics, tourists, university students and the general public (Burarrwanga et al 2012:41-42).

So far this review has focused primarily on human relationships. However, research encounters take place within specific physical, geographical and artefactual
environments. Research within performative and phenomenological paradigms more generally has described the co-evolution of humans and place (Cloke and Jones 2001, Suchet-Pearson et al 2013, Wylie 2002), and cultural geographers have challenged oppositional dualisms relating to time to show how more-than-human pasts as well as presents construct people and place (Jones 2015, Lorimer 2014, Wylie 2005, Wylie 2007). In the specific context of field-research, Bawaka Country inc. (2015) highlight the importance of attending to the locality within which the research takes place but we might also expect more-than-human absences to influence the generation, analysis and storying of research ‘data’ (Bourdieu and Wacquant 1992). Working within a relational paradigm, Kelly notes that “…researchers’ explorations in a particular setting will be dependent on their fluency in the dominant language, awareness of ways of knowing and being shared by other participants, recognition of situational factors … and familiarity with significant wider influences” (Kelly 2014:255). Accepting that (some of) the dominant language(s) and other participants may be neither human nor present, and that ‘ways of knowing’ may have developed through relationships with(in) environments far from the research locality, further expands the possible range of influences on research encounters.

In this paper, I explore how present more-than-human entanglements interact with ghost entanglements to influence observations, reports and interpretations of field research. By focusing on an interaction in an ancient wet sclerophyll / rainforest in northern New South Wales involving an Australian ‘tree-changer’ of settler heritage and an immigrant researcher haunted by a ‘homeland’ half a world away, I expand the existing literature reflecting on relational research encounters into different territory. I use a creative non-fiction approach to illustrate my argument for the reasons now described.

6.3 Creative Non-Fiction

In writing accounts of field research, the researcher is challenged by the complexity and the dynamic, processual nature of entanglements. Traditional academic writing
can appear to fix and freeze the slippery and indistinct and the momentarily existent. Social research, particularly as described in text books, is often now:

“...understood as an autonomous procedure in quest of a conclusive discovery about self-presenting natural data that is subsequently related in an omniscient, transparent text... The text calls no attention to itself, even while it struggles to appear as an automatic and faithful reproduction of an a priori reality” (Banks 2008:158).

This has served a purpose and has furthered debate on social issues but has concealed the subjective and ephemeral nature of research (Law 2004:3). Efforts have been made enliven research writing, to render it less susceptible to criticisms that researchers are obsessed with framing and fixing, for example, through non- or more-than-representational theory (Dewsbury et al 2002, Lorimer 2005, Thrift 2000a) and visual and other arts (Knowles and Cole 2008, Knowles et al 2008). The messy nature of research has been highlighted in academic “stories” of research produced in Australia by a collective of Indigenous and non-Indigenous researchers and more-than-human agencies (Burarrwanga et al 2012), and in the context of spectral geographies, Wylie has called for research to work with forms of documentary experimentation” (Wylie 2007:185) in a way which “unsettles narrative and subject, that reveals the shaping of place through haunting rather than dwelling, that dislocates past and present, memory and visibility...” (2007:185).

Throughout the short history of social science, there has been considerable internal wrangling about art versus science, single versus multiple realities, positivism versus a whole host of alternatives. However, these dualisms are themselves a fairly recent invention as:

“Before the 17th century, these dualisms (between “art” and “science”, “fiction” and nonfiction”) were nowhere to be found... It took an “assault on ambiguity” by the mathematical and physical sciences, with their emphases on theoretical rigor and metric precision... to devalue the then prevailing “natural” forms of discourse through the erection of a hierarchy of language genre” (Barone 2008:106).
Several authors have explored the nature of these dualisms. In 1977, Richard Harvey Brown concluded that, whilst the methodology, and perhaps even the type of person attracted by arts and sciences, may differ “...the pioneering artist and the pioneering scientist are both seen as involved in essentially the same activity: making paradigms through which experience becomes intelligible” (Brown 1977:2, see also Banks 2008:152). Neilsen also seeks to minimise the “false distinctions or choices our enterprises often invite: literary or academic, subjective or objective, science or art, humanities or social sciences” (Neilsen 2008:96). However, Nielsen does observe that whilst the scientific method gathers data to “prove” (perhaps, more accurately, to disprove, or to suggest beyond reasonable doubt), the artistic intention is “to immerse, to illuminate and to connect” (2008:96). And, in contrast to the scientific experience, through lyric inquiry, “A reader does not take away three key points or five examples. A reader comes away with the resonance of another’s world...” (2008:96).

Following an explanation of the background to this research, this paper presents and analyses a creative non-fiction report of an ‘interview’ in Northern New South Wales. I use a creative non-fiction approach to draw attention to the messy, ephemeral nature of entanglements within the encounter and the subjectivity involved in the writing of the report. I focus on the detail of a single interaction in order to highlight the complexities of developing a relational understanding of a more-than-human research encounter and explain “how we come to know and write about others” (Doucet 2008:73).

6.4 Background to the research

During 2012-2013, I was involved in an evaluation of an Australian fire management training program. Through a two-day series of workshops, this program provides landholders with information to enhance their ability to make decisions relating to practical and sustainable management of fire in the landscape.
As part of the evaluation, I undertook case studies of two workshop series, one of which was held in the border country of New South Wales / Queensland. Aspects of the case studies relevant to this paper include:

- Informal ‘interviews’ with landholders before their attendance at the fire training workshop. All but one of these ‘interviews’, or conversations, were conducted whilst walking around the landholding;
- Participant observations of the two workshop days in each series;
- A second mobile conversation with the same participant landholders two months after the end of the workshop series.

I wrote the following account of a research encounter in the field following a second interview with a landholder, Kenny, in northern New South Wales. This was our fourth meeting, after the first interview and two day-long workshops. The research purpose of the meeting was to understand Kenny’s responses to the training process and to set this within the context of his relationships with fire and land management more generally.

6.5 Description of the research encounter

Rain drives into my face, as I skid and stumble the fifty metres from the car. I pull the drawstring on my cagoul tight, the slit mouth of the red hood revealing only my eyes, and knock on the door of the tiny lean-to extension of the caravan. Muffled bumps and thuds rumble through wood and silicon. The door opens and the warm, earthy residue of an afternoon bong floats out before sinking in the sopping air. Kenny wipes his eyes with the back of a grimy hand and peers into the murky light. Laughing at my two-wheel drive hire-car, he asks how I made it up the long, steep, mud-slide of a drive and confirms that I won’t get to the guest house tonight because the ford’s been washed out for two days. Then he squeezes bare, dirt-ingrained feet into board-stiff boots and joins me out in the rain.
We stroll across the garden. New animal-spirit sculptures, carved from too-good-to-burn brushwood, snake in a circle just above the ‘van. “I’m protecting myself,” he tells me and I know enough of his history to sympathise with his need for a little protection. But the spirits have not protected the cacti which tumble hopelessly to the ground, waterlogged roots unable to hold their sodden weight. Shrugging philosophically, Kenny observes that they’re not difficult to propagate, he’ll sort them out when it dries up a bit. They could sort themselves out, no doubt to the chagrin of the networks of humans beavering away to halt the self-driven march of cacti across Queensland (see Australian Invasive Cacti Network Online). But Kenny doesn’t let the cacti have it all their own way here, he likes the garden to be a two-way thing, a co-creation of plant and human. He smiles, “I guess it’s so much a part of me now, I feel you don’t know me until you come here.” Like a field-woman from Tess of the d’Urbervilles, he is “... a portion of the field; (he) has somehow lost (his) own margin, imbibed the essence of (his) surrounding, and assimilated (him)self with it” (Hardy 1981).

I can relate to that. Or maybe I relate better to Emily Bronte, whose “native hills were far more to her than a spectacle; they were what she lived in, and by, as much as the wild birds...” (Bronte 1965: preface). But I’m a long way from my native hills, here. In those hills I can recognise most trees at 100 metres and, moreover, would be able to hazard a decent guess about the plants underneath them, the animals who make long-term homes in them and the visitors who come just for the season. Here, I’m a visitor, but not a regular migrant who knows these hills as well as my own. Here, I’m lost amongst the eucalypts, the bloodwoods and the bangalow palm and have to console myself with the fact that even Kenny would be lost among the fungi31.

Kenny asks if I’d like a cup of tea, warning me that it could take some time as he does not use gas in protest against local fracking applications. I accept and we return to a cleared area of land near the ‘van. The fire has drowned in the deluge so he retrieves a handful of sticks from beneath a plastic cradle and squats to build a pyramid under

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31 A recent estimate put the number of known species of fungi in Australia at less than 12000, whilst the actual number of species is estimated around 50000 (Chapman 2009).
a square of suspended corrugated iron. He balls up a newspaper, flicks his lighter against the trailing edge and gently fans a reluctant flame with a ‘Lock-The-Gate’\textsuperscript{32} sign. I laugh at this double protest against coal seam gas. “I’m growing my dreadlocks again,” he says, “As a public symbol to the fucking government that makes a mockery of everything; that makes landholders obey a hundred petty rules and regulations then threatens to walk right in, take over the whole valley and destroy it forever.” A third protest then!

A log rolls off the fire and burns Kenny’s finger as he retrieves and balances it. He crowns the pyramid with a soot-blackened kettle. We talk in the rain long after the kettle has boiled and the tea has been drunk. I discover that Kenny lived in my homeland for many years and that we share many other experiences and opinions as we discuss Catholicism, animism, education, court cases, house building, dentists, consumerism, children, the death of loved ones, personal freedoms in Australia and Europe. Then I remember that we’re supposed to be co-creating research data about human/fire/land relations and we set off for a walk around Kenny’s 100 acres. The rain has washed away the sebum on my hands and the blood vessels in my fingers are constricting, turning my skin into tyre treads. Kenny laughingly wonders aloud if he didn’t prefer the drought. Still, he reckons the rain, the discomfort, just the sheer effort of maintaining his existence, are infinitely better than the cosy numbness of a city house. He’s done that before but he couldn’t do it again. I share with him my distaste for suburbia, the need to make frequent escapes to the hills in order to remain sane.

We walk up the hill to the area Kenny is thinking of burning. He’s worried that if he burns this patch and there’s no rain following the burn it’ll be invaded by Crofton weed. Crofton weed is the bane of Kenny’s life, resisting his every attempt to destroy it. I’m still struggling to identify this plant and have to ask him to confirm it is what I think it is. He tells me that Crofton weed is just hard work, that’s what it is. He doesn’t

\textsuperscript{32} Kenny is involved with the Lock the Gate Alliance, “a national coalition of people from across Australia, including farmers, traditional custodians, conservationists and urban residents” (http://www.lockthegate.org.au/) that protests against the mining of coal seam gas in the belief that it is unsafe and inappropriate.
mind hard work but he does it on his own terms. When the creative urge takes him
grafts for days and nights at a time, until the job’s finished or the urge fades. He
says he’s a bit obsessive compulsive, having enormous motivation once he decides to
do something until it’s finished or until the urge goes. Like my older son, he’s bursting
with extraordinary creativity, thinking laterally, drawing in metaphor and analogy.

At the top, on the ridge, grass trees are growing from seed. Kenny’s going to plant
them out up here in a geometric design – circle, straight line, circle, straight line,
circle, straight line. It’s another plant-human co-creation but he hesitates as he talks
about this one, revealing a twinge of doubt about making the ridge ‘unnatural’. Then
he sees the moment when he strides up the path to look along the ridge and the grass
trees all line up – whoosh – and grins. “It’s all a bit Andy Goldsworthy\textsuperscript{33} – sort
of magic”, he says. He likes working with magic but not all the magical and mystical
is positive. As we begin a downhill slide into a gully, he is discomforted again. This part
of his land gives him the creeps. Perhaps not an Emily Bronte then – more like one of
her raw, haunted spirits from Wuthering Heights.

Dusk envelops the hill as we return to the caravan. Kenny spends much time re-
agitating the idling fire into productive life to re-boil the kettle. By the time we enter
the caravan to start the interview proper, it’s dark. A candle flame bathes Kenny’s
face in an eerie golden glow. We talk through the fire training workshop we recently
attended. When I ask, “Did it change your vision for your land?” a small smile curves
the corners of his mouth. He pauses a moment, before stating, “Not as much as the
mushrooms.” He tells me that earlier this year, over 1000 psilocybin mushrooms
opened up his world. He ate them for up to five days at a time and felt connected to
everything, felt animal spirits channelling through him, knew exactly what he had to
do with his land. This is one fungus with which he’s very familiar!

I flash back to my single experience with magic mushrooms – to cartwheels on a
remote Scottish beach, star-spattered skies and sand-gritty mussels – and smile. He
watches my response, then pushes a roll-up towards me, “I’ve got a nice bud here if

\textsuperscript{33} Andy Goldsworthy is a British artist working with natural materials.
you wanna smoke it”. I laugh – finally a plant I recognise – but decline the offer because I don’t smoke cannabis. But then I’m visited by anxiety about my commitment to this research. There are so many ways of ‘knowing’ and I worry that in passing over the opportunity to smoke this plant, which is “literally... grounded in (this) precise and particular locale” (Aggarwal et al 2012:4), I am failing to truly engage with situated, human/fire/land relations.

6.6 Beyond here, beyond now, beyond human in the research encounter

A multitude of relational presences and absences work to co-construct this encounter. Several involve absent humans; for example, at one point I am struck by the similarities between Kenny and my older son. However, influences on this research go beyond the human to incorporate complex (bio)physical, geographical and artefactual entanglements which extend temporally and spatially far beyond this encounter.

A few hundred metres below Kenny’s land a thin film of gas lies bonded to the surface of coal. Formed from plant matter deposited over millions of years, and held in place under the pressure of earth and water, this gas is described in promotional material for multinational companies with headquarters far from here as a “vast energy storehouse” (Arrow Energy Online). Its presence brings some uncertainty to the inhabitants of this valley, however; Kenny fears that this mining this gas through hydraulic fracturing will pollute the air, contaminate water supplies and reduce biodiversity and may even force him from his land. He brings his protest against this potential mining into his personal life by refusing to use gas in his caravan, instead burning fallen wood from his landholding for heating and cooking. Thus he reveals himself as highly principled and prepared to undergo considerable inconvenience to support his beliefs. In this way, and through his dreadlocks and the artistic displays of Lock The Gate signs throughout his property, Kenny embodies his protest throughout the encounter. But the influence of this issue goes well beyond these overt signs, for example, encouraging Kenny to question his adherence to rules and
regulations around land management and possibly contributing to his increased consumption of illicit substances. As such, this legacy of ancient plants far beneath Kenny’s land, and their imagined role in his future, give me insights into Kenny’s story and a context in which to interpret his responses to questions about land and fire management.

The spectral futures provoked by the presence of coal-seam gas combine with other more-than-human entanglements to influence the direction of the research encounter. Because Kenny does not use piped gas, he builds a fire to heat a kettle but this is made considerably more difficult by the rain. The impact of the presence of rain, and its implications for methodology have been explored in Chapter 2. For the purposes of this paper, I note only that without the interaction between the rain and Kenny’s reluctance to use gas, this interview would have been much shorter, would have been more tightly restricted to discussions of land, fire and training programs, and would have been less likely to result in Kenny’s revelation that the trajectory of his land is at least partly dependent on psilocybic mushrooms. Here, however, I wish to explore how the rain interacted with my own “histories-(futures-geographies)-in-person” (see Holland and Lave 2009:1) to influence the research encounter.

I spent my childhood in Yorkshire, more than 17000 km from northern New South Wales. On average, the Yorkshire Dales experiences around 1500 mm of precipitation per annum\(^{34}\), thus rain was a frequent presence in my youth. In addition, another memory of rain was “fanned... into renewed life” (Jones 2011:875) during the writing of this paper. Living in remote northern Kenya for a year during the famine of the mid-1980s, I shared with my village celebrations, dancing, utter joy in the, literally, human-life-saving rains which eventually came. For me, rain is associated with youth, life and celebration.

When driving to this research encounter, I was warned by mobile phone that I would be unable to reach the guesthouse and might not make it as far as Kenny’s property

\(^{34}\) Rainfall data from [www.YorkshireDales-stay.co.uk/weather.html](http://www.YorkshireDales-stay.co.uk/weather.html).
due to the rain. However, propelled by ghosts of life-giving rains and an initially subconscious eagerness to return to saturated hills, and prepared for the conditions through experience of surviving in wet, remote conditions, I ignored advice to stay on the Queensland side of the border. Similarly, it was not necessary to drink tea on arrival at Kenny’s property – a glass of water would have sufficed – but both Kenny and I preferred to re-kind the fire and boil a kettle. As the rain mingled with our bodies, we discovered and celebrated a shared willingness to experience the tangible and not entirely comfortable offerings of Country. In this way, my own rainy ghosts combined with Kenny’s anxieties about future fracking to change the course of the research encounter.

The influence of my homeland on this research goes far beyond a simple relationship with weather, however. Despite decades of physical absence from my life, Yorkshire plays an important part in my life, provoking my curiosity about people and place and the relationships between them. Indeed, without my ghost relationship with the Yorkshire Dales, I might not have been evaluating a training program for landholders at all, or have chosen to do so through a relational lens. This relationship alerts me to the Aboriginal ghosts of this land, whose displacement dramatically altered its trajectory. My ghost relationship with Yorkshire enables me to develop understanding of the ways in which Kenny, and other landholders, co-become with their land and sensitises me to the complexities of ‘belonging’ to a land from which the indigenous inhabitants have been forcibly driven (see Read 2000). It allows me to share the passion with which Aboriginal people, academics and others seek to promote acknowledgement of more-than-human agency and its implications for the ways in which we live with and care as Nature (see Suchet-Pearson et al 2013). It engenders awareness of, and frustration about, my limited knowledge of flora and fauna in New South Wales, and the ways in which this lack of knowledge alters the balance of power in research encounters. It operates in the unconscious and affective realms (see Jones 2015, Wylie 2005) but also at the bodily level, in neuronal networks, provoking sensitivity to differences in the taste of water, the smells of wood-smoke, the ‘vibe’ of a place that can give someone “the creeps”. And, in the context of fire management, it encourages a commitment to amplifying the voices
and experiences of landholders to set alongside those of policy-makers, government agencies and training organisations.

My relationship with the Yorkshire Dales also creates interest in ways of exploring human / nature relationships which subsequently move on their own trajectory in my research. My evolving and fragmentary understanding of Kenny’s emerging relationship with his land is influenced by physically absent works of art, including the sculptures of Andy Goldsworthy, and literature, such as Wuthering Heights and Tess of the d’Urbervilles. The presence of these works of art at the research interaction was not always shared. For example, Kenny (and the reader) may or may not have read Tess of the d’Urbervilles and Wuthering Heights. Even if he has, he may never have compared himself to characters from these books and almost certainly was not doing so at the time of this research interaction. Yet these relationships with absent works of art and literature co-constructed my understanding of Kenny’s story at the time and later during the writing up of the research encounter.

These art-works also influence my writing of this encounter and my decision to use creative non-fiction as a tool for discussion. Working in this way enables me to “dislocate past and present, memory and visibility...” (Wylie 2007:185) and to convey something of the hesitancies and uncertainty that frequently do not make it into more traditional research accounts. For example, here I have reported Kenny’s claim that the mushrooms showed him “exactly” what to do with his land whilst also relating his hesitation about making the ridge “unnatural” with his plan to plant grass-trees. Similarly, I decline the offer to smoke cannabis but then wonder whether in doing so I am failing to be open to different ways of “knowing”. The vignette extends this sense of uncertainty to the reader through my statement, “I know enough of his history to sympathise with his need for a little protection”. This is not expanded upon; the reader does not learn what I know. This is partly a measure to protect Kenny’s privacy but also a deliberate attempt to remind readers that when reporting on research, the researcher excludes them from far more information than s/he shares. I am hoping that in adopting a narrative style more commonly associated with fiction, I am encouraging the reader to suspend the belief that this is an accurate portrayal
of a singular, contained event and is, rather, just one tale of many that could have been told.

6.7 Reflections

Throughout this encounter, multiple ghostly entanglements – with humans, rain, other Country, literature – influence my actions and interpretations. My ghosts do not act alone but interact with those of Kenny and the research location itself, to elongate the interview and shift its direction. Dodgshon observes that “the present is clearly burdened with all our temporalities” (Dodgshon 2008:306) and I have shown how research encounters are burdened with the beyond-present temporalities and beyond-location spatialities of the researcher, researched and research location. Perhaps then it is appropriate then to emphasise not only how “histories-in-persons” (Holland and Lave 2009:1) influence field research but geographies, histories and imaginaries in persons and places.

These temporalities and spatialities have very real consequences for the generation, analysis and reporting of research data. For example, my own geographies, histories and imaginaries mean that I am generally more able to establish rapport with landholders than with policy-makers, program staff working from city headquarters and other academics. Like Doucet, I find that on analysing my research, I read landholder “narratives with tacit understanding as they (bring me) back to a place of familiar stories and rhythms (Doucet 2008:78). But it is not only listening to and reading their narratives but being with landholders and observing their interactions as Nature that bring forth more-than-human ghosts and facilitate deeper understanding of relationships. As observed by Doucet, this position can shift and, whilst remaining sympathetic, need not remain wholly uncritical. For example, looking out and forward from this encounter to a phantom future for this region, I can imagine the spread of cactii far beyond Kenny’s land, a scenario that invites a different perspective on his life in this wet sclerophyll / sub-tropical rain forest.
There are inherent dangers in acknowledging and writing about the agency of (bio)physical, geographical and artefactual ghosts in co-constructing field research. Firstly, with specific reference to the ghostly relationships experienced by the researcher, it could appear that I am suggesting that knowledge of beyond-human entanglements is universal rather than situated in particular places. But it is not of knowledge, nor even of memories that I speak but of an orientation or recognition. Gordon notes that “Being haunted draws us affectively, sometimes against our will and always a bit magically, into the structure of feeling of a reality we come to experience, not as cold knowledge, but as transformative recognition” (Gordon 1996:8). It is less to do with being an Insider or Outsider in a particular place, or even with having the a priori intimate knowledge (see Merton 1972) required to understand the challenges to local people, than with developing a particular orientation. Writing on the methods used in post-humanist research, Richardson-Ngwenya notes that in order to “get at ‘the vital’” she did not have to enrol “fantastical new methods” but rather to cultivate “a vitalist geographical imagination that was receptive and open to the liveliness of materialities and the significance of relational becomings...” (Richardson-Ngwenya 2014:297). I suggest that my ghostly relationships provided me with an a priori receptivity to an understanding of the relational becomings of landholders in northern New South Wales, and heightened sensitivity towards the influence of more-than-human relationships.

A second challenge to the development of a relational understanding is the fact that the number of entanglements influencing any research encounter is literally infinite. These entanglements operate across a range of spatial scales, from the international / national / societal, through the institutional to the immediately local or ‘individual’ (Hedegaard 2009, Kelly 2014). As discussed, they also operate across a range of temporal scales, being situated both in past and present. Thelen tells us that “The web of causality is intricate and seamless from the moment of birth” (Thelen 1995:94) but why stop at birth? Knowing the influence of the prenatal environment
on, for example, unborn research participants\textsuperscript{35}, we could trace relational links back to conception, to the experiences of the parents pre-conception, and beyond (see Spector 2012). And the ghosts of research locations can be followed back millennia, through the migration of humans, plants, animals and the very lithospheric plates on which these locations are embedded.

Of the infinite entanglements co-constructing any research encounter, the vast majority will go unrecognised. It is the nature of the human condition that we can process only a miniscule amount of the information available to our senses even at a single moment. It is outside the scope of this paper to review the extensive literature on human perception from either a social scientific (see Gibson 1979, Ingold 2011) or scientific perspective but it may suffice to point out that in the visual system alone, the amount of information entering the retinas at any one time is far greater than that which can be effectively processed by the brain (Van Essen et al 1992). The likelihood of the agency of any entanglement being recognised as influencing the becoming of the research encounter is dependent on its proximity, positioning, size and/or density. But all of these factors interact with the embodied temporalities and spatialities of research participants which influence their tendency to process particular kinds of observations.

Instone observes that “...knowing the world is always a process of selection and ordering that involves choices of what aspects of ‘reality’ to emphasise and what to leave out” (Instone 2004:137) but, critically, many of these “choices” are taken at a subconscious level. Thrift suggests that “probably 95 percent of embodied thought is noncognitive” Thrift (2000b:36) and whilst we may argue with the figures, it might be expected that even our efforts to consciously reflect, or to engage in “a kind of post-hoc rumination” (Thrift 2000b:36) will fail to reveal the vast majority of entanglements influencing our research. Even the most reflexive researchers are not aware of all of the more-than-human ghosts they bring to their work; many emerge

\textsuperscript{35} I am here using the word “participants” to include all parties involved in the research encounter, including the researcher.
during the research itself and “...are not only inaccessible to readers they are likely to be inaccessible to the author herself” (Grosz 1995:13, see also Doucet 2008:76).

Both supporters and detractors of relational approaches caution against the tendency to get bogged down in the detail (Acuto 2011:555). But the entanglements influencing and stemming from any single research encounter are potentially infinite and the research as it appears in writing could take a multitude of paths. Recognising that we privilege particular relationships is crucial to a reflexive understanding of research encounters. Drawing more-than-human ghost relationships into the detail may cause us to get ever more bogged down but may ultimately provide a more robust understanding of our motivations and orientations to research. As noted by Derrida (1994:11) and cited by Wylie (2007:185).

“...they are always there, spectres, even if they do not exist, even if they are no longer, even if they are not yet. They give us to rethink the ‘there’ as soon as we open our mouths.”

6.8 Conclusions

Conceptualising research encounters as brief, fragile entanglements of dynamic, more-than-human trajectories admits a multitude of presences and absences which go beyond the human, beyond the present and beyond the ‘here’ to incorporate (bio)physical, geographical and artefactual ghosts. Ghosts within researchers generate particular orientations to research by working to guide choices on the subjects, theoretical paradigms, observations and storying of research. These ghosts within researchers do not act alone, however, but emerge in relationship with the presences and absences embedded within those being researched and the research location. Robust reflexivity thus requires that we look beyond the present and beyond the human to consider how the multiple temporalities and spatialities in people and places contribute to the becoming of field research.
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Chapter 7 Reflections and Conclusions

I begin this final chapter by reflecting on the contributions made by the Chapters in this thesis and by the thesis as a whole, before drawing to a close with suggestions for possible directions for future research.

7.1 Conclusions and Contributions to Knowledge

This PhD was initially commissioned to conduct an evaluation of the Hotspots Fire Training Program. In order to respond to the expectations of the Hotspots staff, as part of this research I conducted a utilisation, or service, evaluation focusing on the success of Hotspots within the framework defined by staff members (Appendix A). However, in the spirit of pluralistic evaluations, and drawing on the potential of conceptual paradigms which look beyond the human and human agency, the main body of this thesis has explored how the Hotspots Fire Training Program weaves into and through broader human / landscape fire entanglements, with implications for land and fire management, training, policy and academic research.

Positioning this evaluation within a more-than-human, relational paradigm presented a challenge in that, whilst theory in this area is increasingly refined, more-than-human methods are limited. Most of the work done in this area has focused on non-human animals (Buller 2015, Hodgetts and Lorimer 2015) and to a lesser extent on plants (Pitt 2015) thus, in Chapter 2, I pushed forward these conversations by extending more-than-human methods to a non-living phenomenon – fire. Building on work by Pitt which shows how “plants might share their expertise in being plants” (Pitt 2015:50; see also Ingold 2000, 2011, 2013), I demonstrated that it is possible to look beyond humans and the non-human subject of study to consider how other non-humans might offer insights into more-than-human entanglements. Specifically, I considered how rain guided my attention towards the materiality of fire and its relationships, provoking examination of the structures and procedures of the Hotspots program and its relationships with
landholders and ‘nature’, as well as deepening my own understanding of fire and appreciation of the complexities of co-existence within fire-prone areas. Using non-human guides in this way is responsive to Head’s recommendation that that in order to unsettle the human/nature binary it may be helpful to “search for mechanisms of connection” (Head 2011 Online) between humans and others which acknowledge our shared biology, chemistry and history. Thus, as suggested by one reviewer of the paper, this Chapter “should be especially useful as a teaching aid in undergraduate classes on more-than-human geographies, but might also help further debate around more advanced research practices”.

The second of my papers, found in Chapter 3, focused on the pre-training ontological and epistemological understandings of landholders in relation to landscape fire. Modern Australian training programs and governance arrangements regarding human / landscape fire entanglements have tended to rely on abstracted science, pre-determined prescriptions and centralised infrastructure and resources when seeking to understand and manage fire in the landscape. As such they may be poorly set up to embrace and reflect localised knowledges that challenge ‘human / nature’ dualisms, recognise more-than-human agency and complexity and develop through informal pathways that are not amenable to formal measurement or structured manipulation. Yet, as shown in Chapter 3, even as the separation of nature and culture has been, and continues to be, institutionalised, these knowledges and pathways persist. Landholders continue to experiment and adapt as they develop embodied, enminded knowledge, skills and dispositions and co-become with landscape fire. Indeed, Chapter 3 revealed that the very process of ‘knowing’ can be changed by living in fire-prone landscapes, as landholders shift from more passive absorption of written information, and identification with the knowledges of specific communities, towards a process which might be better understood as learning-as-dwelling or wayfaring. These developing ways of knowing led the landholders in this research towards locally nuanced understandings of the complexity of agency within fiery entanglements and awareness that even their best efforts will never guarantee them control over landscape fire. They recognised the range of influences on landscape fire at different spatial scales, from the local distribution of fire brigades to global timber markets, and, whilst catastrophic
events certainly focus their attention, these landholders maintain awareness of long-term influences on landscape fire long before and after bushfires have flared up and died down. Chapter 3 thus challenged existing perceptions that landholders believe major landscape fires to be “unnatural” (Griffiths 2009:35:4) and focus on very bounded spatial and temporal understandings of ecological processes (Cooke and Lane 2015).

This understanding of landholder relationships with landscape fire presents opportunities, challenges and constraints to researchers, trainers, program managers and policy makers, who spend less time in active, embodied engagement with land and fire and more time dwelling in target driven worlds which demand forms of accountability amenable to measurement and control such as journal papers, MERI frameworks and policy documents. In the context of training, whilst many programs now recognise and promote the potential benefits of landscape fire, there is considerable heterogeneity in the training approach. As shown in Chapter 4, some programs, such as Hotspots, focus on abstracted representations such as aerial photographs and the application of fire prescriptions associated with particular of vegetation classifications. This number-driven approach does not suit all landholders, particularly those who are already beginning to tune in to the dynamic, complex more-than-human entanglements within which they are deeply entwined. These landholders may be more suited to alternative training programs which focus on drawing guidance primarily from the land itself, rather than from representations and historical records, and encourage landholders to become actively involved in starting and working with landscape fires themselves. However, other landholders feel a personal need for education about the scientific and legislative aspects of using fire as a management practice and may be more reluctant to consider alternative learning styles or take on responsibility for working directly with fire. It is not difficult to imagine that some amenity-led in-migrants unfamiliar with fire, with living in an area which has been designated “fire-prone”, and with bush management more generally, might welcome clear guidelines on how to proceed and assistance at all stages of the process. Each of the different types of programs will, therefore, appeal to different people and Chapter 4 is novel in showing the importance of recognising that fire training programs may meet with resistance not because of fundamental objections to the use of fire in the landscape but because of a
mismatch between programs and landholder ways of learning or between different understandings of ‘human/nature’ relationships. However, if, as suggested, learning styles are malleable, training has the potential to guide landholders towards particular pathways through fiery entanglements. By exploring the ontologies and epistemologies underpinning different training programs, Chapter 4 drew attention to the importance of practitioners and their funders explicitly considering how individual training programs influence the future pathways of human / landscape fire relationships.

Chapter 5 acknowledged that local, situated fiery entanglements influence, and are influenced by, policy and legislation which may come from outside the community ‘at risk’. Accommodating different ontologies and epistemologies also presents a challenge in this context, as knowledge from many different disciplines is brought together in the processes of policy-making and legislation. Risk reduction policy in New South Wales currently operates through a system of “shared responsibility”, however this is a contested concept which emerges in different forms in different locations and at different stages of the risk cycle. This variance has led to the development of a model which makes explicit hidden-value trade-offs in the negotiation of responsibility-sharing in different contexts and Chapter 5 showed how this model could be applied to fire training programs. The concept of shared responsibility has, however, shifted the focus from individual landscape fire ‘events’ to the community at risk, leading to considerations of how these communities can become more resilient. In current discussion on shared responsibility, notions of community are usually human-centric, in contrast to work within more-than-human paradigms which draws attention to the links between (human) social and ecological resilience and the need for humans to recognise their position within, rather than separate from, ‘nature’. Developing policy which can accommodate these different perspectives thus requires that different disciplines work together towards a common approach to understanding resilience. The key contribution of Chapter 5 to the development of theory and policy relating to fiery entanglements was thus to extend the theoretical human-centric hidden-value trade-offs model to more-than-human communities in order to develop a common framework for understanding resilience to risk across legal, governance, land management and scientific contexts.
Chapter 6 came full-circle, returning to a fire-prone landholding to reflect on the research process. Adopting a wayfaring approach means that the pathway through an evaluation emerges as it is conducted and multiple routes are possible. In this thesis, I have focused on the ontologies and epistemologies underpinning fire training programs and landholder relationships with landscape fire, as well as seeking to interrogate how these issues link into policy, however I would have been equally justified in exploring other issues, such as the economic interactions of the program or its relationship with other land management programs attended by landholders. Even within each area of focus, the pathway is not clear or defined and, in Chapter 6, I showed how the path travelled through a single research encounter emerges through interactions between the geographies, histories and imaginaries in persons and places. This Chapter was novel in revealing how the research event can be influenced by the trajectories of the research location, including geological processes reaching thousands of years into the past and future processes that are yet to happen and, indeed, may never happen at all. Like Chapter 3, this Chapter broke with traditional ways of presenting research, using creative non-fiction to express the dynamic, multi-directional nature of human / landscape fire relationships and highlight the role of past and present more-than-humans in directing what is observed, recorded and reported.

Individually, then, each of these Chapters has contributed to the development of knowledge in different aspects of more-than-human theory and methods and / or to the development of knowledge about learning, training and policy in the context of landscape fire. The thesis as a whole goes beyond the contributions of the individual papers, however, to show the benefits of conducting an evaluation which follows more-than-human pathways as they weave, knot and unravel. As mentioned, in commissioning this evaluation, Hotspots staff were seeking to provide funding bodies with substantive evidence that the program achieves its objectives and to identify ways in which the program could be improved. This is a common understanding of evaluation and encourages a model which works with program staff to identify very specific program aims and attempts to measure results against these criteria. However, this model privileges the views of program staff and administrators about what constitutes success (see Kushner 2000). Proponents of case study (e.g. Stake 1980), democratic (e.g.
MacDonald 1987), pluralistic (House 1993) and personalised (e.g. Kushner 2000) evaluation have long called for evaluations to incorporate and promote social justice (see e.g. Cook 1997) by recording the experiences of all participants, rather than focusing on the “rhetoric of program managers and sponsors” (Kushner 2000:9). Some evaluators who share this desire for social justice draw attention for the need to “achieve cultural competency”, for example, when working with indigenous peoples (Australasian Evaluation Society Online). However, whilst these researchers do commendable work in seeking to move forward theory and practice relating to the human dimension of evaluations, and researchers working within ‘scientific’ frameworks are simultaneously exploring a range of approaches to evaluating biodiversity conservation programs (e.g. Cullen 1999, Ferraro and Pattanayak 2006, Laycock et al 2012), theory has been very limited regarding the development of an evaluation framework which explicitly recognises the entangled trajectories of more-than-human communities. Yet, in other fields, recent more-than-human research has shown the ways in which the bio- (including human), geo- and atmo-spheres are inextricably entangled, with important contributions being made in the context of landscape fire (Clark 2012, Franklin 2006, Head 1994, Mason et al 2013, Pyne 2001).

This thesis has brought together these two fields of study to form an evaluation which describes the more-than-human pathways of landholders and researchers as they open up to different ways of learning about landscape fire, and has considered how these pathways become entangled with those of training programs, policy-makers, researchers, land and fire. This has resulted in the development of a much wider perspective on a single program and extended the relevance of the evaluation beyond the people and places involved. This thesis has not only inverted “the traditional relationship between program and person” (Kushner 2000: back cover) by amplifying the voice of the human participants, rather than just the staff, in training programs, but has also highlighted the agency of non- or other-than-humans in contributing to emerging knowledge. Thus, adopting a more-than-human, and specifically a wayfaring, view of evaluation has shown how learning about more-than-human entanglements emerges and evolves, how training programs and policy weave into the fabric of these
entanglements and, moreover, how evaluations can weave their way into and through this more-than-human world.

7.2 Reflections and suggestions for future research

The entangled trajectories described in this thesis are dynamic and complex; they have no starts and ends but continually shift and grow, sometimes dramatically. Change is not always linear, nor does it always occur within convenient timescales. This presents major challenges to research which is constrained by time and by the fixing and framing inherent within written language. Moreover, this evaluation has itself influenced subsequent funding bids made by Hotspots project partners and the program is now moving towards a slightly different model, exemplified by recent workshops in the Burra region where a post-workshop Hotspots ‘cafe’ is now being held once a month to enable landholders to discuss burns on their properties and post-burn monitoring of species. Unfortunately, this information came too late to be included in these papers which thus risk making Hotspots appear more inflexible than it actually is.

This experience illustrates the challenges of recording never-starting, never-finishing, intermingled learning trajectories. As discussed in Chapter 6, the problem of adequately reporting on complexity and change is common within academic writing. Neilsen (2008:98) reports that:

“Poets typically understand that written language is merely a finger pointing at the moon (McKay 2001); discursive practices that adhere in social science research, however, seem to perpetuate our use of language to land on the moon, name and categorize it, and perhaps claim and populate it as well.”

An alternative trope through which to understand research is that of composting. Kenney observes that:

“In opposition to metaphors of bringing stuff to light, the compost heap draws us into the (sometimes smelly) darkness where recognizable forms are broken down
into hungry critters... this decomposition engenders a kind of analysis that demands we get epistemically dirty. Armed sometimes with just a pitchfork, the composter must learn to replace the question ‘how can we be sure?’ with ‘how to live with doubt?’ Thinking with compost is more about aerating than illuminating, open up material and epistemic spaces without the presumption of sight” (Kenney 2015:757).

The idea of composting allows for recognition that understanding human / landscape fire relations requires us to operate in fuzzy, murky space and, rather than producing singular accounts of events, the aim of research is to aerate this space to “enable and nurture new life” (Kenney 2015:758). From this perspective, my aim in this PhD could be viewed as bringing life to ways of knowing landscape fire that are buried within the ‘mud’ of human / landscape fire relations. In this context, more creative writing, perhaps a novel with accompanying critique, could be a useful format through which to describe the complex, entangled, never-starting, never-finishing trajectories of training organisations, landholders, researchers, fire, threatened birds, global weather systems and so on. A novel could refuse “the temptation of certainty and closure” in order to capture “the complexity, multiplicity and contradictions of our relations with nature” (Instone 2004:134). Multiple factors mitigate against creativity in academia, including the academic review process which has continually drawn the papers in this thesis back within disciplinary boundaries and established writing conventions. and the novel as evaluation could offer an interesting direction for future research.

There are a number of challenges to adopting non-traditional approaches to applied research. In this thesis, perhaps the greatest of these was that, in order to satisfy contractual requirements to Hotspots, at the same time as producing the thesis it was necessary to provide a separate and quite different report to Hotspots. The staff of Hotspots are themselves contractually obliged to respond to requests from their funders for numerical data relating to outcomes and this ‘numbers game’ continues to be the dominant form of evaluation across many programs working with land and people. This has several implications, not least in pushing training programs back towards activities which lead to short-term measurable outcomes rather than encouraging approaches
which direct attention towards the long-term co-becoming of landholders, land and fire. It is difficult for humans educated in a traditional, western system to resist the desire for ‘hard’, ‘objective’ facts’, preferably with numbers which have been statistically manipulated attached. However, whilst this approach can offer some insights into programs, such ‘facts’ can conceal as much as they reveal, particularly when they relate to messy, nebulous, subjective, unpredictable concepts and contexts. Thus I suggest that there is a need for more research into how to move towards a situation in which more-than-human relational evaluations of programs are not only recognised as valid and legitimate but are requested as one of the approaches of choice by training and funding organisations seeking a deeper understanding of the pathways of programs within communities and a provocation for deeper thought on the training process.

My final reflection concerns relationships between Australians of indigenous and settler heritage which have puzzled me since migrating to Australia in 2009. I have come to believe that much of the work done to ‘close-the-gap’ between these populations problematizes indigenous people and appears to focus on encouraging, or cajoling, Aborigines to aspire towards, and achieve, modern goals and to adopt modern lifestyles. I emphasise that this is a personal perspective which reflects my reading of job advertisements and newspaper reports on health and education and working with diversity groups in universities. The field of land and fire management is one of few in which indigenous knowledge is recognised and many programs working with indigenous Australians are seeking ways to combine traditional ecological knowledge with more ‘modern’ approaches. Yet, if the reconciliation process is genuinely committed to examining the colonial relationship between different peoples (and perhaps also between humans and ‘nature’), it is important that programs working with non-indigenous peoples also acknowledge, respect, reflect and embrace different ways of knowing land and fire (see Eriksen and Hankins 2014). Thus I urge research into the actual and potential roles played by different types of land and fire management programs in the context of developing post-colonial relationships, and into more sensitive ways of evaluating them.
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Introduction and Background to the Hotspots Fire Project
This evaluation was conducted as part of a PhD project from March 2011 to August 2014. The broader aims of the PhD were to explore how different landholders, agency and NGO staff negotiate the multiple scientific, social, physical, ethical and political issues and relationships relating to the use of fire as a management practice on private land in New South Wales, and how fire training programs affect these negotiations. This evaluation focuses on one of those fire training programs, The Hotspots Fire Project (hereafter referred to as Hotspots).

Hotspots is a partnership program jointly managed by the Nature Conservation Council of New South Wales (NSW) and the NSW Rural Fire Service. The program is steered by a Committee which includes representatives from the following organisations:

- The Nature Conservation Council of New South Wales (hereafter referred to as the NCCNSW)
- The New South Wales Rural Fire Service (hereafter referred to as the RFS)
- Office of Environment and Heritage (OEH)
- Local Land Services (LLS)
- National Parks and Wildlife Service (NPWS)
- NSW Farmers
- The Southeast Queensland Fire and Biodiversity Consortium
- Forestry Corporation
- Local Government
- The Centre for Environmental Risk Management of Bush Fire at the University of Wollongong

The general purpose of Hotspots is to “assist private landholders and public agencies in managing fire for the protection of life and property while at the same time ensuring healthy, productive landscapes in which biodiversity is protected and maintained”. This assistance is provided in the form of a training program conducted on two days which are held approximately two months apart. On the morning of the first day, Landholders watch Powerpoint presentations and visit one to three field sites to discuss fire ecology, history and management. One of the sites visited is a potential demonstration burn-site, for which a detailed ecological site story
outlining flora, fauna, cultural values and fire history has been prepared in advance by a Hotspots Ecologist. In the afternoon, landholders are provided with an aerial photograph of their property and guided through the completion of individual fire management plans. These plans require landholders to mark the photograph or overlays with features such as infrastructure, water, fire history and vegetation (categorised by Keith class and identified through remote sensing with help from Hotspots staff and representatives from agencies such as the National Parks and Wildlife Service). Based on this information, landholders then partition their land into “management units” and identify management actions for these units.

On the morning of the second day, landholders’ completed fire management plans are briefly reviewed. Participants then travel to the demonstration burn-site where the fire management plan for that site is presented and a risk assessment exercise conducted. Following this, tools for assessing weather, fuels and topography in advance of a burn are demonstrated. In the afternoon, weather permitting, the landholders observe a planned burn.

The specific objectives of Hotspots are as follows:

**Objective One:** On-ground fire management is informed by the best available fire ecology research and operational knowledge.

**Objective Two:** Landholders and land managers gain knowledge and skills to engage in practical and sustainable fire management - and plan and implement together strategies across landscapes.

**Objective Three:** Sustainable fire regimes are recognised in and are part of relevant regional, state and national policies and programs.

As Objective Three is a long-term objective, the main body of this evaluation focuses on Objective Two, and takes into account how Objective One supports this. This report provides information on:

- The experiences of landholders who attend a Hotspots workshop series;
- The impacts of the program on the opinions, confidence and behaviour of individual landholders and
- The impact of the program on relationships between landholders and agencies.
A second evaluator, Jacki Schirmer of the University of Canberra, conducted an evaluation of the impacts of the program on the social capital, health and wellbeing of the participating landholders. The two evaluations shared a common survey instrument but have been separately analysed and written up.

The information in this report is provided to illuminate how well Hotspots is meeting its objectives and to identify how, where and with whom Hotspots can best achieve its aims. The language used throughout the report reflects the author’s belief that surveys offer a broad guide to experiences, rather than definitive, predictive information. This is not sloppiness but deliberate policy (see Appendix A for a discussion of issues relating to the methodology, analysis and reporting of the evaluation).

Methods
The evaluation combined detailed case studies, participant observations of workshops and staff training days, interviews with committee members and a survey sent to all landholders participating in workshops across New South Wales between 2010 and 2013. This report focuses on the case studies, observation of additional workshops in Kulnura and at Budgong and the survey, and these are now described in more detail.

Case Studies
The case study sites were at Mongarlowe in Palerang and Grady’s Creek in North East New South Wales. The case studies involved:

- A visit to the demonstration burn-site with the Hotspots Facilitator and Ecologist (Mongarlowe only) in order to understand how sites are identified and to follow the development of the Ecological Site Story;

- Accompanying Hotspots facilitators whilst “door-knocking” to understand how participants are recruited to the program and to gauge initial reactions to the idea of Hotspots;

- Interviews with landholders before their attendance at Hotspots workshops and with local landholders who chose not to attend workshops. These interviews were conducted whilst walking around the interviewee’s landholding. Rather than using a structured format, the aim was to elicit a “conversational narrative” (Grele 1998), to allow landholders to frame the discussion of their practice relating to their properties and fire.
One landholder who was also members of staff at the local Catchment Management Authority and presenting at the workshop was interviewed at her place of work;

- Participant observations of the two workshop days in each series, focusing on learning, governance and relationships. In Mongarlowe, the workshops were videoed and at Grady’s Creek they were recorded on audio tape;

- A second interview with the same participant landholders two months after the end of the workshop series, to explore reactions to Hotspots and related activities. Landholders were initially asked to share any information which they felt would be relevant to the evaluation before being guided by more structured questions;

- Comparison of survey responses to interview data where landholders participated in both aspects of the research.

Interviewees from each workshop series were randomly selected from a list of possible attendees sent by the Hotspots facilitator by assigning potential attendees a number and drawing them out of a hat. No landholder refused to be interviewed. Table 1 shows the number of landholders interviewed at each case study site before and after Hotspots, and the number of interviewees who also completed the survey (and identified themselves on the completed questionnaires). In some cases, landholders attended the workshops both in an official capacity as a member of an agency and as a local landholder. In one case, the interviewee attended in an official capacity as a representative of the National Parks and Wildlife Service (hereafter referred to as National Parks) only.

Interviews were recorded on audio-tape and transcribed. Each was listened to five times and transcripts were read 5 times, as understanding each landholder’s “whole story” was seen as a crucial part of the PhD. Interviews were then coded in NVIVO, on the basis of themes which emerged from the multiple listening to / readings of interviews. Sample landholder stories were created, which were seamless narratives based on comments made by the landholders and relating to issues identified through multiple listening / readings of the interviews.

Videos of the Mongarlowe workshops were watched 5 times and audio recordings of the Grady’s Creek workshop were listened to 3 times. Facilitator led discussions at the Mongarlowe workshops were transcribed. Videos / audio recordings were watched again after issues of interest to the evaluation had been identified. Where necessary, specific discussions were then transcribed.
**Table 1 Numbers of interviewees, occasions on which they were interviewed and number of interviewees also completing survey**

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Type of Interviewee</th>
<th>Interviewed Pre-Hotspots</th>
<th>Interviewed Post-Hotspots</th>
<th>Interviewed on another occasion</th>
<th>Completed Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mongarlowe</td>
<td>Hotspots Participant Landholder</td>
<td>7</td>
<td>7</td>
<td>2(^{36})</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Hotspots Participant Landholder + Agency Staff Member</td>
<td>3</td>
<td>3</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Hotspots Non-Participant Landholder</td>
<td></td>
<td></td>
<td>2(^{37})</td>
<td></td>
</tr>
<tr>
<td>Grady’s Creek</td>
<td>Hotspots Participant Landholder</td>
<td>7</td>
<td>6</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Hotspots Participant Agency Staff Member</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hotspots Non-Participant Landholder</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Observations**

In addition to observations at Mongarlowe and Grady’s Creek, observations were conducted of the workshop series at Kulnura and the first day of the series at Budgong. Audio recordings were

\(^{36}\) One interviewee was interviewed for a third time, and another for the first time, several months after the second interview because a demonstration burn had taken place on their property.

\(^{37}\) Mongarlowe non-participant landholders were interviewed before the workshop series took place only
made of the workshops. Although not transcribed in full, the observations were listened to three
times, to identify issues of interest to the evaluation and to identify supporting or conflicting
data for each of these issues. No formal interviews were conducted with participants from these
workshops, although informal discussions were held on the day.

Survey
The survey could be completed on paper or online, using Survey Monkey. All landholders were
contacted by email and by letter. Following the initial letter and / or email two reminders were
sent to landholders. This process was managed by Hotspots, in order to protect landholder
confidentiality. Letters and / or emails were sent to over 500 participants, with more than 100
being returned to sender.

Many of the survey questions requested attitude / opinion related data. Unless otherwise stated
in the analysis, participants were offered the chance of answering 1-7 on a Likert scale, where 1
indicates a strongly negative answer (e.g. strongly disagree, much less confident, very poor). 4
indicates neutral and 7 indicates a strongly positive answer (strongly agree, much more
confident, very good). For some questions, respondents were also given the opportunity to
answer unsure / can’t remember or not applicable.

167 completed questionnaires contained sufficient information to be included in the analysis.
This represents a response rate of over 35%. Both survey respondents and interviewees were
allocated to a Burner Type category, based on the information they gave about their burning
activities before and after the Hotspots workshops. 160 landholders provided information about
their burning activities before and after attending Hotspots. Much of the discussion in this report
requires knowledge about burning activity, hence much of the analysis is restricted to these 160
respondents (see Appendix A for further discussion of issues relating to the analysis).

The survey questionnaire asked a series of questions which were used to identify landholder
burning activities before and after the workshops, as shown in Figure 1. Table 2 shows possible
burning activities pre and post Hotspots which were identified through this method. Survey
respondents were allocated to a Burner Type category based on their pre-Hotspots burning
activity and their post-Hotspots burning activity. There were 20 possible categories of Burner
Type based on all possible combinations of 5 types of burn conducted before the workshops and
4 types conducted afterwards. However, only 18 categories were represented by survey
respondents. For the purposes of analysis, these 18 burner types are sometimes brought together into groups sharing similar characteristics, or larger clusters, as shown in Table 3.

The names of burner types are somewhat awkward however they are used throughout the report in order to clearly differentiate between landholders with different experiences and intentions relating to burning. It may be helpful to refer to Table 3 throughout the remainder of the report.

Table 2 Possible burning activities pre and post Hotspots

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Pile</th>
<th>Broad (i.e. non-pile burn)</th>
<th>SUK (Size Unknown)</th>
<th>Other</th>
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<td>Burns conducted before the workshops</td>
<td>NonPre</td>
<td>PilePre</td>
<td>BroadPre</td>
<td>SUKPre</td>
<td>OtherPre</td>
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<tr>
<td>Burns conducted since the workshops or actively planned for the future</td>
<td>NonPost</td>
<td>PilePost</td>
<td>BroadPost</td>
<td>SUKPost</td>
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Table 2 Possible burning activities pre and post Hotspots
Figure 1: Procedure for identifying burning activities before and after the workshop

**Before Hotspots**

Q.11. Had you conducted any burns on your property BEFORE attending the Hotspots workshop?

- **YES**
  - Q.13. “... We’d like to know what area you burned (or if it was a pile burn)…”
    - If no size given, landholder allocated to SUKPre (size unknown)
    - If size given, landholder allocated to PilePre or BroadPre

- **NO**
  - Which of the following types of experience had you had with using fire as a management tool?
    - If YES to any of "I had used fire to…” then landholder allocated to OtherPre
    - If NO to all of "I had used fire to…” then landholder allocated to NonPre

**After Hotspots**

Q.20. Have you conducted any burns on your property SINCE attending the Hotspots workshop? And

- **YES to EITHER**
  - Q.22. Sometimes burns don’t go as planned. We’d like to know what area you burned (or if it was a pile burn)…
    - If no area given, landholder allocated to SUKPost
    - If area given, landholder allocated to PilePost or BroadPost

- **NO To BOTH**
  - Landholder allocated to NonPost

Q.29. Are you actively planning to conduct burns on your property in the FUTURE?

- **YES to EITHER**
  - Q.32. What area do you plan to burn?
    - If no area given, landholder allocated to SUKPost
    - If area given, landholder allocated to PilePost or BroadPost
### Table 3 Burner Types

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<td></td>
<td></td>
<td>SUKPreNotPost</td>
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- **NonPilePreANDPost**: No experience of burning or conducted pile burns only before and after attending Hotspots workshops.
- **NonPilePreBurnPost**: No experience of burning or conducted pile burns only before Hotspots but conducted broad or SUK burn on own land after Hotspots.
- **OtherPreBurnPost**: Experience with broad burns (e.g., through RFS) but not on own land before Hotspots, conducted broad or SUK burn on own land after Hotspots.
- **AllContinuers**: Conducted broad or SUK burns on their own land before and after attending Hotspots workshops.
- **OtherPreNonPilePost**: Experience with burning but not on own land before Hotspots, no intention of conducting broad burns in future.
- **BroadStoppers**: Conducted broad or SUK burns on their own land before attending Hotspots workshops but no intention of conducting broad burns in future.
What has changed as a result of the Hotspots program, 2010-2013?
These results relate to the 167 respondents to the survey only.

- There is a net gain of between 32 and 41 landholders conducting non-pile (or broad) burns following the Hotspots workshops;
- 112 more landholders have developed, or are actively planning to develop, a fire management plan for their property;
- 49 more landholders have contacted, or intend to contact, fire management agencies;
- 28 more landholders intend to use mechanical methods to reduce fuel on their properties;
- For burns other than pile burns, the average area of the burn has dropped slightly due to new burners starting small;
- The majority of survey respondents feel more confident about using fire as a tool to reduce the risk of bushfire;
- There is a very small, positive change in the confidence of survey respondents to use fire to manage weeds;
- More landholders are burning to encourage plant diversity and to maintain animal habitat. These recruits include landholders who are new to burning and landholders who have previously burned but are now more mindful of the environment when they burn;
- More than two-thirds of survey respondents believe they have better relationships with the Rural Fire Service;
- 22 more landholders have joined or plan to join the Rural Fire Service;
- 60% of survey respondents believe they have better relationships with land management agencies;
- Over two thirds of survey respondents better understand why other landholders or land managers burn their land.
The Hotspots program is most likely to achieve its aims when...

(Many of these activities are already taking place and there is evidence that they are successful. Where they are not already taking place, they are recommended on the basis of interview data.)

- Workshops take place in areas which have had high levels of in-migration from out of area, such as subdivisions, in the preceding 3-10 years;

- Efforts are made to encourage younger, employed landholders to participate by recruiting participants through a variety of different routes, offering child-care, accommodating school pick-up and drop-off times, scheduling workshops at weekends to encourage attendance by employed people or “twinning” neighbouring workshop series with one at the weekend and the other during the week. Hotspots should continue to encourage landholders of different genders, educational backgrounds and inclinations towards conservation, from landholdings of different sizes and land-use approaches;

- Advance visits to all potential participants are conducted to identify the experiences, opinions and concerns of local landholders and incorporate these into the workshops;

- Workshops focus on locally specific, well-defined issues which can clearly benefit from fire;

- Landholders with local experiences of fire management are provided with a safe space in which to share these experiences at workshops;

- There are clear expectations that the environmental values of a demonstration burn site will benefit from fire;

- Where the demonstration burn-site is close to previously burned areas, the responses of vegetation and animals to previous burns are clearly explained;

- Workshops emphasise that very small burns can also be beneficial and may be more manageable and desirable for inexperienced burners;

- Workshops emphasise the importance of mechanical work in complementing or replacing the use of fire to achieve the risk-reduction and environmental goals of the program;

- Workshops allow time for comprehensive discussion of weed management and demonstrations of weed management techniques and, where possible, workshops are tied in to other workshops on weed management or other issues of interest to landholders;

- The program is well-supported by the staff and volunteers of the local Rural Fire Service and other local agencies;

- All Hotspots and agency staff, and all volunteers, are aware that landholders can be sensitive to some types of language and behaviour around burning;

- Agency talks are short and succinct.
**Hotspots may like to consider...**

(The following recommendations have funding or other constraints. Nonetheless, interviews and the survey results suggest that they may be helpful in helping the Hotspots program achieve its aims and thus they are recorded here.)

During each workshop series, Hotspots may like to consider:

- Emphasising that the workshops can only offer a summary guide and explicitly directing landholders to resources that explain the complexities of sustainable fire management in greater detail;

- Being more flexible with the timing of demonstration burns. A burn on the first day would double the chances of including a burn in the project and allow for monitoring of the site on the second day. If this is not possible, the timing of burns on the second day should be flexible enough to allow for a burn in the morning if rain is forecast;

- Scheduling smaller burns, with active landholder involvement, into the workshop program or including this as part of a follow-up program for landholders who are less inclined to do large burns but want practical, hands-on experience of small burns. If this is not possible, consider being more explicit within the promotional literature that landholders are not taught how to use fire but how to organise the RFS to conduct a burn on their property.

- Providing more engaging replacement activities, such as burn tables and videos, where burns cannot take place due to inclement weather.

After the workshops, Hotspots may like to consider:

- Arranging post-Hotspots, one-on-one meetings between individual landholders and local Rural Fire Service staff or volunteers to discuss how plans made at the workshops might best be implemented on the property;

- Arranging group follow-up meetings, involving very small-scale burns with measurable goals and guidelines on how to monitor post-burn re-growth, to give reticent burners confidence in the process of burning and the management of that process;

- Creating networks of landholders who inform each other when they are burning on their properties and invite each other to witness / participate in the burns. This could be achieved through a follow-up questionnaire which monitors the experience of participants in Hotspots workshops and asks whether or not landholders would like to be put in contact with other landholders considering a burn. This could be managed by a Hotspots “hub” coordinator, if the trial of this system proves successful.
Results
Under each heading, key findings are given as bullet points, followed by an explanation, tables and charts and, where applicable, suggested implications for Hotspots.

Summary of Responses to Hotspots
The following section describes the fire-related activities of survey respondents before and after attending Hotspots workshops. It examines the number of people burning, the areas and purposes of burns and changes in confidence and opinions around burning. It also looks at relationships between landholders and the Rural Fire Service and other agencies such as the Catchment Management Authority and National Parks New South Wales. The survey data is supported by information from the interviews, in order to provide a deeper understanding of the issues discussed.

Detailed Analysis of Responses to Hotspots

Number of Landholders Burning
- There is a net gain of between 32 and 41 landholders conducting non-pile (hereafter referred to as broad) burns following the Hotspots workshops.

Explanation
In exploring the change in number of landholders burning, it is emphasised that the purpose of Hotspots is not to encourage all landholders attending workshops to conduct broad burns on their land. Hotspots staff members aim to “help involve, inform, equip and motivate landholders and communities to become more actively engaged in fire management” by “supporting the development of individual property fire management plans”\(^\text{38}\). In the areas in which workshops are conducted, the Hotspots team would view it as appropriate for broad burns to be included in most (but not all) of these landholders’ fire management plans. Thus, the following information is provided as a guide to changes in burning activity and behaviour following the workshops. However, it must be recognised that in some vegetation types, such as rainforest or riparian, Hotspots staff members would seek to dissuade landholders from burning land. In addition, where landholders are not confident about burning or have physical or other

\(^{38}\) Hotspots Fire Project, 2011, *Delivering the Hotspots Training Program, A Guide for Facilitators*
limitations or have other appropriate management strategies in place, Hotspots staff would not seek to impose a burning regime on their properties.

Landholders were asked, *Had you conducted any burns on your property* BEFORE attending the Hotspots workshop? If they answered Yes, they were then asked for information about their three most recent burns, including the year in which each of these burns was held, the intended and actual areas burned and the goals of each burn. This information was also requested for up to three burns SINCE attending the Hotspots workshop and up to three actively PLANNED for the future.

Pre Hotspots: 83 landholders gave information about the area of burns they had conducted before attending the Hotspots workshops. 51 landholders had conducted at least one broad burn and 32 had conducted pile burns only. A further 6 did not report the area of burn(s) they had conducted on their own land. These are reported as SUK (Size Unknown) burns. 26 had not burned on their own land but had burned elsewhere, for example, through the Rural Fire Service or, in the case of at least one landholder, for scientific research in another region of Australia.

Post Hotspots: 104 landholders gave information about the area of burns they have conducted, or are actively planning to conduct, following Hotspots. 83 landholders have conducted, or intend to conduct, a broad burn, 21 have conducted or intend to conduct pile burns and 9 have conducted, or intend to conduct, a SUK (size unknown) burn on their own land.
Overall, there is a net gain of at least 32 landholders conducting or intending to conduct broad burns on their own land following Hotspots. This is probably a slight underestimate, and it is possible that the gain is up to 41 landholders. The figure of 41 is calculated on the basis that all of the 6 landholders conducting SUK burns before Hotspots were conducting pile burns and all of the 9 landholders conducting SUK burns after Hotspots were conducting broad burns. This is highly unlikely. It is more likely that the 4 landholders conducting SUK burns both before and after Hotspots were conducting burns of the same type. 3 landholders who had conducted broad burns on their own properties before Hotspots, have conducted or intend to conduct a SUK burn following the workshops. It is likely that these 3 landholders are also conducting broad burns after Hotspots but did not specify the size of these burns as they are still in the planning stages or are part of a regular burning regime. It is more difficult to assess the likely size of SUK burns conducted by 1 NonPreSUKPost, 1 OtherPreSUKPost and 1 SUKPreBroadPost. The actual increase in the number of landholders conducting broad burns is, therefore, likely to be between 32 and 35.

11 landholders who had conducted broad burns on their own properties before Hotspots, have not done so since and have no plans to do so. Possible reasons for this apparent discontinuation of burning include:

1. Previous burns were for clearing and this has now been accomplished (6 of these burners had previously burnt only once on their own land and one of these acknowledges that he did so to clear land for pasture several decades ago.)

2. Age (OwnBroadPreNOTPost are generally older. They may have burned in the past but be unwilling to keep up this practice for health reasons.)

3. Change in view of the appropriateness or practicality of burning (interviews suggest that a small number of landholders who were previously burning may have decided that burning is not the most appropriate method of land management on their properties. For example, some landholders believe that burning encouraged weeds on their land. Others have observed litigation activities arising from burns in their area and decided that burning is too risky.)

4. Missing out pages in the survey, by accident or design (One landholder completing the paper survey incorrectly wrote that the pages on planned burns were a repeat of the pages on actual burns.)
**Area of Burns Pre and Post Hotspots**

- For burns other than pile burns, the average area of the burn drops slightly following the Hotspots workshops. Pre Hotspots 40% of all non-pile burns are less than 1 hectare, compared with 53% post Hotspots. Similarly, only 55% of pre Hotspots burns are less than 2 ha., compared with 71% post Hotspots.

- The majority of landholders with no previous experience of burning (63% of NonPilePreAndPost and 69% of NonPilePreBurnPost) prefer to burn very small areas to encourage biodiversity, rather than larger areas.

- Fear of fire escaping into the wider area is a deterrent to burning, with a third of all landholders agreeing that they do not want to conduct a burn as they are concerned the burn may get out of control.

- 68 people (43%) witnessed a demonstration burn at their workshop. Interview and survey data suggest that many, but not all, landholders would like to be more actively involved in a smaller burn, rather than witnessing a large demonstration burn.

**Explanation**

The average area of all broad burns conducted drops slightly following the Hotpots workshops. As might be intuitively expected, this is due to landholders with no previous experience of conducting broad burns on their own land (new burners) starting small. Around 60% of planned or executed burns by NonPilePreBurnPost are less than 1ha, and 85% are less than 2 ha. However, for AllContinuers (experienced burners), burn areas change little as a result of Hotspots, with 39% of burns being less than 1 ha. and 53-57% being below 2 ha both before and after the workshops.

Landholder preferences for burn size were explored further in Q.38. To what extent do any of the following apply to you when considering doing a prescribed burn... I prefer to burn very small areas (e.g. small clumps of plants) to encourage biodiversity, rather than larger area (Appendix A, Chart I). Around two thirds of landholders who had not burnt before Hotspots (63% of NonPilePreAndPost and 69% of NonPilePreBurnPost) agreed to some extent with this statement. Only 2% of the NonPilePreAndPost and 12% of NonPilePreBurnPost prefer to burn larger rather than very small areas. The figures are slightly more balanced for landholders who have previously used fire as a management practice on their own land, with just over half (54%) preferring to do very small burns and around a fifth (21%) preferring to conduct larger burns.
Some landholders may prefer to burn smaller areas because they perceive that this is more beneficial to plant and animal communities. For example, Laurel asked, “If you’re burning because the hakea is senescing, why not just burn the hakea?” Laurel later indicated that, whilst she would not conduct a large broad burn on her land, she might experiment with burning a very small patch out of “research interest”. The importance of “trialability” for landholders undertaking conservation initiatives has been emphasised in academic literature (see, for example, Pannell and Vanclay, 2011). Hotspots participants are not alone in wishing to be able to undertake small-scale trials of a new land management practice before committing themselves to the practice over larger areas.

Other landholders may feel daunted by the prospect of conducting large-scale burns because of the potential for these to get out of control. Q.38 also asked To what extent do any of the following apply to you when considering doing a prescribed burn...I don’t want to conduct a burn as I am concerned the burn may get out of control (Appendix A, Chart I). Around a third of landholders (50 out of 149) agreed to some extent (A5, 6 or 7) with this statement. NonPilePreANDPost, who have not conducted, and have no intention of conducting, broad burns, were over-represented in this group with half (21/42) agreeing that safety concerns made them reticent about burning.

The results show, then, that new burners conduct smaller burns, that the majority of new burners and non burners prefer to burn very small areas to benefit biodiversity and that a
substantial minority of all survey respondents may be deterred from burning by concerns that large burns could get out of control. Thus, it might be valuable to conduct very small burns, perhaps with active involvement by landholders, in the Hotspots workshops or as part of a follow-up program. Comments by an early group of interviewees suggest that providing opportunities for landholders to become actively involved in a small burn could draw in some of the NonPilePreAndPost burners who have not been persuaded by Hotspots to conduct a larger, RFS-managed burn.

This suggestion was put to interviewees at Grady’s Creek. Whilst one long-time farmer and burner felt that whether or not any kind of burn took place was “nothing” to him, all of the others agreed that active involvement in a small burn would be a good idea. Comments included:

Kenny: Yeah, that’s an improvement. I think it would be better more along those lines.

Tom: I can see value in that. I can’t see value in the spectator sport side of it.

Whilst this suggestion was not explicitly made in interviews in other areas, one agency staff member in Northern New South Wales and a local brigade captain in Palerang themselves volunteered the idea that starting small would be a good way to develop confidence. For example, Jack said:

If you start small you get the understanding. And then go again. And if you need to go bigger, later, well go a bit bigger. After a period of time – it could be months, weeks, years – and you’d be quite happy if you saw the need – you could walk around a coupla hectares all by yourself and set it all alight because you’ve had that experience.

The concerns of some landholders about the lack of practical experience with fire in the workshops were relayed to Hotspots at a meeting in January 2013. Discussion revealed that the Hotspots team view the project as providing landholders with the skills to engage with the ideas around burning and the information to make the decision to burn their land with support from the Rural Fire Service, rather than providing the skills for landholders to burn land themselves. Furthermore, they have concerns about insurance constraints around hands-on involvement of landholders in a burn. Another meeting in February 2014 showed that Hotspots would prefer to actively discourage landholders from burning even very small areas, if they are not confident in conducting a burn. However, some interviewees questioned the practicalities of combining the availability of a volunteer fire brigade with appropriate weather for burning. For example,
Andrew, who is himself a Rural Fire Service volunteer, said that in his area, “There’s – what – 200 landholders here. How many weekends with the fire brigade could you actually do it?”

The practicalities of conducting burns are underlined by the fact that, despite being scheduled for all workshops, demonstration burns were witnessed at Hotspots workshops by only 68 survey respondents (43%) due to inclement weather. The survey results suggest that there is no relationship between witnessing a burn and the likelihood of landholders conducting a burn following Hotspots, as 43% of NonPilePreANDPost and 42% of NonPilePreBurnPost observed a demonstration burn. It might be concluded from these results that a demonstration burn is unnecessary and brings no added value to Hotspots. However, interviews and informal conversations suggest that this is not true for the following reasons:

- Some participants are attracted to Hotspots because of the possibility that a burn will take place. For example, Tim, who borders a National Park for which a burn has been planned for some time but repeatedly postponed due to poor weather, felt very frustrated by the cancellation of the Hotspots burn. He explained, “I just want to see a burn now. I’ve been waiting for two years and I just want to see a burn.”

- Interviews suggest that observing planned burns, and the subsequent responses of vegetation, can be an important feature in encouraging landholders to accept fire as a management tool. For example, Kenny described his evolution from believing that the “green” attitude was to exclude fire in all situations, to believing that planned fire can be beneficial in some habitats. Shortly after moving to his property, the neighbour set a fire which burned up into Kenny’s property. He explained that he was:

  “…livid, you know – that my neighbours could just come and set fire to my place... And they were like, Oh calm down, you know, it only burns to where it’s burned before... And they’re actually right! I kind of thought, oh no, it’ll be years before it’s back to how it was but it’s so not like that round here.”

It is important to note that by the time of the interview, Kenny had had several years to observe the response of the forest to the burn. It was not simply the burn itself that changed his opinion but the long-term aftermath. It may be that a longer time scale is

39 The focus is on NonPilePreBurnPost and NonPilePreANDPost landholders here as all other groups have already been involved in burning themselves, and are thus less likely to be influenced by witnessing a demonstration burn.
required before assessing whether or not the response of vegetation to fire on the demonstration burn sites influences the attitudes and behaviour of landholders around burning.

- Participants who did not witness a demonstration burn are more likely to be disappointed by the training in skills required to conduct a burn. 35% of those who did not witness a burn reported that the training in conducting a burn was poor, unmemorable or non-existent and a further 10% described it as neither good nor bad (Appendix A, Chart VII). In comparison, 14% of those who did witness a burn reported that the training in conducting a burn was poor, unmemorable or non-existent and only 3% described it as neither good nor bad. Some interviewees were clearly concerned that they had not gained more skills in burning. For example, Martha said, “I would have liked to have had more information on actual burning. That’s the thing that worries me – actually doing the job,” Juliet stated, “I think it would be good to have some more sort of hands-on sort of thing. And in the end I felt that it was mostly theory” and Shelley said, “I had thought that the burn section of the thing, looking at how fire behaves and so on would play a bigger part in the whole thing.” Other interviewees complained that the workshops focused too much on theory and not enough on practical experience of controlled fire. For example, Jack explained:

“I think a burn is very much the key to understanding the whole Hotspots thing. Seeing it, feeling it, understanding it, monitoring it is the key part. Hotspots could have been and should have been more focused... on the fact that fire is a practical tool. You’ve gotta pick up the tool. You can read all you like about it, you can be told all you like about it, but... if Hotspots is serious about fire it has to have fire on the ground.”

With a couple of exceptions, the interviewees who felt that Hotspots did not offer enough practical experience of fire did not respond to the survey, perhaps in the belief that the long, impersonal questionnaire was itself evidence of the gulf between bureaucratic agencies / universities, and practical landholders. This suggests that the opinions of this group of landholders may be under-represented in the results of the survey.

In late 2013, the evaluator suggested to the then Hotspots Co-ordinator that in order to maximise the chances of participants experiencing fire at Hotspots workshops, the
demonstration burn could be moved to the first rather than the second day of the series. This would have the added advantage that participants would be able to see and discuss the results of the burn at the second workshop a couple of months later and approaches to monitoring and understanding the response of the site could then be demonstrated. Although considered, this suggestion was rejected by Hotspots staff as it was believed to be too difficult to change the structure of the workshops at this stage. Comments by interviewees suggest that there is some frustration with the inflexibility of the workshops, however. For example, at the Grady’s Creek workshop it was not raining on the morning of the second day but the demonstration burn was rained off as participants were standing at the site!

Kenny complained that:

...we spent so long talking about what we were gonna do, we probably could have had the burn that day early if we’d just gone out and lit it when we were all there, and talked about it later when the rain was putting it out for us.

More than half of the interviewees commented, without being explicitly asked, that activities on the second afternoon appear somewhat ad-hoc when burns do not take place. Some made suggestions as to how “non-burn” afternoons might be better spent. For example, Andrew suggested:

You know, there’s a high cancellation rate. I’d have thought he’d have a video of a hazard reduction so at least he could have shown another one... I’m not saying that’s as good but it would have been related to all the things we’d been looking at, especially if it had some later film of how it came back.

At a meeting in February 2014, Hotspots were made aware of the frustrations around the cancellation of demonstration burns. Discussion revealed that a staff member was already looking into the use of a “burn table”, which is a small scale model of how a burn might proceed across a landscape under variable conditions. This is a promising alternative where a demonstration burn cannot take place.

**Implications**

Hotspots may like to consider:

- Emphasising that smaller burns can also be beneficial and may be more manageable for inexperienced burners.
• Scheduling smaller burns, with active landholder involvement, into the workshop program or including this as part of a follow-up program for landholders who are less inclined to do large burns but want practical, hands-on experience of small burns. If this is not possible, it may be best to be more explicit within the promotional literature that landholders are not taught how to use fire but how to organise the RFS to conduct a burn on their property.

• Being more flexible within the program. If it is not possible to bring the demonstration burns forward to the first day, then consider the early morning of Day 2 if rain is forecast or likely.

• Scheduling more engaging replacement activities where demonstration burns cannot be held, such as videos, burn tables and so on (note: this is now being addressed).

• Creating networks of landholders who inform each other when they are burning on their properties and invite each other to witness / participate in the burns. This could be achieved through a follow-up questionnaire, which monitors the experience of participants in Hotspots workshops and asks whether or not landholders would like to be put in contact with other landholders considering a burn.

Reasons for Burning
Landholders were asked to give reasons for the three most recent burns conducted on their properties before attending Hotspots workshops and for three burns conducted or planned after attending Hotspots workshops. The tables in this section show the number of landholders giving a particular reason for any burn (i.e. Burn 1, 2 or 3). Thus they explore whether individual landholders burn for the stated reason, rather than the number of burns for which this is a goal. The reasons are then discussed in the context of related survey and interview questions.

Risk Reduction
• Reducing fuel or risk to landholders’ own or neighbouring properties were included in the goals of almost all survey respondents conducting broad burns both before and after Hotspots workshops.
• 90% of (155) survey respondents believe that landholders have a responsibility to reduce the risk of bushfire on their land. Only 1 person disagreed to any extent, and 14 neither agreed nor disagreed.

• The vast majority, but not quite all, of survey respondents broadly support the idea of using fire to reduce fuel loads in native vegetation on rural properties.

• The majority of landholders have somewhat increased in confidence in using fire as a tool to reduce risk of bushfire (average 5.28 across all landholders on a 7 point Likert scale).

Inexperienced burners are least likely to say that they have increased in confidence.

**Explanation**

50 out of 55 landholders (91% of landholders who gave any reason) stated that the goal of at least one of their pre-Hotspots burns was to reduce fuel and / or to reduce wildfire risk to their own or other properties. After Hotspots, 88 out of 91 landholders (97% of landholders who gave any reason for their post-Hotspots burns) said this was a goal of at least one of their burns (see Appendix A, Chart II). However, interviews suggest that some of these landholders (for example, Kenny) view their vegetation, rather than their buildings and other possessions, as their primary assets. As such, they perceive that there is a need to reduce fuel loads in certain vegetation types (e.g. wet sclerophyll) in order to reduce the risk to other vegetation types (e.g. rainforest) rather than to buildings on their properties.

Landholders take their responsibilities for reducing bushfire on their land very seriously, averaging an answer of just over 6 (6.12) on a 7 point Likert scale to the question, *To what extent do you agree or disagree with the following statements? Please consider the whole statement in your response: Landholders have a responsibility to reduce the risk of bushfire on their land* (Appendix A, Chart IV).

Only one person disagreed at all with this statement (A3) and 15 (9%) neither agreed nor disagreed. Responses to similar questions in interviews varied widely, giving much greater insight into the extent to which this issue is mired in practical and political considerations. For example, Phil explained:
Of course it’s a responsibility, it’s just how that sort of thing has evolved in the politics of land management... You can’t just say it’s all the landholder’s responsibility because fire sits within a social context that’s outside of the farmer’s control... To say, you know, the farmer has more responsibility beyond a simple statement of involvement is kind of stupid. We’ve set up all this land as farming, as a way of extracting value out of the landscape, and then you’re gonna blame the person who’s got his name on the deeds if anything goes wrong? Then you don’t really understand what the hell you were doing setting up agriculture in these contexts in the first place.

This kind of interview answer reveals the difficulties some survey participants may have in responding to apparently straightforward but, in reality, extremely complex questions.

The vast majority of all survey respondents (including those who have never burned and have no intention of burning) are broadly supportive of the idea of burning for fuel reduction. Q.42 asked, To what extent do you agree or disagree with the following statement? In the right conditions, it is acceptable to use fire to reduce fuel loads in native vegetation on rural properties (Appendix A, Chart III). 146 of 155 landholders answering this question agreed to some extent (A 5, 6 or 7 on a 7 point Likert scale). Only 1 landholder (OtherPreNonPilePost) strongly disagreed and 1 landholder (NonPilePreNewBurner) slightly disagreed.

Overall, the majority of landholders reported a slight increase in confidence in their abilities to use fire as a tool to reduce risk of bushfire. Table 6 shows the responses given to Q.6. Did the Hotspots workshop make you feel MORE or LESS confident to...Use fire as a tool to reduce risk of bushfire (e.g. prescribed burn)? (See also Appendix A, Chart V.) It is interesting to note that the least experienced burners, NonPilePreAndPost and NonPilePreBurnPost, were most likely to say that they had neither increased nor decreased in confidence. On average, NonPilePreAndPost have gained least in confidence. Although the difference is small, when combined with the fact that almost half of NonPilePreAndPost don’t want to conduct a burn as they are concerned that the burn may get out of control, it suggests that lack of confidence may be a major factor in preventing some of these landholders from burning.

The large number of AllContinuers (41%) who state that they have gained a considerable amount of confidence in using fire to reduce the risk of bushfire is encouraging to Hotspots. Clearly these experienced burners feel that they have more to learn and that Hotspots facilitated this learning.
Three landholders have less confidence in using fire as a result of attending Hotspots workshops. Interviews suggest this may be because of concerns about litigation.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|}
\hline
 & To reduce fuel loads on my property & To reduce wildfire risk to buildings on my property & To reduce wildfire risk to neighbouring properties & Any fuel / risk related answer: any burn & Number giving any reason for a burn \\
 & Number (%) & Number (%) & Number (%) & Number (%) & Number (%) \\
\hline
All Continuers & 42 (93) & 33 (73) & 16 (36) & 42 (93) & 45 \\
Broad Stoppers & 9 (82) & 5 (45) & 4 (36) & 9 (82) & 11 \\
All Landholders & 51 (91) & 38 (68) & 20 (36) & 51 (91) & 56 \\
\hline
\end{tabular}
\caption{Pre Hotspots: Landholders burning for fuel or risk reduction, any burn}
\end{table}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|}
\hline
 & To reduce fuel loads on my property & To reduce wildfire risk to buildings on my property & To reduce wildfire risk to neighbouring properties & Any fuel / risk related answer: any burn & Number giving any reason for a burn \\
 & Number (%) & Number (%) & Number (%) & Number (%) & Number (%) \\
\hline
NonPilePre &  &  &  &  &  \\
BurnPost & 30 (94) & 24 (75) & 19 (59) & 31 (97) & 32 \\
OtherPre &  &  &  &  &  \\
BurnPost & 11 (85) & 11 (85) & 4 (31) & 12 (92) & 13 \\
All Continuers & 45 (98) & 36 (78) & 21 (46) & 45 (98) & 46 \\
All Landholders & 86 (95) & 71 (78) & 44 (48) & 88 (97) & 91 \\
\hline
\end{tabular}
\caption{Post Hotspots: Landholders burning for fuel or risk reduction, any burn}
\end{table}
**Table 6 Did the Hotspots workshop make you feel MORE or LESS confident to... Use fire as a tool to reduce risk of bushfire (e.g. prescribed burn)**

<table>
<thead>
<tr>
<th>Response</th>
<th>NonPilePre Number (%)</th>
<th>NonPilePre BurnPost Number (%)</th>
<th>OtherPre BurnPost Number (%)</th>
<th>All Continuers Number (%)</th>
<th>OtherPre NonPilePost Number (%)</th>
<th>Broad Stoppers Number (%)</th>
<th>All Landholders Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (2)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (&lt;1)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (2)</td>
<td>1 (8)</td>
<td>0 (0)</td>
<td>2 (1)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>16 (36)</td>
<td>11 (33)</td>
<td>3 (23)</td>
<td>12 (26)</td>
<td>1 (8)</td>
<td>2 (18)</td>
<td>45 (28)</td>
</tr>
<tr>
<td>5</td>
<td>15 (34)</td>
<td>7 (21)</td>
<td>5 (38)</td>
<td>13 (28)</td>
<td>4 (33)</td>
<td>3 (27)</td>
<td>47 (30)</td>
</tr>
<tr>
<td>6-7</td>
<td>13 (30)</td>
<td>15 (45)</td>
<td>5 (38)</td>
<td>19 (41)</td>
<td>6 (50)</td>
<td>6 (55)</td>
<td>64 (40)</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>33</td>
<td>13</td>
<td>46</td>
<td>12</td>
<td>11</td>
<td>159</td>
</tr>
<tr>
<td>Average</td>
<td>5.02</td>
<td>5.33</td>
<td>5.38</td>
<td>5.28</td>
<td>5.42</td>
<td>5.90</td>
<td>5.28</td>
</tr>
</tbody>
</table>

**Management of Weeds**

- There is an increase in the *number* of landholders burning to reduce weeds, from 24 to 46, however the *percentage* of landholders citing this reason for at least one of their burns increases only slightly.

- The vast majority of landholders agree that landholders have a responsibility to reduce feral animals and weeds on their own properties and disagree that there is no point trying to manage feral animals and weeds.

- 132 (87%) of all landholders (whether burning their own land or not) support the use of fire to manage weeds. 17 (11%) are ambivalent and 3 (2%) disagree to some extent with this practice.

**Explanation**

As can be seen from Tables 8 and 9 (see also Appendix A, Chart II), the percentage of landholders who cite reducing weeds as a reason for burning increases from 45% (25 of the 56 people conducting broad burns before Hotspots) to 51% (46 of the 91 people conducting broad burns after Hotspots workshops).
Survey respondents take their responsibilities for weeds very seriously. Q.42 asked, *To what extent do you agree or disagree with the following statement? Landholders have a responsibility to reduce feral animals and weeds on their land* (Appendix A, Chart IV). The average of all landholders’ answers to this question was just over 6 (6.08). Only 3 people disagreed at all with this statement, two of whom also strongly disagreed with the next statement, *There is no point trying to manage feral animals and weeds on my property* (Appendix A, Chart IV). It is possible to disagree with both statements (that is, to believe that landholders have no responsibility to manage feral animals and weeds but that it is worth trying to do so anyway) but it is also possible that these two respondents made a mistake in entering one or the other responses. In total 13 people agreed to some extent that there is no point trying manage feral animals or weeds. However, the average of all landholders’ answers on this question was just over 2 (2.12), reflecting the view that it is possible to make a positive impact on the management of feral animals and weeds.

The vast majority of landholders, whether burning or not, support the use of fire to manage weeds. As shown in Table 7, 87% agreed to some extent with Q.42: *To what extent do you agree or disagree with the following statements? Please consider the whole statement in your response. In the right circumstances it is acceptable to use fire to manage weeds on rural properties* (Appendix A, Chart III). Only 3 landholders (2%) disagreed at all with this statement. However, interviewees were concerned that burning could exacerbate weed problems and one respondent wrote on the survey that weeds had increased as a result of a burn on his/her property. These concerns were reflected in questions raised by landholders at workshops in the case studies. Question 38, sought to quantify these concerns by asking *To what extent do any of the following apply to you when considering doing a prescribed burn? I am concerned that weeds will come in after a burn* (Appendix A, Chart I).

Around a quarter of landholders (39) agreed to some extent, with 24 (16%) agreeing strongly (A6 or 7). AllContinuers were least likely to be concerned about weeds coming in after a burn, perhaps because they see burning as just one part of a wider management plan. Interviews suggest that concerns about weeds are localised, with more landholders in the higher fertility areas of northern New South Wales expressing the view that this is a major issue for them when considering a burn.

The Hotspots team is aware of concerns about weed management. At all observed workshops (Mongarlowe, Grady’s Creek, Kulnura and Budjong) participants were reminded that land
management is an ongoing process and that burning forms just one part of that process. At Grady’s Creek the workshops incorporated a presentation from an expert on weeds. However, the confidence of most landholders in relation to weed management changed only a little or not at all as a result of attending the workshops. Q.6. asked, Did the Hotspots workshop make you feel MORE or LESS confident to...Manage weeds on my property to help reduce fire risk \ and \ Successfully manage weed problems on my property in general (Appendix A, Chart V). As can be seen in Tables 10 and 11, landholders’ answers average 4.81 for gaining confidence in managing weeds to help reduce fire risk, and 4.67 for successfully managing weeds in general. The workshops had no impact at all on the confidence of 43% of survey respondents to manage weeds to help reduce fire risk, and no impact on the confidence of half of survey respondents to manage weeds in general. A very small number of all respondents (around 7 %) feel disempowered by the workshops in terms of weed management.

Interviews suggest that one reason for limited improvements in confidence relating to weed management is a belief that the burns recommended by Hotspots are too cool to affect weeds. For example, Tom explained:

I poison at the moment and fire presents a way to clean up what’s left at the end quicker, rather than waiting a couple of years for it to break down... In the periods that we’re permitted to have a fire... it simply won’t be hot enough to deal a blow to the weeds so you still have to poison. So really, at the end of the day, it gave me a way of cleaning up dead stuff rather than killing stuff that wasn’t meant to be there.

Similarly Robert believed:

Can’t get a burn hot enough to do any good. South-facing slopes’ll only get good enough to burn in October then there’s a total fire ban, we can’t touch it. You’ve gotta have a fire getting towards Christmas otherwise your Crofton weed will come in. Crofton weed’s your trouble, you won’t get Crofton weed to burn. Well, it’ll singe over the top of it but it won’t do no good, it’ll make it worse. Same trouble you got with red lantana. Worst thing you can do with red lantana? Burn it cool. Spreads it, makes it worse. Pink stuff, you burn it and kill it. Funny they’re so different.
Table 7 To what extent do you agree or disagree with the following statements?

<table>
<thead>
<tr>
<th>Answer</th>
<th>In the right circumstances it is acceptable to use fire to manage weeds Number (%)</th>
<th>In the right circumstances it is acceptable to use fire to grow green pick Number (%)</th>
<th>In the right circumstances it is acceptable to use fire to improve the diversity of plants growing in native vegetation Number (%)</th>
<th>It is too complicated to use fire to manage biodiversity Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (strongly disagree)</td>
<td>0 (0)</td>
<td>3 (2)</td>
<td>1 (1)</td>
<td>27 (18)</td>
</tr>
<tr>
<td>2</td>
<td>1 (1)</td>
<td>8 (5)</td>
<td>2 (1)</td>
<td>35 (23)</td>
</tr>
<tr>
<td>3</td>
<td>2 (1)</td>
<td>4 (3)</td>
<td>4 (3)</td>
<td>20 (13)</td>
</tr>
<tr>
<td>4 (neither agree nor disagree)</td>
<td>17 (11)</td>
<td>47 (31)</td>
<td>18 (12)</td>
<td>41 (27)</td>
</tr>
<tr>
<td>5</td>
<td>28 (18)</td>
<td>22 (14)</td>
<td>30 (20)</td>
<td>12 (8)</td>
</tr>
<tr>
<td>6</td>
<td>48 (32)</td>
<td>33 (22)</td>
<td>40 (26)</td>
<td>7 (5)</td>
</tr>
<tr>
<td>7 (strongly agree)</td>
<td>56 (37)</td>
<td>35 (23)</td>
<td>57 (38)</td>
<td>6 (4)</td>
</tr>
<tr>
<td>No. Responses</td>
<td>152</td>
<td>152</td>
<td>152</td>
<td>148</td>
</tr>
<tr>
<td>Average</td>
<td>5.89</td>
<td>5.08</td>
<td>5.78</td>
<td>3.14</td>
</tr>
</tbody>
</table>
### Table 8 Pre Hotspots: Landholders burning for vegetation or animal management, any burn

<table>
<thead>
<tr>
<th></th>
<th>Number giving any answer</th>
<th>To reduce weeds Number (%)</th>
<th>To encourage green pick Number (%)</th>
<th>To encourage plant growth and/or diversity Number (%)</th>
<th>To maintain or improve habitat for animals Number (%)</th>
<th>To encourage green pick and plant growth / diversity Number (%)</th>
<th>To encourage plant growth / diversity and animal habitat Number (%)</th>
<th>To encourage green pick and animal habitat Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AllContinuers</strong></td>
<td>45</td>
<td>20 (44)</td>
<td>6 (13)</td>
<td>13 (29)</td>
<td>9 (20)</td>
<td>3 (7)</td>
<td>6 (13)</td>
<td>2 (4)</td>
</tr>
<tr>
<td><strong>BroadStoppers</strong></td>
<td>11</td>
<td>5 (45)</td>
<td>1 (9)</td>
<td>7 (64)</td>
<td>4 (36)</td>
<td>1 (9)</td>
<td>4 (36)</td>
<td>0 (0)</td>
</tr>
<tr>
<td><strong>All Landholders</strong></td>
<td>56</td>
<td>25 (45)</td>
<td>7 (13)</td>
<td>20 (36)</td>
<td>13 (23)</td>
<td>4 (7)</td>
<td>10 (18)</td>
<td>2 (4)</td>
</tr>
</tbody>
</table>

### Table 9 Post Hotspots: Landholders burning for vegetation or animal management, any burn

<table>
<thead>
<tr>
<th></th>
<th>Number giving any answer</th>
<th>To reduce weeds Number (%)</th>
<th>To encourage green pick Number (%)</th>
<th>To encourage plant growth and/or diversity Number (%)</th>
<th>To maintain or improve habitat for animals Number (%)</th>
<th>To encourage green pick and plant growth / diversity Number (%)</th>
<th>To encourage plant growth / diversity and animal habitat Number (%)</th>
<th>To encourage green pick and animal habitat Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NonPilePreBurnPost</strong></td>
<td>32</td>
<td>15 (47)</td>
<td>1 (3)</td>
<td>13 (41)</td>
<td>14 (44)</td>
<td>1 (3)</td>
<td>10 (31)</td>
<td>0 (0)</td>
</tr>
<tr>
<td><strong>OtherPreBurnPost</strong></td>
<td>13</td>
<td>7 (54)</td>
<td>1 (8)</td>
<td>7 (54)</td>
<td>7 (54)</td>
<td>0 (0)</td>
<td>5 (38)</td>
<td>1 (8)</td>
</tr>
<tr>
<td><strong>AllContinuersPost</strong></td>
<td>46</td>
<td>24 (52)</td>
<td>9 (20)</td>
<td>23 (50)</td>
<td>18 (39)</td>
<td>3 (7)</td>
<td>16 (35)</td>
<td>6 (13)</td>
</tr>
<tr>
<td><strong>All Landholders</strong></td>
<td>91</td>
<td>46 (51)</td>
<td>11 (12)</td>
<td>43 (47)</td>
<td>39 (43)</td>
<td>4 (4)</td>
<td>31 (34)</td>
<td>7 (8)</td>
</tr>
</tbody>
</table>
Table 10 Did the Hotspots workshop make you feel MORE or LESS confident to... 
manage weeds on your property to reduce fire risk

<table>
<thead>
<tr>
<th>Response</th>
<th>NonPilePre AndPost Number (%)</th>
<th>NonPilePre BurnPost Number (%)</th>
<th>OtherPre BurnPost Number (%)</th>
<th>All Continuers Number (%)</th>
<th>OtherPre NonPilePost Number (%)</th>
<th>Broad Stoppers Number (%)</th>
<th>All Landholders Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
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<td>0 (0)</td>
<td>3 (7)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>4 (3)</td>
</tr>
<tr>
<td>3</td>
<td>2 (5)</td>
<td>2 (6)</td>
<td>1 (8)</td>
<td>1 (2)</td>
<td>1 (8)</td>
<td>0 (0)</td>
<td>7 (4)</td>
</tr>
<tr>
<td>4</td>
<td>19 (43)</td>
<td>15 (45)</td>
<td>3 (23)</td>
<td>19 (41)</td>
<td>5 (38)</td>
<td>7 (63)</td>
<td>68 (43)</td>
</tr>
<tr>
<td>5</td>
<td>11 (25)</td>
<td>5 (15)</td>
<td>6 (46)</td>
<td>7 (15)</td>
<td>2 (15)</td>
<td>1 (9)</td>
<td>32 (20)</td>
</tr>
<tr>
<td>6-7</td>
<td>11 (25)</td>
<td>11 (33)</td>
<td>3 (23)</td>
<td>16 (25)</td>
<td>5 (38)</td>
<td>3 (27)</td>
<td>49 (31)</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>33</td>
<td>13</td>
<td>46</td>
<td>13</td>
<td>11</td>
<td>160</td>
</tr>
<tr>
<td>Average</td>
<td>4.73</td>
<td>4.94</td>
<td>4.92</td>
<td>4.80</td>
<td>4.92</td>
<td>4.70</td>
<td>4.81</td>
</tr>
</tbody>
</table>

Table 11 Did the Hotspots workshop make you feel MORE or LESS confident to... 
Successfully manage weeds on your property in general

<table>
<thead>
<tr>
<th>Response</th>
<th>NonPilePre AndPost Number (%)</th>
<th>NonPilePre BurnPost Number (%)</th>
<th>OtherPre BurnPost Number (%)</th>
<th>All Continuers Number (%)</th>
<th>OtherPre NonPilePost Number (%)</th>
<th>Broad Stoppers Number (%)</th>
<th>All Landholders Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>1 (2)</td>
<td>1 (3)</td>
<td>0 (0)</td>
<td>2 (4)</td>
<td>1 (8)</td>
<td>0 (0)</td>
<td>5 (3)</td>
</tr>
<tr>
<td>3</td>
<td>1 (2)</td>
<td>1 (3)</td>
<td>2 (15)</td>
<td>0</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>4 (3)</td>
</tr>
<tr>
<td>4</td>
<td>22 (50)</td>
<td>18 (55)</td>
<td>4 (31)</td>
<td>24 (52)</td>
<td>6 (46)</td>
<td>8 (73)</td>
<td>82 (51)</td>
</tr>
<tr>
<td>5</td>
<td>9 (20)</td>
<td>6 (18)</td>
<td>5 (38)</td>
<td>5 (11)</td>
<td>3 (23)</td>
<td>1 (9)</td>
<td>29 (18)</td>
</tr>
<tr>
<td>6-7</td>
<td>11 (25)</td>
<td>7 (21)</td>
<td>2 (15)</td>
<td>15 (33)</td>
<td>3 (23)</td>
<td>2 (18)</td>
<td>40 (25)</td>
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<tr>
<td>Total</td>
<td>44</td>
<td>33</td>
<td>13</td>
<td>46</td>
<td>13</td>
<td>11</td>
<td>160</td>
</tr>
<tr>
<td>Average</td>
<td>4.73</td>
<td>4.61</td>
<td>4.54</td>
<td>4.80</td>
<td>4.62</td>
<td>4.50</td>
<td>4.67</td>
</tr>
</tbody>
</table>
Management of Plant Growth and Diversity, Animal Habitat and Green Pick

- The number of landholders burning to encourage green pick increases from 7 to 11 after Hotspots workshops but the percentage remains the same.

- The majority of landholders support burning for the production of green pick.

- There is an increase in the number of landholders burning to encourage plant growth and diversity, from 20 (36%) before Hotspots, to 43 (47%) after. This includes an increase in the number of AllContinuers burning to improve plant growth and diversity, from 13 to 23.

- The majority (83%) of landholders, whether burning or not, agree with the use of fire to encourage plant growth and diversity, however 43% of people either agree or are unsure whether or not it is too complicated to use fire to encourage plant growth and diversity.

- There is a net gain of 21 landholders burning to maintain or improve animal habitat.

Explanation
There is a small increase in the number of landholders burning to encourage green pick after the workshops (from 7 to 11 – see Tables 7 and 8 and Appendix A, Chart II). However, the percentage of landholders burning for this reason remains broadly similar before and after Hotspots (around 12%). This percentage is quite low not least because not many Hotspots participants are managing domestic stock. Table 9 shows that the majority of all landholders (58%) support burning for the production of green pick and only 11% disagree with this practice.

A fairly substantial minority of landholders who were burning before the Hotspots workshops were doing so to encourage plant growth / diversity (20 landholders or 36%). This increases to 43 landholders (47%) following Hotspots (Appendix A, Chart II). In some cases it is not clear whether landholders were seeking to manage vegetation for domestic stock or to maintain or improve native vegetation. For example, both before and after Hotspots workshops, 4 landholders (7%) answered yes to encouraging plant growth and / or diversity and to encouraging green pick. However, pre Hotspots, 16 landholders (29%) were burning to encourage plant growth and / or diversity but not to encourage green pick. This increases to 39

Green pick is early pasture growth following rain after fire, drought or other disturbance.

The percentage remains the same because there is an increase in the total number of landholders burning for any reason.
landholders (43%) after the Hotspots workshops. It is likely that these people were concerned with the health of native vegetation.

There is a larger increase in the number of people burning to maintain / improve animal habitat, from 13 to 39 (23% to 43% - see Appendix A, Chart II). Again, however, of the 13 landholders burning to maintain / improve animal habitat before Hotspots, 2 landholders were also burning to encourage green pick. Of the 39 landholders burning to maintain / improve animal habitat after Hotspots, 7 are also burning to encourage green pick. It is possible that these landholders are seeking to improve habitat for domestic livestock rather than native animals. If all landholders burning to encourage green pick are removed from before and after calculations, there is a net gain of 21 landholders from 11 (20%) to 32 (35%) who appear to be burning to maintain / improve habitat for native animals.

Question 6 asked, Did the Hotspots workshop make you feel MORE or LESS confident to... Take action to protect and improve biodiversity on your property? (See Appendix A, Chart V.) As shown in Table 12, 68% of all landholders feel that their confidence has improved to some extent, with 39 % agreeing strongly (A6 or 7; see also Appendix A, Chart v)). NonPilePreBurnPost are most positive about the improvement in their confidence, with 82% believing that their confidence has improved to some extent (A5, 6 or 7) and 48% agreeing strongly (A6 or 7).

It is encouraging to note that there is an increase in the number of AllContinuers burning to encourage plant growth and / or diversity, from 13 to 23 (or from 10 to 20 after removing those landholders who are also burning to encourage green pick). Furthermore, 65% of AllContinuers agree to some extent (A5, 6 or 7) that they have more confidence to take action to protect and improve biodiversity on their properties as a result of Hotspots. These results show that many experienced burners are amenable to change and are taking on-board advice about the environmental benefits of burning. Even where long-term farmers and burners feel they don’t gain a great deal overall from Hotspots, some appear to value the environmental information. For example, Robert felt that most of the workshop was irrelevant to him but described a Hotspots Ecologist as “... pretty good really. Mark, yeah, I had a bit of yarn with him. He was good. That was worth a bit.”

Interviews suggest, however, that some experienced burners would welcome a more nuanced understanding of burning and were frustrated by the simplicity of the workshops. For example, Phil did not return to the second day of the workshops because:
...you’ve got to start somewhere but we’re not just doing an introductory course here, we’re dealing with a threatened species. And if you don’t get the biology, what’s the point? There are generalisable principles that can be transferred across but hey - we wanna get beyond that.

Some experienced landholders who do not burn were similarly frustrated with the lack of nuanced discussion. Summer found the Hotspots workshops “quite confronting” because of the “generalisations”, whilst Andrew and Connie also wanted more detailed information. Andrew explained:

(A Hotspots Ecologist) gave me a link to the actual document that specified the zones and the fire period... I felt that document ought to have been in the pack.... the interpretation that seemed to come out was a lot more rigid than that document seemed to imply. And I just thought the background information should have been there... you need that background. You need that quality of article to know what he’s talking about.”

A small number of landholders remain hostile to the use of fire to improve plant diversity even after attending Hotspots workshops. Question 42 asked, To what extent do you agree or disagree with the following statements? Please consider the whole statement in your response.

In the right circumstances it is acceptable to use fire to improve the diversity of plants growing in native vegetation (Appendix A, Chart III). As can be seen from Table 9, 18 landholders (12%) are ambivalent about this and 7 landholders (5%) disagree to some extent (A1, 2 or 3). Many more landholders are concerned about the complexity of using fire to manage biodiversity. A later part of Q.42 asks, To what extent do you agree or disagree... it is too complicated to use fire to manage biodiversity? (Appendix A, Chart IV) As shown in Table 9, 25 landholders (17%) agree to some extent and just over a quarter neither agree nor disagree. NonPilePreBurnPost are the least daunted by the complexity of using fire to manage biodiversity with only 13% agreeing that it is too complicated.

NonPilePreANDPost are the least likely to have confidence in the use of fire to manage biodiversity, with 20% agreeing that it is too complicated and a further 40% neither agreeing nor disagreeing. Again, this reflects interview data. For example, Summer (a NonPilePreANDPost landholder) was concerned that the complexity of using fire to manage biodiversity was not sufficiently acknowledged by the workshops:
I just think that there’s so many examples of disturbance that’s not human-induced, whether it’s wildfire or – I mean, yeah, maybe there might be a specific example where an isolated community hasn’t got a mosaic of disturbance and it’s senescing and we’re at risk of losing it, possibly, but I don’t know of any examples and we don’t have enough science to be able to say that whether or not it’s gonna help those species in this part of the world. I’m not against (prescribed fire) I just think there’s so much disturbance that happens anyway.

Like others who expressed similar views about the complexity of using fire to manage biodiversity, this interviewee specifically states that she is not against the use of fire *per se*. However, the emphasis on generalisations and numbers as used in fire frequency thresholds is a stumbling point for these landholders and, indeed, many scientists and land managers. The Hotspots team are well aware of the complexity and nuances of fire management. Waminda Parker, the NCCNSW Coordinator, emphasises that “You want to get people looking at the bush rather than thinking about the thresholds. These are a guide only.” Furthermore, during one workshop a Hotspots facilitator mentioned that using fire to manage land is an evolving science for agencies such as the Rural Fire Service and National Parks and Wildlife Service. In response to a question from Laurel about evidence based practice relating to fire frequency thresholds, he explained:

...we’ve had significant discussion amongst the agencies about how we actually monitor these things and how they’re set up. So whether – is it done on fuel load and the potential to burn or is it done on allowing for those biodiversities or is it done on time frames? So really, the inclination is for us to steer away from those set time frames, those fire regimes, where we’re really starting to look at other variables.

This is a particularly significant comment because the “set time frames” or “fire regimes” are the very approach to sustainable fire management that is at the core of the Hotspots workshops. This, combined with the difficulties of communicating large amounts of complex information to a heterogeneous audience, can result in some landholders perceiving that Hotspots is promoting an approach to fire management which is abstract and hands-off and fails to recognise the complexity of using fire to manage biodiversity.

It is difficult to resolve this issue, not least because it is the apparent simplicity of the Hotspots approach to using fire to manage land that *appeals* to some other landholders. Discussion with Hotspots staff members suggest that rather than attempting to fully resolve this tension, it may
be more appropriate to ensure that is acknowledged in workshops and to guide interested landholders towards appropriate resources through which they can explore issues in greater depth. Facilitators could explicitly refer to these alternative resources through comments such as “if you want more detail about…”, “there are some links to interesting articles in the handouts…” or “you may like to have a chat to the Ecologist / Agency staff about this over lunch”. This may not please everybody, as some landholders have concerns that the complexity of fire management is not being expressed to other landholders who might not choose to explore these resources. For example, Laurel explained her concern that, “What we’re starting to see is, from an ecological perspective, all the right language being used and all the right concepts being put across but the way in which those messages are being conveyed isn’t necessarily underpinned by a depth of understanding…” However, acknowledging that fire management is complicated, and emphasising that new burners need to seek environmental approval for broad burns, may go some way towards reducing tensions.

Interviews suggest that Hotspots is particularly successful in transmitting its ecological message around fire and biodiversity if the message is locally specific and well-defined in scope. In certain areas Hotspots has focused on the conservation of target species such as the emu and Eastern Bristle Bird. This approach appeals to many landholders. For example, Kenny explains:

I feel like in some ways it’s quite straight-forward here. Cus it’s very defined which areas probably should be burned if we want to keep them in this way and which areas not to burn. Basically it’s these bristle bird areas.

The complexities, limitations and costs of single species conservation approaches are well documented and the ideal scale for ‘conservation territories’ hotly debated but the capacity of iconic species such as the emu or koala to garner support for conservation amongst the public remains strong. This approach may strike a compromise between providing more depth and detail to knowledgeable and experienced landholders, whilst keeping the scope sufficiently limited to avoid overwhelming newcomers to fire management. Related to this theme, some interviewees expressed irritation about non-local images being shown to illustrate general points in the presentations. Hotspots staff members have been made aware of these criticisms and are working to ensure that this does not happen in future workshops.

The difficulties of finding the right balance of depth and detail in discussion around fire management reflect the heterogeneity of the community with which Hotspots is trying to work. In a single twoday workshop series, Hotspots is trying to meet the needs of landholders with no
experience of burning and those who have been burning for decades, all of whom have different views on the precise circumstances in which it is appropriate to use fire and different views on how (and whether) to manage “biodiversity”. This is an ambitious task. One approach to acknowledging the complexity of the landholder community would be to involve experienced landholders to a greater extent within workshops. The Hotspots promotional literature puts great emphasis on the use of scientific knowledge in the development of the program but it is important to note that 75% of survey respondents feel that local landholders’ knowledge is at least as good or better than scientific data about the environment (Appendix A, Chart IV). Where possible, Hotspots could seek greater integration of this knowledge into the workshops as people learn best from the people they know and trust. Where this did happen at one workshop, interviewees commented positively about the contribution made by a farmer. For example, Phil said:

I thought when Robert was talking it was really community engagement. We were really reviewing the environmental history for that area and his take on it. It was nice in that there was no judgementalness about it.

Whilst community profiling can help with a broad understanding of the social environment, advance visits to potential participants could more clearly identify individual expectations of the workshops, levels of knowledge and experience, and concerns relating to fire in the landscape. Understanding these different needs would enable Hotspots to support more meaningful involvement of individual landholders in the workshops.

Involving landholders to a greater degree might also help Hotspots better meet its aspirations to be a participatory project. Hotspots staff members describe the project as a “community engagement” project at the empowering end of the IAP2 participatory spectrum. However, in its current format Hotspots might better be described as a “hands-on education project” so as to avoid comparison with genuinely participatory projects which work with landholders over a much longer period and encourage participatory engagement at all stages of the project cycle. This issue is discussed in greater detail in the PhD thesis.

Some landholders who believe that it is too complicated to use fire to manage biodiversity might benefit from a follow-up visit to their own property to consider how fire might be used in their particular circumstances. Almost a third of survey respondents (31%) feel that the post-workshop contact was poor, unmemorable or non-existent (Appendix A, Chart VII). NonPilePreBurnPost are least likely to feel negative about the post-workshop contact.
Table 12 Did the Hotspots workshop make you feel MORE or LESS confident to... Take action to protect and improve biodiversity on your property?

<table>
<thead>
<tr>
<th>Answer</th>
<th>NonPilePre NonPilePost</th>
<th>NonPilePre BurnPost</th>
<th>OtherPre BurnPost</th>
<th>All Continuers</th>
<th>OtherPre NonPilePost</th>
<th>Broad Stoppers</th>
<th>All Landholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
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<td>1 (8)</td>
<td>1 (2)</td>
<td>0</td>
<td>0</td>
<td>4 (3)</td>
</tr>
<tr>
<td>4</td>
<td>14 (33)</td>
<td>6 (18)</td>
<td>4 (31)</td>
<td>13 (28)</td>
<td>2 (15)</td>
<td>4 (36)</td>
<td>43 (27)</td>
</tr>
<tr>
<td>5</td>
<td>13 (30)</td>
<td>10 (30)</td>
<td>3 (23)</td>
<td>11 (24)</td>
<td>5 (38)</td>
<td>4 (46)</td>
<td>46 (29)</td>
</tr>
<tr>
<td>6-7</td>
<td>15 (35)</td>
<td>16 (48)</td>
<td>5 (38)</td>
<td>19 (41)</td>
<td>4 (31)</td>
<td>3 (27)</td>
<td>62 (39)</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>33</td>
<td>13</td>
<td>46</td>
<td>13</td>
<td>11</td>
<td>159</td>
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<tr>
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<td>5.48</td>
<td>5.08</td>
<td>5.24</td>
<td>4.77</td>
<td>5.20</td>
<td>5.18</td>
</tr>
</tbody>
</table>

Implications of Data on Reasons for Burning
Following Hotspots, NonPilePreBurnPost are more than twice as likely to burn for fuel / risk reduction as for environmental reasons. Thus Hotspots is likely to continue to attract participants to workshops by concentrating on risk reduction. However, maintaining or improving native vegetation and animal habitat is a primary goal for at least one third of all landholders burning post-Hotspots. Interviews suggest that many landholders are attracted to the program because of its environmental message (e.g. Kenny, Martha, Tim). Even where risk reduction forms one of the goals of their burns, these people would not burn unless there were also environmental benefits. For other landholders, burning in an environmentally appropriate way is of concern even where the management of native vegetation or animal habitat is not an explicit goal. Indeed, it is a legal obligation. Thus, it is important that Hotspots continues to strike a balance in discussing using fire to manage risk to people and property and using fire to maintain or improve native habitat.

Many experienced burners appear to be benefiting from Hotspots. However, interviews suggest that some of the AllContinuers who have not gained confidence in protecting and improving biodiversity on their properties believe that the workshops are not practical enough. Others perceive that the environmental message is not sufficiently nuanced and this view is shared by several landholders who have never burned and are not persuaded to do so by Hotspots. Thus:
• It is essential that Hotspots choose their demonstration sites well, in order to ensure that there are clear expectations that the environmental values of the site will benefit from a burn. Where this is not the case, staff should make it absolutely clear that the purpose of the burn is to reduce the risk to people and property;

• Hotspots may like to consider advance visits to potential participants. These would identify the experience, opinions and concerns of local landholders, and enable the Hotspots team to focus in on the local and specific. Advance visits would also enable the facilitator to introduce the maps and ensure that participants understand the mapping procedure, thus facilitating the running of the first day. In addition, advance visits could identify local people who might like to share and discuss their experiences. However, any attempt to incorporate greater involvement of local people will necessarily be limited due to the format of Hotspots and requires considerable thought around creating “safe spaces” for discussion and ensuring that people are comfortable about sharing their experiences;

• Landholders appear to respond very well to a focus on locally-specific, well-defined issues which can clearly benefit from fire. Hotspots may benefit from continuing to adopt this approach where possible.

Weeds are a major concern for many landholders attending Hotspots. Hotspots do mention weeds at workshops and landholders have welcomed advice from weed experts. Where possible, it would be helpful to tie workshops in to other programs or workshops specifically aimed at weed management.

NonPilePreANDPost landholders are more likely to feel that it is too complicated to use fire to manage biodiversity and least likely to have gained confidence in burning to reduce bushfire risk. These landholders are also more likely to be reticent about using fire because of concerns about burns getting out of control. A follow-up meeting, involving a very small-scale burn with a specific, measurable goal and guidelines on how to monitor post-burn re-growth, may give reticent burners confidence in the process of burning and the management of that process. A member of the Hotspots team is intending to trial a system of “Hotspots volunteers” recruited through the Rural Fire Service and acting as local “hub” coordinators, helping to organise work-shops. It may be possible for these volunteers to co-ordinate follow-up and bring groups of interested individuals into contact with each other in order to observe and / or participate in burns on each other’s properties.
Hotpots may like to consider marketing the workshops as “hands-on, community education/engagement” and refrain from using instruments such as the IAP2 participation spectrum so as to avoid comparison with more long-term, genuinely participatory projects.

**Land Management Activities Before and After Hotspots**

- 112 (73% of) landholders have developed a fire management plan for their property since Hotspots, or are actively planning to. 26 already had a plan before Hotspots, and 9 have no intention of making a plan. NonPilePreBurnPost were least likely to have made a plan before Hotspots and most likely to have made a plan as a result of Hotspots.

- 49 landholders (36%) have contacted, or intend to contact, fire management agencies as a result of Hotspots. 59 (43%) had already done so before attending Hotspots. NonPilePreBurnPost and OtherPreBurnPost were least likely to have contacted fire management agencies before Hotspots and most likely to do so afterwards.

**Explanation**

Landholders were asked about changes in their land management as a result of Hotspots. This question was presented in the following format:

10. **Have you done any of the following activities before Hotspots or since Hotspots, or are you planning to do them in future? Select all that apply.**

<table>
<thead>
<tr>
<th>Developed a fire management plan for my property</th>
<th>I did this BEFORE attending Hotspots</th>
<th>I have done this SINCE attending Hotspots</th>
<th>I am ACTIVELY PLANNING to do this in the future</th>
<th>I DON’T PLAN to do this in future</th>
</tr>
</thead>
</table>

Response rates overall were quite low for this question, ranging from 136 to 155 out of a possible 160 landholders of known burner type. It is possible that, in some cases, none of the answers matched the activities or intentions of some landholders. For example, some landholders may not have joined a voluntary fire fighting service yet and may not be actively planning to, but do
not wish to totally rule it out. These people may prefer to give no answer than to tick, “I DON’T plan to do this in future.” However, it is also likely that some landholders chose to miss out this statement, and other statements in this section due to the length of the survey.

A further difficulty with the analysis of this question is that, despite being asked to “select all that apply”, few people gave more than one answer. For example, when asked about using mechanical methods to reduce fuel on their properties (e.g. mowing, slashing, hand removal of weeds), 89 landholders said they had done this before attending Hotspots workshops only. This implies that these landholders are going to cease all weeding / mowing and other mechanical methods of managing land on their properties. As 85 % of NonPilePreBurnPost intend to burn less than 2 hectares a year, it seems highly unlikely that burning will meet all of their land management requirements. Thus, it is more likely that landholders simply ticked the first response that applies to them.

Table 14 shows that Hotspots encourages people to think about how to manage fire on their property. Almost three quarters of respondents have made a fire management plan as a result of Hotspots. Only 9 landholders (6%) have no intention of making a management plan. Survey respondents were happy with the opportunities to develop a fire management plan for their property at the workshops. Q.5. asked, How good or poor were the following aspects of the workshop you attended? Opportunity to develop a fire management plan for my property... The average rating for responses to this question is 6.15 on a 7 point Likert scale.

Table 15 suggests that Hotspots also plays a valuable role in encouraging landholders to become actively involved in the management of fire on their properties. 49 landholders who had had no previous contact with fire management agencies now intend to make contact. Of the 23 landholders who have never made contact with fire agencies in the past and have no intention of doing so in future, 14 have no intention of burning. It is not clear why 5 NonPilePreBurnPost, 1 OtherPreNewBurner and 3 AllContinuers do not intend to contact fire management agencies as they do intend to conduct burns. These results may reflect input errors or confidence that these landholders can manage any burns themselves, out of fire permit season.

Although many more landholders are now have a management plan and have contacted or intend to contact fire management agencies, some landholders still lack confidence in how to

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42 It is not clear whether respondents view a fire management plan as relating to the whole of their property, as the term is used in the Hotspots workshops, or relates to a plan for house protection and / or evacuation in the event of wildfire.
go about the planning process. When asked to rate the training in skills needed to plan a burn, the average response was 5.74 out of 7 (Appendix A, Chart VII). However, when asked whether the Hotspots workshop made people feel MORE or LESS confident to plan and prepare for a burn, about a quarter (38 / 158) of landholders reported that there was no change in their confidence (Appendix A, Chart V). Four landholders feel their confidence actually decreased. Table 13 suggests that this is not a feature of landholders already knowing how to plan a burn, as people with no previous experience of burning were more likely to say that their confidence had not increased. Landholders may perceive that planning and preparing for a burn is more complex than simply completing a paper management plan and contacting fire management agencies. This may be a good thing; Hotspots may encourage people to be more aware of their own limitations, understand what is involved in managing fire and be more aware of associated risks.

Table 13 Did the Hotspots workshop make you feel MORE or LESS confident to... Plan and Prepare for a burn?

<table>
<thead>
<tr>
<th>Answer</th>
<th>NonPilePre ANDPost</th>
<th>NonPilePre BurnPost</th>
<th>OtherPre BurnPost</th>
<th>All Continuers</th>
<th>OtherPre NonPilePost</th>
<th>Broad Stoppers</th>
<th>All Landholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (2)</td>
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<td>1 (2)</td>
<td>1 (8)</td>
<td>0 (0)</td>
<td>3 (2)</td>
</tr>
<tr>
<td>4</td>
<td>14 (33)</td>
<td>10 (30)</td>
<td>1 (8)</td>
<td>10 (22)</td>
<td>2 (15)</td>
<td>2 (18)</td>
<td>39 (25)</td>
</tr>
<tr>
<td>5</td>
<td>13 (30)</td>
<td>9 (27)</td>
<td>7 (54)</td>
<td>12 (26)</td>
<td>4 (31)</td>
<td>3 (27)</td>
<td>48 (30)</td>
</tr>
<tr>
<td>6-7</td>
<td>16 (37)</td>
<td>13 (39)</td>
<td>5 (38)</td>
<td>22 (48)</td>
<td>6 (46)</td>
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<td>Total</td>
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<td>46</td>
<td>13</td>
<td>11</td>
<td>159</td>
</tr>
<tr>
<td>Average</td>
<td>5.12</td>
<td>5.21</td>
<td>5.46</td>
<td>5.37</td>
<td>5.38</td>
<td>5.80</td>
<td>5.30</td>
</tr>
</tbody>
</table>

As explained at the start of this section, it is unlikely that 89 landholders (58%) who claim to have used mechanical methods to reduce fuel on their properties before Hotspots will not do so in future, as suggested by Table 16. In view of the order in which the responses were laid out, it is more likely to be accurate that 28 landholders have used, or intend to use, mechanical methods to reduce fuel as a result of the Hotspots workshops. Together, these results suggest that, for survey respondents at least, Hotspots does not just promote burning but encourages landholders to think more broadly about how to take a pro-active role in the management of fire. As one interviewee (Juliet) says, “It can’t help but make you think about it. It makes you go back as well and think about what you’ve seen over time. Just realise that it’s quite a while since there’s been any real fire activity...”
Implications for Hotspots

Hotspots is very successful in encouraging landholders to develop a management plan and contact fire agencies. However, there still appears to be something of a gap in confidence between completing a plan and contacting fire agencies on the one hand, and the broader aspects of planning and preparing for a fire on the other. As noted in previous sections, the gap appears to be even bigger when looking at actually conducting a burn. Confidence appears to be a particular issue for NonPilePreANDPost landholders, whether in their own abilities to use fire or in the usefulness of fire as a management practice. One-on-one or small group follow-up with these landholders could be helpful in developing their confidence in using fire in their own specific situations. This follow-up could be conducted by local Rural Fire Service staff.

In addition to promoting the use of fire as a management practice, Hotspots also draws the attention of landholders to the need to maintain their properties and prepare them for fire using mechanical means. This is an important, potentially life-saving feature of Hotspots and workshops should continue to emphasise the importance of mechanical work in complementing the use of fire to achieve the risk-reduction and environmental goals of the program.
Table 14 Have you done any of the following activities before Hotspots or since Hotspots, or are you planning to do them in future? Select all that apply. Developed a fire management plan for my property

<table>
<thead>
<tr>
<th>Activity Description</th>
<th>NonPilePre AndPost No. (% of 39)</th>
<th>NonPilePre BurnPost No. (% of 33)</th>
<th>OtherPre BurnPost No. (% of 13)</th>
<th>All Continuers No. (% of 45)</th>
<th>OtherPre NonPilePost No. (% of 13)</th>
<th>Broad Stoppers No. (% of 11)</th>
<th>All Landholders No. (% of 154)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I did this BEFORE Hotspots (ONLY)</td>
<td>4 (10)</td>
<td>3 (9)</td>
<td>2 (15)</td>
<td>9 (20)</td>
<td>5 (38)</td>
<td>3 (27)</td>
<td>26 (17)</td>
</tr>
<tr>
<td>I did not do this BEFORE but have done it SINCE or am actively PLANNING to</td>
<td>29 (74)</td>
<td>29 (88)</td>
<td>11 (85)</td>
<td>30 (67)</td>
<td>6 (46)</td>
<td>8 (71)</td>
<td>113 (73)</td>
</tr>
<tr>
<td>I did this BEFORE and have done it SINCE (or am actively PLANNING to)</td>
<td>1 (3)</td>
<td>1 (3)</td>
<td>0 (0)</td>
<td>4 (9)</td>
<td>0 (0)</td>
<td>0 (0)</td>
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<td>I DON'T PLAN to do this in future</td>
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<td>0 (0)</td>
<td>2 (4)</td>
<td>2 (15)</td>
<td>0 (0)</td>
<td>9 (6)</td>
</tr>
</tbody>
</table>
Table 15 Have you done any of the following activities before Hotspots or since Hospots, or are you planning to do them in future? Select all that apply. Contacted fire management agencies in my area

<table>
<thead>
<tr>
<th>I did this BEFORE Hotspots (ONLY)</th>
<th>NonPilePre AndPost No. (% of 35)</th>
<th>NonPilePre BurnPost No. (% of 30)</th>
<th>OtherPre BurnPost No. (% of 13)</th>
<th>All Continuers No. (% of 39)</th>
<th>OtherPre NonPilePost No. (% of 12)</th>
<th>Broad Stoppers No. (% of 10)</th>
<th>All Landholders No. (% of 138)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12 (34)</td>
<td>11 (37)</td>
<td>2 (15)</td>
<td>20 (51)</td>
<td>7 (58)</td>
<td>7 (70)</td>
<td>59 (42)</td>
</tr>
<tr>
<td>I did not do this BEFORE but have done it SINCE or am actively PLANNING to</td>
<td>11 (31)</td>
<td>14 (47)</td>
<td>10 (77)</td>
<td>11 (28)</td>
<td>3 (25)</td>
<td>1 (10)</td>
<td>50 (36)</td>
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<tr>
<td>I did this BEFORE and have done it SINCE (or am actively PLANNING to)</td>
<td>2 (6)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>5 (13)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>7 (5)</td>
</tr>
<tr>
<td>I DON'T PLAN to do this in future</td>
<td>10 (29)</td>
<td>5 (17)</td>
<td>1 (8)</td>
<td>3 (8)</td>
<td>2 (17)</td>
<td>2 (20)</td>
<td>23 (17)</td>
</tr>
</tbody>
</table>
Table 16 Have you done any of the following activities before Hotspots or since Hotspots, or are you planning to do them in future? Select all that apply. Used mechanical methods to reduce fuel on my property

<table>
<thead>
<tr>
<th>Activity Description</th>
<th>NonPilePreAndPost No. (% of 42)</th>
<th>NonPilePreBurnPost No. (% of 28)</th>
<th>OtherPreBurnPost No. (% of 13)</th>
<th>All Continuers No. (% of 44)</th>
<th>OtherPreNonPilePost No. (% of 13)</th>
<th>Broad Stoppers No. (% of 11)</th>
<th>All Landholders No. (% of 151)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I did this BEFORE Hotspots (ONLY)</td>
<td>23 (55)</td>
<td>16 (57)</td>
<td>10 (54)</td>
<td>16 (59)</td>
<td>8 (62)</td>
<td>8 (73)</td>
<td>89 (58)</td>
</tr>
<tr>
<td>I did not do this BEFORE but have done it SINCE or am actively PLANNING to</td>
<td>8 (19)</td>
<td>10 (36)</td>
<td>3 (23)</td>
<td>4 (9)</td>
<td>0 (0)</td>
<td>3 (27)</td>
<td>28 (19)</td>
</tr>
<tr>
<td>I did this BEFORE and have done it SINCE (or am actively PLANNING to)</td>
<td>8 (19)</td>
<td>2 (7)</td>
<td>2 (15)</td>
<td>13 (30)</td>
<td>5 (38)</td>
<td>0 (0)</td>
<td>30 (20)</td>
</tr>
<tr>
<td>I DON’T PLAN to do this in future</td>
<td>3 (7)</td>
<td>0 (0)</td>
<td>1 (8)</td>
<td>1 (2)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>5 (3)</td>
</tr>
</tbody>
</table>
Table 17 Have you done any of the following activities before Hotspots or since Hotspots, or are you planning to do them in future? Select all that apply. Done mechanical work to prepare my property for fire

<table>
<thead>
<tr>
<th>Activity Description</th>
<th>NonPilePre AndPost ( % of 42)</th>
<th>NonPilePre BurnPost ( % of 32)</th>
<th>OtherPre BurnPost ( % of 13)</th>
<th>All Continuers ( % of 44)</th>
<th>OtherPre NonPilePost ( % of 13)</th>
<th>Broad Stoppers ( % of 11)</th>
<th>All Landholders No. ( % of 155)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I did this BEFORE Hotspots (ONLY)</td>
<td>24 (57)</td>
<td>18 (56)</td>
<td>8 (62)</td>
<td>24 (55)</td>
<td>7 (54)</td>
<td>7 (64)</td>
<td>88 (57)</td>
</tr>
<tr>
<td>I did not do this BEFORE but have done it SINCE or am actively PLANNING to</td>
<td>7 (17)</td>
<td>11 (34)</td>
<td>3 (23)</td>
<td>7 (16)</td>
<td>1 (8)</td>
<td>3 (27)</td>
<td>32 (21)</td>
</tr>
<tr>
<td>I did this BEFORE and have done it SINCE (or am actively PLANNING to)</td>
<td>10 (24)</td>
<td>3 (9)</td>
<td>2 (15)</td>
<td>13 (30)</td>
<td>5 (38)</td>
<td>1 (9)</td>
<td>34 (22)</td>
</tr>
<tr>
<td>I DON'T PLAN to do this in future</td>
<td>1 (2)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (1)</td>
</tr>
</tbody>
</table>
Workshop-Specific Issues

- Whilst some issues may not appear particularly significant when considered across all Hotspots workshops, in specific areas these issues may “make” or “break” the workshop.

Explanation

Some issues may appear to be of little importance when considered across all workshops, however at the local level they may dominate fire relations. One example is that of litigation. Q.38 asked, To what extent do any of the following apply to you when considering doing a prescribed burn? I’m concerned about legal problems if I do a burn, (Appendix A, Chart I). Across all landholders, in all workshops, only 28% of survey respondents expressed any concern about legal problems relating to burns (A5, 6 or 7). Another question asked, To what extent do any of the following apply to you when considering doing a prescribed burn? It is too complicated to apply for approval to do a burn, (Appendix A, Chart I). Only a quarter of people agreed with this statement. However, in one of the case study areas, at least two law suits against landholders have been successful in the past decade. Legal considerations were at the forefront of many landholders’ minds as shown by the following comments made by Robert whilst looking at a map of the valley:

If you could sign up with all those people and sign a waiver to say, well, if a fire gets on my place I’m not gonna take you on... This fella here cost me 4 and a half thousand already. This bloke over here – I can tell you all the stories – just here, there’s a fire along that mountain along there, come down the slopes, cost him $14000. No chance of doing it. Fires are a thing of the past.

Discussion at the workshops in this case study was dominated by concerns about litigation. Unfortunately, because litigation is largely outside their control, Hotspots staff members were not able to reassure people on this issue and many landholders came away with no change to the concerns that they had taken to the workshop. Tom summarised the problem as follows:

...at the end of the day I don’t think they gave a lot of the people what they wanted to hear because I think a lot of people were concerned about litigation issues and they had no answers for that... The frustration that the Hotspots program delivered was, it showed how you can use fire as a tool but then at the other end of it said, if you use it as a tool and it goes wrong it’s your fault.
Litigation is a very complex issue and nobody blamed Hotspots staff for being unable to give landholders the answers they wanted. Survey respondents overall believe that the Hotspots workshops were very helpful in helping them to understand the legal situation around fire, with over 85% answering 5, 6 or 7 to Q.8. To what extent do you AGREE or DISAGREE with the following statements about the Hotspots workshop? The Hotspots workshop helped me understand rules and regulations about fire management (Appendix A, Chart VI). However, the concerns about litigation highlight the need for quality information about local conditions before the workshop takes place. At another workshop concerns were raised about the demonstration burn-site being part of an Endangered Ecological Community and, more generally, about the use of fire in an extensively disturbed area. Whilst neither of these situations preclude the use of fire, participants felt that a more explicit acknowledgement and treatment of these issues would have given them more confidence in the process as a whole.

Implications for Hotspots
The Hotspots program was designed remotely from the areas in which it is delivered. “Localising” the workshops is an explicit part of the Hotspots scoping process and is achieved through the development of a local Ecological Site Story prepared by a Hotspots ecologist. However, there may be more general political, social or ecological conditions experienced by landholders that undermine the workshops if they are not identified through the scoping process. Again, advance visits to potential participants may help to unearth some of these constraints.

Relationships with the Rural Fire Service (RFS) or other voluntary fire-fighting service
• 36% of survey respondents have, at some point, been members of the Rural Fire Service or a similar fire-fighting organisation.

• Landholders with no experience of burning their own land before Hotspots are less likely ever to have been members of a fire-fighting organisation.

• 72% of survey respondents agreed that the Hotspots workshops had improved their relationship with the Rural Fire Service.

• 22 (16% of) landholders have joined or plan to join the Rural Fire Service or other voluntary fire fighting service following Hotspots. 30% were already members.
The vast majority of survey respondents (84%) feel comfortable inviting members of the Rural Fire Service onto their property.

**Explanation**

Several questions looked specifically at landholder relationships with the Rural Fire Service. Question 9 asked about membership of the RFS before, during and after attending the Hotspots workshops. As might be expected, those landholders who had no experience of burning are least likely to have been members of the RFS or similar organisation. Only 27% of NonPilePreANDPost and NonPilePreBurnPost were, or ever had been, members of a volunteer fire fighting group, compared with an average of 36% for all landholders (See Table 18).

Question 7 asked, *To what extent do you AGREE or DISAGREE with the following statements about the Hotspots workshop? The Hotspots workshop helped me build good relationships with the Rural Fire Service.* 114 (72 % of 158) landholders agreed to some extent (A5, 6 or 7 out of 7).

Question 10 also asked about membership of the Rural Fire Service and revealed that 22 landholders were intending to join the Service following the workshops. Recruiting members for the Rural Fire Service is not in the remit of Hotspots, but the RFS may be pleased by this beneficial side effect. It is interesting to note that NonPilePreBurnPost are least likely to have been members before the workshops and most likely to have no plans to join afterwards. This may be a pointer to the extra value of a program like Hotspots in reaching landholders who might not choose to be involved with the RFS through other channels.

Four landholders (2.5 %) felt the workshops had adversely impacted on their relationships with the RFS. None of these respondents gave reasons for this. However, one interviewee (Phil) who did not respond to the survey complained that a local RFS employee at the workshop (not a Hotspots employee) did not understand fire or farmers. This RFS employee advised a local farmer to stay on a burn site until “...all the smoke had stopped being issued from the hill”. Phil said that this was

... ridiculous, I don’t know any government authority that keeps people on a fire ground – they’ll have the whole thing contained and out within a 20 metre radius of the bloody fire edge but you know, it can be still burning in the middle. But they’re not gonna keep people there until that’s completely extinguished, sometimes there are logs burning for bloody months.
Another anonymous survey respondent, who felt that her relationships with the RFS had improved as a result of Hotspots, nonetheless commented on her questionnaire that “the burn went badly... it was embarrassing... the demonstration was for ‘urban cowboys’.”

Question 38 also sought views on the relationship between landholders and the RFS, asking To what extent do any of the following apply to you when considering doing a prescribed burn? I feel comfortable inviting local members of the Rural Fire Service onto my property, (Appendix A, Chart I).

81 landholders (54% of 151) agreed with no reservations (A7), and 127 (84%) agreed to some extent (A5, 6 or 7). 14 landholders (9%) felt somewhat ambiguous about inviting local members of the RFS onto their properties, whilst 10 landholders (7%) feel uncomfortable to some extent (A1, 2 or 3). Interviews and informal discussions suggest that sometimes participants are not entirely comfortable with the RFS because of localised issues, such as bad experiences with a...
particular brigade leading to a breakdown of trust. Other landholders have broader ideological objections to the way the RFS is run, with interviewees commenting on the “bullshit bureaucracy”, the fact that brigade members are overly fond of “playing with their (toys)” and concerns that the RFS “attracts all the wrong sort of people”. Clearly, all of these issues are outside the control of Hotspots staff.

In reviewing the issues relating to relationships with the RFS, it must be emphasised that the number of interviewees and survey respondents commenting negatively on the conduct of RFS members / employees at Hotspots workshops is very small. Overall, there is compelling evidence that Hotspots is reaching some landholders who might otherwise not have associations with the RFS, and is positively influencing relationships. However, it must also be recognised that many landholders who perceive that there are differences between themselves and RFS staff or volunteers may choose not to come to the workshops in the first place.

**Implications for Hotspots**

Whilst the local RFS brigade is a useful entry into a community, it is essential to recognise that the majority of potential NonPilePreBurnPost will not come through this route. Recruitment is, and should continue to be, done through multiple routes such as door-knocking, conservation groups and so on.

The majority of people attending Hotspots workshops have very positive experiences with the Rural Fire Service but a very small minority do not. Hotspots staff members may like to consider tactfully reminding local RFS volunteers of possible sensitivities around language and behaviour.

**Relationships with other agencies**

- The average score given by survey respondents for presentations given by staff from outside agencies such as National Parks, Forests NSW and the CMA was 6.0 out of a possible 7.

- Most landholders agreed that there were good opportunities to talk / network with government agency staff at the workshops (average score 5.83 out of a possible 7).

- 60% of (162) survey respondents felt that the workshops had helped them build good relationships with land management agencies (such as National Parks, Forests NSW and the CMA) although 8% felt that their relationships had worsened.
• Over two thirds of survey respondents (69% of 151)) agreed that the workshops had helped them understand why other landholders or land managers burn their land.

Explanation
Overall, survey respondents appreciated the involvement of agencies such as National Parks, Forests NSW and the Countryside Management Authority (CMA) in the Hotspots Program. Talks given by agency staff were rated highly (average 6.0 out of a possible 7, n=162) and landholders valued the opportunities to talk and network with agency staff (average 5.83 out of 7, n=159, Appendix A, Chart VII). The majority of survey respondents felt that the workshops had helped them develop their relationships with land management agencies, with 60 % (of 159) answering 5, 6 or 7 to the question To what extent do you AGREE or DISAGREE with the following statements about the Hotspots workshop? The Hotspots workshop...helped me build good relationships with land management agencies. 47 (30% of) survey respondents felt the workshops had made no difference to their relationships, but it is important to recognise that many of these people may have had good relationships with land management agencies, or may have been agency staff themselves, in the first place. The Hotspots team, and the Advisory Committee consisting of representatives from a wide range of agencies, may also be encouraged by the results for another part of Question 8, To what extent do you agree or disagree with the following statements about the Hotspots workshop? The Hotspots workshop ...helped me understand why other landholders or land managers burn their land, (Appendix A, Chart VI). 151 landholders answered this question and 69% agreed that the workshop had helped them gain understanding. 26% felt the workshops had made no difference, but again many of these landholders may already have been sympathetic to other people burning.

13 respondents (8%) felt that the workshops had caused their relationships with land management agencies to decline. Interviews suggest that some of the more practical landholders struggled with the language at the workshops. For example, Deb complained that there was too much “agency speak” and Jack agreed that the Hotspots workshops had reminded him that “agencies don’t know how to talk to landholders”. Both of these landholders felt that the contribution from agency staff was useful but talks were too long. For example, Jack said:
I mean the National Parks can come in and they can give a five minute thingy – we’re National Parks and we do this thing and we have a burn coming up. End of story. That’s all someone needs to know... And any other agency – CMA et cetera – five minutes!

Four survey respondents (3 %) felt that, following the workshops, they had lower levels of understanding about other people’s decisions to burn. Interviews suggest that some landholders were concerned that agencies did not demonstrate a sufficiently strong evidence base for burning despite more than a decade of adopting a fire threshold approach to planning and burning. Other landholders were not persuaded of the benefits of burning by the evidence from previous burns discussed and observed at the workshops. For example, the following exchange took place during Juliet’s interview:

Juliet: Looking at it now and given all the information that they gave us during the workshops ... it wasn’t gonna do anything positive. Like they had burned before and they’d seen that – Oh, this turned up because of that which creates a bigger fire hazard

A: So it wasn’t really a clear-cut case? That fire is the tool for the job there?

Juliet: Well, by the end of the thing I felt exactly the opposite.

Implications
Agency talks are welcomed by the vast majority of survey respondents but agency staff should endeavour to ensure that talks are short and succinct.

The Hotspots team should ensure that they choose demonstration burn-sites which are clearly expected to benefit from fire. Where these are adjacent to previously burned sites, the Hotspots team should clearly explain the responses of vegetation following fire and how these relate to expectations. Where the vegetation response is genuinely unexpected or undesirable, the team should explain how the response from the demonstration burn might be expected to differ.
Summary of the Personal Characteristics of Survey Respondents

This section describes the ages, occupations and gender of survey respondents as well as looking at the length of time they have been living in their local area, length of time managing land, their land-use activities and educational background.

The purpose of exploring these issues is to find out whether particular characteristics influence the likely responses of landholders to Hotspots. It is important to recognise that all groups are heterogeneous and that the decision on whether or not to burn is influenced by the interaction of multiple characteristics. However, focusing on personal characteristics may illuminate whether there are particular types of landholder with whom Hotspots is most effective and other groups of landholders who are not catered for by Hotspots.

It is again emphasised that the purpose of Hotspots is not to encourage all landholders to conduct broad burns on their land but to emphasise appropriate use of fire. However, locations for workshops are chosen in the belief that it is appropriate for most landholders in the area to include fire as a tool in their management repertoire. Thus it is of interest to look at the personal characteristics of landholders attending Hotspots and explore how these influence behaviour and activity relating to fire.
Detailed Results of the Personal Characteristics of Survey Respondents

Age and Occupation

- The median age of survey respondents is between 55 and 59. 47% of survey respondents are aged 60 years or over.

- The median age of all post-Hotspots burners (NonPilePreBurnPost, AllContinuers and OtherPreBurnPost) falls within the range 55-59. The median age of all post-Hotspots nonburners (NonPilePreANDPost, OtherPreNonPilePost and BroadStoppers) falls within the range 60-64.

- Just under a third of survey respondents describe themselves as retired, just over a third as employed and just under a quarter as self-employed. The remaining survey respondents describe themselves as some combination of retired, employed and self-employed, or as unemployed or home makers.

- AllContinuers (i.e. those landholders who burned their own land before and after attending Hotspots workshops) are less likely to describe themselves as retired or employed and more likely to describe themselves as self-employed.

- NonPilePreBurnPost, OtherPreBurnPosts and OtherPreNonPilePost are more likely to describe themselves as employed, a combination of employed and self-employed or unemployed and looking for work.

Explanation
Participants were asked to identify their ages within five year age categories (e.g. 45-49, 50-54), as pilot questionnaires revealed that this reduced sensitivities about disclosing ages. As a result, median ages are calculated to five year age categories.

The median age for “farmers” reported by the Australian Bureau of Statistics is 53. As can be seen in Table 19, Hotspots workshops attract older landholders, with a median age in the range 55-59. Only 16% of survey respondents are below the age of 50 and about half (52%) are below 60. 29% are over 65. The attractiveness of Hotspots to rural amenity in-migrants, the lack of childcare available at workshops and the fact that workshops are held on weekdays may influence the age of participants.
These results point to two possible areas of concern for Hotspots. The data suggest that increasing age may reduce the likelihood of people using fire as a management tool after attending a Hotspots workshop. When all post-Hotspots burners (NonPilePreBurnPost, OtherPreBurnPost and AllContinuers) are combined, the median age range (55-59 years) is lower than the median age range for all post-Hotspots non-burners (NonPilePreANDPost, OtherPreNonPilePost and BroadStoppers – 60-64 years). Similarly, 21% of post-Hotspots burners are aged over 65 compared with 41% of post-Hotspots non-burners.

Secondly, some of the older interviewees indicated that they might move closer to urban areas as they age further, as shown in the following discussion between Andrew and Connie:

Andrew: We’ve talked about probably another 10 years and then we’ll probably have to move into (the local town) or somewhere. Just because...

Connie: Shopping...

Andrew: You need to be able to drive...

Connie: And chop wood.
Andrew: And it would be a shame to deprive other people of this experience by us hanging on when we couldn’t look after it.

As many survey respondents may move off property within the next decade or so, they have limited years in which they are likely to be involved in active fire management. This has implications for the long-term sustainability of outcomes. It appears that few Hotspots participants are likely to be actively involved in burning their land for more than a decade. A critical mass of active fire managers may develop over this time, potentially influencing cultural norms around burning, however it is also possible that any skills developed will be lost. For example, when asked whether he thought the existence of a physical fire management plan might result in burning intentions being passed on to future incomers, Tom replied:

Tom: No. You’re making an assumption that the next person has the same set of values and I don’t think it works that way.

Here Tom reflects the common desire of landholders to change previous management activities when they take over a property. As noted by Phil, “You don’t feel like a farmer unless you’ve left your mark on a block of land.” This applies to other landholders, including conservationists, as shown by the response average of 6.17 to the question, “To what extent do you agree or disagree with the following statement? I have a responsibility to leave my land in better condition than it was when I started managing it.”

Over a third of survey respondents (36%) are retired or a combination of retired and self-employed. A similar proportion (38%) are employed or a combination of employed and self-employed. The high percentage of retirees may reflect the fact that Hotspots is attractive to rural amenity in-migrants or it may be a feature of the fact that Hotspots workshops are frequently held on weekdays. It may also reflect the fact that Hotspots offers no childcare and has no funding for such support. At the workshops observed, Hotspots staff did endeavour to accommodate and entertain children where possible but this service was ad hoc and not advertised. Furthermore, there was hostility to the presence of young children from some other landholders.
Table 19 Burner Types by Occupation

<table>
<thead>
<tr>
<th>NonPilePre ANDPost</th>
<th>Retired Only or Retired + HomeMaker Number (%)</th>
<th>Self-Employed Only Number (%)</th>
<th>Employed Only Number (%)</th>
<th>Retired + Self-Employed Number (%)</th>
<th>Self-Emp + Employed Number (%)</th>
<th>Unemployed Number (%)</th>
<th>HomeMaker Only Number (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 (40)</td>
<td>10 (23)</td>
<td>13 (30)</td>
<td>2 (5)</td>
<td>1 (2)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>8 (26)</td>
<td>2 (6)</td>
<td>14 (45)</td>
<td>3 (10)</td>
<td>4 (13)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>4 (31)</td>
<td>3 (23)</td>
<td>6 (46)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>10 (23)</td>
<td>15 (34)</td>
<td>13 (30)</td>
<td>2 (5)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>4 (9)</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>2 (18)</td>
<td>1 (9)</td>
<td>5 (45)</td>
<td>1 (9)</td>
<td>0 (0)</td>
<td>2 (18)</td>
<td>0 (0)</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>6 (60)</td>
<td>2 (20)</td>
<td>2 (20)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>47 (31)</td>
<td>33 (22)</td>
<td>53 (35)</td>
<td>8 (5)</td>
<td>5 (3)</td>
<td>2 (1)</td>
<td>4 (3)</td>
<td>152</td>
<td></td>
</tr>
</tbody>
</table>

The percentage of survey respondents describing themselves as employed or as employed and self-employed is higher for all new burners at 55% (58% of NonPilePreBurnPost and 46% of OtherPreBurnPost), than the average for all respondents. In contrast, when those who have never burned on their own property and have no intention of doing so in future (NonPilePreANDPost, OtherPreNonPilePost) are combined, the percentage who describe themselves as employed or a combination of employed and self-employed is lower than average at 36%. Whilst the differences are quite small (in view of the sample sizes), they do suggest that Hotspots may be more successful in encouraging employed people to use fire as a management practice on their properties. It is possible that Hotspots plays a role in bringing the attention of people who work off their properties back to their land and fire, resulting in a more active approach to land management. It is also possible that fire appears to be a “quick fix” to landholders who have limited time on property to devote to thinking about or applying land management techniques. As might be expected from the age profiles, more BroadStoppers (60%) and NonPilePreANDPost (40%) are retirees than other landholders. Fewer Broadstoppers are employed (20%), however this is a very small group of 10 landholders.

Implications
Hotspots may like to explore ways in which younger participants could be encouraged to join the program. This is likely to make the program more sustainable in the long term. The evidence
also suggests that younger landholders are more likely to use fire as a management practice after attending Hotspots workshops.

The survey results suggest that previous non-burners who are employed off-property some or all of the time are more likely to use fire as a management practice. Thus it is important that Hotspots continues to target these people, even though they may be harder to contact. In order to provide them with more opportunities to be involved in Hotspots, it may be appropriate to consider “twinning” workshop series which are being held in reasonably close proximity, with one workshop series being held on weekdays and one on weekends. This approach could have implications for landscape-scale results of Hotspots, however any negative effects could be ameliorated by follow-up approaches that bring together landholders from the two different workshops. These might include follow-up burns or putting landholders who are interested in burning in contact with each other.

Gender

• Hotspots appears to attract more male than female landholders

• There is no significant gender differentiation in landholder responses to Hotspots

Explanation

In Table 20, survey respondents of each gender are categorised by burner type. Hotspots does appear to be more attractive to male landholders than female landholders as more survey respondents identified themselves as male (88) than female (57). This is unsurprising, as research shows that fire is perceived and managed differently by males and females. Interviews for this evaluation also indicate that men are more likely to be actively involved both in land management and in the physical aspects of setting and managing large, planned fires. The interviews suggest that, whilst in many heterosexual couples both partners attend workshops, females are more likely than males to come to the workshops if their work is connected with natural resource management or if their male partners are in poor health. Further research would be required to confirm these findings.

Amongst landholders who do attend Hotspots, there is little gender differentiation in terms of percentage distribution across burner types. Women are marginally more likely to be non-
burners (NonPilePreANDPost and OtherPreNonPilePost) and very slightly less likely to be AllContinuers but the percentage of males in each of the burner type categories is broadly similar to the percentage of females. Survey data, interviews, observational and anecdotal evidence from this study suggest that, amongst those landholders who do engage with fire issues, men and women are equally likely to hold opinions about using fire as a management tool. Many are also involved in planning for fire, particularly when supported by people experienced with fire, such as members of the Rural Fire Service.

<table>
<thead>
<tr>
<th>Burner Types</th>
<th>Female Number (% of all females)</th>
<th>Male Number (% of all males)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NonPilePreNonPilePost</td>
<td>17 (30)</td>
<td>22 (25)</td>
</tr>
<tr>
<td>NonPilePreBurnPost</td>
<td>12 (21)</td>
<td>19 (22)</td>
</tr>
<tr>
<td>OtherPreBurnPost</td>
<td>5 (9)</td>
<td>8 (9)</td>
</tr>
<tr>
<td>All Continuers</td>
<td>15 (27)</td>
<td>27 (31)</td>
</tr>
<tr>
<td>OtherPreNonPilePost</td>
<td>3 (5)</td>
<td>7 (8)</td>
</tr>
<tr>
<td>Broad Stoppers</td>
<td>5 (9)</td>
<td>5 (6)</td>
</tr>
<tr>
<td>All Landholders</td>
<td>57</td>
<td>88</td>
</tr>
</tbody>
</table>

**Implications**

Currently, Hotspots attracts more men than women. Evidence with other fire-related programs suggest that there are a number of possible ways to attract more women, such as holding women only workshops, offering childcare and ensuring that participants are recruited through a variety of avenues such as posters outside schools and so on. Hotspots may already consider these approaches or may like to do so now.

Amongst landholders who do attend Hotspots, the likelihood of using fire as a management practice post-workshops is very similar for men and women.

**Length of time managing rural land and living in the local area**

- The median length of time survey respondents have spent managing rural land is 6-10 years.
• The median length of time managing rural land is greater for survey respondents who had already conducted a broad burn on their own land before attending a Hotspots workshop (AllContinuers and BroadStoppers = 11-15 years), compared with those who had not (NonPilePreANDPost, NonPilePreBurnPost, OtherPreBurnPost, OtherPreNonPilePost = 6-10 years).

• More than 80% of those who had conducted a broad burn on their land before attending Hotspots had lived in their local area for more than 10 years. Fewer of the New Burners had lived in the local area for more than 10 years than any other cluster (NonPilePreBurnPost = 48%, OtherPreBurnPost=33%).

• The median length of time survey respondents had lived in their local area is 11-15 years.

• The median length of time all New Burners (NonPilePreBurnPost and OtherPreBurnPost) had lived in the local area is lower, at 6-10 years, than for all other clusters.

**Explanation**

There is a link between the length of time landholders had spent managing rural land and the likelihood of that they had already conducted a broad burn on their own land before attending a Hotspots workshop. 60% of AllContinuers and 70% of BroadStoppers had been managing their property for more than ten years before attending a workshop, compared with only 26% of NonPilePreBurnPost, 30% of OtherPreBurnPost and 32% of NonPilePreANDPost. The median length of time spent managing rural land for experienced burners (AllContinuers and BroadStoppers) falls in the range 11-15 years and for all other clusters falls in the range 6-10 years.

Interviews suggest that many landholders in rural subdivisions spend their first years on a property building a house and observing their land. For example, when advised by a Hotspots staff member that an ice-cream bean tree on his land was seeding already and would “soon be everywhere”, Tom accepted that it needed removing but said, “I tell you what, I won’t be doing it until I have a house”. It is thus unsurprising that those who have been living on their land for 2 years or less (and even up to 5 years) had not yet got around to burning.
Table 21 Burner Type by Time Spent Managing Rural Land and Time Living in the Local Area

<table>
<thead>
<tr>
<th>Burner Type</th>
<th>Median time spent managing rural land in years</th>
<th>% managing land for more than 10 years (total number respondents)</th>
<th>Median Time living in the local area (years)</th>
<th>% living in local area for more than 10 years (total number respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NonPilePre AndPost</td>
<td>6-10</td>
<td>32 (41)</td>
<td>16-20</td>
<td>75 (32)</td>
</tr>
<tr>
<td>NonPilePre BurnPost</td>
<td>6-10</td>
<td>26 (32)</td>
<td>6-10</td>
<td>48 (29)</td>
</tr>
<tr>
<td>OtherPre BurnPost</td>
<td>6-10</td>
<td>30 (13)</td>
<td>6-10</td>
<td>33 (12)</td>
</tr>
<tr>
<td>All Continuers</td>
<td>11-15</td>
<td>60 (43)</td>
<td>16-20</td>
<td>82 (39)</td>
</tr>
<tr>
<td>OtherPre NonPilePost</td>
<td>6-10</td>
<td>42 (11)</td>
<td>11-15</td>
<td>67 (9)</td>
</tr>
<tr>
<td>Broad Stoppers</td>
<td>11-15</td>
<td>70 (10)</td>
<td>21-25</td>
<td>78 (9)</td>
</tr>
<tr>
<td>All Landholders</td>
<td>6-10</td>
<td>40 (150)</td>
<td>11-15</td>
<td>67 (130)</td>
</tr>
</tbody>
</table>

Responses to Q. 50, *How many years have you lived in the local area in which you currently live*, also revealed differences, this time between new burners and other landholders. The median length of time living in the local area is 6-10 years for NonPilePreBurnPost and OtherPreBurnPost which is lower than for OtherPreNonPilePost (11-15 years), NonPilePreANDPost (16-20 years), AllContinuers (16-20 years) and BroadStoppers (21-25 years). 48% of NonPilePreBurnPost and 33% of OtherPreBurnPost had lived in their local area for more than 10 years, compared with 67% of OtherPreNonPilePost, 75% of NonPilePreANDPost, 82% for AllContinuers, and 78% of BroadStoppers.

Some landholders who are hostile to the use of fire when they move in to a rural area change their attitudes after being immersed in the environment, observing local fires and meeting local people. For example, Kenny recalled meeting an organic farmer in the early days of managing his property:
Kenny: We could hear bell birds and we were all talking about those and she said, “Oh it’s because we’ve stopped burning off. When we used to burn off there weren’t bell birds around.” And she’d just explained that she had an organic farm over there and it didn’t make sense to me. In those days I thought, well you’re such a red-neck cus you’re promoting bush fire but you’re an organic farmer, it just doesn’t add up... In retrospect, actually, it’s the more – it’s the better attitude in a sense. It probably was keeping the bellbirds down and it was going with the flow, a bit like the Aborigina ls do, of accepting that we will have fire.

It is possible that many of the landholders who come into managing a property from outside the area might have gone on to use fire in the future even without the intervention of the Hotspots team. However, this does not mean that Hotspots workshops have no role to play, even for those people who have already made the decision that they would like to use fire on their land. There appears to be something of a gap between the decision and the practical application of fire as a management tool, and landholders may need some encouragement. As Kenny explained:

Kenny: I guess (Hotspots) has given me more – I feel like I’ve been given the go-ahead, if you like, to have a fire. Given me a bit of momentum or a boost to know that there’s all these other organisations behind me.

Furthermore, attending a Hotspots workshop may hasten the decision to burn amongst some landholders. Kenny had lived on his property for more than 8 years at the time of this interview and was only now starting to make preparations to burn. Observation and reflection are enormously important in land management but the extent of sub-division throughout New South Wales means that large areas may suffer from sub-optimum management approaches for periods of up to a decade even in the hands of well-intentioned landholders. By raising awareness of the plight of threatened species such as the northern population of the Eastern Bristle Bird, Hotspots may encourage better management of habitat at critical times.

**Implications**

New burners are more likely to have come from a different area of the country within the past decade and more likely to have been managing land for a shorter length of time than experienced burners. Hotspots is more likely to be successful in encouraging more landholders to pro-actively use fire to manage land by working with people who are relatively new to managing land and, even more importantly, landholders who have moved in to the locality from
outside the area. Thus, Hotspots may like to consider targeting areas which have had high levels of in-migration from out of area, such as subdivisions, in the preceding decade.

**Education**

- 88 landholders (59%) had some kind of university qualification. Those who had no experience with fire before attending Hotspots were more likely to have some kind of university qualification (NonPilePreANDPost = 76% and NonPilePreBurnPost = 65%) than all other groups.

**Explanation**

More than half (59%) of all landholders hold a university diploma or degree. Those who had conducted a broad burn on their own land before attending Hotspots (AllContinuers and BroadStoppers) are less likely to hold a university qualification, with 51% having a degree or diploma compared with 71% of landholders who have no burning experience at all (NonPilePreANDPost and NonPilePreBurnPost). For all landholders, having a university qualification is associated with less time spent managing rural land\(^ {43}\), hence it may be that the apparent relationship between education and likelihood of previous burning is a feature of time spent managing land. However, it is seductive to hypothesize that inexperienced landholders with a university education have less confidence with the *practical* aspects of managing land, which in turn reduces the likelihood that they have already conducted a broad burn on their land. Certainly, as discussed in the next section on burning outcomes, confidence appears to play a part in the likelihood of landholders burning.

There appears to be no relationship between qualifications and the likelihood of burning in future. AllContinuers and OtherPreBurnPost are less likely to hold a university qualification whilst NonPilePreBurnPost and NonPilePreANDPost are more likely to hold a university qualification.

\(^{43}\) The average length of time managing land for those with a university qualification falls in the range 3-5 years, compared with 11-15 years for those without a university qualification.
Implications
New burners are being recruited from different educational backgrounds. This suggests that the educational approach of Hotspots is well-matched to the audience but see earlier sections for landholder views on practical versus theoretical understandings of fire.

Area of Land Managed
- The median area of land managed by survey respondents is 30-39 Ha. More than two thirds of respondents manage less than 50 Ha. The range is large, from less than 10 Ha. to more than 2000 Ha.
- Burners and non-burners are represented in all categories.
- With the exception of BroadStoppers, the median area of land managed by survey respondents with no burning experience at all pre-Hotspots is smaller (20-29 Ha.) than that managed by experienced burners (40-49 Ha. for OtherPreBurnPost, AllContinuers and OtherPreNonPilePost).
- There appears to be no link between the area of land managed and the likelihood of burning land post Hotspots. However, it should be emphasised here that this relates to survey respondents only and may not be representative of landholders more widely.

Implications
The area of land managed does not appear to influence the likelihood that landholders who attend Hotspots will conduct a broad burn on their property following the workshops. Hotspots should continue to target landholders managing different-sized areas of land, subject to other social and landscape scale considerations.
### Table 22
What is the highest level of post-school education you have obtained?

<table>
<thead>
<tr>
<th>Group</th>
<th>None Number (%)</th>
<th>Certificate from TAFE / Apprenticeship Number (%)</th>
<th>Graduate diploma Number (%)</th>
<th>University undergrad degree Number (%)</th>
<th>University post-grad degree Number (%)</th>
<th>Other Number (%)</th>
<th>Total University Number (%)</th>
<th>Total Number answering question</th>
</tr>
</thead>
<tbody>
<tr>
<td>NonPilePreANDPost</td>
<td>4 (10)</td>
<td>6 (15)</td>
<td>9 (22)</td>
<td>12 (29)</td>
<td>10 (24)</td>
<td>0 (0)</td>
<td>31 (76)</td>
<td>41</td>
</tr>
<tr>
<td>NonPilePreBurnPost</td>
<td>1 (3)</td>
<td>9 (29)</td>
<td>6 (19)</td>
<td>6 (19)</td>
<td>8 (26)</td>
<td>1 (3)</td>
<td>20 (65)</td>
<td>31</td>
</tr>
<tr>
<td>OtherPreBurnPost</td>
<td>2 (15)</td>
<td>6 (46)</td>
<td>0 (0)</td>
<td>3 (23)</td>
<td>2 (15)</td>
<td>0 (0)</td>
<td>5 (38)</td>
<td>13</td>
</tr>
<tr>
<td>AllContinuers</td>
<td>3 (7)</td>
<td>19 (44)</td>
<td>6 (14)</td>
<td>7 (16)</td>
<td>8 (19)</td>
<td>0 (0)</td>
<td>21 (49)</td>
<td>43</td>
</tr>
<tr>
<td>OtherPreNonPilePost</td>
<td>2 (18)</td>
<td>3 (27)</td>
<td>0 (0)</td>
<td>2 (18)</td>
<td>3 (27)</td>
<td>1 (9)</td>
<td>5 (45)</td>
<td>11</td>
</tr>
<tr>
<td>BroadStoppers</td>
<td>0 (0)</td>
<td>4 (40)</td>
<td>2 (20)</td>
<td>3 (30)</td>
<td>1 (10)</td>
<td>0 (0)</td>
<td>6 (60)</td>
<td>10</td>
</tr>
<tr>
<td>All Landholders</td>
<td>12 (8)</td>
<td>47 (32)</td>
<td>23 (15)</td>
<td>33 (22)</td>
<td>32 (21)</td>
<td>2 (1)</td>
<td>88 (59)</td>
<td>149</td>
</tr>
</tbody>
</table>
## Table 23 Area of Land Managed

<table>
<thead>
<tr>
<th></th>
<th>Median Area of Land Managed</th>
<th>% managing less than 10 Ha. (total number respondents)</th>
<th>% managing more than 40 Ha. (total number respondents)</th>
<th>% managing more than 100 Ha. (total number respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NonPilePreAndPost</td>
<td>20-29</td>
<td>26 (43)</td>
<td>44 (43)</td>
<td>7 (43)</td>
</tr>
<tr>
<td>NonPilePreBurnPost</td>
<td>20-29</td>
<td>28 (32)</td>
<td>44 (32)</td>
<td>15 (32)</td>
</tr>
<tr>
<td>OtherPreBurnPost</td>
<td>40-49</td>
<td>8 (13)</td>
<td>54 (13)</td>
<td>16 (13)</td>
</tr>
<tr>
<td>All Continuers</td>
<td>40-49</td>
<td>17 (41)</td>
<td>56 (41)</td>
<td>31 (41)</td>
</tr>
<tr>
<td>OtherPreNonPilePost</td>
<td>40-49</td>
<td>9 (11)</td>
<td>55 (11)</td>
<td>27 (11)</td>
</tr>
<tr>
<td>Broad Stoppers</td>
<td>20-29</td>
<td>20 (10)</td>
<td>20 (10)</td>
<td>10 (10)</td>
</tr>
<tr>
<td>All Landholders</td>
<td>30-39</td>
<td>21 (150)</td>
<td>47 (150)</td>
<td>19 (150)</td>
</tr>
</tbody>
</table>

### Land-Use Activities

- 71% of survey respondents make no income from their properties and only 12% obtain more than 10% of their income from their properties.

- AllContinuers are most likely to derive some income from their properties, although 57% of these landholders make no income at all in this way.

- 97% of survey respondents live on their properties either full or part-time. Around 70% of all respondents appear to be full-time residents, whilst 27% are part-time residents.

- The most common major land-use activities reported (after residential) were recreation (48%), conservation (46%) and grazing (22%).

- When minor land-use activities are also included, recreation (86%), conservation (79%) and grazing (45%) were still the main activities reported, and horticulture was reported as a major or minor activity for over a third (36%) of respondents.
• It is difficult to identify clear differences between burner types in the data on land-use activities, not least because of the subjectivity of assessing an activity as “major” or “minor”. However, it appears that those who have never burned and have no intention of burning are slightly less likely to report conservation as a major or minor activity. Nonetheless, it is important to note that some of the landholders who are most passionately opposed to burning are ardent conservationists.

**Explanation**
Hotspots attracts landholders who are making little or no money from their properties and this is true for all clusters. The majority of survey respondents (71%) do not make any income from their properties and only 12% derive more than 10% of their income from their properties. AllContinuers are most likely (43%) and NonPilePreANDPost (85%) are least likely to derive at least some income from their properties. All other clusters are broadly similar to the average. Only six landholders make all of their income from their properties, four of whom are AllContinuers.

This data is consistent with interview data and observations from workshops. In general, Hotspots does not attract landholders running larger-scale agricultural businesses. In fact, there is little incentive to attract large-scale farmers as Hotspots output targets are based on the numbers of landholders attending workshops. As such, they tend to be run in areas of high amenity in-migration as these areas yield more potential participants in a smaller geographical area. This said, individual workshop facilitators do attempt to persuade any farmers living in these target areas to attend workshops, however their efforts appear to be less successful than with other groups. This was commented on by a number of interviewees. Juliet explained that there were three local communities in the local area, only one of which was represented at the workshops. Jack felt this was a pity, although he did feel that large-scale farmers were broadly supportive of Hotspots:

Jack: I would’ve liked to see the older families of the area come. They’re not hostile to the message – they probably can’t see the benefit. And for those people that I’ve spoken to (the facilitator) about, they are knowledgeable. They’re not pretending. That’s where I’ve learnt stuff – from those blokes. It’d be nice for them to rock up purely from a personal point

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44 Brodie Rafferty, *pers. comm.*
of view... But if that’s not their want, that’s not their want. I don’t think there’s any great animosity, I think it’s a matter of, you’re right, you do it.

However, Kenny suggested that farmers may choose not to come to Hotspots because of a perception that the workshops are for “greenies”. In response to hearing that one local farmer would be coming to the workshops he exclaimed, “Wow! That’s a fucking achievement!”

Interviews suggest that where landholders running agricultural businesses do attend Hotspots workshops they can feel alienated by the nature of the discussion. Two farmers observed the first day of a case study workshop series with the intention of hosting a workshop series on their own property. However, after the introductory talk they told the facilitator, “This wouldn’t work in an agricultural area.” As mentioned earlier, another farmer-interviewee, Robert, felt that the Hotspots workshops were well-run and well-organised and enjoyed one-on-one discussion with the Hotspots Ecologists. Nonetheless he believed that he had “wasted two days” because “they didn’t really address the problems that we’re having with fire.” In addition to litigation issues, he wanted more discussion about the practicalities (particularly labour and cost implications) of cutting fire tracks through highly productive areas from which fire has largely been excluded for 30 years, and total fire bans which make it almost impossible to burn the southern sides of slopes due to the climate in the area. Most importantly Robert was concerned about fire getting away:

Robert: The only type of fire we’re gonna get now is wildfires. Big fires. Real big fires. No-one has burnt... One time the fire would go and someone would have a piece burnt to stop it but there’s no-one burnt, there isn’t any. So there’s no buffer. Nowhere to stop the fire.

Question 46 related to land-use activities, asking Which of the following activities / land cover occur on the land you manage (select all that apply)? A number of options followed and possible responses were No, Minor Use of my land, Major use of my land. Almost all landholders identified “residential” as a use of their land, however only 70% stated that this was a major land-use. This suggests that just over a quarter of survey respondents live part-time on their land. The percentages for each cluster were broadly similar to the percentages for all landholders.
Recreation and conservation were cited as major uses of land by 48% and 46% respectively of all landholders. A slightly greater percentage of new burners identified recreation (NonPilePreBurnPost = 53%, OtherPreBurnPost = 62%) and / or conservation (NonPilePreBurnPost = 53%, OtherPreBurnPost = 54%) as major land-use activities on their property. Those who have never burned and have no intention of burning are slightly less likely to report conservation as a major activity (NonPilePreANDPost = 42%, OtherPreNonPilePost = 36%). These differences are small, however, particularly when considering the number of landholders in each group.

The decision as to whether something constitutes a major or minor activity is somewhat subjective. As such, the analysis of major and minor land-use activities may be more useful than analysis of major activities alone. There are differences between clusters on some major and minor land-use activities, however these yield little useful information in terms of understanding the likelihood of a particular type of landholder changing their burning activity in response to the Hotspots workshops. For example, only 28% of NonPilePreBurnPost graze animals, compared with an average for all landholders of 45%. However 62% of OtherPreBurnPost graze

### Table 24 Income derived from property

<table>
<thead>
<tr>
<th></th>
<th>No income derived from rural property Number (%)</th>
<th>10% or less of income derived from rural property Number (%)</th>
<th>More than 50% of income derived from rural property Number (%)</th>
<th>Number Landholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>NonPilePreANDPost</td>
<td>29 (85)</td>
<td>31 (91)</td>
<td>2 (6)</td>
<td>34</td>
</tr>
<tr>
<td>NonPilePreBurnPost</td>
<td>21 (72)</td>
<td>26 (90)</td>
<td>2 (7)</td>
<td>29</td>
</tr>
<tr>
<td>OtherPreBurnPost</td>
<td>9 (75)</td>
<td>12 (100)</td>
<td>0 (0)</td>
<td>12</td>
</tr>
<tr>
<td>AllContinuers</td>
<td>24 (57)</td>
<td>35 (83)</td>
<td>7 (14)</td>
<td>42</td>
</tr>
<tr>
<td>OtherPreNonPilePost</td>
<td>6 (75)</td>
<td>6 (75)</td>
<td>1 (13)</td>
<td>8</td>
</tr>
<tr>
<td>BroadStoppers</td>
<td>6 (75)</td>
<td>7 (88)</td>
<td>1 (13)</td>
<td>8</td>
</tr>
<tr>
<td>All Landholders</td>
<td>95 (71)</td>
<td>117 (88)</td>
<td>13 (8)</td>
<td>133</td>
</tr>
</tbody>
</table>
animals, suggesting that grazing activity has little impact on the openness of landholders to conducting broad burns. AllContinuers track the average for all activities other than commercial forestry and grazing, in which slightly more engage. Survey respondents who have never burned, and who have no intention of burning their own land, appear marginally less likely than the average to identify conservation as a major or minor activity on their land (NonPilePreANDPost = 72%, OtherPreNonPilePost = 64% compared with 79% for all landholders). However, it is important to recognise that the deviation from the average is small and that, overall, more than 70% of these landholders do use their land for conservation.

It is also important to recognise that conservationists may be amongst those most opposed to burning, as shown by interviews with participants from Mongarlowe and Kulnura, and with agency staff. The most contentious Hotspots workshops (Mongarlowe and Nattai) occurred in areas where participants felt particularly strongly that burning would not enhance the ecological values of the area. Several interviewees from one of the case study sites came to believe that Hotspots did not pay sufficient attention to local conditions when promoting burning, primarily because of the history of disturbance on the demonstration burn-site.

Implications
Hotspots attracts landholders whose main sources of income are not dependent on agriculture. In view of the nature of Hotspots funding, which depends on numbers of landholders attending workshops rather than land area managed by attendees, this is unlikely to change. In some ways, this is a pity as larger-scale farmers may have larger areas of native vegetation and hence greater capacity to influence both future fire behaviour and environmental outcomes. If Hotspots were to target agricultural landholders, workshops would need to be adapted for this audience.

Hotspots attracts landholders who value the recreational and conservation aspects of their land. As Hotspots staff members are aware, commitment to conservation does not automatically lead to a desire to burn. As such, when choosing demonstration burn sites it is essential to show that the burn is clearly expected to be of ecological benefit to the site.
### Table 25 Major use of land by burner type

<table>
<thead>
<tr>
<th>Burner Type</th>
<th>Residential (you live on the land full-time or part-time)</th>
<th>Recreation (e.g. bushwalking, relaxing)</th>
<th>Conservation</th>
<th>Grazing</th>
<th>Cropping</th>
<th>Horticulture</th>
<th>Commercial forestry</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number (%)</td>
<td>Number (%)</td>
<td>Number (%)</td>
<td>Number (%)</td>
<td>Number (%)</td>
<td>Number (%)</td>
<td>Number (%)</td>
</tr>
<tr>
<td>NonPilePreANDPost</td>
<td>28 (65)</td>
<td>18 (42)</td>
<td>18 (42)</td>
<td>7 (16)</td>
<td>0 (0)</td>
<td>1 (2)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>NonPilePre BurnPost</td>
<td>22 (69)</td>
<td>17 (53)</td>
<td>17 (53)</td>
<td>3 (9)</td>
<td>2 (6)</td>
<td>2 (6)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>OtherPreBurnPost</td>
<td>8 (62)</td>
<td>8 (62)</td>
<td>7 (54)</td>
<td>2 (15)</td>
<td>0 (0)</td>
<td>1 (8)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>AllContinuers</td>
<td>32 (74)</td>
<td>22 (51)</td>
<td>19 (44)</td>
<td>14 (33)</td>
<td>1 (2)</td>
<td>3 (7)</td>
<td>4 (9)</td>
</tr>
<tr>
<td>OtherPreNonPilePost</td>
<td>8 (73)</td>
<td>4 (36)</td>
<td>4 (36)</td>
<td>5 (45)</td>
<td>2 (18)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>BroadStoppers</td>
<td>9 (90)</td>
<td>4 (40)</td>
<td>5 (50)</td>
<td>3 (30)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (10)</td>
</tr>
<tr>
<td>All Landholders</td>
<td>107 (70)</td>
<td>73 (48)</td>
<td>70 (46)</td>
<td>34 (22)</td>
<td>5 (3)</td>
<td>7 (5)</td>
<td>5 (3)</td>
</tr>
<tr>
<td></td>
<td>Residential (you live on the land full-time or part-time)</td>
<td>Recreation (e.g. bushwalking, relaxing)</td>
<td>Conservation</td>
<td>Grazing</td>
<td>Cropping</td>
<td>Horticulture</td>
<td>Commercial forestry</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------------------------------------</td>
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<td>---------</td>
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<td>---------------------</td>
</tr>
<tr>
<td></td>
<td>Number (%)</td>
<td>Number (%)</td>
<td>Number (%)</td>
<td>Number (%)</td>
<td>Number (%)</td>
<td>Number (%)</td>
<td>Number (%)</td>
</tr>
<tr>
<td>NonPilePreANDPost</td>
<td>43 (100)</td>
<td>36 (84)</td>
<td>31 (72)</td>
<td>15 (35)</td>
<td>4 (9)</td>
<td>12 (28)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>NonPilePre BurnPost</td>
<td>31 (97)</td>
<td>26 (81)</td>
<td>27 (84)</td>
<td>9 (28)</td>
<td>3 (9)</td>
<td>15 (47)</td>
<td>3 (9)</td>
</tr>
<tr>
<td>OtherPreBurnPost</td>
<td>12 (92)</td>
<td>13 (100)</td>
<td>11 (85)</td>
<td>8 (62)</td>
<td>0 (0)</td>
<td>6 (46)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>AllContinuers</td>
<td>41 (95)</td>
<td>36 (84)</td>
<td>34 (79)</td>
<td>23 (53)</td>
<td>6 (14)</td>
<td>16 (37)</td>
<td>6 (14)</td>
</tr>
<tr>
<td>OtherPreNonPilePost</td>
<td>11 (100)</td>
<td>10 (91)</td>
<td>7 (64)</td>
<td>8 (73)</td>
<td>2 (18)</td>
<td>4 (36)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>BroadStoppers</td>
<td>10 (100)</td>
<td>9 (90)</td>
<td>10 (100)</td>
<td>5 (50)</td>
<td>3 (30)</td>
<td>1 (10)</td>
<td>1 (10)</td>
</tr>
<tr>
<td>All Landholders</td>
<td>148 (97)</td>
<td>130 (86)</td>
<td>120 (79)</td>
<td>68 (45)</td>
<td>18 (12)</td>
<td>54 (36)</td>
<td>11 (7)</td>
</tr>
</tbody>
</table>
Appendix A
Graphs of Survey Results
In order to remind the reader that the graphs below refer to survey respondents only, most charts show the number, rather than the percentage, of respondents giving a particular response. The reader should also remember that these are results for all landholders responding to each question.

Different burner types had different profiles in terms of their responses, as discussed in the text.

Chart I
To what extent do you agree or disagree with the following statements?
In the right conditions...

- it is acceptable to use fire to keep access open for people or vehicles
- it is acceptable to use fire to improve the plant diversity in native vegetation
- it is acceptable to use fire to grow green pick
- it is acceptable to use fire to manage weeds on rural properties
- it is acceptable to use fire to reduce fuel loads in native vegetation

Number of survey respondents:

- 1-2 Strongly disagree
- 3
- 4 Neutral
- 5
- 6-7 Strongly agree
Landholders have a responsibility to reduce the risk of bushfire on their land

Landholders have a responsibility to reduce feral animals and weeds on their land

There is no point trying to manage feral animals and weeds on my property

Local landholder’s knowledge is often better than scientific data about the environment

It is too complicated to use fire to manage biodiversity

Landholders should be able to use their land as they wish even if others in the community do not like it

Too many rules and regulations are applied to landholders who want to use fire on their land

To what extent do you agree or disagree with the following statement?

1-2 Strongly disagree

3

4 Neutral

5

6-7 Strongly agree
Chart V

Did the Hotspots workshop make you feel MORE or LESS confident to...

- successfully manage weeds on my property in general
- manage weeds on my property to reduce fire risk
- take action to protect & improve biodiversity in the local landscape
- take action to protect & improve biodiversity on my property
- Manage fire-sensitive species and habitats in a prescribed burn
- Apply to relevant authorities to conduct a burn
- Plan and Prepare for a burn
- Use fire as a tool to reduce risk of bushfire

Number of survey respondents

1-2 Much less confident
3
4 No change
5
6-7 Much more confident
Chart VI

To what extent do you agree with the following? The Hotspots workshop...

- helped me feel more in control of my land management
- made me more interested in the native vegetation on my property
- helped me understand why other landholders/land managers burn
- helped me learn more skills and knowledge
- made me feel more confident I've been using fire appropriately
- helped me understand the effects of fire on plants and animals
- helped me understand fire behaviour and fire weather
- helped me understand rules and regulations about fire management

Number of survey respondents

1-2 Strongly disagree
3 Strongly disagree
4 Neutral
5
6-7 Strongly agree
8 N.A./Can’t remember
Chart VII

**How good or poor were the following aspects of the workshop you attended?**

- Post-workshop contact
- Pre-workshop contact
- Training in skills to CONDUCT a burn
- Training in skills to PLAN a burn
- Opportunities to talk/network with government agency reps
- Opportunities to contribute knowledge of local area

**Legend:**
- 1-2 Very poor
- 3
- 4
- 5
- 6-7 Very good
- 8-9 Can't remember

**Number of respondents**
Appendix B

Issues relating to the methods and analysis used in the evaluation

The Hotspots Fire Project does not operate in a vacuum but in a complex and ever-changing social, political and ecological environment. Perhaps the greatest impact on landholders and landholdings is fire itself, from the 2009 fires in Victoria which killed 173 people and burned over 450000 ha. of land, to smaller, local fires which may have dramatic impacts on a small number of people. The media play a large role in influencing landholders regarding fire, government policies come and go and numerous agency or non-government initiatives exist to inform or persuade people to adopt certain practices relating to fire. Furthermore, landholdings exist within highly temporally variable conditions relating to global climate and local weather; livestock, feed, timber and real estate prices; the fluctuating dollar and wider economy; water allocations; government policies; plant and animal invasions and the human demographics of the rural landscape. In addition to possible involvement in food or timber production, tourism or off-farm income-generation activities, landholders may be active in conservation initiatives both on and off their landholding, including integrated pest management, Landcare and Greening Australia.

All of these things complicate the picture when evaluating Hotspots. Interviews for this evaluation suggest that landholders perceive that there is now a greater general acceptance of landholders working with fire to manage land than there was eight or so years ago when Hotspots first began to run workshops. The Hotspots program has certainly played a part in this move towards acceptance but it is challenging to identify exactly how much change can be attributed to Hotspots. Furthermore, change is often a slow, incremental process which proceeds almost undetected for long periods. People may be unaware of the change in themselves until it reaches a critical tipping point. Surveys and interviews held within months of the workshops may not reveal some of these deep change processes.

Surveys offer a broad guide to the experiences of a large number of participants in a program. This survey was designed after completion of one case study and observation of two further workshop series, so as to incorporate issues of interest and importance to landholders. The questionnaire was very long, which was largely unavoidable due to the different remits of the two organisations working with the same landholders. Nonetheless, some landholders may feel that their views are not represented because relevant questions were not asked. Furthermore, in all surveys, understandings of particular words or phrases can vary. Whilst potential variations are explored and minimised during piloting, they cannot be completely eliminated. Some of the constructs underlying the questions are complex and controversial. As such, the survey data has been analysed mainly through descriptive statistics, as it is felt that complex statistical procedures can
often blur the complexity of concepts underlying the questions. The qualitative data complement the survey data in that interviews and observations allow individual participants to frame the discussion and respond to questions in more complex and detailed ways. On this occasion, the qualitative data also provide greater insight into change, as landholders were interviewed both before *and* after the workshops. In addition, interviewee involvement was elicited before the Hotspots workshops hence the decision to participate was not affected by their feelings about the program.

It would be unreasonable to extrapolate from the data to all Hotspots participants as there are compelling reasons to believe that survey respondents represent a particular sub-set of participants.

These reasons relate to the following issues:

- **Motivation:** If the program has made a sufficiently big impression to encourage someone to change their land management practices relating to fire, they may be more likely to respond to a lengthy survey about it than if the program had had little or no impact on their land management practices.

- **Attitudes towards bureaucracy:** Interviews and informal discussions at workshops show that some participants with more negative views about Hotspots workshops are concerned that the program is too bureaucratic and not sufficiently practical. It appears that these interviewees failed to respond to the survey\(^{45}\), possibly because they believed that the lengthy survey was more of the same.

- **Time:** Those with limited time to explore alternative management practices (such as weekenders or landholders employed full-time off property) may be less likely to change their land management approaches *and* less likely to complete the survey.

- **Prize draw:** Whilst the prize draw may have had a small impact on these factors, it also brings its own biases such as over-representation by those who perceive that they have more time and / or a greater need for money. This could again bias the survey against those who work full-time off property.

\(^{45}\) Participants were given the choice of giving their name when answering the questionnaire. 126 respondents did so, 41 did not. In workshop areas where interviews were held, a process of elimination makes it possible to identify which interviewees did not respond.
In addition to issues around the reliability of extrapolating the data to all participants, the value of doing so is also questionable. Interviews and informal discussions with individual landholders and agency staff at Nattai, Mongarlowe, Kulnura and Grady’s Creek suggest that a Hotspots workshop will not, in itself, change the minds of people who already hold strong views. This does not mean that there is no value in these people attending workshops, as attitudinal and behavioural change can be slow processes reliant on cumulative rather than single experiences. However, it does mean that the best way for Hotspots to be seen to produce good results would be for facilitators to deter those people who hold an existing negative view about the use of fire from attending the workshops. This would be a dangerous path upon which to embark, with implications for community coherence and resilience. Furthermore, in terms of the long-term sustainability of change, it is better that all views are aired in an environment which permits a response from Hotspots staff.

Nonetheless, many people who object to the use of fire as a management tool choose not to attend the workshops anyway, as shown by interviewees in Mongarlowe and Grady’s Creek, and anecdotal evidence from Budgong. Unfortunately, it is impractical to estimate the numbers of people who might fall into this category as it would require unjustifiable assumptions about how far people might be expected to travel to a workshop, how many have exposure to advertising about the workshops and are aware that a workshop is happening, and the reasons for non-attendance.

---

1. Hotspots Fire Project (undated) Case Study: Learning and living with fire – the Currawinya story
3. The wording of these statements in Q.42 and the choice of a Likert scale to answer them require explanation. Since the “right conditions” are stipulated in the question, strictly speaking landholders should have answered 1, 4 or 7, i.e. it is never acceptable, I don’t know, or yes, there are some conditions in which it is acceptable. The question could have been worded as, “Are there ever conditions in which it is acceptable to use fire to...”, and participants given the choice of answering Yes / No or Unsure. We can be confident that the 73 landholders answering 7 – strongly agree would be comfortable answering yes – there are conditions in which it is acceptable to use fire to... However, due to the political nature of “the fire question”, and the complexities surrounding beliefs about its under- and over-use by some individuals and agencies,
some landholders might feel reluctant to appear to be offering a *carte blanche* to the use of fire with no reservations. For example, whilst the single landholder answering 1 – strongly disagree should feel comfortable answering no – there are never any conditions in which it is acceptable to use fire, others might feel that they would like to see greater restrictions on the use of fire but do not disagree with its use *per se*. This may be true of the five landholders (4 Non/PileBurners and 1 NonPreNewBurner) who neither agree nor disagree (answer 4) and the 25 landholders who answered 5 – slightly agree.

The statements were not bounded geographically, hence participants should have responded according to their understanding of whether it is acceptable to use fire *anywhere*. It is likely that they restricted their answers to Australia, and quite possible that they restricted their answers to New South Wales or their own local area.

\[n\] Penny Watson, Hotspots Workshop Day 2, Grady’s Creek, May 2013.


Appendix 2: Guide to questions asked in post-Hotspots semi-structured interviews with landholders

First of all, I’d like you to speak freely about your experiences with Hotspots.

Freestyle

1. Tell me, in your own words, about your experiences with Hotspots. I’m particularly interested in where Hotspots met your expectations and where there were surprises, good or bad.

Specifics (to be asked only if not covered by the answer above)

General impressions

1. What were the strengths of the Hotspots approach?

2. What were the weaknesses of the Hotspots approach?

3. Can you remember why you decided to attend the workshops?

4. What were your thoughts when you first arrived at the shed?

5. Can you take me through your memory of what happened at the workshops? (Agenda)

6. Was this what you expected to happen?

7. How would you describe the atmosphere at the workshops?
Resources

1. A number of resources were used before and during the workshops. What are your views on these?

<table>
<thead>
<tr>
<th>Resource</th>
<th>Helpful?</th>
<th>Influence outcome of workshop?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-workshop literature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maps – aerial photography</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Folders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burn-sites (comparison – previous / proposed burns)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. A number of people spoke at the workshops, including (facilitator), (Ecologist), (NWPS) and (RFS). Was it helpful to hear the perspectives of a range of different people?

Learning that took place during HS

1. What motivates Hotspots to carry out these workshops?

2. (If not already answered) What outcomes do you think that Hotspots were hoping for as a result of the project?

3. Can you describe the Hotspots approach to using fire to manage native vegetation?

4. What do you think the short- (0-2 yr) and long- (2-50 yrs) term consequences of this approach are likely to be for each of these categories?

<table>
<thead>
<tr>
<th>Category</th>
<th>Short-term</th>
<th>Long-term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel loads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fauna</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water quality</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Are there any limitations to burning as a strategy through which to manage land?

6. Are there any other ways in which you could obtain similar results to burning?

7. Is there anything you still feel confused about?
Relationships with people

1. Did you speak to anyone at the Hotspots workshops that you might otherwise not have spoken to or that you’ve never met?

2. Did you feel that your knowledge, values and opinions were acknowledged and respected before and during the Hotspots workshops?

3. Did you feel that the knowledge, values and opinions of other participants were acknowledged and respected before and during the Hotspots workshops?

4. Did anything that was said by other participants (not Hotspots facilitator or ecologist) affect your views on fire and biodiversity?

5. Have you spoken to anyone since the Hotspots workshops that you might not otherwise have spoken to?
   a. Who?
   b. What did you speak about?

6. Have you discussed the Hotspots project with anyone since the workshops?

7. Since the workshops, have you spoken to anyone about your land that you might not otherwise have discussed this with?

8. Since the workshops, have you spoken to anyone about fire that you might not otherwise have discussed this with?
Relationships with your land, landscape and fire

1. How did the workshops affect the way you look at your land or landscape?
   a. Do you know more about flora / fauna / soil?
   b. Do you feel that there is more to know about your land?
   c. Do you have more interest in native vegetation?
   d. Do you have different expectations or vision for your property or landscape?
   e. Do you have a different understanding of how your property fits into the wider landscape?

2. How did the workshops affect what you will do with your land or landscape (other than using fire)
   a. Will the workshops change what you are doing?
   b. If so, how?
   c. If not, do you have more or less confidence in what you were doing already?

3. Did attending the workshops affect, in any way, who you will do things with
   a. On your land
   b. In the landscape

4. Did attending the workshops affect, in any way, the way you feel about fire
   a. On your land
   b. In the landscape

5. Did attending the workshops affect, in any way, what you will do with / or about fire
   a. On your land
   b. In the landscape

If you have chosen to use fire as a tool to manage your land, discuss fire plans

6. Why have you chosen to burn?
7. Who was involved in the decision to burn?
8. When will you burn?
9. Where will you burn?
10. What area (size) will you burn on each occasion?

For the next burn

11. Do you know the fire history for this area?

12. How will you set about burning your land?
   • Who will you inform?
   • Will you be personally involved in the burn?
   • Who else will you involve in the burn?
13. Is there anything particular that you would take into account or watch for
   • before burning
   • during burning
   • after burning (ask specifically about monitoring if this is not brought up)

If you have chosen not to use fire to manage your land

6. Can biodiversity ever be enhanced through the use of fire?

7. Why have you chosen not to burn?

Hypothetical scenarios

1. Imagine a utopian but realistic / achievable long-term vision of Australia:
   a. Is wildfire a part of that vision? (Where: remote and / or residential areas?)
   b. Does wildfire bring any benefits?
   c. Does wildfire bring any challenges?
   d. Is prescribed burning a part of that vision? (Where?)
   e. Does prescribed burning bring any benefits?
   f. Does prescribed burning bring any challenges?
   g. Who plans prescribed burns on privately-owned land?
   h. Who implements prescribed burns on privately-owned land?
   i. If a prescribed burn gets out of control on private land, who is held responsible?
Appendix 3: Guide to questions asked in semi-structured interviews with agency staff

NOTE: These questions were intended as a personal guide to topics I hoped to cover during interviews and were not intended to be read out verbatim.

Personal History

1. Can you explain a little about how you came to be working as a ... (Early influences, training and qualifications, career trajectory)

2. Have you ever undertaken any training or study in...
   a. Training / Education / Community Development
   b. Natural resource management
   c. Fire

3. Why are you working
   a. In this geographical area?
   b. For this organisation?

Management Area

1. Geographical boundaries of the area

2. What’s distinctive or important about this area (positives and challenges)?

3. In this area:
   a) How is the land used?
   b) Has this changed over time?
   c) How?
   d) Do you expect more or less change in future?
   e) What will influence future changes?

4. What (or who) influences the way you manage / work in this area?
   Give examples if necessary, e.g. people (relationships past and present), topography, geology, biology, history of land use, government policies, education, economic considerations, time pressures, climate?
Conservation and Landscapes

1. In the area covered by your job, what's desirable / non-desirable in this area? (Flora? Fauna? Other?)

2. Has species composition / type of vegetation / vegetation quality changed in the time that you've been here?

3. What (or who) influences what lives here?
   Brainstorm all the influences including people (relationships past and present), site conditions (slope, vegetation, weeds), weather, government policy etc.

4. People talk about biodiversity conservation but don't always agree what that means.
   a. What does biodiversity conservation mean to you?
   b. Does it matter?
   c. Why?

5. What do you think are the most important biodiversity issues in the area covered by your job?

6. What are the most important biodiversity issues on a wider scale (e.g. across Australia)?

7. How does biodiversity in this area link into biodiversity on a larger scale?

8. Within community conservation or land management projects there appears to be a trend towards working at the landscape-scale.
   a. What are the benefits of developing a landscape-scale approach to biodiversity conservation?
   b. What are the challenges to developing a landscape-scale approach to conserving biodiversity?
   c. How can Hotspots contribute to resolving these issues?
Fire

1. Many people believe that before 1788 and the arrival of Europeans, Aboriginal people extensively used fire to manage land.
   a. Do you believe this?
   b. For what purpose(s) do you think they were burning?
   c. What impact did this have on the land?
   d. Should this influence the way land is managed now?
   e. How?
   f. Is there anything to be learned from the way that Aboriginal people thought about or conceptualised the relationships between people, fire and land?
   g. What?

2. What benefits, if any, does wildfire bring?

3. What challenges, if any, does wildfire present?

4. What benefits, if any, does prescribed burning bring?

5. What challenges, if any, does prescribed burning present?

6. Imagine a utopian but realistic / achievable long-term vision of Australia:
   a. Is wildfire a part of that vision? (Where: remote and / or residential areas?)
   b. What role does wildfire play?
   c. Is prescribed burning a part of that vision? (Where?)
   d. What role does prescribed burning play?
   e. Who plans prescribed burns on privately-owned land?
   f. Who implements prescribed burns on privately-owned land?
   g. If a prescribed burn gets out of control on private land, who is held responsible?
Communities and Community Engagement

1. Who lives in the area covered by your job (what kind of people)?

2. In New South Wales, what do you think is currently happening / what changes or developments are taking place with landholders and conservation? (N.B. General trends - NOT as a result of Hotspots.)
   a. knowledge / education (e.g. book vs experiential learning)
   b. practice
   c. attitudes
   d. expectations
   e. emotions

3. As part of your job, do you communicate about land-based activities with landholders in NSW? (Give specific examples if numerous communications)
   a. With whom?
   b. How?
   c. Where?
   d. What form do these discussions take (information / opinion gathering / knowledge sharing etc.)

4. Who should make decisions about what or whom should live in this area?
   a. Private land
   b. Public land

5. What role should landholders play in the development of policy relating to conservation on privately-owned land?

6. How can that role be facilitated?

7. What opportunities are currently available for landholders to contribute to the development of policy relating to conservation on privately-owned land?

8. In NSW, what do you think is currently happening / what changes or developments are taking place with landholders and fire? (N.B. General trends - NOT as a result of Hotspots.)
   a. knowledge / education / understanding
   b. practice
   c. attitudes / beliefs / values
   d. emotions
9. As part of your job, do you ever talk to other people about using fire as a management tool on private land?
   a. Who?
   b. Where?
   c. When (under what circumstances do these discussions arise?)
   d. Please describe recent discussions you’ve had about fire. (Are you sharing knowledge and experience / opinions / seeking to change someone’s point of view?)

10. Do you feel that the legal responsibilities of landholders have changed over recent decades in relation to using fire to manage land?
   b. How?
   c. Who holds these expectations (Other landholders? Conservation Groups? Wider society?)
   d. What has precipitated these changes

11. Do you feel that the moral responsibilities, or expectations, of landholders have changed over recent decades in relation to using fire to manage land?
   b. How?
   c. Who holds these expectations (Other landholders? Conservation Groups? Wider society?)
   d. What has precipitated these changes

12. Who should make decisions about the use of fire as a management tool in this area?
   a. Private land
   b. Public land

13. What role should landholders play in the development of policy relating to the use of fire as a management tool on privately-owned land?

14. How can that role be facilitated?

15. What opportunities are currently available for landholders to contribute to the development of policy relating to the use of fire as a management tool on privately-owned land?

16. What does shared responsibility mean to you?

17. What does community engagement mean?
18. What does two-way engagement mean?

19. In NSW, what do you think is currently happening / what changes or developments are taking place in terms of landholders’ relationships with each other? (N.B. General trends - NOT as a result of Hotspots.) (volunteering/ changing understandings of what it means to live in the countryside).

20. In NSW, what do you think is currently happening / what changes or developments are taking place in terms of landholders’ relationships with staff from your agency (changing demographics / volunteering / changing understandings of what it means to live in the countryside).
Hotspots Workshop (Note: these questions were asked only of those staff directly involved in workshops)

1. What are you expecting from landholders during the first workshop? (Cooperation / engagement / hostility etc.)

2. What’s your role in the first workshop?

3. What do you aim to achieve in the first workshop?

4. What is the first workshop as a whole aiming to achieve?

5. What’s your role in the second workshop?

6. What do you aim to achieve in the second workshop?

7. What is the second workshop as a whole aiming to achieve?
Hotspots General

1. Please think about the success of Hotspots
   a. What are the achievements of Hotspots?
   b. Is Hotspots successful overall?
   c. How do you know?
   d. In what ways is Hotspots most successful?
   e. In what ways is Hotspots less successful?
   f. Is there anything you would like to see Hotspots achieve that it hasn’t already achieved?

2. Have you ever seen a Hotspots workshop?
   a. If yes, what were the strengths of the approach?
   b. If yes, what were the weaknesses of the approach?
   c. If no, do you know how they are run?

3. Think about other way(s) in which Hotspots could approach fire and conservation with landholders?
   a. How would they be different from the current Hotspots approach?
   b. Why do it the Hotspots way?

4. Do you know of any other projects working with landholders on fire and conservation in New South Wales?
   a. How are they similar?
   b. How are they different?
   c. What are the advantages of having different projects working in different ways on the same issues?
   d. What are the disadvantages of having different projects working in different ways?

5. Hotspots is a partnership between very different types of organisations
   a. What strengths have these partnerships brought to Hotspots?
   b. What challenges have these partnerships brought to Hotspots?
   c. What would you change about the structure of Hotspots?

6. Where do you see the future of Hotspots?
Science and Society

“Despite recent advances in conceptualizing the uncertain and socially embedded nature of (scientific) knowledge claims, science is still treated by some as a source of certainty on which to base decisions” about natural resource management 46.

“what policy advisers anoint as ‘science’ for intended public authority always embodies unstated policy-related commitments, including presumptions over the defining questions”47.

1. To what extent do you agree that science is a source of certainty on which to base decisions about using prescribed fire on private land?

2. Other than scientific knowledge, what issues might be considered by a landholder when making the decision to use prescribed fire on his / her land?

3. Other than scientific knowledge, what considerations might be involved in the development of policy about the use of prescribed fire on privately-owned land?

Fire and Native Species

“There is no doubt that land managers would like to be able to predict the effect of fire regimes on biodiversity, but the current models are little more than guesswork... That is unlikely to change for many years”48.

There is a paucity of large-scale, replicated fire research and we know very little about the mechanisms underlying fire impacts on native species. Therefore, we are not yet in a position to manage fire for biodiversity conservation.


4. To what extent do you agree that we don’t yet know very much about how fire impacts on native species (flora, fauna, fungi etc.)?

5. Should our current levels of knowledge about how fire impacts on native species affect individual landholder approaches to the use of fire as a management tool?

6. How?

7. Should our current levels of knowledge about how fire impacts on native species affect the development of policy relating to the use of prescribed fire on private land?

8. How?

9. Should our current levels of knowledge about how fire impacts on native species affect training programs such as Hotspots?

10. How?

Fire and Risk

“If you own the fuel and it catches fire, you also own that fire and you also own the responsibility to do something about that fire”\textsuperscript{49}.

11. To what extent do you agree that landholders should be held responsible for the fuel-loads on their own properties?

12. Do we need further legislation to ensure that landholders are held responsible for wildfire which starts, or spreads, on their properties?

## Hotspots evaluation survey

### About this survey

This survey asks you to evaluate the Hotspots workshop you attended. We are doing this to find out how well Hotspots is doing in achieving its vision of supporting sustainable fire management for healthy landscapes, through increasing community understanding of the role of fire in the Australian bush and to improve the management of fire across the landscape for ecological outcomes, while also protecting life and property.

This survey asks you to evaluate the workshop, and also asks questions about you and your views, values and beliefs. This information will help the Hotspots team improve future workshops. Please be honest and open in your answers - we want to hear about the things that didn’t work well for you in the workshop, as well as what did, so we can work to continue improving this unique initiative.

This evaluation is being conducted by two researchers: Amanda Edwards from the University of Wollongong, and Jacki Schirmer from the University of Canberra. The survey results will be used to provide feedback to the Hotspots team, to report on the outcomes of Hotspots, and in academic papers and reports.

If you need any help completing the survey, you can contact the researchers on the following numbers: Jacki Schirmer - 02 6201 2785; Amanda Edwards - XXX XXX.

The survey is voluntary, and has been approved by the Human Research Ethics Committees of the University of Canberra and University of Wollongong.

The survey should take XX minutes to complete. Click ‘next’ to start the survey.
**Hotspots evaluation survey**

**What happened at the Hotspots workshop you attended?**

Because different Hotspots workshops have sometimes included different activities, we need to ask a couple questions about what happened at the workshop you attended.

1. **Where was your Hotspots workshop held (eg the town/location)?**

2. **What year did you attend the Hotspots workshop?**

   - [ ] 2019
   - [ ] 2012
   - [ ] 2011
   - [ ] 2010
   - [ ] 2009
   - [ ] 2008
   - [ ] 2007
   - [ ] 2006
   - [ ] Not sure

3. **How did you hear about the Hotspots workshop? (select all that apply)**

   - [ ] I was contacted before the workshop by one of the facilitators
   - [ ] I was told about the workshop by a member of my local Rural Fire Service
   - [ ] I was asked to come to the workshop by a local landcare or natural resource management coordinator
   - [ ] I saw a poster or received a flyer about the workshop
   - [ ] Other (please specify)

4. **Which of the following happened as part of the Hotspots workshop you attended (select all that apply)**

   - [ ] A demonstration burn was held
   - [ ] The workshop involved two days
   - [ ] The workshop involved three days
   - [ ] After the workshop, one of the Hotspots people contacted me to follow up on aspects of the workshops
   - [ ] A Hotspots staff member came onto my property to discuss vegetation types or the management (either before, during or after the workshops were held)
Hotspots evaluation survey

Your experiences with land and fire management

These questions ask about how much experience you have had with different types of fire and land management, before you attended the Hotspots workshop, and since. This helps us understand how best to tailor workshops to the experience of landholders.

5. Had you seen or experienced any out of control wildlife/bushfires prior to participating in the Hotspots workshop? (this doesn’t need to have occurred where you live now, and may include seeing the aftermath of large fires as well as experiencing them at firsthand)

- Yes
- No

6. If YES, did you experience any of the following (select all that apply)

- Loss of family/friends
- Personal injury or health impacts
- Friends/family experienced injury or health impacts
- Colleagues/neighbors/other associates were negatively impacted in some way
- Loss of personal assets
- Damage to personal assets
- Loss of livestock
- Friends/family experienced damage/loss of assets
- Personal anxiety
- Not impacted at all

Other (please specify)
Hotspots evaluation survey

7. Before attending the Hotspots workshop, which of the following types of experience had you had with using fire as a management tool, fighting bushfire, or using methods other than fire to reduce fire risk (select all that apply)?

☐ I had no experience with fighting fire or using it as a management tool (e.g., fuel reduction burns)
☐ I was a member of a volunteer fire fighting group at the time of participating in the workshop (e.g., RFS)
☐ I had been a member of a volunteer fire fighting group in the past, but was no longer a member at the time of the workshop
☐ I had used fire to encourage green pick
☐ I had used fire to reduce weeds
☐ I had used fire to reduce fuel loads and risk of bushfire
☐ I had used fire to encourage plant growth and diversity
☐ I had used fire for hunting
☐ I had used fire to improve access to land for people or vehicles

Other (please specify)

8. How vulnerable do you personally feel to the possible threat of future bushfires at your current residence (for example, direct loss of life or assets, or significant health impacts)?

☐ Not at all vulnerable
☐ Only a little vulnerable
☐ Moderately vulnerable
☐ Vulnerable
☐ Very vulnerable
☐ Unsure

9. What is the most significant change you experienced as a result of the Hotspots workshop?

1. Please describe the most significant change that has resulted FOR YOU from your involvement with the Hotspots Project. (There may have been many changes, great and small, positive and negative. Choose the change that you feel is most significant. Describe who was involved, what happened, where and when. Include enough detail to make it understandable by someone not familiar with your situation. Please ensure that you focus on change).

2. Explain why you chose this particular change.

3. Please describe the most significant change that has resulted FOR YOUR COMMUNITY from the Hotspots Project.

4. Explain why you chose this particular change.
### Hotspots evaluation survey

10. Have you done any of the following activities either (i) before attending the Hotspots or (ii) after attending the Hotspots workshop, and/or (iii) are you actively planning to do them in the future? Please tick all that apply.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Did this BEFORE attending Hotspots</th>
<th>Did this SINCE attending Hotspots</th>
<th>Am ACTIVELY PLANNING to do this in the future</th>
<th>Don’t PLAN to do this in future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed a fire management plan for my property</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Planned a burn on my property (whether or not you have conducted it yet)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Conducted a burn on my property</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Contacted fire management agencies in my area</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Talked with other workshop participants about fire management</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Talked about fire management with landholders whose property is near mine</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Talked about fire management with local landholders who did not attend the Hotspots workshop</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Developed a joint fire management plan with landholders who live near me</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Talked to other landholders about managing biodiversity in the local area</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Joined the Rural Fire Service or other voluntary fire fighting organisation</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>Socialised with people I met at the Hotspots workshop that I hadn't socialised with before</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Worked to monitor changes to the vegetation on my property</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Worked with others to monitor changes in the vegetation in the local region</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Talked to other Hotspots workshop participants about managing biodiversity in the local region</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Talked to landholders who did not attend the workshop about managing biodiversity in the local region</td>
<td>☐</td>
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<td>☐</td>
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</tbody>
</table>
### Hotspots evaluation survey

**How well was the Hotspots workshop conducted?**

We want your views on how well the Hotspots workshop you went to was conducted.

#### 11. How good or poor were the following aspects of the workshop you attended?

<table>
<thead>
<tr>
<th>Aspect</th>
<th>1 (very poor)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 (very good)</th>
<th>Unsure</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation of information by Hotspots facilitators</td>
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<td>Presentation by ecologist</td>
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<tr>
<td>Presentations by other agencies (e.g., National Parks, Forests NSW)</td>
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<tr>
<td>Food and drinks</td>
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<tr>
<td>Venue (e.g., lighting, sound, temperature)</td>
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<td>Field discussions</td>
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<tr>
<td>Training in skills needed to PLAN a burn</td>
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<tr>
<td>Training in practical skills needed to CONDUCT a burn</td>
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<td>Opportunity to ask questions during the workshop</td>
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<tr>
<td>Opportunity to develop a fire management plan for my property</td>
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<tr>
<td>Opportunities to talk/network with other landholders attending the workshop</td>
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<tr>
<td>Opportunities to talk/network with RFS members attending the workshop</td>
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<tr>
<td>Opportunities to talk/network government agency representatives OTHER than RFS members</td>
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<tr>
<td>Opportunities to contribute my knowledge of the local area</td>
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<td>Opportunities to discuss/debate different points of view</td>
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<tr>
<td>Property maps given to landholders</td>
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<tr>
<td>Written materials provided for me to take home</td>
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<tr>
<td>Pre-workshop contact</td>
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<td>Post-workshop contact</td>
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<tr>
<td>The respect given to the views of all landholders</td>
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<tr>
<td>The balance between representatives of government agencies and landholders</td>
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</tbody>
</table>
# Hotspots evaluation survey

## Evaluating outcomes of Hotspots

This page asks you whether the Hotspots workshop made you feel MORE or LESS confident to do a range of things related to fire, biodiversity, and land management (or led to no change at all).  

### 12. Did the Hotspots workshop make you feel MORE or LESS confident to...

<table>
<thead>
<tr>
<th>Activity</th>
<th>1 (Not at all)</th>
<th>2 (A little)</th>
<th>3 (Some)</th>
<th>4 (A lot)</th>
<th>5 (Very much)</th>
<th>6 (Bunch more)</th>
<th>7 (Much more)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use fire as a tool to reduce risk of bushfire (eg. prescribed burn)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Identify the fire history of my property</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Collaborate with others in my community to plan fire management in my district</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Contact fire management agencies in my area</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Identify different vegetation types on my property</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>Map different vegetation types on my property</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tr>
<tr>
<td>Protect sensitive vegetation and habitat areas during a prescribed burn</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tr>
<tr>
<td>Apply to relevant authorities for permission to conduct a burn</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>Work with other landholders in my community on land management issues</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>Take action to address land degradation issues on my property</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Take action to protect and improve biodiversity on my property</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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</tr>
<tr>
<td>Take action to protect and improve biodiversity in my local landscape (including my and other properties in the area)</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<td>○</td>
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<td>○</td>
</tr>
</tbody>
</table>
### Hotspots evaluation survey

**13. To what extent do you AGREE or DISAGREE with the following statements about the Hotspots workshop? The Hotspots workshop...**

<table>
<thead>
<tr>
<th>Statement</th>
<th>1 (Strongly disagree)</th>
<th>2</th>
<th>3</th>
<th>4 (Neither)</th>
<th>5</th>
<th>6</th>
<th>7 (Strongly agree)</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>...reduced community conflict in my local area about using fire as a land management tool</td>
<td></td>
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<tr>
<td>...increased community disagreement about land management in my local area</td>
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<tr>
<td>...improved my relationships with other landholders in the local area</td>
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<tr>
<td>...worsened my relationships with some other landholders in my area</td>
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<td>...raised some issues that were not fully resolved</td>
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<tr>
<td>...helped me understand the effects of fire on plants and animals in my area</td>
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<td>...made me feel stressed</td>
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<td>...helped me understand rules and regulations about fire management</td>
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<td>...helped me understand fire behaviour and fire weather</td>
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<tr>
<td>...helped me learn new skills and knowledge I didn’t have before</td>
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<td>...made me more interested in the native vegetation on my property</td>
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<tr>
<td>...gave me an opportunity to get to know other landholders I hadn’t met before</td>
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<td>...made me feel more confident that I have been using fire appropriately on my property</td>
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<tr>
<td>...helped me learn where I could access expert assistance, advice or other resources to help with my land management</td>
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<td>...made me feel frustrated</td>
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<td>...helped me feel more in control of my land management</td>
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<td>...was tiring physically</td>
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<td>...was tiring mentally</td>
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<tr>
<td>...helped me build good relationships with natural resource management agencies (eg National Parks, CMA)</td>
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<td>...demanded too much of my time</td>
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<td>...made me feel satisfied</td>
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<tr>
<td>...was overall something I was glad I did</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>...was overall something I wish I hadn’t done</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
### Hotspots evaluation survey

**Did you change your land management as a result of the Hotspots workshop?**

14. Since attending Hotspots, have you... (choose one only)

- [ ] ...planned but not yet conducted a burn on my property
- [ ] ...conducted a burn on my property
- [ ] ...neither planned or conducted a burn on my property
Hotspots evaluation survey

Your planned future burns

If you indicated you have planned but not yet conducted a burn on your property, we would like to know a little about the type of burns you are planning to do (skip to Question 23 if this doesn’t apply to you).

15. What year(s) do you plan to do burns (answer for up to three planned burns)

<table>
<thead>
<tr>
<th>Planned burn 1</th>
<th>Planned burn 2 (if you have planned more than one)</th>
<th>Planned burn 3 (if you have planned more than two)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. What area do you plan to burn? (answer for up to three planned burns)

<table>
<thead>
<tr>
<th>Planned burn 1</th>
<th>Planned burn 2 (if you have planned more than one)</th>
<th>Planned burn 3 (if you have planned more than two)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

17. What are the goals of the burn? (select all that apply)

<table>
<thead>
<tr>
<th>Burn 1</th>
<th>Burn 2 (if you have planned more than 1 burn)</th>
<th>Burn 3 (if you have planned more than 2 burns)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- To reduce fuel loads on my property
- To reduce fire risk to buildings on my property
- To reduce fire risk to neighbouring properties
- To reduce weeds
- To encourage the growth of fodder for stock
- To encourage plant growth and/or diversity
- To maintain or improve habitat for animals
- To maintain/improve access for people or vehicles
- To clear land for hunting
- Other

Other (If you have a purpose not listed above, please describe what it is)

For the NEXT burn you intend to conduct, please answer the following questions

18. When was this same piece of land last burnt (either wildfire or prescribed burn)?

[Blank space]
19. How would you describe the type of vegetation in this area? Please use the words which you would normally use e.g. pastureland, weedy scrub, swampy meadow, tropical rainforest, snow gum woodland, crop stubble etc.

20. For what purpose is this land maintained and/or managed (tick all that apply)?

- Grazing
- Shelter/windbreak
- Conservation
- Hunting
- Access for people or vehicles
- Crop production
- Don’t know
- Other

If you indicated ‘other’, please describe:

21. We want to know a bit more about your planning for the burn

<table>
<thead>
<tr>
<th>Will you make a paper or computerised plan/map for the burn?</th>
<th>No</th>
<th>Not sure</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there any notable features of this land which will require special protection during a burn (e.g. heritage features, tree hollows with nesting birds etc)?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you replied ‘yes’ regarding notable features, please describe these features:
Hotspots evaluation survey

22. For your next planned burn (tick all that apply for each statement):

<table>
<thead>
<tr>
<th></th>
<th>No-one other than me</th>
<th>Spouse / partner</th>
<th>Other household member</th>
<th>Business partner</th>
<th>Neighbours</th>
<th>Rural Fire Service</th>
<th>Other government agency</th>
<th>Not sure</th>
<th>Other (Please describe below)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was anyone else involved in making the decision to burn?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Will you inform anyone that you intend to burn?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Will you request help from other people with site preparation?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Will you request help from other people with the actual burn?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
</tbody>
</table>

If you indicated 'other', please describe


# Hotspots evaluation survey

## Burns you conducted BEFORE attending Hotspots

If you indicated you conducted burns on your property before attending Hotspots, we would like to know a little about these burns (go to Question 31 if this doesn’t apply to you)

23. In what years did you conduct burns prior to attending Hotspots (list the three most recent burns, or fewer if you hadn’t conducted this many)

<table>
<thead>
<tr>
<th>Year</th>
<th>Pre-Hotspots burn 1</th>
<th>Pre-Hotspots burn 2</th>
<th>Pre-Hotspots burn 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

24. Sometimes burns don’t go as planned. We’d like to know what area you burned, and what area you planned to burn.

<table>
<thead>
<tr>
<th>Year</th>
<th>Pre-Hotspots Burn 1</th>
<th>Pre-Hotspots Burn 2</th>
<th>Pre-Hotspots Burn 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Approximate area of land you intended to burn? (hectares)</th>
<th>Pre-Hotspots Burn 1</th>
<th>Pre-Hotspots Burn 2</th>
<th>Pre-Hotspots Burn 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Approximate area of land you actually burned? (hectares)</th>
<th>Pre-Hotspots Burn 1</th>
<th>Pre-Hotspots Burn 2</th>
<th>Pre-Hotspots Burn 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

25. What were the goals of the burn? (select all that apply)

- To reduce fuel loads on my property
- To reduce fire risk to buildings on my property
- To reduce fire risk to neighbouring properties
- To reduce weeds
- To encourage the growth of fodder for stock
- To encourage plant growth and/or diversity
- To maintain/improve habitat for animals
- To maintain/improve access for people or vehicles
- To clear land for hunting
- Other

Other (if you have a purpose not listed above, please describe what it is): ____________

For the MOST RECENT burn you had conducted before attending Hotspots, please answer the following questions.

26. When had this same piece of land last been burnt (either wildfire or prescribed burn, before this burn)?

__________
Hotspots evaluation survey

27. How would you describe the type of vegetation in this area? Please use the words which you would normally use e.g. pastureland, weedy scrub, swampy meadow, tropical rainforest, snow gum woodland, crop stubble etc.

28. For what purpose is this land maintained and/or managed (tick all that apply)?

☐ Grazing
☐ Shelter / weed-break
☐ Conservation
☐ Harvesting
☐ Access for people or vehicles
☐ Crop production
☐ Don’t know
☐ Other

If you indicated ‘other’, please describe:

29. We want to know a bit more about your planning for the burn

Did you make a paper or computerised plan/map for the burn?

☐ No  ☐ Yes

Were there any notable features of this land which required special protection during the burn (e.g. heritage features, tree hollows with nesting birds etc.)?

☐ No  ☐ Yes

If you replied ‘yes’ regarding notable features, please describe these features:
**Hotspots evaluation survey**

30. For the most recent burn you had conducted prior to attending Hotspots:

<table>
<thead>
<tr>
<th>Question</th>
<th>No-one other than me</th>
<th>Spouse / partner</th>
<th>Other household member</th>
<th>Business partner</th>
<th>Neighbours</th>
<th>Rural Fire Service</th>
<th>Other government agency</th>
<th>Not sure</th>
<th>Other (Please describe below)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was anyone else involved in making the decision to burn?</td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Did you inform anyone that you intended to burn?</td>
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<td></td>
</tr>
<tr>
<td>Did you request help from other people with site preparation?</td>
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</tr>
<tr>
<td>Did you receive help from other people with site preparation?</td>
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</tr>
<tr>
<td>Did you request help from other people with the actual burn?</td>
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<td></td>
</tr>
<tr>
<td>Did you receive help from other people with the actual burn?</td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

If you indicated 'other', please describe...
**Hotspots evaluation survey**

**Burns you have conducted SINCE attending Hotspots**

If you indicated you have conducted burns on your property since attending Hotspots, we would like to know a little about these burns (go to Question 39 if this doesn’t apply to you).

31. In what years have you conducted burns since attending Hotspots (list up to three burns, or fewer if you haven’t conducted this many)

<table>
<thead>
<tr>
<th>Year</th>
<th>Post-Hotspots burn 1</th>
<th>Post-Hotspots burn 2</th>
<th>Post-Hotspots burn 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

32. Sometimes burns don’t go as planned. We’d like to know what area you burned, and what area you planned to burn.

<table>
<thead>
<tr>
<th>Post-Hotspots Burn 1</th>
<th>Post-Hotspots Burn 2</th>
<th>Post-Hotspots Burn 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Approximately what area of land did you INTEND to burn? (hectares)

<table>
<thead>
<tr>
<th>Burn 1</th>
<th>Burn 2</th>
<th>Burn 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Approximately what area of land did you ACTUALLY burn? (hectares)

<table>
<thead>
<tr>
<th>Burn 1</th>
<th>Burn 2</th>
<th>Burn 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

33. What were the goals of the burn? (select all that apply)

- To reduce fuel loads on my property
- To reduce fire risk to buildings on my property
- To reduce fire risk to neighbouring properties
- To reduce weeds
- To encourage the growth of fodder for stock
- To encourage plant growth and/or diversity
- To maintain or improve habitat for animals
- To maintain/improve access for people or vehicles
- To clear land for hunting
- Other

Other (if you have a purpose not listed above, please describe what it is)  

<table>
<thead>
<tr>
<th>Burn 1</th>
<th>Burn 2</th>
<th>Burn 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For the MOST RECENT burn you have conducted since attending Hotspots, please answer the following questions

34. When had this same piece of land last been burnt (either wildfire or prescribed burn, before this burn)?

[^1]
35. How would you describe the type of vegetation in this area? Please use the words which you would normally use e.g. pastureland, weedy scrub, swampy meadow, tropical rainforest, snow gum woodland, crop stubble etc.

36. For what purpose is this land maintained and/or managed (tick all that apply)?

- Grazing
- Shelter/wind-break
- Conservation
- Hunting
- Access for people or vehicles
- Crop production
- Don’t know
- Other

If you indicated ‘other’, please describe:

37. We want to know a bit more about your planning for the burn

Did you make a paper or computerised plan/map for the burn?
- No
- Yes

Were there any notable features of the land which required special protection during the burn (e.g. heritage features, tree hollows with nesting birds etc.)?
- No
- Yes

If you replied ‘yes’ regarding notable features, please describe these features:
# Hotspots evaluation survey

### 38. For the most recent burn you have conducted since attending Hotspots:

<table>
<thead>
<tr>
<th></th>
<th>No-one other than me</th>
<th>Spouse / partner</th>
<th>Other household member</th>
<th>Business partner</th>
<th>Neighbours</th>
<th>Rural Fire Service</th>
<th>Other government agency</th>
<th>Not sure</th>
<th>Other (Please describe below)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was anyone else involved in making the decision to burn?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Did you inform anyone that you intended to burn?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Did you request help from other people with site preparation?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Did you receive help from other people with site preparation?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Did you request help from other people with the actual burn?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>Did you receive help from other people with the actual burn?</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
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</tr>
</tbody>
</table>

If you indicated 'other', please describe: ____________________________
### Hotspots evaluation survey

**Your views about prescribed burning on your property**

We want to know how you feel about conducting burns on your property, whether it's to reduce fuel (and hence risk of wildfire), or to enhance biodiversity.

#### 39. To what extent do you agree or disagree with the following statements about prescribed burning?

<table>
<thead>
<tr>
<th>Statement</th>
<th>1 (strongly DISAGREE)</th>
<th>2</th>
<th>3</th>
<th>4 (NEITHER agree or disagree)</th>
<th>5</th>
<th>6</th>
<th>7 (strongly AGREE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>My property is too small to conduct a prescribed burn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My land is too steep to conduct a prescribed burn</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Powerlines or other physical limitations prevent me conducting a prescribed burn</td>
<td></td>
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</tr>
<tr>
<td>The native vegetation on my property is too fire sensitive to burn</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I don't want to burn because the native vegetation on my property has been extensively disturbed in the past</td>
<td></td>
<td></td>
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<tr>
<td>Prescribed burning isn't practical because weather conditions are usually not suitable for burning</td>
<td></td>
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</tr>
<tr>
<td>In my local area, there is good science to show how fire can be used to maintain and improve plant and animal diversity</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>I prefer to use mechanical methods to reduce fuel or encourage biodiversity, instead of fire</td>
<td></td>
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</tr>
<tr>
<td>I do not possess the knowledge and skills required to PLAN a prescribed burn</td>
<td></td>
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</tr>
<tr>
<td>I do not possess the knowledge and skills needed to CONDUCT a prescribed burn</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>I or other people on my property have physical limitations which make it difficult to do a prescribed burn (eg a health problem or disability)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>It is easy to get my neighbors to agree to me doing a prescribed burn on my property</td>
<td></td>
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<tr>
<td>It is too complicated to apply for permission to do a burn</td>
<td></td>
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</tr>
<tr>
<td>It takes too much time to apply for permission to do a burn</td>
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<tr>
<td>I feel comfortable inviting local members of the Rural Fire Service onto my property</td>
<td></td>
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</tr>
<tr>
<td>I don't want to conduct a burn as I am concerned the burn may get out of control</td>
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<tr>
<td>I have access to the equipment I need to manage a prescribed burn</td>
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<tr>
<td>I prefer to burn very small areas (eg small clumps of plants) to encourage biodiversity, rather than larger areas</td>
<td></td>
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</tbody>
</table>
Hotspots evaluation survey

Your views about landholder’s responsibilities regarding land, fire and env...

This page asks for your views on a range of issues around the rights and responsibilities of landholders. This will inform Hotspots so workshops can be designed to better respect and acknowledge landholder views on these topics.

40. To what extent do you agree or disagree with the following statements? Please consider the whole statement in your response.

<table>
<thead>
<tr>
<th>Statement</th>
<th>1 (Strongly Disagree)</th>
<th>2</th>
<th>3</th>
<th>4 (Neither)</th>
<th>5</th>
<th>6</th>
<th>7 (Strongly Agree)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landholders have a responsibility to reduce the risk of bushfire on their land</td>
<td></td>
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</tr>
<tr>
<td>In the right conditions, it is acceptable to use fire to reduce fuel loads in native vegetation on rural properties</td>
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<tr>
<td>In the right conditions, it is acceptable to use fire to manage weeds on rural properties</td>
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<tr>
<td>In the right conditions, it is acceptable to use fire to grow green pick (encourage growth of green pasture for stock)</td>
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<tr>
<td>In the right conditions, it is acceptable to use fire to clear land for hunting</td>
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<tr>
<td>In the right conditions, it is acceptable to use fire to improve the diversity of plants growing in native vegetation</td>
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</tr>
<tr>
<td>In the right conditions, it is acceptable to use fire to keep access open for people or vehicles</td>
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<tr>
<td>Too many rules and regulations are applied to landholders who want to use fire on their land</td>
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<tr>
<td>Landholders have a responsibility to reduce feral animals and weeds on their land</td>
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<tr>
<td>There is no point trying to manage feral animals and weeds on my property as more will keep coming on from other areas</td>
<td></td>
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<tr>
<td>I have a responsibility to leave my land in better condition than it was when I started managing it</td>
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<tr>
<td>Landholders should be paid to undertake work on their farm that improves the environment</td>
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<tr>
<td>Landholders need to prioritise producing food over protecting the environment</td>
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<tr>
<td>Local landholder’s knowledge is often better than scientific data about the environment</td>
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<tr>
<td>It is too complicated to use fire to manage biodiversity</td>
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<tr>
<td>Neighbouring properties present a fire risk to my own property</td>
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<tr>
<td>Protecting the environment is more important than landholder profit</td>
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<tr>
<td>The economic and social wellbeing of country regions is more important than protecting the environment</td>
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<tr>
<td>Landholders should be able to use their land as they wish even if others in the community do not like it</td>
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<tr>
<td>Laws to protect the environment should not interfere with landholder activities</td>
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<tr>
<td>Caring for nature is more important than the freedom of landholders to use the land as they wish</td>
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</tbody>
</table>
# Hotspots evaluation survey

## Land management issues on your land

41. How much of a problem are the following issues on YOUR PROPERTY? (select all that apply)

<table>
<thead>
<tr>
<th>Issue</th>
<th>Not a problem</th>
<th>Small problem</th>
<th>Moderate problem</th>
<th>Big problem</th>
<th>Very big problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil erosion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of native vegetation</td>
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<tr>
<td>Loss of plant diversity</td>
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<td></td>
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<tr>
<td>Loss of habitat for threatened or endangered animal and bird species</td>
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<tr>
<td>Weed invasion</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Feral animals</td>
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</tbody>
</table>

42. How much of a problem are the following issues IN YOUR LOCAL REGION? (select all that apply)

<table>
<thead>
<tr>
<th>Issue</th>
<th>Not a problem</th>
<th>Small problem</th>
<th>Moderate problem</th>
<th>Big problem</th>
<th>Very big problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil erosion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Loss of native vegetation</td>
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<tr>
<td>Loss of plant diversity</td>
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<tr>
<td>Loss of habitat for threatened or endangered animal and bird species</td>
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<tr>
<td>Weed invasion</td>
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<td></td>
<td></td>
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<tr>
<td>Feral animals</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Hotspots evaluation survey

Having your say on fire management in your region

We want to know if you've had a say about fire management in your local area.

43. Have you done any of the following to have your views heard about a PRESCRIBED BURN in your local area? (select all that apply)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yes, before attending</th>
<th>Yes, after attending</th>
<th>No, never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attended a public meeting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made a written submission to a government department, agency or</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>environmental group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written to a newspaper</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spoken with the Rural Fire Service</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spoken with the Catchment Management Authority</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Spoken with the National Parks and Wildlife Service</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spoken with other government agencies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spoken with an environmental group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Looked at district fire plans</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spoken with neighbours</td>
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</tbody>
</table>

44. Have you done any of the following to have your views heard about FIRE POLICY IN NSW? (select all that apply)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yes, before attending</th>
<th>Yes, after attending</th>
<th>No, never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attended a public meeting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made a written submission to a government department, agency or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>environmental group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written to a newspaper</td>
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<td></td>
<td></td>
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<tr>
<td>Spoken with the Rural Fire Service</td>
<td></td>
<td></td>
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<tr>
<td>Spoken with the Catchment Management Authority</td>
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<tr>
<td>Spoken with the National Parks and Wildlife Service</td>
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<td></td>
</tr>
<tr>
<td>Spoken with other government agencies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spoken with an environmental group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Looked at district fire plans</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spoken with neighbours</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

45. In the past year, have representatives from any other agencies other than Hotspots visited your property to give advice on using fire?

- [ ] No
- [ ] Yes (please list agencies below)

Please list agencies if you answered yes:
Hotspots evaluation survey

Your property

This part of the survey asks for some information about your property. This will help us better understand the types of land management and time priorities of workshop participants, so we can tailor Hotspots to address these.

46. How many rural properties do you manage (ie make day to day decisions about how the land will be used and managed)
   ○ 1
   ○ 2
   ○ 3
   ○ 4 or more

47. Do you use the land you manage for any of the following purposes? (select all that apply)

<table>
<thead>
<tr>
<th>Purposes</th>
<th>No</th>
<th>Minor use of my land</th>
<th>Major use of my land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential (you live on the land either full-time or part-time)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Recreation</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Conservation</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Grazing</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Cropping</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Horticulture</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Commercial forestry</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other (please describe)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

48. Approximately what percentage of your property/properties is covered with the following types of vegetation?

<table>
<thead>
<tr>
<th>Vegetation</th>
<th>0%</th>
<th>1-9%</th>
<th>10-19%</th>
<th>20-39%</th>
<th>40-59%</th>
<th>60-79%</th>
<th>80-100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native forest/woodland</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Native scrub (not forest or woodland)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Commercial tree plantation</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Horticulture (e.g. grapevines, fruit trees)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Hotspots evaluation survey

49. How many years have you spent managing rural land in total? (include time spent managing properties other than the ones you manage now)

- 1 year or less
- 2-5 years
- 6-10 years
- 11-19 years
- 20-29 years
- 30-39 years
- 40 or more years

50. What area of rural land do you manage in total (across all properties if you manage more than one property)

- Less than 10 hectares
- 10-19 hectares
- 20-29 hectares
- 30-39 hectares
- 40-49 hectares
- 50-74 hectares
- 75-99 hectares
- 100-199 hectares
- 200-299 hectares
- 300-399 hectares
- 400-499 hectares
- 500-999 hectares
- 1000-1499 hectares
- 1500-1999 hectares
- 2000 or more hectares
### Hotspots evaluation survey

**About you**

#### 51. What is your age?
- [ ] 24 or younger
- [ ] 25-29
- [ ] 30-34
- [ ] 35-39
- [ ] 40-44
- [ ] 45-49
- [ ] 50-54
- [ ] 55-59
- [ ] 60-64
- [ ] 65-69
- [ ] 70-74
- [ ] 75 or older

#### 52. What is your gender?
- [ ] Female
- [ ] Male
- [ ] Prefer not to say

#### 53. Which of the following best describes you currently (select all that apply)?
- [ ] Retired
- [ ] Homemaker
- [ ] Part-time volunteer (unpaid)
- [ ] Full-time volunteer (unpaid)
- [ ] Unemployed and looking for work
- [ ] Studying part-time
- [ ] Studying full-time
- [ ] Self-employed - full-time
- [ ] Self-employed – part-time
- [ ] Employed full-time (working for a wage)
- [ ] Employed part-time (working for a wage)
- [ ] Employed on a casual basis (working for a wage)
54. If you are employed (paid or unpaid, including homemakers), what is your occupation? If you have more than one job, please write up to two different occupations

Occupation 1: 

Occupation 2 (if you have more than one job): 

55. If you are employed, how many hours do you work on average per week (include all your jobs, and give the average hours over the last month)

- [ ] Less than 10 hours per week
- [ ] 10-14 hours per week
- [ ] 15-19 hours per week
- [ ] 20-24 hours per week
- [ ] 25-29 hours per week
- [ ] 30-34 hours per week
- [ ] 35-39 hours per week
- [ ] 40 hours per week
- [ ] 41-44 hours per week
- [ ] 45-49 hours per week
- [ ] 50 or more hours per week

56. How many years have you lived in the local area in which you currently live?

- [ ] Less than one year
- [ ] 1-2 years
- [ ] 3-5 years
- [ ] 6-10 years
- [ ] 11-15 years
- [ ] 16-20 years
- [ ] 21-25 years
- [ ] 26-29 years
- [ ] 30-34 years
- [ ] 35-39 years
- [ ] 40-49 years
- [ ] 50-59 years
- [ ] 60 or more years
### Hotspots evaluation survey

57. What is the highest level of high school education you have obtained?
- [ ] I didn’t complete any high school
- [ ] Third year of high school (Year 9 or equivalent)
- [ ] Fourth year of high school (Year 10 or equivalent)
- [ ] Fifth year of high school (Year 11 or equivalent)
- [ ] Completed high school (Year 12 or equivalent)

58. What is the highest level of post-high school qualifications you have obtained (answer even if you didn’t complete high school)
- [ ] Certificate (eg from TAFE)
- [ ] Diploma
- [ ] University undergraduate degree
- [ ] University postgraduate degree
- [ ] Other (please describe)
Hotspots evaluation survey

About your household

The following questions ask for some information about your household – meaning the people who live in your home on a regular basis.

59. Which of the following best describes your household? (select one only)

- Single person household
- Couple, no children living at home
- Couple with dependent children living at home
- Couple with non-dependent adult children living at home (i.e. they don’t need your money)
- Share house (two or more adults not in a relationship live together)
- Other (please describe)

60. If other people living in your household are employed (paid or unpaid, including homemakers), what are their occupation? If they have more than one job, please write up to two different occupations.

Person 1 (e.g. wife/husband) - Occupation:

Person 2 (e.g. son/daughter/inhousemate) - Occupation:

61. In 2011-2012, what was your approximate household income before tax? Include wages/salaries, pensions, earnings from investments and shares.

- $0 to $20,790
- $20,800 to $41,599
- $41,600 to $64,999
- $65,000 to $103,899
- $104,000 to $129,599
- $130,000 to $155,699
- $156,000 to $181,699
- $182,000 to $207,999
- $208,000 to $250,000
- $250,000 or higher
62. What proportion of your income is made from your rural property? (e.g., from agriculture or other enterprises that depend on your land)

- 9% (all your income is earned off property)
- 1-10%
- 11-19%
- 20-29%
- 30-39%
- 40-49%
- 50-59%
- 60-69%
- 70-79%
- 80-89%
- 90-99%
- 100% (all your household income is earned from your property)
(NOTE: QUESTIONS ON THIS PAGE RELATE TO THE PARALLEL RESEARCH CONDUCTED BY DR JACKIE SCHIRMER OF THE UNIVERSITY OF CANBERRA)

### Hotspots evaluation survey

#### Your overall health and wellbeing

We want to ask some questions about your health and wellbeing, to help us better understand whether landholders may require additional assistance to implement some of the actions recommended in Hotspots workshops, and to understand how the workshops – which sometimes discuss topics that can be stressful – may affect your overall wellbeing.

63. How would you rate your general health?

- [ ] Excellent
- [ ] Very good
- [ ] Good
- [ ] Fair
- [ ] Poor

64. Thinking about your own life and personal circumstances, how satisfied have you been with the following lately?

<table>
<thead>
<tr>
<th></th>
<th>0 (very dissatisfied)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10 (very satisfied)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your life as a whole</td>
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<tr>
<td>Your standard of living</td>
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<tr>
<td>What you are currently achieving in life</td>
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<tr>
<td>Feeling part of your community</td>
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<tr>
<td>Your present financial situation</td>
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<td>Hotspots evaluation survey</td>
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<tr>
<td><strong>65. Sometimes asking people to change their land management - or any part of their life - is difficult. To what extent do you agree or disagree with the following statements about change?</strong></td>
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<tr>
<td>1 (strongly disagree)</td>
<td>2</td>
<td>3 (neither agree or disagree)</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7 (strongly agree)</td>
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<tr>
<td>I will be able to achieve most of the goals that I have set for myself</td>
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<tr>
<td>When facing difficult tasks, I am certain that I will accomplish them</td>
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<tr>
<td>In general, I think that I can obtain outcomes that are important to me</td>
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<tr>
<td>I believe I can succeed at most any endeavour to which I set my mind</td>
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<tr>
<td>I will be able to successfully overcome many challenges</td>
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<td></td>
</tr>
<tr>
<td>I am confident that I can perform effectively on many different tasks</td>
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<tr>
<td>Compared to other people, I can do most tasks very well</td>
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<td></td>
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<tr>
<td>Even when things are tough, I can perform quite well</td>
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<tr>
<td>I cope well when major changes happen in my life</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>My capacity to adapt to change is very good</td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>I am confident of my ability to learn new skills</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thanks to my resourcefulness, I can handle unforeseen situations</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I personally just can’t cope with any more change</td>
<td></td>
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</tbody>
</table>
(NOTE: QUESTIONS ON THIS PAGE RELATE TO THE PARALLEL RESEARCH CONDUCTED BY DR JACKIE SCHIRMER OF THE UNIVERSITY OF CANBERRA)

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**Hotspots evaluation survey**

66. The following question asks about your overall feelings of wellbeing. We ask them to help us analyse whether discussing issues around fire management causes an increase in distress for any people, given that fire and its management are sometimes sensitive topics associated with anxiety and trauma. They are often asked on surveys of people's health and wellbeing in Australia. If you feel uncomfortable answering this question, please skip it and go on to the next question.

This question asks about how you've been feeling lately. In the last four weeks, how often have you felt...

<table>
<thead>
<tr>
<th>Feeling</th>
<th>None of the time</th>
<th>A little of the time</th>
<th>Some of the time</th>
<th>Most of the time</th>
<th>All of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Content?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Tired out for no good reason?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Nervous?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>So nervous that nothing could calm you down?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Hopeless?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Restless or agitated?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>So restless you could not sit still?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Depressed?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>That everything was an effort?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>That life is fun?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>On top of the world?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>So sad that nothing could cheer you up?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Worthless?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Lucky to be you?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Pleased to be alive?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

If you are feeling distressed or need assistance, you can contact the following services for assistance, 24 hours a day:

- Beyond Blue - 1300 22 4636
- Lifeline - 131 114

If you are experiencing emotional difficulties following an experience with wildfire, the Fire & Rescue NSW has the services of a full-time Salvation Army Chaplain, who can provide counselling. His services are free and available 24 hours a day. Telephone: (02) 9265 2736.
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# Hotspots evaluation survey

## Your community

Some land management issues are best addressed through rural communities working together. However, this isn’t always easy – not every community finds it easy to get together to look at these things. Here we ask about your connections to your community. This helps us identify what groups in rural communities may be best able to work together to address land and fire management issues.

67. To what extent do you agree or disagree with the following statements about the local community your property is located in (if you manage multiple properties in different communities, please answer for your residential or primary property)?

<table>
<thead>
<tr>
<th>Statement</th>
<th>1 (strongly disagree)</th>
<th>2</th>
<th>3</th>
<th>4 (neither agree nor disagree)</th>
<th>5</th>
<th>6</th>
<th>7 (strongly agree)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel welcome in the community</td>
<td></td>
<td></td>
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<tr>
<td>I feel part of the community</td>
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<tr>
<td>I feel that I belong in the community</td>
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<tr>
<td>I feel a sense of ‘being in it together’ with the community</td>
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<tr>
<td>I feel like an outsider in the community</td>
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<tr>
<td>I feel appreciated by others in the community</td>
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<tr>
<td>I feel liked by most people</td>
<td></td>
<td></td>
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<tr>
<td>I feel like people look out for me</td>
<td></td>
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<tr>
<td>I am included in the community</td>
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<tr>
<td>I can access support from other people in my local community</td>
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</tr>
<tr>
<td>I can access support from my family and friends to help me through any difficult times</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>People in this community get along pretty well</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
(NOTE: QUESTIONS ON THIS PAGE RELATE TO THE PARALLEL RESEARCH CONDUCTED BY DR JACKIE SCHIRMER OF THE UNIVERSITY OF CANBERRA)

<table>
<thead>
<tr>
<th>Hotspots evaluation survey</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>68. How often do you do the following things?</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activity</th>
<th>Never or almost never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Seldom</th>
<th>Quite often</th>
<th>Very often</th>
<th>Always</th>
<th>Almost always</th>
</tr>
</thead>
<tbody>
<tr>
<td>I spend time doing things with family members who don't live with me</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I make time to keep in touch with my friends</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I chat with my neighbours</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I take part in religious/church activities with others</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I take an active part in organised group activities in my community (including at your children's school, your church, or general community events)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I attend events that bring people together such as fêtes, shows, festivals, or other community events</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I socialise with my workmates before work or after work</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

| **69. How involved are you in the following types of groups or activities in your local community?** |

<table>
<thead>
<tr>
<th>Group/Activity</th>
<th>Not at all involved</th>
<th>Minimally involved (eg you receive a newsletter)</th>
<th>A bit involved (eg you sometimes go to meetings but not often)</th>
<th>Regularly involved (eg you regularly attend activities)</th>
<th>Very highly involved (eg you hold an office bearing position, or attend activities weekly)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sporting group (eg football, bushwalking club)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Hobby group</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Volunteer fire fighting group (VFRS)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
</tr>
<tr>
<td>Emergency services volunteer group (BES)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Landcare, Bushcare or other environmental volunteer group</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Civic/community organisation (eg Lions, Rotary)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Farmers organisation (eg NSW Farmers)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>Political group</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Religious group</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Land management</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
### Hotspots evaluation survey

#### Thank you for completing the survey!

We appreciate your time and effort doing this survey. If you want to hear about the survey results, or are interested in doing more surveys in future, please indicate this below.

**70. Please indicate if you would like to hear from us in future**

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send me a summary of results of the study</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am willing to be sent another survey in the future</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am willing to participate in an interview about fire and land management</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**71. If you want to be sent results or participate in future surveys or interviews, please provide your contact details below. These will not be passed on to any other organisations.**

Your name: 

Your email address: 

Your postal address:  
(Include street, town, state and postcode)