Evaluation of the Hotspots Fire Project

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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"[i]. 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

Case Study	Type of Interviewee	Interviewed Pre-Hotspots	Interviewed Post-Hotspots	Interviewed on another occasion	Completed Survey
Mongarlowe	Hotspots Participant Landholder	7	7	2[1]	7
	Hotspots Participant Landholder + Agency Staff Member	3	3		1
	Hotspots Non-Participant Landholder			2[2]	
Grady's Creek	Hotspots Participant Landholder	7	6		3
	Hotspots Participant Agency Staff Member		1		
	Hotspots Non-Participant Landholder	1	1		

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 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.

[1] 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.
[2] Mongarlowe non-participant landholders were interviewed before the workshop series took place only

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.

Figure 1: Procedure for identifying burning activities before and after the workshop

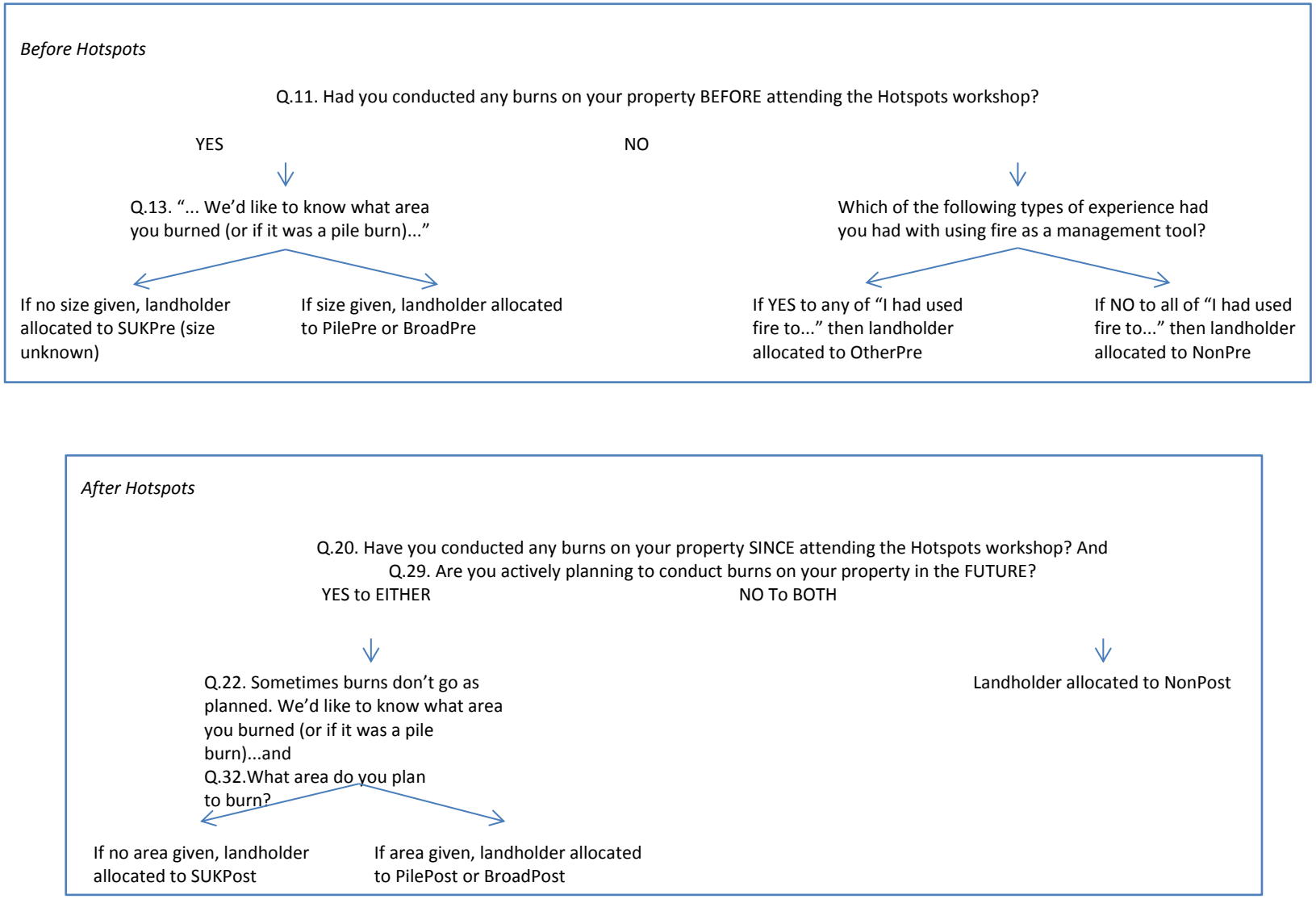


Table 2
Possible burning activities pre and post Hotspots

	None	Pile	Broad (i.e. non-pile burn)	SUK (Size Unknown)	Other
Burns conducted before the workshops	NonPre	PilePre	BroadPre	SUKPre	OtherPre
Burns conducted since the workshops or actively planned for the future	NonPost	PilePost	BroadPost	SUKPost	X

Table 3
Burner Types

Cluster	**No.**	**Group**	**No.**	**Individual**	**No.**
NonPilePreANDPost	44			NonPreNonPost	26
No experience of burning or conducted				NonPrePilePost	4
pile burns only before *and* after				PilePreNonPost	3
attending Hotspots workshops				PilePrePilePost	11
NonPilePreBurnPost	33	*NonToBroad*	32	NonPreBroadPost	14
No experience of burning or conducted				PilePreBroadPost	18
pile burns only before Hotspots		*NonToSUK*	1	NonPreSUKPost	1
but conducted broad or SUK burn					
on own land after Hotspots					
OtherPreBurnPost	13			*OtherPreBroadPost*	12
Experience with broad burns (e.g.				*OtherPreSUKPost*	1
through RFS) but NOT on *own* land					
before Hotspots, conducted broad or					
SUK burn on own land after Hotspots					
AllContinuers	46	*BroadContinuers*	41	BroadPreBroadPost	38
Conducted broad or SUK burns on their				BroadPreSUKPost	3
own land before and after attending		*SUKContinuers*	5	SUKPreBroadPost	1
attending Hotspots workshops				SUKPreSUKPost	4
OtherPreNonPilePost	13			OtherPreNonPost	10
Experience with burning but not on				OtherPrePilePost	3
own land before Hotspots, no intention					
of conducting broad burns in future					
BroadStoppers	11			BroadPreNonPost	7
Conducted broad or SUK burns on their				BroadPrePilePost	3
own land before attending Hotspots				SUKPreNotPost	1
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

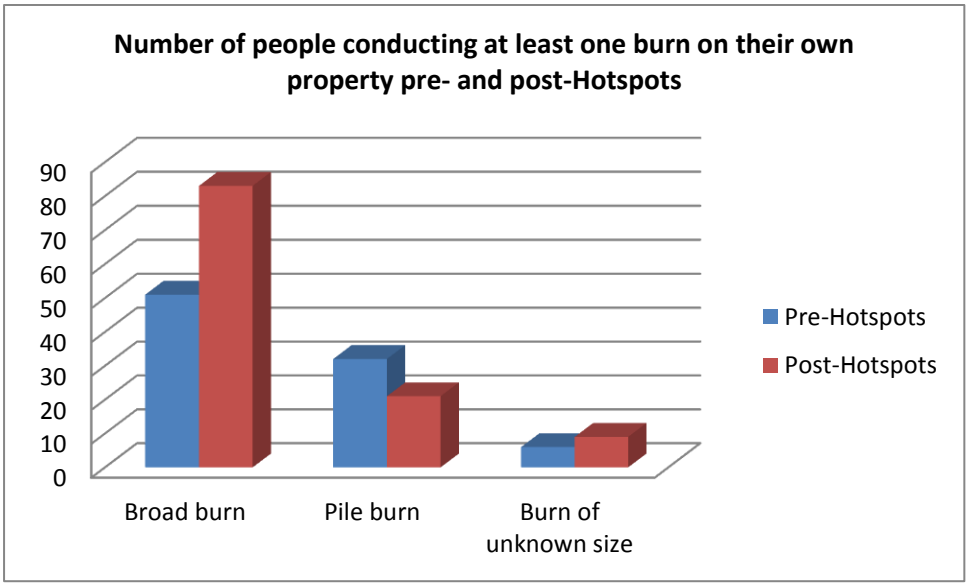
In exploring the change in number of landholders burning, it is emphasised that the purpose of Hotspots is *not* to encourage *all* landholders attending workshops to conduct broad burns on their land. Hotspots staff members aim to "help involve, inform, equip and motivate landholders and communities to become more actively engaged in fire management" by "supporting the development of individual property fire management plans"[3]. 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 limitations or have other appropriate management strategies in place, Hotspots staff would not seek to impose a burning regime on their properties.

[3] Hotspots Fire Project, 2011, *Delivering the Hotspots Training Program, A Guide for Facilitators*

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:

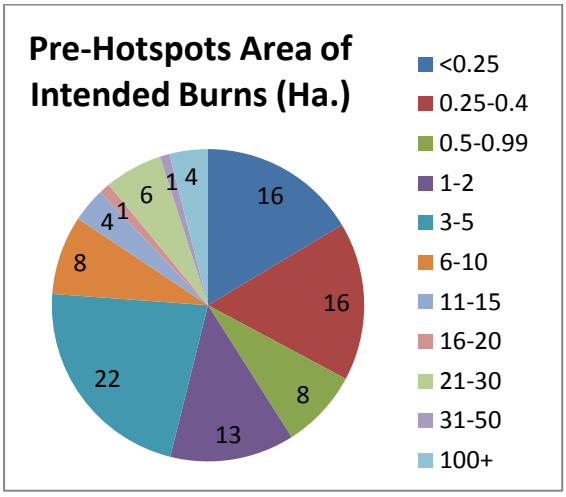
1. Previous burns were for clearing and this has now been accomplished (6 of these burners had previously burnt only once on their own land and one of these acknowledges that he did so to clear land for pasture several decades ago.)
2. Age (OwnBroadPreNOTPost are generally older. They may have burned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

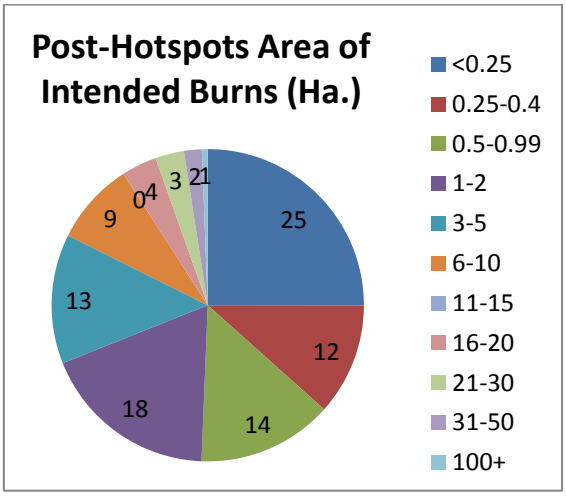
Area of Burns Pre and Post Hotspots

- 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[ii]). 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[4]. 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 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

[4] 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.

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[iii].

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.

Table 4
Pre Hotspots: Landholders burning for fuel or risk reduction, any burn

	To reduce fuel loads on my property Number (%)	To reduce wildfire risk to buildings on my property Number (%)	To reduce wildfire risk to neighbouring properties Number (%)	Any fuel / risk related answer: any burn Number (%)	Number giving any reason for a burn Number (%)
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

Table 5
Post Hotspots: Landholders burning for fuel or risk reduction, any burn

	To reduce fuel loads on my property Number (%)	To reduce wildfire risk to buildings on my property Number (%)	To reduce wildfire risk to neighbouring properties Number (%)	Any fuel / risk related answer: any burn Number (%)	Number giving any reason for a burn Number (%)
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

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)

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

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, 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). (See also Appendix A, Chart II).

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.

Table 7
To what extent do you agree or disagree with the following statements?

Answer	In the right circumstances it is acceptable to use fire to manage weeds Number (%)	In the right circumstances it is acceptable to use fire to grow green pick Number (%)	In the right circumstances it is acceptable to use fire to improve the diversity of plants growing in native vegetation Number (%)	It is too complicated to use fire to manage biodiversity Number (%)
1 (strongly disagree)	0 (0)	3 (2)	1 (1)	27 (18)
2	1 (1)	8 (5)	2 (1)	35 (23)
3	2 (1)	4 (3)	4 (3)	20 (13)
4 (neither agree nor disagree)	17 (11)	47 (31)	18 (12)	41 (27)
5	28 (18)	22 (14)	30 (20)	12 (8)
6	48 (32)	33 (22)	40 (26)	7 (5)
7 (strongly agree)	56 (37)	35 (23)	57 (38)	6 (4)
No. Responses	152	152	152	148
Average	5.89	5.08	5.78	3.14

Table 8
Pre Hotspots: Landholders burning for vegetation or animal management, any burn

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

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

	Number giving any answer	To reduce weeds Number (%)	To encourage green pick Number (%)	To encourage plant growth and /or diversity Number (%)	To maintain or improve habitat for animals Number (%)	To encourage green pick *and* plant growth / diversity Number (%)	To encourage plant gth / diversity *and* animal habitat Number (%)	To encourage green pick *and* animal habitat Number (%)
NonPilePre BurnPost	**32**	15 (47)	1 (3)	13 (41)	14 (44)	1 (3)	10 (31)	0 (0)
OtherPreBurnPost	**13**	7 (54)	1 (8)	7 (54)	7 (54)	0 (0)	5 (38)	1 (8)
AllContinuers	**46**	24 (52)	9 (20)	23 (50)	18 (39)	3 (7)	16 (35)	6 (13)
All Landholders	**91**	46 (51)	11 (12)	43 (47)	39 (43)	4 (4)	31 (34)	7 (8)

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 10
Did the Hotspots workshop make you feel MORE or LESS confident to...
Manage weeds on my property to reduce fire risk

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

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

Response	NonPilePre AndPost Number (%)	NonPilePre BurnPost Number (%)	OtherPre BurnPost Number (%)	All Continuers Number (%)	OtherPre NonPilePost Number (%)	Broad Stoppers Number (%)	All Landholders Number (%)
1-2	1 (2)	1 (3)	0 (0)	2 (4)	1 (8)	0 (0)	5 (3)
3	1 (2)	1 (3)	2 (15)	0	0 (0)	0 (0)	4 (3)
4	22 (50)	18 (55)	4 (31)	24 (52)	6 (46)	8(73)	82 (51)
5	9 (20)	6 (18)	5 (38)	5 (11)	3 (23)	1 (9)	29 (18)
6-7	11 (25)	7 (21)	2 (15)	15 (33)	3 (23)	2 (18)	40 (25)
Total	44	33	13	46	13	11	160
Average	4.73	4.61	4.54	4.80	4.62	4.50	4.67

Management of Plant Growth and Diversity, Animal Habitat and Green Pick[5]

- The number of landholders burning to encourage green pick increases from 7 to 11 after Hotspots workshops but the percentage remains the same[6].
- 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.

[5] Green pick is early pasture growth following rain after fire, drought or other disturbance.
[6] The percentage remains the same because there is an increase in the total number of landholders burning for any reason.

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 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 Hotstpots, 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[iv] and land managers. The Hotspots team are well aware of the complexity and nuances of fire management. Waminda Parker, the NCCNSW Co-ordinator, 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[v] and the ideal scale for 'conservation territories' hotly debated[vi] 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 two-day 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?

Answer	NonPilePre NonPilePost	NonPilePre BurnPost	OtherPre BurnPost	All Continuers	OtherPre NonPilePost	Broad Stoppers	All Landholders
1-2	0	0	0	2 (4)	2 (15)	0	4 (3)
3	1 (2)	1 (3)	1 (8)	1 (2)	0	0	4 (3)
4	14(33)	6 (18)	4 (31)	13 (28)	2 (15)	4 (36)	43 (27)
5	13(30)	10 (30)	3 (23)	11 (24)	5 (38)	4 (46)	46 (29)
6-7	15(35)	16 (48)	5 (38)	19 (41)	4 (31)	3 (27)	62 (39)
Total	43	33	13	46	13	11	159
Average	5.09	5.48	5.08	5.24	4.77	5.20	5.18

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 act 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.

	I did this BEFORE attending Hotspots	I have done this SINCE attending Hotspots	I am ACTIVELY PLANNING to do this in the future	I DON'T PLAN to do this in future
Developed a fire management plan for my property				

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[7]. 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.

[7] 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.

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 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?

Answer	NonPilePre ANDPost	NonPilePre BurnPost	OtherPre BurnPost	All Continuers	OtherPre NonPilePost	Broad Stoppers	All Landholders
1-2	0 (0)	0 (0)	0 (0)	1 (2)	0 (0)	0 (0)	1 (1)
3	0 (0)	1 (3)	0 (0)	1 (2)	1 (8)	0 (0)	3 (2)
4	14 (33)	10 (30)	1 (8)	10 (22)	2 (15)	2 (18)	39 (25)
5	13 (30)	9 (27)	7 (54)	12 (26)	4 (31)	3 (27)	48 (30)
6-7	16 (37)	13 (39)	5 (38)	22 (48)	6 (46)	6 (55)	68 (43)
Total	43	33	13	46	13	11	159
Average	5.12	5.21	5.46	5.37	5.38	5.80	5.30

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

	NonPilePre AndPost No. (% of 39)	NonPilePre BurnPost No. (% of 33)	OtherPre BurnPost No. (% of 13)	All Continuers No. (% of 45)	OtherPre NonPilePost No. (% of 13)	Broad Stoppers No. (% of 11)	All Landholders No. (% of 154)
I did this BEFORE Hotspots (ONLY)	4 (10)	3 (9)	2 (15)	9 (20)	5 (38)	3 (27)	26 (17)
I did not do this BEFORE but have done it SINCE or am actively PLANNING to	29 (74)	29 (88)	11 (85)	30 (67)	6 (46)	8 (71)	113 (73)
I did this BEFORE and have done it SINCE (or am actively PLANNING to)	1 (3)	1 (3)	0 (0)	4 (9)	0 (0)	0 (0)	6 (4)
I DON'T PLAN to do this in future	5 (13)	0 (0)	0 (0)	2 (4)	2 (15)	0 (0)	9 (6)

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

	NonPilePre AndPost No. (% of 35)	NonPilePre BurnPost No. (% of 30)	OtherPre BurnPost No. (% of 13)	All Continuers No. (% of 39)	OtherPre NonPilePost No. (% of 12)	Broad Stoppers No. (% of 10)	All Landholders No. (% of 138)
I did this BEFORE Hotspots (ONLY)	12 (34)	11 (37)	2(15)	20 (51)	7 (58)	7 (70)	59 (42)
I did not do this BEFORE but have done it SINCE or am actively PLANNING to	11 (31)	14 (47)	10 (77)	11 (28)	3 (25)	1 (10)	50 (36)
I did this BEFORE and have done it SINCE (or am actively PLANNING to)	2 (6)	0 (0)	0 (0)	5 (13)	0 (0)	0 (0)	7 (5)
I DON'T PLAN to do this in future	10 (29)	5 (17)	1 (8)	3 (8)	2 (17)	2 (20)	23 (17)

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

	NonPilePre AndPost No. (% of 42)	NonPilePre BurnPost No. (% of 28)	OtherPre BurnPost No. (% of 13)	All Continuers No. (% of 44)	OtherPre NonPilePost No. (% of 13)	Broad Stoppers No. (% of 11)	All Landholders No. (% of 151)
I did this BEFORE Hotspots (ONLY)	23 (55)	16 (57)	10 (54)	16 (59)	8 (62)	8 (73)	89 (58)
I did not do this BEFORE but have done it SINCE or am actively PLANNING to	8 (19)	10 (36)	3 (23)	4 (9)	0 (0)	3 (27)	28 (19)
I did this BEFORE and have done it SINCE (or am actively PLANNING to)	8 (19)	2 (7)	2 (15)	13 (30)	5 (38)	0 (0)	30 (20)
I DON'T PLAN to do this in future	3 (7)	0 (0)	1 (8)	1 (2)	0 (0)	0 (0)	5 (3)

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

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

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.

Table 18
Membership of the RFS before Hotspots

	Number answering question	I was a member of a volunteer fire fighting group at the time of participating in the workshop (eg RFS) Number (%)	I had been a member of a volunteer fire fighting group in the past, but was no longer a member at the time of Hotspots Number (%)	I have *at some point* been a member of the RFS or similar Number (%)
NonPilePre AndPost	44	12 (27)	0 (0)	12 (27)
NonPilePre BurnPost	33	7 (21)	2 (6)	9 (27)
OtherPre BurnPost	13	4 (31)	3 (23)	7 (54)
All Continuers	46	14 (30)	5 (11)	19 (41)
OtherPre NonPilePost	13	6 (46)	0 (0)	6 (46)
Broad Stoppers	11	4 (36)	1 (9)	5 (45)
All Landholders	160	47 (29)	11 (7)	58 (36)

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 *un*comfortable 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!

4 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 *non*-burners (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 5 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 5 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.

Table 19
Burner Types By Median Age in Years

	Median Age (years)	Number of respondents
NonPilePre NonPilePost	60-64	40
NonPilePre BurnPost	55-59	31
OtherPre BurnPost	55-59	12
All Continuers	55-59	43
OtherPre NonPilePost	55-59	11
Broad Stoppers	65-69	10
All Landholders	55-59	147

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:

> 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

	Retired Only or Retired + Home-Maker Number (%)	Self-Employed Only Number (%)	Employed Only Number (%)	Retired + Self-Employed Number (%)	Self-Emp + Employed Number (%)	Un-employed Number (%)	Home-Maker Only Number (%)	Total
NonPilePre ANDPost	17 (40)	10 (23)	13 (30)	2 (5)	1 (2)	0 (0)	0 (0)	43
NonPilePre BurnPost	8 (26)	2 (6)	14 (45)	3 (10)	4 (13)	0 (0)	0 (0)	31
OtherPre BurnPost	4 (31)	3 (23)	6 (46)	0 (0)	0 (0)	0 (0)	0 (0)	13
All Continuers	10 (23)	15 (34)	13 (30)	2 (5)	0 (0)	0 (0)	4 (9)	44
OtherPre NonPilePost	2 (18)	1 (9)	5 (45)	1 (9)	0 (0)	2 (18)	0 (0)	11
Broad Stoppers	6 (60)	2 (20)	2 (20)	0 (0)	0 (0)	0 (0)	0 (0)	10
All Landholders	47 (31)	33 (22)	53 (35)	8 (5)	5 (3)	2 (1)	4 (3)	152

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 may 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 20
Burner Types By Gender (Numbers)

	Female Number (% of all females)	Male Number (% of all males)
NonPilePreNonPilePost	17 (30)	22 (25)
NonPilePreBurnPost	12 (21)	19 (22)
OtherPreBurnPost	5 (9)	8 (9)
All Continuers	15 (27)	27 (31)
OtherPreNonPilePost	3 (5)	7 (8)
Broad Stoppers	5 (9)	5 (6)
All Landholders	57	88

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

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

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:

> 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 Aboriginals 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:

> 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[8], 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.

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.

[8] 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.

Table 22
What is the highest level of post-school education you have obtained?

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

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.

Table 23
Area of Land Managed

	Median Area of Land Managed	% managing less than 10 Ha. (total number respondents)	% managing more than 40 Ha. (total number respondents)	% managing more than 100 Ha. (total number respondents)
NonPilePre AndPost	20-29	26 (43)	44 (43)	7 (43)
NonPilePre BurnPost	20-29	28 (32)	44 (32)	15 (32)
OtherPre BurnPost	40-49	8 (13)	54 (13)	16 (13)
All Continuers	40-49	17 (41)	56 (41)	31 (41)
OtherPre NonPilePost	40-49	9 (11)	55 (11)	27 (11)
Broad Stoppers	20-29	20 (10)	20 (10)	10 (10)
All Landholders	30-39	21 (150)	47 (150)	19 (150)

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.

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[9]. 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

[9] Brodie Rafferty, *pers. comm.*

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:

> 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 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:

> 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.

Table 24
Income derived from property

	No income derived from rural property Number (%)	10% or less of income derived from rural property Number (%)	More than 50% of income derived from rural property Number (%)	Number Landholders
NonPilePreANDPost	29 (85)	31 (91)	2 (6)	34
NonPilePreBurnPost	21 (72)	26 (90)	2 (7)	29
OtherPreBurnPost	9 (75)	12 (100)	0 (0)	12
AllContinuers	24 (57)	35 (83)	7 (14)	42
OtherPreNonPilePost	6 (75)	6 (75)	1 (13)	8
BroadStoppers	6 (75)	7 (88)	1 (13)	8
All Landholders	95 (71)	117 (88)	13 (8)	133

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 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

Major use of land by burner type

	Residential (you live on the land full-time or part-time) Number (%)	Recreation (e.g. bushwalking, relaxing) Number (%)	Conservation Number (%)	Grazing Number (%)	Cropping Number (%)	Horticulture Number (%)	Commercial forestry Number (%)
NonPilePreANDPost	28 (65)	18 (42)	18 (42)	7 (16)	0 (0)	1 (2)	0 (0)
NonPilePre BurnPost	22 (69)	17 (53)	17 (53)	3 (9)	2 (6)	2 (6)	0 (0)
OtherPreBurnPost	8 (62)	8 (62)	7 (54)	2 (15)	0 (0)	1 (8)	0 (0)
AllContinuers	32 (74)	22 (51)	19 (44)	14 (33)	1 (2)	3 (7)	4 (9)
OtherPreNonPilePost	8 (73)	4 (36)	4 (36)	5 (45)	2 (18)	0 (0)	0 (0)
BroadStoppers	9 (90)	4 (40)	5 (50)	3 (30)	0 (0)	0 (0)	1 (10)
All Landholders	107 (70)	73 (48)	70 (46)	34 (22)	5 (3)	7 (5)	5 (3)

Table

Major *and* minor use of land by burner type

	Residential (you live on the land full-time or part-time) Number (%)	Recreation (e.g. bushwalking, relaxing) Number (%)	Conservation Number (%)	Grazing Number (%)	Cropping Number (%)	Horticulture Number (%)	Commercial forestry Number (%)
NonPilePreANDPost	43 (100)	36 (84)	31 (72)	15 (35)	4 (9)	12 (28)	1 (2)
NonPilePre BurnPost	31 (97)	26 (81)	27 (84)	9 (28)	3 (9)	15 (47)	3 (9)
OtherPreBurnPost	12 (92)	13 (100)	11 (85)	8 (62)	0 (0)	6 (46)	0 (0)
AllContinuers	41 (95)	36 (84)	34 (79)	23 (53)	6 (14)	16 (37)	6 (14)
OtherPreNonPilePost	11 (100)	10 (91)	7 (64)	8 (73)	2 (18)	4 36)	0 (0)
BroadStoppers	10 (100)	9 (90)	10 (100)	5 (50)	3 (30)	1 (10)	1 (10)
All Landholders	148 (97)	130 (86)	120 (79)	68 (45)	18 (12)	54 (36)	11 (7)

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

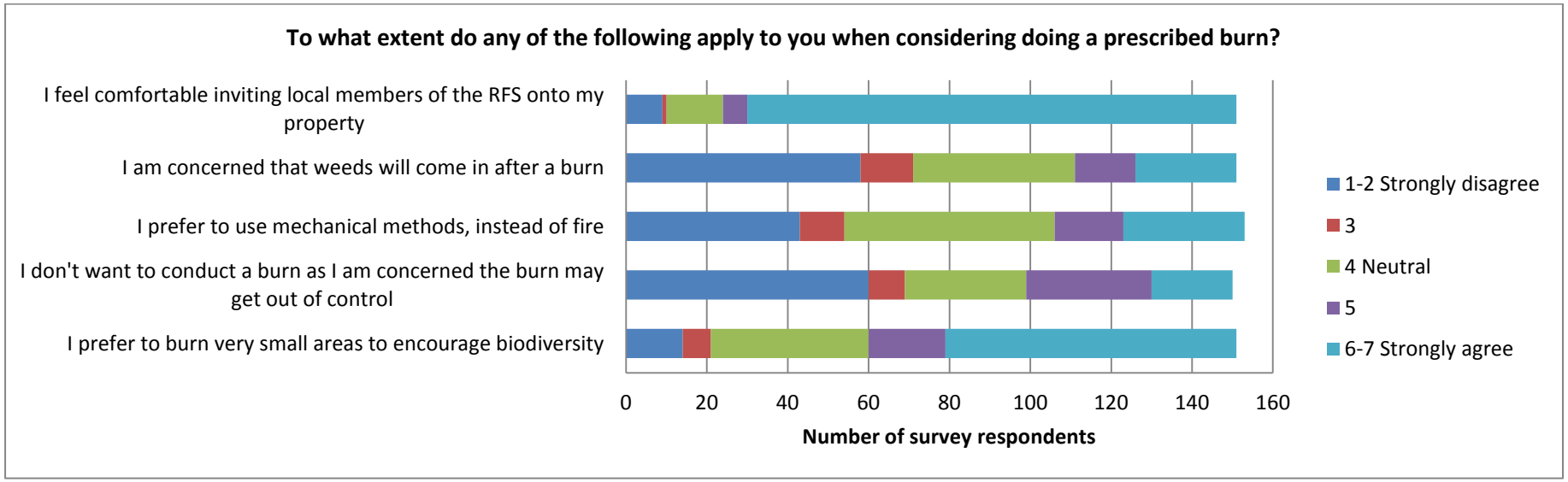


Chart II

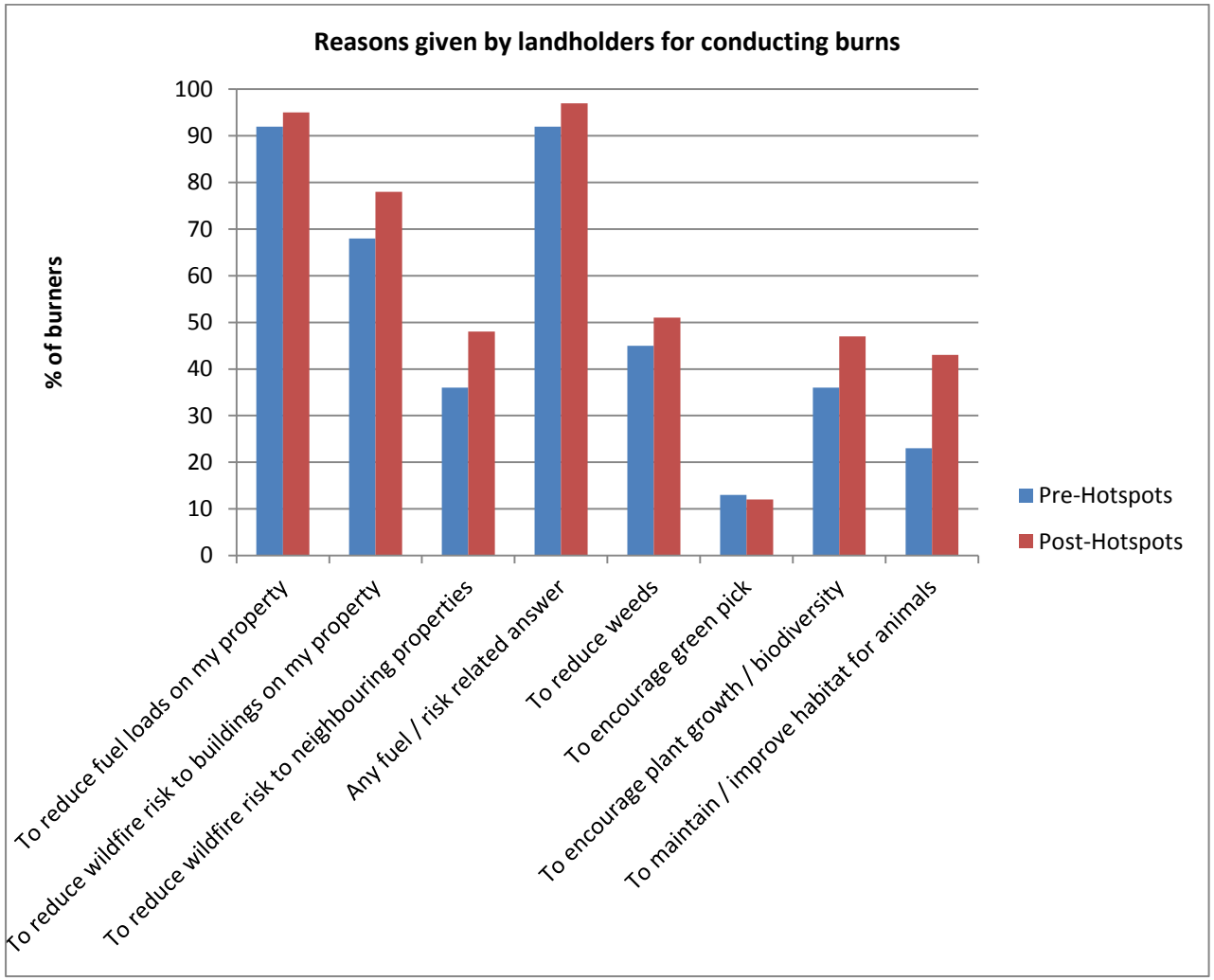

Reasons given by landholders for conducting burns
% of burners
100
90
80
70
60
50
40
30
20
10
0
To reduce fuel loads on my property
To reduce wildfire risk to buildings on my property
To reduce wildfire risk to neighbouring properties
Any fuel / risk related answer
To reduce weeds
To encourage green pick
To encourage plant growth / biodiversity
To maintain / improve habitat for animals
Pre-Hotspots
Post-Hotspots

Chart III

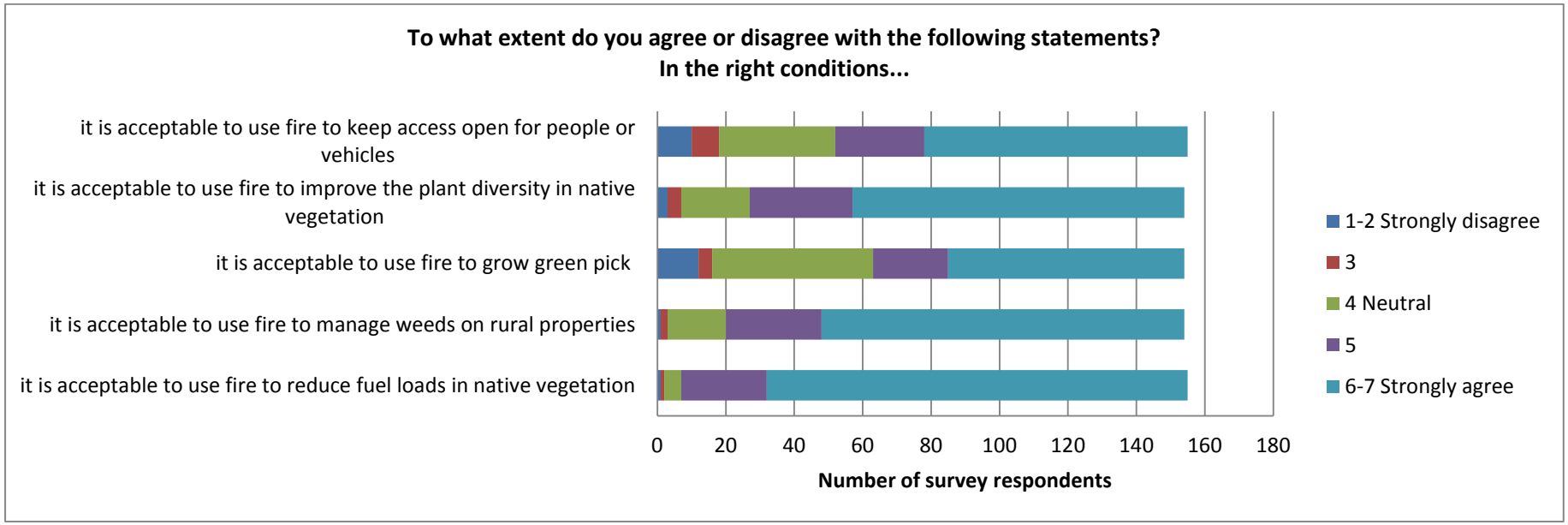

To what extent do you agree or disagree with the following statements?
In the right conditions...
it is acceptable to use fire to keep access open for people or vehicles
it is acceptable to use fire to improve the plant diversity in native vegetation
it is acceptable to use fire to grow green pick
it is acceptable to use fire to manage weeds on rural properties
it is acceptable to use fire to reduce fuel loads in native vegetation
0
20
40
60
80
100
120
140
160
180
Number of survey respondents
1-2 Strongly disagree
3
4 Neutral
5
6-7 Strongly agree

Chart IV

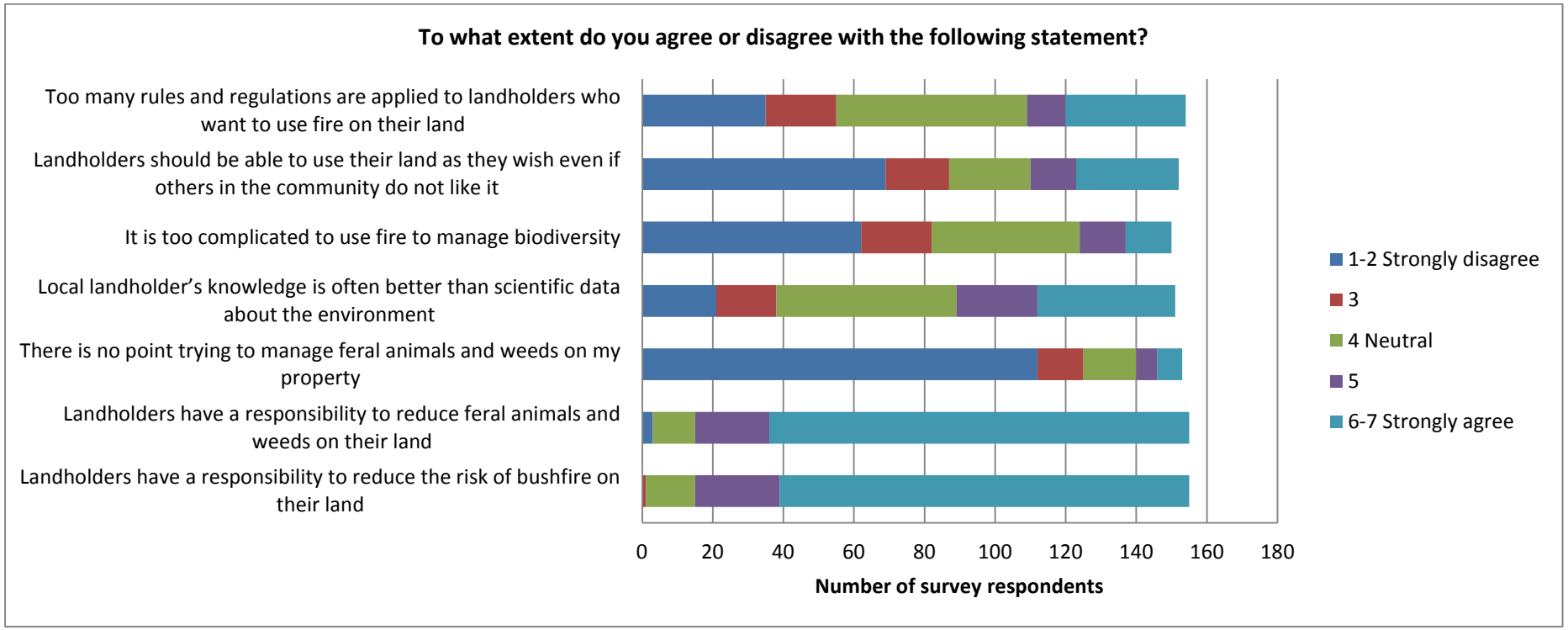

To what extent do you agree or disagree with the following statement?
Too many rules and regulations are applied to landholders who want to use fire on their land
Landholders should be able to use their land as they wish even if others in the community do not like it
It is too complicated to use fire to manage biodiversity
Local landholder's knowledge is often better than scientific data about the environment
There is no point trying to manage feral animals and weeds on my property
Landholders have a responsibility to reduce feral animals and weeds on their land
Landholders have a responsibility to reduce the risk of bushfire on their land
0
20
40
60
80
100
120
140
160
180
Number of survey respondents
1-2 Strongly disagree
3
4 Neutral
5
6-7 Strongly agree

Chart V

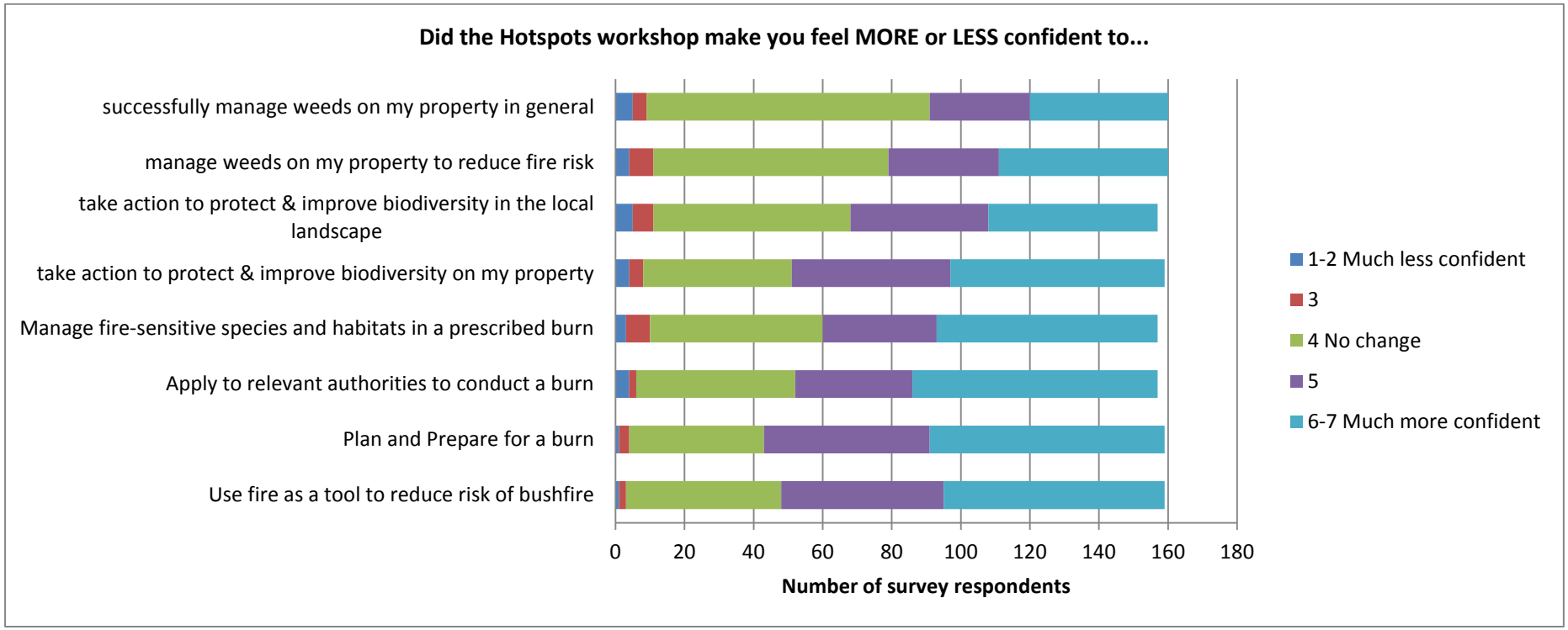

Did the Hotspots workshop make you feel MORE or LESS confident to...
successfully manage weeds on my property in general
manage weeds on my property to reduce fire risk
take action to protect & improve biodiversity in the local landscape
take action to protect & improve biodiversity on my property
Manage 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
0
20
40
60
80
100
120
140
160
180
Number of survey respondents
1-2 Much less confident
3
4 No change
5
6-7 Much more confident

Chart VI

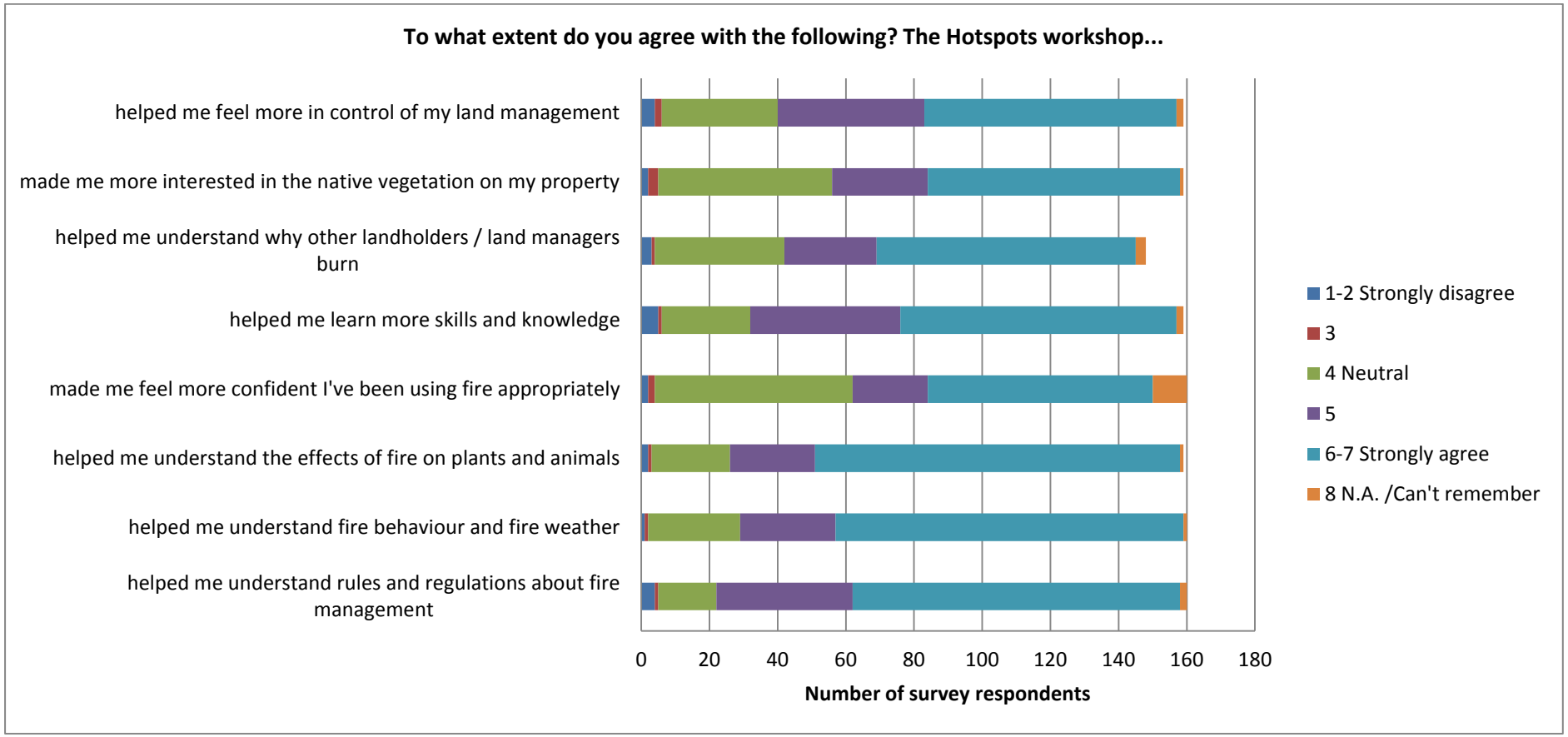
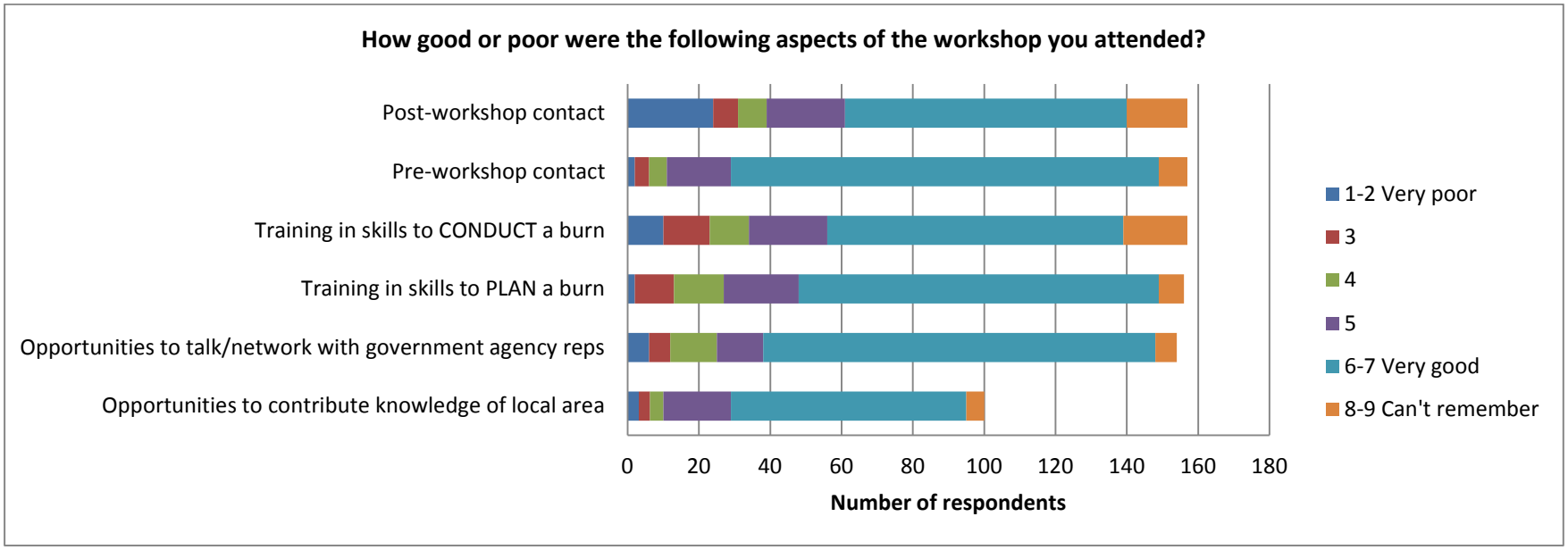

To what extent do you agree with the following? The Hotspots workshop...
helped me feel more in control of my land management
made me more interested in the native vegetation on my property
helped me understand why other landholders / land managers burn
helped me learn more skills and knowledge
made 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
0
20
40
60
80
100
120
140
160
180
Number of survey respondents
1-2 Strongly disagree
3
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
0
20
40
60
80
100
120
140
160
180
Number of respondents
1-2 Very poor
3
4
5
6-7 Very good
8-9 Can't remember

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[10], 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.

[10] 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.

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i Hotspots Fire Project (undated) Case Study: Learning and living with fire – the Currawinya story

[ii] Pannell, David and Vanclay, Frank (2011: Eds) *Changing Land Management: Adoption of New Practices by Rural Landholders.* CSIRO Publishing, 208pp. ISBN: 9780643100381.

[iii] 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.

[iv] Penny Watson, Hotspots Workshop Day 2, Grady's Creek, May 2013.

[v] See e.g. Flather, C.H., Knowles, M.S. & Kendall, I.A. 1998, "Threatened and endangered species geography", Bioscience, vol. 48, no. 5, pp. 365-376 and Courchamp, F., Woodroffe, R. & Roemer, G. 2003, "Removing protected populations to save endangered species", Science,vol. 302, no. 5650, pp. 1532-1532.

[vi] Lisa M. Campbell, Matthew H. Godfrey (2010) Geo-political genetics: Claiming the commons through species mapping. Geoforum, Volume 41, Issue 6, November 2010, Pages 897–907. http://dx.doi.org.ezproxy.uow.edu.au/10.1016/j.geoforum.2010.06.003