

Do wildfire experiences influence views on climate change?

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Received 24 August 2013
Revised 6 March 2014
Accepted 11 March 2014

Abstract

Purpose – This paper aims to explore the influence of wildfire events on community perceptions of climate change and the risk of future wildfire disasters in southern Australia.

Design/methodology/approach – The study was located around Beechworth in northeast Victoria, where wildfires occurred in 2003 and 2009. Semi-structured qualitative interviews and focus group interviews were conducted in 2010, involving 40 people from local businesses, government and property owners.

Findings – The authors conclude that people's experiences of recent consecutive wildfire events did not necessarily influence their views on climate change in general or as a causal agent of wildfire events. However, there was general agreement that weather conditions had been extreme in recent times. Some attributed the increase in wildfires to factors other than climate change that were more easily observed.

Research limitations/implications – Further research is needed into the relationship between wildfire experiences, climate change views and adaptive behaviours across a wider range of social contexts. Research needs to determine if views and behaviours change over time or with frequency or severity of fires.

Practical implications – Understanding the nature of potential wildfires, and being able to prepare and respond to such events, is more important than believing in climate change, as views may not change in response to fire events. Strategies need to focus on supporting people to prepare, respond and recover from wildfires, regardless of their climate change perceptions.

Social implications – Paying attention to people's local social context and how it influences their beliefs about climate change will allow sensitive and adaptive strategies to evolve over time.

Originality/value – There is limited research into relationships between disaster experiences and perceptions of climate change, particularly the influence of wildfire experiences.

Keywords Australia, Climate change, Natural disasters, Disaster mitigation, Public perceptions, Wildfire

Paper type Research paper



This work was funded through the National Climate Change Adaptation Research Facility, which is an initiative of and funded by the Australian Government Department of Climate Change and Energy Efficiency, with additional funding from the Queensland Government, Griffith University, Macquarie University, Queensland University of Technology, James Cook University, The University of Newcastle, Murdoch University, University of Southern Queensland and University of the Sunshine Coast. The role of NCCARF is to lead the research community in a national interdisciplinary effort to generate the information needed by decision-makers in government and in vulnerable sectors and communities to manage the risk of climate change impacts. The views and opinions expressed in this publication are not necessarily the views of the Commonwealth, and the Commonwealth does not accept responsibility for any information or advice contained herein.

Introduction

This paper explores the influence of multiple wildfire events in southern Australia on community perceptions of climate change and the risk of future wildfire disasters occurring. Australia is acknowledged as one of the most fire-prone areas in the world (Bradstock *et al.*, 2012). Two of the worst fire events were in the state of Victoria in January 1939 and in February 1983. In the past decade, there has been an increase in the frequency of major fire events in Victoria, including the Eastern Victorian Fires of 2003 (Indian, 2007), the Tolmie/Mansfield fires of 2006 (Sharp *et al.*, 2009) and the devastating fires north of the city of Melbourne on February 7, 2009, where more than 270 lives were lost (North and Bainbridge, 2010). Climate change predictions estimate that the region will experience hotter and drier summers with an increase in the number of extreme fire risk days (CSIRO, 2010).

Public perceptions and knowledge of climate change generally, have been extensively researched over the past two decades, internationally (Brody *et al.*, 2008; Leiserowitz, 2005; Lorenzoni *et al.*, 2006; Webber and Stern, 2011) and, more recently, in Australia (Ashworth *et al.*, 2011; Leviston *et al.*, 2011; Mazur *et al.*, 2013; Reser *et al.*, 2012; Fielding *et al.*, 2012). Several authors have reported that public perceptions of climate change issues vary according to factors such as place of residence, political preferences, physical vulnerability, knowledge, level of education, media coverage and gender (Agho *et al.*, 2010; Ashworth *et al.*, 2011; Brody *et al.*, 2008; Leviston *et al.*, 2011; Lui *et al.*, 2014).

There have also been numerous studies investigating the influence of climate change knowledge or attitudes on adaptive behaviour (Buys *et al.*, 2011; Kreibich, 2011; Patt and Schroter, 2008; Rogers *et al.*, 2012; Spence *et al.*, 2011) and mental well-being (Doherty and Clayton, 2011; Morrissey and Reser, 2007; Searle and Gow, 2010). Considerable research has been undertaken to explore and measure relationships between direct experience of natural hazards, risk perceptions and mitigation measures (Martin *et al.*, 2009; McGee *et al.*, 2009; Whitmarsh, 2008). Much of this research has been driven by policymakers, educators and private industry in the quest to improve climate change mitigation, adaptation and education strategies (Cottrell *et al.*, 2008; Gunderson, 2010; Morrissey and Reser, 2007).

However, there has been less direct research on whether people see a connection between climate change and individual or multiple disasters such as wildfires. There is even less known about the influence of people's direct experiences of certain natural disasters on their perceptions of climate change. For example, if an individual experiences a major natural disaster such as wildfire, flood or cyclone, are they more or less likely to believe that human-induced climate change is occurring and/or is causing natural disasters? Are they more or less concerned that there will be more frequent disasters in the future? Do they become more fearful or more nonchalant? Is the severity or frequency of impact an important influence on climate change perceptions? Or do factors other than disaster experience have greater influence on climate change views?

Such information is becoming increasingly sought after by emergency managers to inform government policy and community capacity building to cope with natural disasters (Ashworth *et al.*, 2011; Boon *et al.*, 2012a, 2012b; Cottrell *et al.*, 2008; O'Brien *et al.*, 2006). Predictions of increased frequency of climate-induced natural disasters (CSIRO, 2010; IPCC, 2011) have generated some research into public perceptions of climate change across a range of natural disaster types in different contexts, although

we note that wildfire cases are limited. In the next section, we review some of the international literature on the complex relationships between disaster experiences and perceptions of climate change, including case studies from Australia.

There are conflicting conclusions as to whether climate change views are influenced by experience of natural disasters. For example, [Whitmarsh \(2008\)](#) reported that there was no difference between flood victims and non-victims in their views on the impacts and uncertainty of climate change. Instead, flood-affected participants attributed the flooding to local causes, such as lack of maintenance of water courses, highlighting the role of direct local observations in attributing causality. [Whitmarsh \(2008\)](#) concurred with others ([Lorenzoni et al., 2006](#); [Reser et al., 2012](#)) that climate change is often seen as a distant problem rather than a direct, personal risk.

In contrast, another UK survey conducted in 2010 (after more flood events and more media coverage on climate change) found that those reporting flood experience had significantly higher levels of concern and certainty about climate change impacts than those with no direct experience of floods ([Spence et al., 2011](#)). However, they suggested that knowledge of multiple major events and increasing salience accorded to climate change in public discourses may have had more influence than the disaster experience itself. Similar conclusions were made by [Brulle et al. \(2012\)](#) from an empirical analysis of the factors affecting the US public concern about the threat of climate change between January 2002 and December 2010. A time-series analysis indicated that weather extremes had no effect on aggregate public opinion. It was concluded that elite cues (political action and information), media and structural economic factors have the largest effect on the level of public concern about climate change in the USA.

The Australian experience of climate related disasters and how it affects climate change perceptions is equally varied. Australia has experienced several devastating natural disasters in recent decades, including Cyclone Larry in 2006 and Cyclone Yasi in 2011; Bushfires in 1983, 2003, 2006, 2009 and 2013; major floods in 2009, 2010, 2011 and 2013; and prolonged droughts. Most research on these disasters has focussed on disaster risk perceptions, responses, recovery and preparedness for future events. There have been few direct studies on whether people link these events to climate change with the exceptions of the cases reviewed here.

[Kiem et al. \(2010, p. 40\)](#) reviewed case studies of Australian communities impacted by drought and noted that those living in a community that has experienced, and is predicted to experience future natural hazards, are more likely to be convinced about the reality of climate change and the need for action. Those people were also reported to be more responsive to new knowledge about the risks from climate change and the potential for response than those who had not experienced drought. Likewise, [Reser et al. \(2012\)](#) found that Australian participants with prior direct experience with extreme weather events and natural disasters showed consistent but *modest* positive relationships with climate change-related variables such as belief, concern, psychological adaptation, psychological distress and behavioural engagement ([Reser et al., 2012, p. 150](#)). However, in relation to severity of disaster experience, they concluded that:

[...] periodic exposure and repeated experience with extreme weather and natural disaster events likely normalise these occurrences for some, but such prior experience also appears to be associated with a raised collective consciousness, wariness, and felt exposure and vulnerability to such events ([Reser et al., 2012, p. 132](#)).

We can also draw information from Australian disaster risk-perception research in terms of factors that influence people's perceptions of disasters and/or climate change. In relation to tropical cyclone risk, Li (2009) found major differences between short- and longer-term residents in Darwin, as well as differences between residents working in weather-related professions and non-professional residents. Long-term residents linked climate change to changed weather patterns in Darwin over the past twenty- to thirty years. Expert residents understood the link between cyclones and climate change. Hence, length of residence and occupation were considered important factors in climate change views after Cyclone Tracey in 1974.

Farmers and rural landholders in Australia have also been singled out for research on climate change views and adaptation behaviours due to the impacts of drought on agriculture. Mazur *et al.* (2013) examined the links between rural landholders' knowledge, beliefs, risk perceptions and adaptations to climate change in two locations. They found most rural landholders were not climate change deniers and were adapting tactically to drier conditions. However, there were generally low levels of climate change knowledge amongst landholders and a mistrust of climate change science. Another study by Buys *et al.* (2011) of two small rural communities (farmers and non-farmers) reported conflicting views on how climate change is conceptualised. There were also pronounced differences in the degree of concern and need for action, the role of local industry, who will "win" and "lose" and the willingness of rural communities to adapt.

Most of the studies reviewed above were quantitative surveys. It would appear that there is limited qualitative research exploring how people who have experienced natural disasters, feel about climate change causing these events and what they think will occur in the future. In addition, we could not find any published international research on the influence of wildfire experiences on people's beliefs about climate change. This may be due to the observed overall lack of attention to wildfire in the natural hazard literature (Martin *et al.*, 2009). Hence, it is possible that our study is unique in this respect, and we hope it will stimulate further research (qualitative and quantitative) on the potential links between natural disaster experiences and climate change perceptions.

The study was part of a larger research project funded by the Australian Department of Climate Change and Energy Efficiency and led by James Cook University titled "Recovery from disaster experience: its effect on perceptions of climate change risk and on adaptive behaviours to prevent, prepare, and respond to future climate contingencies". This paper reports on the qualitative results on perceptions of climate change risk only, as the qualitative preparedness and resilience findings have been published elsewhere (Boon *et al.*, 2012a, 2012b; Boon, 2014; Millar *et al.*, 2012; Stevenson *et al.*, 2012).

Methods

Location

The research centred on Beechworth, a town with a population of 3,000 in the north-east of the state of Victoria and the largely rural shire of Indigo (Figure 1). The area experienced two major wildfire events in 2003 and 2009. Although towns were spared, there was considerable loss of farm property, livestock and wildlife and two human deaths (North and Bainbridge, 2010).

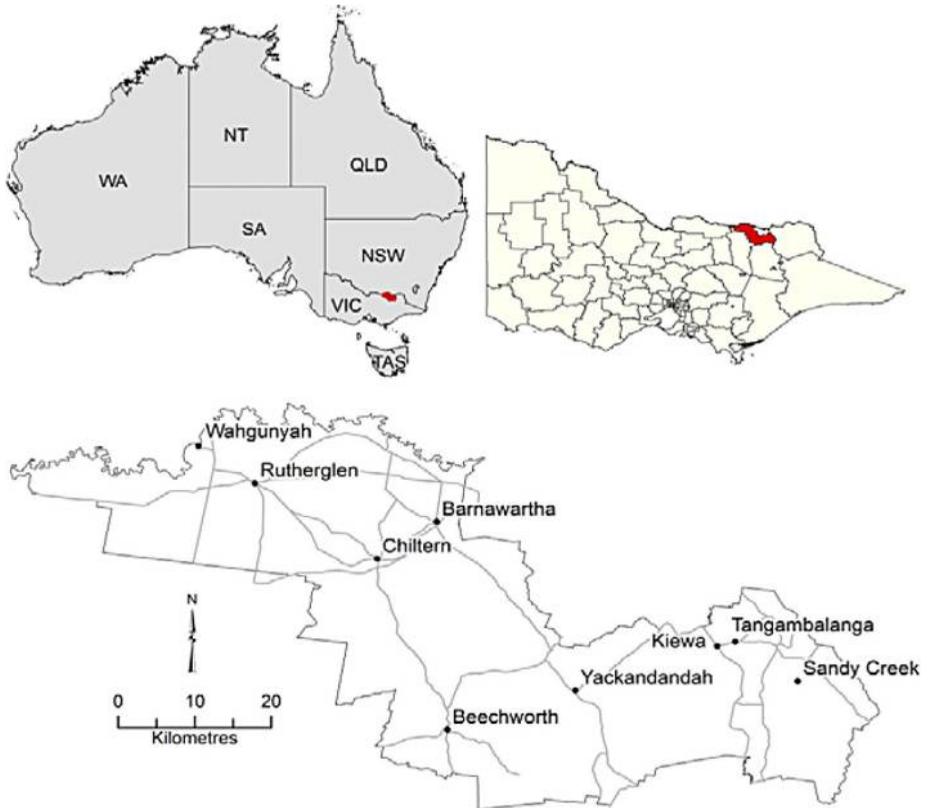


Figure 1.
Location of
Beechworth and
fire-affected area

Source: CSU

Selection of participants

The research methods were approved by James Cook University human ethics committee and conducted according to ethics guidelines. In-depth qualitative data were collected through individual key informant interviews followed by separate focus group interviews with sectors of the community that had direct experience and knowledge of the fire events. The time period since the 2009 fires was just under two years.

Key informants were selected on the basis of having extensive involvement in fire response and recovery but from different sectors (Table I). (Eight individuals and one couple were interviewed between November 2010 and January 2011). These ten people were involved with the 2003, 2006 and/or 2009 bushfires in the Beechworth area in the following capacities:

- co-ordinator, Beechworth Neighbourhood Centre, arrived just after the 2003 fires;
- owner of a motel in Beechworth, and ex-president of the Beechworth Chamber of Commerce during the 2009 fires;
- bushfire Youth Development Officer, Indigo Shire, also covering Alpine Shire;

- manager, Emergency Management Planning Committee, Indigo Shire;
- team Leader, Community Strengthening Project, Indigo Shire;
- former Manager of Community Planning, and Municipal Recovery Manager, Indigo Shire. Experienced 2006 and 2009 fires in this position;
- bruarong farmer, Bruarong Hall Committee member, formerly Indigo Shire Home and Community Care worker (2009 fires), active fire fighter;
- stanley resident, Stanley CFA member, social researcher;
- orchardist – property lost in 2003 and 2009 fires; and
- buckland Gap resident, Beechworth, CFA member and coordinator of the Beechworth Health Service’s Planned Activity Group (elderly residents living at home).

Key informants were then asked to suggest community groups for the focus group interviews using the snowball selection technique (Noy, 2008). The purpose of the focus groups was to explore issues raised by key informants across a broader section of the community. Four separate group interviews were held in December 2010 and January 2011 with the following focus groups:

- *Stanley women’s social group (SFG)*: A group established post-2003 fires to provide newcomers with friendship and support. Fire came close to their homes.
- *Bruarong community group (BFG)*: Members of the Bruarong Hall Committee and the Bruarong community, including farmers, CFA members and businesses directly impacted by the 2009 fires. Pasture, trees and fences burnt, some stock lost.
- *Beechworth business community group (BBFG)*: Members of the Beechworth Chamber of Commerce representing tourism and general businesses including people whose homes were directly threatened by fires in 2003 and 2009.
- *Government representatives (GFG)*: Members of the Indigo Shire Community Resilience Committee, Regional Development Victoria, Department of Human Services Victoria and the Ovens and King Community Health Service.

In total, ten key informants and four focus groups (involving 30 people) were interviewed from November 2010 to January 2011 (Table I).

| Sector | Key informants | Focus groups | Total no. of people |
|------------------------------|----------------|-----------------------|---------------------|
| Business | 1 | 1 (4 women and 1 man) | 6 |
| Government (local and state) | 4 | 1 (2 women, 2 men) | 8 |
| Women’s group | 1 | 1 (5 women) | 6 |
| Property owners | 4 | 1 (8 women, 8 men) | 20 |
| Total | 10 | 4 (30 people) | 40 |

Table I.
Interviewees by
sector and gender
(*N* = 40)

Interview methods

An interview guide was used with the following questions to stimulate discussion:

- Q1. Tell me about your experience of the fires?
- Q2. Tell me about your views on climate change and wildfire events?
- Q3. Tell me your views about the possibility of future wildfires?

The individual key informant interviews involved only one interviewer, while the focus group interviews had one interviewer and one note taker. Throughout the interviews, people were encouraged to reflect on their experiences of the fires. Different views were encouraged in the focus group so that the group was not expected to come to any consensus on matters relating to the fire events. Participants responded enthusiastically. For many interviewees, it was the first time that they had been asked to talk about their experiences of the fires and they welcomed the opportunity to discuss the positive and negative aspects of the disaster experience.

For some, it brought back raw emotions of loss, anger, fear and gratitude. The interviewers were aware that the interviews may be cathartic for participants, and were ready to offer referral to support services if necessary. It was important to create a safe, non-threatening atmosphere at the start of the interview so that people felt they could express their feelings in a supported environment.

All interviews were digitally recorded and notes made of key points with permission of the participants. Notes were enhanced later using the recordings to identify key themes and extract quotes from interviewees.

Data analysis

Key informant and focus group transcripts were analysed using the standard qualitative techniques as described by Patton (2002). A process of coding and categorising the primary patterns in the responses to each question was used. In the results below, participants are coded as (KI 1-10) for Key Informants and SFG (1-5), BFG (1-16), BBFG (1-5) and GFG (1-4) for focus group participants.

Results

This section presents the emerging themes relating to wildfire experiences and climate change perceptions. It starts with a summary of people's experiences with the fires to highlight the diversity of experiences encountered within and across interview groups. It also provides background context to their perceptions of climate change and fire events in the pursuing sections.

Experiences of the fires varied from direct property damage, loss of income and supporting those affected

People's experiences of the fires varied according to their proximity to the fire at the time, their professional and volunteer roles, their physical abilities, resources available and their emotional response. The BFG members were directly in the line of fire as it swept across the Yackandandah valley through their properties. They were actively preparing, carting water or putting out embers for several days as illustrated in the following quote:

I mean here it was, all around you. Even though it was a fair way away at night time it got close. I'd be spending all day mopping up all the burnt stuff that was still burning - this was after the

fire- and at night time I used to stay awake all night just to keep an eye on it. And the scary part was it would be flaring up of a night; you'd see it or you'd hear a crash down up the hill [...] a learning experience I guess! Not that we really needed it [...] [BFG 4].

The fire came close to the homes of some members of SFG. One woman evacuated with her sick husband to Beechworth town. Another woman was away at the time but returned to hear the stories. A couple of landholders stayed put and were confident they could handle the fire if it came on to the property as highlighted in this quote:

[...] we've got a great dam and a good pump and we felt confident that we could fight it ..we'd already ploughed around because we've got bush on our property and pines [...] We felt in control, I know that sounds silly, but if you've got the right people who are experienced in fire fighting [...] [SFG 3].

Many businesses in the region rely heavily on tourism. The Beechworth business group members were all impacted by loss of income from a decrease in tourists during and after the fires. They felt that the situation was worsened by the media using the term "Beechworth Fires" so that outsiders thought the town had shut down. As one business operator said:

[...] we had a number of suppliers saying "Are you guys still operating?" because they had the impression in Melbourne that Beechworth was devastated! [BBFG 1].

Self-employed people servicing the tourism operators also suffered, having to stop work during the fires and having jobs cut as the tourism operators tightened their budgets:

Yeah for a week or so I couldn't do any work because there was a lot of "fire stuff", and then local business were affected that I worked for, so they cut back on my work [BBFG 2].

The government service group members talked about their experiences in terms of providing immediate emergency relief services, funding assistance and mental health support. There was general consensus from everyone interviewed that services had improved between the 2003 and 2009 fires. As one government representative stated:

[...] down here we were on the ground within two days and we had teams of people, two people per car, full of all bits and pieces and we'd mapped out the path of the fire and our staff actually did this over a ten day period. They knocked on the door and basically said "Just want to make sure you're okay" [...] We did all the properties in Indigo Shire and Alpine Shire so when case management came into play we had already identified people who we knew weren't going to cope [...] [GFG 4].

None of the government service members interviewed had property damage or direct confrontation with the fires, but they were very aware of the emotional and mental impact of the fires on some people:

[...] in 2009 we had a big meeting over here when the fires were around. I noticed a lot of the new comers were really panicky and wanted to be told what to do. A number of people in the group behind me were asking questions, lots of questions, about what do I do, where do I go, to how do I go, who's going to tell me when I have to go, that sort of stuff [GFG 2].

A government key informant also gave the following observation:

The people looked just destroyed - they'd been shooting stock all day. One tough old farmer said it nearly did him in. It's just so hard; the fire, the CFA, the working, then coming home and

destroying your own stock. 'Layers of despair' is the term I used. It's the sort of stuff that doesn't go away [...] [KI 8].

Uncertainty over causal relationship between fire events and climate change

The study revealed mixed views on whether the recent wildfire events were linked to climate change. Some participants were willing to "declare their position" on whether climate change had caused the recent wildfire events, as shown in these affirmative quotes:

I think there's a lot to be said for that [more intense fires], and there has been huge fluctuations [in weather], and I think we still have to take into account the increasing effect of the human population on it [the weather] and that's being realistic about it. [SFG 5].

[...] the weather conditions in Victoria are greater and every decade is hotter than the one before. This last ten years has been the hottest and the weather conditions are getting worse, so whatever causes the fire it's harder to stop on those days. And we're going to get more of that [...] [BFG 12].

I know we talk about climate change, but we went through these fluctuations in the past; sort of heat rounds and things like that [...] [SFG 1].

Thirty year cycle, I remember Poppy saying this happens every thirty years; you get thirty years of dry and then you get thirty years of wet, with variations in between [...] [BFG 7].

In talking about other people's perceptions, most participants thought that there was a level of scepticism and uncertainty in the community about climate change and its links to natural disasters. As one key informant and member of the Bruarong focus group said:

[...] talking to people here I realise that most of them think that [the fire event] was just a mad day; the heat, the wind; everything just went mad. It was once in a lifetime and they'll never have to deal with it again. They don't think about it being a product of the drought, the environment, something larger. And then when we get a summer like this with all the rain, those people say; see? What are you talking about you gloomy thing? [KI 8].

You couldn't really say that it [climate change] caused the fires. You wouldn't know [...]. [BFG 3]

Although there was a range of views on whether climate change was causing more severe weather events such as fires, there was general agreement across all focus groups that weather conditions had been extreme in recent times. Some participants spoke of extreme weather being experienced that was beyond the experience of their collective memory as highlighted in the quotes below:

A lot of people are saying it's never been this extreme. A lot of the old cockies [farmers] are saying it, like my dad said, he's never seen it. [GFG 4]

So the cumulative impact of disasters which perhaps in the past would have occurred every ten years or twenty years but now it's happening bang, bang, bang, bang [...] I think the drought was obviously the start and then the fires and the floods. I think it's going to be a short sharp series of events and it's just going to chip away at people [...] [GFG 2].

Perceptions of factors other than climate change causing increased fire events

The interviews and focus groups revealed that several people thought that there were factors other than climate change causing the increase in frequency and severity of wildfires. Risk factors such as changed forestry management practices and a higher population density of newcomers in bush areas were mentioned.

Two members of the Beechworth business group felt that different forest management practices had increased the risk of fire and the potential intensity of fires. They pointed to the limiting of wood collection from the forest and the exclusion of livestock from national parks as causes of increased fire risk and intensity. The following is a quote from a member of the Beechworth Chamber of Commerce:

I worry about the changes. We used to have a lot more clearing happening. With undergrowth, people used to go out and bring in their own fire wood. And you talk to some of the oldies; someone said the other day up around the gorge you used to go right through without any undergrowth. People take it away and stuff. It's just that old traditional way of doing things is not happening [...] [BBFG 1].

SFG interviewees who lived close to plantation pine forests felt an increased risk of fire due to modern forest management practices. They reflected on the changes in employment in the industry resulting in less people being on hand to react immediately to fire, and the current management of forests from corporate headquarters, with fewer people on the ground. They also felt that past state forestry enterprises had superior monitoring and fire management practices, in contrast to the corporate forestry company now dominant in this area:

We were never ever frightened of fires. Fires were something that happened down in Wangaratta; grass fires [...] there were always men employed out in the pines in the nursery, a lot of men, and they were mostly local men and if a little fire started it was just put out straight away. And it was not a department or CFA called, but we always felt very safe because the pine people looked after the pines. That was the big thing here and of course they're not there now [...] [SFG 3].

Four participants also commented on the fact that more city people (known locally as “tree changers”) were building in high fire danger areas, with an expectation that local authorities will look after them during a fire event. They expressed that newcomers lacked knowledge about the area and what to do in bushfire events. One of the government staff expressed the following observations and concerns:

There's a spike in building applications and requests for places like Beechworth and Yackandandah and Stanley because people have still got this misconception of what is safe. [GFG 2]

A new resident from Stanley gave her own account of feeling vulnerable:

I was here for the 2009 fires; very different from the ones I've experienced before. I was in the Adelaide hills and then I was in Canberra. In a city it's totally different. You're very much on your own (here). I think we were pretty naïve [about fires] [...] [SFG 2].

Views on the risk of future fires

When asked if there would be more frequent and/or intense fires occurring in the future, participant's views ranged from those who felt that fire intensity would continue to occur within the range already experienced, to those who just hoped there would not be

any more severe fires. The following member of the SFG believed that the risk of fire is dictated by seasonal conditions, and that fluctuations in climate, and therefore fire risk, are quite normal as exemplified in the following quote:

[...] I think if you look at a much, much bigger window I think this is what happens; I think we're going through a period of time where we are having hotter days, but [...] if we wait a bit longer the rain was going to come. So are we going to have hotter days interminably? No, because we've had the last of the very hot days and maybe we're going to go through three or four years, or twenty three years, where we're not going to have fires. [SFG 1]

For one key informant, her belief was that it was a one-off event:

"That particular day is one day you'll never see again I hope, even the lead up to it. It was just one horrific day [KI 7]".

However, a couple of participants knew of people who had moved to the larger regional centre of Albury-Wodonga, as a result of their experience with the fires. They believed that these people had a realistic view of their ability to prepare adequately for and cope mentally with future fires, and had made a sensible decision:

A lot of the old people have moved. They made that decision. I know one of my neighbours, it was just too much, and she'd been on the land. Just too much, too much to worry about, too much grass [...] [GFG 4].

However, only one interviewee had ever considered moving because of the threat of fires. Most interviewees agreed that proper preparation reduced the risk to an acceptable level, and that the inconvenience of the short "fire season" was outweighed by the benefits of living comfortably for the rest of the year as highlighted in the quote here:

If I went back to Melbourne I'm more likely to be involved in a car accident than I am to be killed in a fire. I really do believe that, because I don't believe that your life is at risk in a fire situation, if you take the precautions [...] and it's such a tiny part of the year! It's like about six weeks, if anything, out of the twelve months of the year where Stanley is the most beautiful place to live [...]. [SFG 2]

Government participants accepted that the government's approaches were based on expectations of more frequent and severe natural disasters caused by climate change. They were aware of the uncertainty and scepticism in the community about links between climate change and fires. However, they felt there was a quiet acceptance that "things are different now" as exemplified in this quote:

[...] they don't say it, they won't name it, but I think they know it [...] [KI 1].

Discussion and conclusions

From this research, we conclude that people's experiences of recent consecutive wildfire events did not influence their views on climate change or whether climate change was associated with wildfire events. Likewise, the nature of people's wildfire experience in terms of severity of property or income loss, or emotional impact did not appear to influence their perceptions of climate change.

There are two explanations for this, supported by literature on the nature of climate change perceptions. The first is the complexity, uncertainty and controversy around climate change information and debates. We confer with Etkin and Ho (2007), Lorenzoni *et al.* (2006), Weber (2006), Whitmarsh (2008) and Ashworth *et al.* (2011), that for many

people, climate change is not tangible as climate is highly variable over time, information about climate change is received externally and can be exaggerated by the media and politics. As Weber (2006, p. 103) stated, “The time-delayed, abstract, and often statistical nature of the risks of global warming does not evoke strong visceral reactions”.

The relative importance placed on climate change, in relation to other issues, also affects how people view climate change. A review of literature on Australian’s views of climate change by the CSIRO in 2011 reported that climate change was rated as the fifth most important issue, behind the cost of living, the economy and the global financial crisis, employment and the health system, but ahead of other issues such as immigration, education and crime and justice (Ashworth *et al.*, 2011). According to the IPCC (2007) report, psychological research has shown that individuals prioritise risks according to the most immediate risk at the time.

This brings us to the second related explanation that climate change perceptions are highly varied as they are embedded in historical and contemporary social or political contexts.

Our research confirms the enormous variation in community views and uncertainty regarding climate change (Buys *et al.*, 2011; Doherty and Clayton, 2011; Schulte and Miller, 2010; Spence *et al.*, 2011; Reser *et al.*, 2012; Webber and Stern, 2011). There was a range of perceptions within and across sector groups including those who did not believe climate change was occurring or related to fire events (mostly long term landholders); those who observed more extreme weather and disaster events but were not sure if it was caused by climate change or if it would continue (some landholders and business owners); those who believed climate change was causing more frequent natural disasters (most government representatives and newcomers); and those who were undecided (most business group members).

Other studies show the influence of varied social and cultural contexts on climate change perceptions. For example, Brulle *et al.* (2012) found that extreme weather events had no effect on public views on climate change, whilst political mobilisation by elites and advocacy groups was critical in influencing climate change concern. Lui *et al.* (2014) also reported that climate change knowledge and perceptions of ranchers and farmers in Nevada, USA, were influenced by their partisan affiliation, political ideology and gender (female ranchers and farmers being more concerned about climate change than male conservative ranchers and rural residents). Byg and Salick (2009) described how Tibetan villagers saw evidence of climate change from their local observations which were strongly connected to spiritual and moral beliefs. Hence, the socially constructed nature of climate change perceptions is so powerful that it can resist being altered by disaster experiences.

There is some evidence that prior experience with natural disasters can increase disaster awareness, preparedness and/or adaptive behaviours (Spence *et al.*, 2011), regardless of perceptions of climate change. However, recent studies on wildfire experiences in the USA, did not find positive correlations between direct experience, risk perceptions and mitigation efforts. In a study of western US communities that had experienced at least one catastrophic wildfire, and frequent, multiple wildfires in the vicinity of their homes, Martin *et al.* (2009) reported that direct experience with the wildfires did not directly influence their decisions to mitigate risk. Likewise, McGee *et al.* (2009) found that experiencing a wildfire had limited effect on risk perceptions for many

and reduced risk perceptions for others. Similarly, concerns about wildfire remained the same for many and increased for some. Therefore, understanding the nature of potential wildfires, and being able to prepare and respond to such events is more important for survival and adaptation than believing in climate change. Policies and management strategies need to focus on supporting people to prepare, respond and recover from wildfires, regardless of their climate change perceptions.

However, paying attention to people's local social context and how it influences their beliefs about climate change can be useful as it allows sensitive and adaptive strategies to evolve over time. Communication about climate change needs to focus on practical advice tailored to each location, and not be based on fear, guilt or complex scientific explanations (IPCC, 2007). We recommend further research to explore the complex relationship between wildfire experiences, climate change views and adaptive behaviours across a wider range of social contexts. Research could also determine if views and behaviours change over time or with frequency or severity of fires.

References

- Agho, K., Stevens, G., Taylor, M., Barr, M. and Raphael, B. (2010), "Population risk perceptions of global warming in Australia", *Environmental Research*, Vol. 110 No. 8, pp. 756-763.
- Ashworth, P., Jeanneret, T., Gardner, J. and Shaw, H. (2011), "Communication and climate change: what the Australian public thinks", Report No. EP112769, CSIRO Publishing, Canberra.
- Boon, H.J. (2014), "Disaster resilience in a flood-impacted rural Australian town", *Natural Hazards*, Vol. 71 No. 1, pp. 683-701.
- Boon, H., Clark, B., Cottrell, A., Stevenson, B., Millar, J. and King, D. (2012b), "Lifestyle at risk. The case of Ingham", *Proceedings of the Australian & New Zealand Disaster and Emergency Management Conference, Brisbane*, 16-18 April, pp. 59-74.
- Boon, H., Cotterill, A., Stephenson, R., Millar, J., King, D. and Lake, D. (2012a), "Bronfenbrenners bioecological theory for modelling community resilience to natural disasters", *Natural Hazards*, Vol. 60 No. 2, pp. 381-408.
- Bradstock, R.A., Gill, M. and Williams, R.J. (Eds) (2012), *Flammable Australia : Fire Regimes, Biodiversity and Ecosystems in a Changing World*, CSIRO Publishing, Collingwood, Victoria.
- Brody, S.D., Zahran, S., Vedlitz, A. and Grover, H. (2008), "Examining the relationship between physical vulnerability and public perceptions of global climate change in the United States", *Environment and Behaviour*, Vol. 40 No. 1, pp. 72-95.
- Brulle, R.J., Carmichael, J. and Jenkins, J.C. (2012), "Shifting public opinion on climate change: an empirical assessment of factors influencing concern over climate change in the US 2002-2010", *Climatic Change*, Vol. 114 No. 2, pp. 169-188.
- Buys, L., Miller, E. and van Megen, K. (2011), "Conceptualising climate change in rural Australia: community perceptions, attitudes and (in) actions", *Regional Environmental Change*, Vol. 12 No. 1, pp. 237-248.
- Byg, A. and Salick, J. (2009), "Local perspectives on a global phenomenon – climate change in Eastern Tibetan villages", *Global Environmental Change*, Vol. 19 No. 2, pp. 156-166.
- Commonwealth Scientific and Industrial Research Organisation (CSIRO) (2010), *Climate Variability and Change in South-Eastern Australia: A Synthesis of Findings from Phase 1 of the South-Eastern Australian Climate Initiative (SEACI)*, Australian Government Department of Climate Change, Canberra.

-
- Cottrell, A., Bushnell, B., Spillman, M., Newton, J., Lowe, D. and Balcombe, L. (2008), "Community perception of bushfire risk", in Handmer, J. and Haynes, K. (Eds), *Community Bushfire Safety*, CSIRO, Collingwood, pp. 11-20.
- Doherty, T.J. and Clayton, S.D. (2011), "The psychological impacts of global climate change", *American Psychologist*, Vol. 66 No. 4, pp. 265-276.
- Etkin, D. and Ho, E. (2007), "Climate change: perceptions and discourses of risk", *Journal of Risk Research*, Vol. 10 No. 5, pp. 623-641.
- Fielding, K., Head, B.W., Laffan, W., Western, M. and Hoegh-Guldberg, O. (2012), "Australian politicians' beliefs about climate change: political partisanship", *Environmental Politics*, Vol. 21 No. 5, pp. 712-733.
- Gunderson, L. (2010), "Ecological and human community resilience in response to natural disasters", *Ecology and Society*, Vol. 15 No. 2.
- Indian, J. (2007), "The use of local knowledge in the Australian high country during the 2003 bushfires", *Australian Journal of Emergency Management*, Vol. 22 No. 4, pp. 27-33.
- Intergovernmental Panel on Climate Change (IPCC) (2007), "Working group II: impacts, adaptation and vulnerability", IPCC Fourth Assessment Report, IPCC.
- Intergovernmental Panel on Climate Change (IPCC) (2011), "Summary for policymakers", in Field, C.B., Barros, V., Stocker, T.F., Qin, D., Dokken, D.J., Ebi, K.L., Mastrandrea, M.D., Mach, K.J., Plattner, K., Allen, S.K., Tignor, M. and Midgley, P.M. (Eds), *Intergovernmental Panel on Climate Change Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*, Cambridge University Press, Cambridge, New York, NY.
- Kiem, A.S., Verdon-Kidd, D., Boulter, S. and Palutikof, J. (2010), "Learning from experience: historical case studies and climate change adaptation synthesis report", NCCARF Synthesis and Integrative Research Program, National Climate Change Adaptation Research Facility, Gold Coast.
- Kreibich, H. (2011), "Do perceptions of climate change influence precautionary measures?", *International Journal of Climate Change Strategies and Management*, Vol. 3 No. 2, pp. 189-199.
- Leiserowitz, A.A. (2005), "American risk perceptions: is climate change dangerous?", *Risk Analysis*, Vol. 25 No. 6, pp. 1433-1442.
- Leviston, Z., Leitch, A. and Grenhill, M. (2011), "Australian's views on climate change", CSIRO Report, CSIRO, Canberra.
- Li, G.M. (2009), "Tropical cyclone risk perceptions in Darwin, Australia: a comparison of different residential groups", *Natural Hazards*, Vol. 48 No. 3, pp. 365-382.
- Lorenzoni, I., Leiserowitz, A., DeFranca Doria, M., Poortinga, W. and Pidgeon, N.F. (2006), "Cross-national comparisons of image associations with 'global warming' and climate change' among laypeople in the United States of America and Great Britain", *Journal of Risk Research*, Vol. 9 No. 3, pp. 265-281.
- Lui, Z., Smith, W.J. and Safi, A.S. (2014), "Rancher and farmer perceptions of climate change in Nevada, USA", *Climatic Change*, Vol. 122 Nos 1/2, pp. 313-327.
- McGee, T.K., McFarlane, B.L. and Varghese, J. (2009), "An examination of the influence of hazard experience on wildfire risk perceptions and adoption of mitigation measures", *Society and Natural Resources*, Vol. 22 No. 4, pp. 308-323.
- Martin, W., Martin, I. and Kent, B. (2009), "The role of risk perceptions in the risk mitigation process: the case of wildfire in high risk communities", *Journal of Environmental Management*, Vol. 91 No. 2, pp. 489-498.

- Mazur, N., Curtis, A. and Rogers, M. (2013), "Do you see what i see? Rural landholders' belief in climate change", *Society & Natural Resources: An International Journal*, Vol. 26 No. 1, pp. 75-85.
- Millar, J., Boon, H., Stevenson, B., Cottrell, A., King, D., Stelling, A. and Rogers, M. (2012), "Individual and community resilience to natural disasters: a comparison of bushfire and drought events in Victoria", *Proceedings of the Australian & New Zealand Disaster and Emergency Management Conference, Brisbane*, 16-18 April, pp. 285-300.
- Morrissey, S.A. and Reser, J.P. (2007), "Natural disasters, climate change and mental health considerations for rural Australia", *Australian Journal of Rural Health*, Vol. 15 No. 2, pp. 120-125.
- North, L. and Bainbridge, J. (2010), "The Victorian bushfires and extreme weather events: media coverage, crisis and communication", *Media International Australia Incorporating Culture and Policy*, No. 137, p. 67.
- Noy, C. (2008), "Sampling knowledge: the hermeneutics of snowball sampling in qualitative research", *International Journal of Social Research Methodology*, Vol. 11 No. 4, pp. 327-344.
- O'Brien, G., O'Keefe, P., Rose, J. and Wisner, B. (2006), "Climate change and disaster management", *Disasters*, Vol. 30 No. 1, pp. 64-80.
- Patt, A. and Schroter, D. (2008), "Perceptions of climate risk in Mozambique: implications for the success of adaptation strategies", *Global Environmental Change*, Vol. 18 No. 3, pp. 458-467.
- Patton, M.Q. (2002), *Qualitative Research and Evaluation Methods*, Sage Publications.
- Reser, J.P., Graham, B.L., Glendon, A., Ellul, M.C. and Callaghan, R. (2012), *Psychological Public Risk Perceptions, Understandings, and Responses to Climate Change and Natural Disasters in Australia and Great Britain*, Griffith University.
- Rogers, M., Curtis, A. and Mazur, N. (2012), "The influence of cognitive processes on rural landholder responses to climate change", *Journal of Environmental Management*, Vol. 111, pp. 258-266.
- Schulte, S. and Miller, K.A. (2010), "Wildfire risk and climate change: the influence on homeowner mitigation behaviour in the wildland – urban interface", *Society & Natural Resources: An International Journal*, Vol. 23 No. 5, pp. 417-435.
- Searle, K. and Gow, K. (2010), "Do concerns about climate change lead to distress?", *International Journal of Climate Change Strategies and Management*, Vol. 2 No. 4, pp. 362-379.
- Sharp, E., Thwaites, R., Millar, J. and Curtis, A. (2009), "Factors affecting community-agency trust in bushfire management: community member perspectives", Report No. 51, Institute of Land, Water and Society, Charles Sturt University, Albury.
- Spence, A., Poortinga, W., Butler, C. and Pidgeon, N.F. (2011), "Perceptions of climate change and willingness to save energy related to flood experience", *Nature Climate Change*, Vol. 1, pp. 46-49.
- Stevenson, B., Boon, H., Clark, B., Millar, J., Cottrell, A. and King, D. (2012), "Recovery from disaster: a case study of individual and community resilience in the face of cyclones", *Proceedings of the Australian & New Zealand Disaster and Emergency Management Conference, Brisbane*, 16-18 April, pp. 368-386.
- Webber, E.U. and Stern, P.C. (2011), "Public understanding of climate change in the United States", *American Psychologist*, Vol. 66 No. 4, pp. 315-328.
- Weber, E. (2006), "Experience-based and description-based perceptions of long-term risk: why global warming does not scare us (yet)", *Climatic Change*, Vol. 7 Nos 1/2, pp. 103-120.

Whitmarsh, L. (2008), "Are flood victims more concerned about climate change than other people? The role of direct experience in risk perception and behavioural response", *Journal of Risk Research*, Vol. 11 No. 3, pp. 351-374.

Further reading

Eriksen, C. and Gill, N. (2010), "Bushfire and everyday life: examining the awareness-action 'gap' in changing rural landscapes", *Geoforum*, Vol. 41 No. 5, pp. 814-825.

Nursey-Bray, M. (2010), "Climate change adaptation in Australia: education, training and achieving social and political outcomes", *International Journal of Climate Change Strategies and Management*, Vol. 2 No. 4, pp. 393-402.

Reser, J.P. and Morrissey, S.A. (2008), "Situating and framing individual and community experience and response to hazards: a psychological perspective", in Gow, K. and Paton, D. (Eds), *Phoenix of Natural Disasters: Community Resilience*, Nova Science, New York, NY, pp. 47-72.

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