

Increasing community resilience to bushfire — implications from a north Queensland community case study

Sally Bushnell and Alison Cottrell report on research that defines bushfire issues within a community, with the aim of contributing to efforts to increase community resilience to bushfire

Abstract

Increasing community resilience to the bushfire hazard through raising awareness and increasing preparedness for bushfire is a crucial step towards reducing the impact of a bushfire event. The case study presented in this paper investigates the attitudes, expectations and needs of a community in north Queensland in regard to the bushfire risk in their area. Understanding these social aspects, and the community itself, can lead to better delivery of bushfire services, and thereby increase community resiliency. The findings from the case study present a number of implications for bushfire service delivery in the area.

Introduction

The bushfire hazard is fast becoming recognised as a social issue. Bushfires are a natural part of ecosystem processes in Australia. However, as human settlements expand into or adjacent to bushland areas, the risk to lives and property increases. Therefore, there is a greater number of cases in which bushfire and people meet, and consequently bushfire management must focus on the social dimensions of the hazard, in addition to the more familiar technical and scientific dimensions. Targeting community resilience to the bushfire hazard has the potential to significantly reduce the impact of a bushfire event.

Currently there are few resources available for bushfire service providers to efficiently and effectively increase community resilience. The case study presented in this paper is part of a larger project that is developing a tool for service providers nation-wide to define their community and clarify bushfire issues within it, which will provide the means to target community resilience. At the local level however, the case study provides information that can help direct hazard reduction strategies in the surveyed community. This paper reports the results of this case study and discusses the implications for bushfire service delivery in the area.

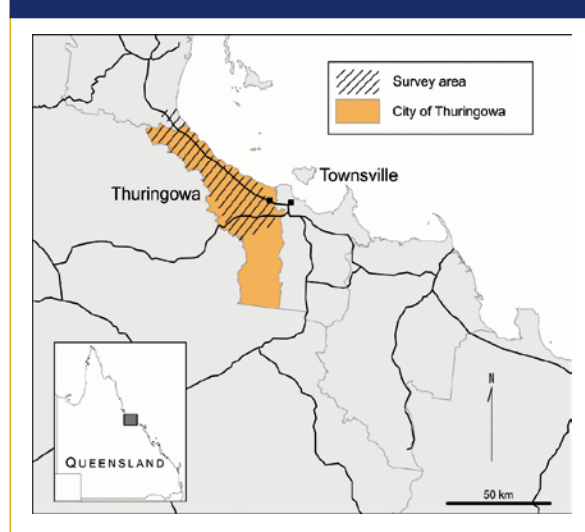
Methodology*

Study area

The City of Thuringowa is the twin city to Townsville in northeast Queensland (Figure 1). The study area is peri-urban and thus incorporates residential, rural and farming properties. The predominant level of bushfire risk is moderate, and in recent times there have been no significant bushfire events. Ten Rural Fire Brigades (RFB) operate within the area.

Focus groups

Figure 1. Survey area, located in the City of Thuringowa, north Queensland, Australia



Initially, a number of focus group discussions were undertaken with members of the local RFBs and with members of local community groups. This was to identify local bushfire issues in the area as perceived by these groups, and to guide questionnaire development.

Mail survey

An eight-page self-completion questionnaire was designed to collect data on a wide range of social factors including: demographics and property/lifestyle factors; hazard experience; knowledge of local fire services, bushfire and controlled burning; perception of local hazard risks; participation in bushfire

preparation activities; preferences for the receipt of bushfire information; views on responsibility for bushfire-related activities; views on service providers and services provided; views on local community and risk; and involvement in community organisations. The questionnaire was trialled in a pilot survey and appropriate changes made before the final version.

Data collection

In total, 957 questionnaires were delivered in October 2005. Questionnaires were hand-delivered to mailboxes to ensure that each RFB area was sampled randomly and equally. Respondents were asked to return surveys by mail using the provided postage-paid return envelopes. One hundred questionnaires were delivered to each RFB area except one, which was delivered 57 due to its small population size. An overall response rate of 28% was achieved with a total of 263 completed surveys returned.

Data analysis

Data for all survey questions were analysed descriptively. For quantitative data, chi-square tests were used to test for statistically significant relationships between variables of interest, and for qualitative data, themes and topics were identified from comments provided by respondents.

Results*

Three major themes derived from the survey data are presented in this paper; each theme has implications for bushfire management in Thuringowa.

Roles and responsibility for bushfire hazard management

Almost all respondents agreed that they would rely on the local fire brigade if there was a bushfire in their locality (93%). Respondents more likely to state such a reliance were those with an urban background (i.e. formerly from an urban area), newcomers to the area, those who were more concerned about the bushfire hazard and those who agreed that the local fire brigade does a good job. For bushfire maintenance activities, respondents mostly indicated that property owners and the local council are responsible (Table 1).

Some respondents tended to view the RFB's role as more extensive especially those that appear to not be familiar with the RFB. For example, those who did not know if RFB members are volunteers (i.e. paid or not) tended to state that the RFB should maintain firebreaks around properties. Respondents living on suburban-size blocks, those with an urban background, not working full time and renters also viewed the RFB as responsible for more activities. These respondents similarly tended to view the council's role as more extensive.

Preparation for bushfires

Respondent preparation for bushfire was linked to perception of the hazard, perceptions of responsibility and previous experience with bushfire; respondents were more likely to prepare when they perceived the bushfire risk, perceived themselves as responsible for reducing the risk (see section above) and had experienced a bushfire before. Eighty-four percent of respondents rated the bushfire hazard in their locality as moderate to very high, although ratings of bushfire risk to their house was lower with 87% giving a rating of moderate to very low. Thirty-seven percent of respondents had experienced a bushfire in the past, and comments regarding what they learned from this experience were commonly about how the fire behaved and the importance of preparing homes for bushfire. Experiences of bushfire through observing controlled or uncontrolled fires in their locality and reports in the media of fires burning elsewhere were commonly selected prompts for respondents to begin preparing their homes for bushfire (Figure 2).

Almost all respondents stated that they undertook activities on their property to prepare for bushfire (94%). Common activities were cutting long grass, clearing rubbish out of the yard and clearing leaves from gutters (Figure 3). Some respondents were more likely to undertake certain types of activities than others. For example, the preparation of a firebreak tended to be undertaken by men, the self employed and tradespeople, while an evacuation plan tended to be prepared by females, office workers, household managers and households with children.

Table 1. Respondent views on who is responsible for bushfire maintenance activities

	RFB (%)	Property owner (%)	Local council (%)	Parks and Wildlife Service (%)
Firebreaks around properties	9.7	83.1	7.2	0.0
Keep overgrown bushland and creek beds clear	11.0	12.4	54.1	22.5
Clear overgrown properties	0.4	81.0	18.2	0.4
Remove rubbish from public areas	0.4	2.0	95.6	2.0
Maintain property access for the fire brigade	6.3	72.1	19.8	1.8

Figure 2: Prompts for thinking about preparing for bushfire in Thuringowa indicating order of importance to respondents who could nominate their three most important prompts.

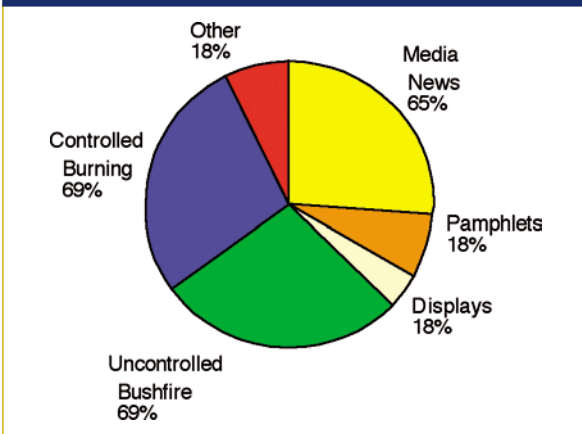


Figure 4: Useful sources of information about bushfire in Thuringowa indicating the highest preferences where respondents could nominate three choices.

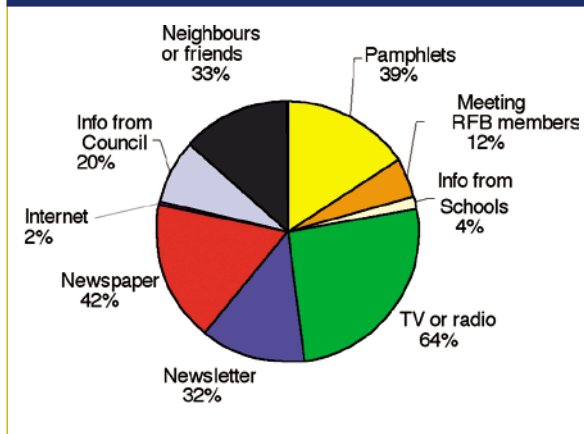


Figure 3: Bushfire preparation activities undertaken by respondents in Thuringowa indicating the highest ranking activities of the three activities nominated by respondents.



Respondents demonstrated an overall understanding of the bushfire season: almost all respondents selected at least one month within the normal bushfire season (97%). However, respondents did not demonstrate an understanding of the ideal time for controlled burning (months leading up to the bushfire season, determined by the RFB): almost half selected months outside of this time (46%), and many tended to select months after the ideal time (i.e. during the bushfire season). Seventy-eight percent of respondents were aware of a controlled burn in their area in the last two years, and of these 62% had received notification of the burn, mainly via leaflets in the mail. Overall, respondents were supportive of controlled burning, although they indicated that notification prior is important.

Bushfire education

Most respondents indicated that they receive information about bushfire (91%). Information sources commonly selected as useful were TV or radio, newspapers and pamphlets in the mail (Figure 4).

Some respondents however, had clear preferences for certain sources of information. Respondents living on rural properties showed a preference for information from TV or radio, and those on farming properties from meeting with local brigade members. Long-term residents (> 15 years) also appeared to prefer meeting with brigade members and meeting with neighbours and friends. Furthermore, those working locally and renting their house also tended to prefer meeting with brigade members. Respondents with children and those aged between 26 and 40 years showed a preference for information brought home by children from school. Respondents who worked fulltime tended to prefer information from the internet, whilst those not working fulltime or not working at all preferred information from local community newsletters and the council.

Bushfire awareness through word of mouth was evident from the data. Although a minority stated that they talked to their neighbours about bushfire preparation (23%), those that did so tended to perceive a higher risk to their house, and talking to neighbours was commonly mentioned as the means by which respondents became aware of controlled burns in their area. These respondents were also more likely prompted to prepare for bushfire season by controlled burning rather than uncontrolled fires in their area. However, there were some misconceptions about controlled burning. For example these respondents were more likely to agree that people bring their rubbish to a controlled burn.

Discussion

The roles and responsibilities of various bushfire service providers is a topical issue. It is clear from the Thuringowa case study, and other similar studies (e.g. Beringer, 2000; Gilbert, 2004), that people primarily expect fire brigades to protect people and property from bushfires. Indeed, that is the overarching goal of fire services; however it is the level of reliance on

these services during a bushfire event that is cause for concern. This study highlights the heavy reliance on brigades, and with such alarming figures (93% stating their reliance), Thuringowa bushfire service providers need to consider an awareness raising strategy that defines the different roles and responsibilities for all players, including residents. In particular, residents need to be aware of the fact that limited resources can restrain brigade efforts to protect all properties during a large bushfire event, and therefore residents need to be adequately prepared to take on the role themselves, or ensure that their property is adequately prepared before evacuating. The survey revealed a number of groups within the community who may rely more heavily on the local brigades than others, and who may not fully understand their own role and that of service providers in bushfire management. These groups include residents with an urban background, newcomers, and perhaps those who cannot justify or afford to take on a greater role in bushfire management (e.g. renters and the unemployed). Other studies have identified newcomers as a group that has little understanding of their local bushfire hazard and associated issues (e.g. Beringer, 2000; Halvorsan, 2002). Residents living on smaller allotments may also expect their local council to undertake more bushfire-related activities.

Such information can help direct awareness-raising strategies. Targeting newcomers to the area for example, could have a considerable positive impact on overall resident understanding of their own responsibilities, and therefore increase their independence. Cooperative efforts between local brigades, council and real estate agents should provide the means to identify new residents moving to the area (as well as other groups) and disseminate appropriate bushfire information.

Perceptions of responsibility for bushfire management were found to be linked to respondent participation in management activities. That is, in order to take action and undertake bushfire preparation activities, a person must first understand that they are responsible to do so, which further emphasises the need for clearly defining a resident's responsibilities. Bushfire risk perception, bushfire experience and preparation were also found to be linked. Previous experience with bushfire appears to have led to more accurate perceptions of the bushfire risk, which leads to participation in bushfire preparation activities. It is therefore important that residents maintain their level of bushfire risk perception, perhaps through retaining what they learned from their experience(s), as well as being aware that what they experienced may happen again in Thuringowa. This may also be achieved through information dissemination. Such findings and implications have been discussed in other studies (e.g. Gardner et al., 1987; Beringer, 2000; Odgers and Rhodes, 2002; Anderson-Berry, 2003; Gilbert, 2004; McCaffrey, 2004).

The direct and indirect experiences of bushfire acting as prompts for residents to begin bushfire preparations for the season, as reported by respondents in this case study, have noteworthy implications. It suggests that various types of experiences with bushfire can be important for residents to perceive the risk and prepare for it. However, it is dangerous if residents begin preparations after the bushfire season has started. Using prompts such as uncontrolled bushfires burning in the locality and viewing media reports of bushfires elsewhere to begin preparations indicates that it is being undertaken too late. Preparations coinciding with controlled burning undertaken by the local brigades in the area are ideal. These burns are undertaken before the bushfire season and are adjusted accordingly with conditions affecting the timing of the bushfire season from year to year. Despite a general understanding of when the bushfire seasons falls in Thuringowa, many respondents did not understand the ideal time for controlled burning, and many selected months falling within the bushfire season. Therefore, while there may be some residents who understand controlled burning and are prompted to prepare by controlled burning, there are many who are confused and prone to preparing too late. A contributing cause may be that many residents are unaware of when controlled burns are undertaken in their locality, thereby missing the 'prompt' to prepare, or missing the opportunity to link controlled burning with the time of year, and with preparations for the bushfire season. Reasons why residents do not always receive notification for controlled burning are not known, although the RFB states that it notifies all residents. Thus further investigation, or perhaps a different approach, will be needed if notifications continue to fail to reach residents.

Notification of controlled burning is important for a number of reasons and at the forefront is that residents want to be notified. It also offers a valuable opportunity to include extra information to define the bushfire season and the ideal time for preparing for it, and to encourage all residents to view controlled burning in their locality as a prompt to prepare their homes, rather than uncontrolled fires or media reports of uncontrolled fires. This strategy could also address a number of misconceptions residents have in relation to controlled burning. Furthermore, there is an opportunity to address levels of preparedness; there are indications that residents are under-prepared. The activities undertaken were commonly for 'housekeeping', not specifically for bushfire hazard reduction such as ensuring a water supply and preparing an evacuation plan. A property is not prepared for bushfire unless a suite of activities are undertaken. This is a common problem (Odgers and Rhodes, 2002; Balcombe, in prep), with serious consequences, particularly if the residents believe that they are prepared, creating a false sense of security, which can significantly increase vulnerability (Montz, 1993; Holden et al., 2000; Anderson-Berry, 2003; Blanchard and Ryan, 2004; Nelson et al., 2004).

KEY IMPLICATIONS

- The need for community education and awareness-raising programs to address a number of issues highlighted by this case study.
 - Define the roles and responsibilities of property owners and bushfire service providers in Thuringowa: newcomers to the area particularly need such information;
 - Define the ideal time for household preparations for bushfire through linking with controlled burning undertaken in the area: additional information provided with controlled burning notifications could clearly state the ideal time for bushfire preparations and the suite of preparation activities needed to be undertaken, as well as address misconceptions about controlled burning.
- The need for more strategically-based information strategies:
 - Use a number of different information sources to reach most corners of the community;
 - Promote informal information networks throughout the community.
- The need to address cost and feasibility issues for some residents to enable and encourage greater levels of household preparation.
- The need for bushfire service providers to share resources to attain the goal of safe and resilient communities.

It is possible that residents in Thuringowa underestimate their personal risk: respondents to the survey clearly rated the risk to their property to be less than that of their locality, perhaps due to inaccurate perceptions of preparedness. However, people can simply view themselves as less at risk than others (Johnston et al., 1999; Kumagai et al., 2004; McCaffrey, 2004). For whatever reason, it is important to ensure that residents have the correct information so that self-assessments of vulnerability can be more objective.

Throughout the above discussion, the importance of information dissemination to residents has been highlighted. Community members in the focus groups conducted for this study also indicated a desire for more information and education. However, disseminating information is not a straightforward activity, and although there is evidence of increased awareness of hazards through community information programs (Rohrman, 2000ab; Anderson-Berry, 2003), the overall effectiveness, especially when put into context with resources expended, is often questionable. This case study has brought attention to the possible ineffectiveness of disseminating information about controlled burning via leaflets/pamphlets in the mail

in Thuringowa. This is somewhat surprising due to respondents rating this information strategy as highly useful. Anecdotal evidence suggests that residents may disregard the pamphlets, perhaps due to other priorities at the time, confusing them with 'junk' mail, or there may simply be a lack of interest in reading such material. This method however, should not be disregarded; it is clearly an important line of communication for some residents. Rather, it indicates that there is a need for more strategically based information programs.

This case study provides a number of implications for information strategies in Thuringowa. In particular, a number of different information sources need to be utilised in order to reach most corners of the community, which could be undertaken simultaneously or separately to target appropriate groups depending on the goal of the program. Overall, respondents stated that TV or radio was the most or at least one of the most useful sources of information about bushfires, followed by newspapers and pamphlets. These are perhaps the most accessible information sources in our society, and thus are appropriate means of disseminating information. However, results suggest that different people prefer information from different sources, highlighting the need to use different sources. In addition, the information received from the source most preferred should have a greater impact on that individual. It should be noted that verification of these results is required; there may be a large distance between respondent stated behaviour and observed behaviour. Furthermore, any information strategies undertaken need to be evaluated for effectiveness in delivering the desired message.

Information sharing via 'word of mouth' appears to be an effective method of raising awareness about bushfire risk and associated issues in Thuringowa. Contact with neighbours was associated with higher perceptions of the bushfire risk and awareness of controlled burning in their area, as well as household bushfire preparations beginning at the ideal time. Community cohesiveness has indeed been linked with greater community resilience to hazards (Buckle, 2000; Jakes et al., 2002; Anderson-Berry, 2003; McGee and Russell, 2003). However, community cohesiveness is a very complex phenomenon and affecting the state of cohesion through any means is basically unfathomable.

Creating and encouraging community networks to transfer information about the bushfire hazard and its management is probably undervalued, and although difficult to evaluate, it is potentially one of the most efficient and effective strategies available: that is, the stimulation of informal networks is important. RFB volunteers in particular are in a unique position to influence communication through interacting with community members and transferring information on a



The impact of a bushfire event can be reduced through awareness raising and preparedness training.

day-to-day basis, because the community they serve is also the community in which they live.

There is evidence from the survey data that cost and feasibility of bushfire preparation may be a problem for some households. There was a bias towards activities that require the resources and know-how that the respondent already possesses, for example tradespersons are more likely to prepare a firebreak. Preparation activities can require significant resources and those who do not have the resources or cannot justify undertaking these activities, for example the unemployed and renters, are less likely to do so. Evaluations of cost-versus-benefit and implementation feasibility of home protection measures can be complex, and often extend beyond the number of dollars involved (Bushnell and Cottrell, in press). Residents who perceive themselves as unable to undertake some level of home protection can consequently rely more heavily on service providers and, as discussed above, this is cause for concern. There are a number of potential strategies to help address cost and feasibility issues. Examples include subsidising the cost of equipment for home protection such as water tanks and pumps, and arranging a number of bushfire preparation working days where community resources, including equipment and know-how, can be shared between households.

Conclusion

This case study has identified a number of strategies that could lead to increased community resilience to the bushfire hazard in the Thuringowa area. In particular there is a need to refine the content of educational strategies and reassess the use of current communication channels. Community education and awareness raising programs need to address a number of issues highlighted by this case study:

- Define the roles and responsibilities of property owners and bushfire service providers in Thuringowa; newcomers to the area particularly need such information; and

- Define the ideal time for household preparations for bushfire through linking with controlled burning undertaken in the area; additional information provided with controlled burning notifications could clearly state the ideal time for bushfire preparations, and the suite of preparation activities needed to be undertaken, as well as address misconceptions about controlled burning.

There is also a need for more strategically-based information strategies which:

- Use a number of different information sources in order to reach most corners of the community;
- Promote informal information networks throughout the community; and
- Address cost and feasibility issues for some residents to enable and encourage greater levels of household preparation.

However, for reasons of cost and feasibility, one agency cannot achieve the task single-handedly; success also depends on sharing of effort and resources. It is therefore imperative that fire services, councils and other relevant service providers work together to provide the support needed to realise the common goal of creating bushfire safe and resilient communities.

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About the Authors

Sally Bushnell is a Research Officer for the Bushfire Cooperative Research Centre (CRC). Her special interests broadly include hazard and environmental management, in particular community participation in management and sustainable outcomes. Current research includes the Understanding Communities Project with the Bushfire CRC.

Alison Cottrell is a researcher with the Centre for Disaster Studies and the Bushfire CRC, and a senior lecturer with the School of Earth and Environmental Science at James Cook University. Her special interests are community participation in hazard mitigation, the social construction of risk and resilience to hazards. Current research includes the Understanding Communities Project with the Bushfire CRC.

*Full details of the methodology and results are available in Bushnell et al (2006).

