

Communicative Ecologies and the Value of MyFireWatch to the Community of Kununurra

Lelia Green^(✉) and Donell J. Holloway

Edith Cowan University, Perth, WA, Australia
l.green@ecu.edu.au

Abstract. This paper is the culmination of a research project involving four fieldtrips to the remote northwestern Australia town of Kununurra. The primary purpose of the research was to engage Kununurra's visitors and residents in a participatory methodology for scenario based design to create a community-focused version of a professional fire mapping service, FireWatch. The research resulted in the development of MyFireWatch, a map based website which shows fire hotspots derived from satellite images across Australia, bringing this critical information to non-specialist users. The review of the take-up of MyFireWatch was conducted some 13 months after its launch in Kununurra, and the twelve interviewees involved were very positive overall. Their major concern was that visitors to Kununurra – especially backpackers and the senior self-drive tourists that Australians call 'grey nomads' – might not know about the service. A review of the tourist-focused sites in Kununurra reveals that organisations that promote tourism are reluctant to inform tourists about the potential dangers of their holiday destination. Thus, the culture and communication practices of tourism organisations are demonstrated to undermine the usefulness of otherwise valuable technological advances.

Keywords: Wildfire · Tourism · Remote Australia · Scenario-based design · Emergency communications

1 Introduction

Between 2012 and 2015, a number of research trips were made to Kununurra in the northwest of Western Australia. The aim of this research was to identify need and demand for a community-focused version of FireWatch, a professional fire mapping service provided by Landgate, which is an agency of the Western Australian government. The research visits also incorporated a participatory design approach to incorporate community feedback to the ongoing design of the community-focused website. This research resulted in the development of MyFireWatch.¹ Designed for community use, MyFireWatch was launched in Kununurra in 2014, and the final fieldwork trip was carried out in August 2015 to assess community response to the service; and the take up of, and feedback on, the new site.

¹ <http://myfirewatch.landgate.wa.gov.au/>.

The information underpinning the FireWatch services provided by Landgate is based on near real time satellite data. It provides map-based information which is relevant for bushfire safety planning in Australia. Although called bushfires in Australia, these fires equate to what are called wildfires elsewhere and some of the respondents cited use both terms interchangeably. The original FireWatch site had been used for many years by fire- and land-management specialists and had been tweaked on a number of occasions to accommodate requests from experts in these areas. Accordingly, it was technical in nature and today a separate service, called FireWatch Pro, continues this commitment to professional users. The vision for this research project, which was funded by ARC Linkage grant LP110200020 (2011-14) and research partner Landgate, was to create an alternative FireWatch site for public use, particularly aimed at people living, working and travelling in remote and rural areas where fire safety and protection services may be less available. A scenario-based design was first used to construct a prototype site [1]. This site was then tested and refined using iterative, participatory methods which acknowledge the politics inherent in design [2]. To do this, the researchers carried out qualitative interview-based fieldwork, as well as side-by-side user-based testing, in the remote Kimberley community of Kununurra. The interviews gained information about existing bushfire safety and mitigation communications practices so that MyFireWatch could complement these risk mitigation strategies and support their effective operation. The side-by-side, user-based testing further analysed and refined the design of the website. This chapter engages with the question “What cultural factors are influencing the take up and use of a participatory-designed fire information site” and draws on data from the final set of interviews carried out in August 2015. Discussion of the background to this research and the research methodology follows below.

2 Background

During the initial scenario-based design process a range of potential users of MyFireWatch were researched and identified, as well as some ancillary ways in which the service can be used, and a series of stakeholders. It was subsequently found that although the research participants most at risk of experiencing a fire-related incident were Kununurra residents, they also had the greatest resources available to deal with that threat in terms of social connections, knowledge and information, and skills and experience to deal with such an eventuality. Visitors to the area tend to fall into two categories: cash rich and time poor (package tourists) and time rich and cash poor (backpackers and grey nomads/self-drive tourists). Package tourists are constructed as being essentially under the protection of locals: they pay to live in facilities staffed and managed by front line service providers and travel in organised groups to experience particular aspects of the Kununurra environment within a given timeframe. Even so, and somewhat ironically, the most recent and arguably highest profile fire incident to threaten life in the Kununurra area involved cash rich/time poor tourists. The 2011 RacingThePlanet bushfire tragedy horrifically injured two participants [3] and harmed a number of others, leading to a 330-page Western Australian Legislative Assembly report arising from a government enquiry into the disaster [4]. The issue here was not

that the tourists, in this case ultramarathoners, were not supported by professionals, but that the professionals in question were not locals and lacked the experience and expertise to understand the fire ecology of the area [5]. Although the organisers did not use the (then) FireWatch service to discover critical additional information about the visible smoke in the neighbourhood on the day of the race, the site was used in the subsequent forensic investigations of this bushfire tragedy [6].

Kununurra locals construct backpackers and grey nomads (self-drive tourists) very differently from package tourists. Because of their longer term engagement with their travel experience, these visitors prefer to experience the locations to which they travel without a managing/mediating influence and do not want (and sometime cannot afford) to pay local people to care for them as if they were proxy residents or guests. Backpackers and grey nomads need to rely much more upon their own awareness of the environment and its risks, and many of them have a range of appropriate technologies and skills to manage these. Thus, the challenge of choosing a tourist town like Kununurra as the research site highlights the need to reach out to a range of different populations who may be well or poorly integrated within the structures of Kimberley-based fire management service provisions. Interviews with independent tourists and tourism stakeholders indicate that independent tourists travelling in remote Australia are, in general, experienced users of geo-based technologies and platforms such as the Bureau of Meteorology website, satellite phones, and a variety of GPS devices. This finding aligns with the high use of geospatial technologies in the tourism industry both by tourism operators and tourists themselves. Correspondingly, geo-based technologies are an integral part of modern day fire suppression and mitigation practices. Thus, self-drive tourists' familiarity with geo-based technologies facilitates their ready use of the MyFireWatch site. Both the independent tourists and tourist operators interviewed for this project indicated that the MyFireWatch site is a useful addition to their repertoire of geo-based technologies, not only for personal security but for planning tourist events, trips and treks [7].

The Kimberley region in Australia's remote northwest is one of the most sparsely populated areas on earth. The lack of population centres goes hand in hand with an absence of specialised services available to support the small, permanent population centres. There are no professional fire fighters routinely employed in these communities. Apart from a few Department of Fire and Emergency Services (DFES) and Department of Parks and Wildlife (DPAW) employees who carry out fire mitigation and suppression as part of their professional duties, emergency firefighting services are largely provided by volunteers, who have other employment responsibilities [8]. This absence of a readily available 'responsible other' shifts what is termed the 'locus of responsibility' [9] from the professional service provider (the non-existent full-time fire fighter) to the person who may need the service (the tourist or the local resident). In remote areas it is expected that people will assume far more personal responsibility for their own safety in emergencies and disasters, such as flood, cyclone, and fire, than would be expected in a city and other more populated areas. Given this expectation, however, it is particularly important that travellers understand this increased personal responsibility and have accurate and readily available information available as required. Both visitors and residents need knowledge about expected levels of responsibility, resources available to support informed decision-making and the appropriate

technology required to receive this information (radio, web access, geo-located phones etc.) [7]. In planning communication strategies to reach tourists and other visitors, it is important to understand their information seeking behaviour and to appreciate the additional pressures of delivering vitally needed fire safety information to the public in times of fire stress.

The information seeking behaviour of tourists in times of disaster or crisis range from the use of more traditional broadcast channels, such as television or radio, to the increasing use of internet-based information services. Two major internet-based trends have been identified in terms of analysing tourists' use of information services during times of crisis. These are the use of social media and the use of official/authoritative websites as sources of information. The use of social media by tourists significantly increases during a crisis [10–14]. This reliance upon social media is especially true of international tourists who may be unfamiliar with the local language and/or have difficulty identifying and accessing authoritative information in their locality [15].

When tourists do seek official or authoritative information online, there can also be a mismatch between tourists' perceptions of where they should find these sources of information and where this information is actually located. In particular, tourists may assume that tourist information bodies are providers of disaster/crisis information for tourists. New Zealand research shows that tourists frequently use Tourist Information Centre websites (i-Sites) as popular information sources, including disaster or crisis information, despite these centres only being "charged with providing tourism products advice (and bookings) rather than discussing severe weather information (although most display the weather forecast)" [16]. Given these findings, significant attention has been paid to what might be termed the 'communicative ecology' which supports bushfire information.

Sless argues that "each of us, as individuals or as members of communities, inhabits particular communications ecologies" [17]. These environments for interacting can also be seen as relating to specific circumstances, such as the communicative ecology relating to bushfire information. An examination of the communication options and practices available to people living in and visiting Kununurra reveals that communication around bushfires depends upon three layers of connectivity within an adapted version of Hearn and Foth's construction of communicative ecologies [18]: (i) technological connectivity; (ii) informal social connectivity; and, (iii) formal professional connectivity.

The technological layer of connectivity supports all but face-to-face communication. This varies according to the individual person and the technology they have available for use, and according to the place, and the infrastructure it has to support a range of communication options. The informal social layer of connectivity requires an understanding of who knows what in which circumstances along with an appreciation of the optimal informal networks through which to access that information. These skills tend to develop alongside knowledge of place and people, and mostly characterise residents who have lived in an area for an extended period of time, across different seasons, and who have developed a series of interlocking social networks and patterns of mutual reliance and shared obligations.

The formal professional layer of connectivity relates to communication within the various emergency services and, where appropriate, between the various emergency

services. Although, as noted previously, these professional emergency service roles are often taken by volunteers, such volunteers are working as volunteers in positions which would be filled by dedicated paid specialists in an urban context. Unfortunately, visitors may not understand the differences between the paid professionalism of emergency service providers in the cities and the dedicated service of volunteer emergency responders in remote and regional areas. Similarly, not all communications links between professional services in remote locations are as seamless as they maybe in more populous contexts [19]. The emphasis tends to be on secure communications within an emergency service (such as fire response), rather than effective interchanges between emergency responders (such as between fire and ambulance services). In addition to the different kinds of use that volunteers in these services make of secure and siloed communication channels, is the less flexible and more fragile range of options for connecting with interested publics in remote areas. If visitors used to city-based responses to emergency situations expect that all roads leading to a fire will be blocked by people with ‘Diversion’ signs advising drivers of alternative routes available, they may well be disappointed. In remote areas this only happens on main roads. The chances are that local people have used their nuanced but informal social connections to identify who is doing what and where their own service and resources are most required and will be most help. Locals might well assume that a visitor can see a smoke plume in a distance and would not take a road that heads towards it. At the same time, a visitor might assume that a road is safe unless it is officially blocked. These are the kinds of miscommunications that reveal the different workings of people’s separate communications ecologies.

It was noted above that the three levels of (i) technological connectivity; (ii) informal social connectivity; and, (iii) formal professional connectivity discussed here represent an adaptation of Hearn and Foth’s [18] construction of communicative ecologies. These scholars suggest, in their editorial preface to a special issue of the *Electronic Journal of Communication*, that a communicative ecology is composed of “agents that are connected in various ways by various exchanges of mediated and unmediated forms of communication [20]”. The three layers they argue that characterise communicative ecologies are:

A technological layer which consists of the devices and connecting media that enable communication and interaction. A social layer that consists of people and social modes of organizing those people – which might include, for example, everything from friendship groups to more formal community organizations, as well as companies and legal entities. And finally, a discursive layer which is the content of communication – that is, the ideas or themes that constitute the known social universe that the ecology operates in [18].

Our conception of such communicative ecologies does not assume Hearn and Foth’s [18] shared “known social universe” since it is here that we distinguish the significant differences between individuals’ communicative ecologies. Issues that we identified as a result of the MyFireWatch project include an assumption that people often make that they understand the contents of another person’s communicative ecology without examining the parameters under which that ecology was developed and operates. Instead of this comfortable assumption of congruence we identified a critical mismatch within the Kununurra context around expectations of emergency

service-driven communication. This mismatch was most pronounced when comparing the on-the-ground knowledge of local people who use both informal social and formal professional networks to negotiate life-impacting situations, and the assumptions made by many visitors. What visitors understand to be professional practice is constructed as a national attribute of the emergency service profession concerned (e.g. fire response; ambulance service), but does not reflect the specifics of the local communicative ecology. In fact, formal professional communication systems can be expected to differ as greatly between remote and urban Australia as informal social networks do [19].

Our construction of a communicative ecology acknowledges the critical importance of the discursive context [21] but sees this as key to the defining problematic of differences between individuals' communicative ecologies. Critically important in any understanding of the context of emergency communications in remote areas is the difference between informal social networks of communication, from which visitors know they are excluded; and formal professional communication, which visitors erroneously assume they understand from their experience of professional practice in their home context. An awareness of the MyFireWatch site is part of the message-process which flags for visitors that emergency service provision in remote and regional Australia might differ significantly from their experience of emergency services in the city. Thus one of the roles of this site is to underline the differences in fire management between city and country and to identify the greater role (and expectation) assumed of proactive choice and responsibility when it comes to people taking the steps necessary to avoid the dangers posed by wildfire. Another of the aims of MyFireWatch is to improve, and add to, the publicly available channels through which emergency information is made available for people to use when formulating their plans for responding to the risks posed by fire. We now consider, within the Kununurra context, the three layers of the communicative ecology posed above: (i) technological connectivity; (ii) informal social connectivity; and, (iii) formal professional connectivity. (Please see [21], for a detailed consideration of the discursive layer.) Taken together, these layers of connectivity support the community-based circulation of information around bushfires in the Kununurra area.

3 Communication Ecology of Bushfire Information

3.1 Technological Connectivity

By the time self-drive visitors and backpackers reach the Kununurra area, they will have travelled through parts of remote Australia and be aware that mobile phone services are patchy and critically dependent upon the geographical coverage of their specific service provider. Compared to the situation in most cities, the communication technologies and networks underpinning the communication ecology in the bush are extremely fragile, coupled with fewer options for a 'plan B'. These uncertain communication options go hand in hand with the requirement upon people to be more self-reliant, with the possibility of severe consequences for poor choices, or poor access to information services.

John Storey, a local resident who helped with the logistics of the 2011 Kimberley RacingThePlanet Ultramarathon, underlined the challenge posed by technological connectivity in his evidence to a Western Australian Parliamentary Inquiry into the incident when he said:

This area is incredibly difficult for communications. The Army, in their exercises in 1992, had trouble with communications. The Chinese satellite phones that they [RacingThePlanet] had in 2010 let them down. Everywhere else in the world, right across the Gobi, right across the Atacama, they have mobile coverage, whereas they did not here. All your UHF, VHF, HF are line of sight and do not work in those ranges. They learnt that. I know this time [2011] they came back better prepared. I do not know what they had, but they did have a lot of satellite phones, and this time good Iridium ones and the Thuraya ones [22].

With mobile phone reception limited to the town area and with emergency service communications between first responders such as DFES (Department of Fire and Emergency Services), the police, ambulance services and local council often being technically incompatible, communications during extreme fire conditions in the Kimberley region is problematic. Accordingly, residents have a sophisticated awareness of multiple channels and networks of communication that can help provide a ‘back-up plan’ in times of crisis. Such complex networks may include two-way radios and satellite phones, knowing which people have access to critical communication resources and how to contact them.

3.2 Informal Social Connectivity

Often discounted in analysis of emergency communications during fire events are the local, informal communication channels that characterise on-the-ground emergency response efforts. Activating and harnessing these channels includes visiting, phoning, texting or radioing neighbours during a fire emergency to ensure people’s safety and to organise collaborative fire suppression efforts. Although comparatively informal, these complex communications support community members in “the critical period before emergency service responders can appear on site. In this situation, it is often local knowledge that underpins improvised grassroots communication networks that inform and organise the neighbourhood” [23].

Gail expresses the confidence that Kununurra residents often have in their local – volunteer – firefighters:

We have got the local fire brigades. We know we can ring them. The local fire brigades seem to work very well together even when they’re spread across the valley. The communication between those people and their core people are long-term people who know the area and know the seasons, know the quickest and easiest back ways to get into various places when they need to. So I think that for the small amount of risk we perceive the town being in, they do very well and it’s [the fire mitigation measures are] well prepared and well maintained by property owners.

In regions like the Kimberley, where visitors and tourists are operating outside community networks, the dry season poses a range of risks. Patchy communication channels, coupled with the well-resourced but silo-ed emergency service providers, create the context within which the information provided by MyFireWatch can make a

critical difference [8]. Even so, many newly arrived tourists fail to appreciate that the huge wilderness areas that they look forward to experiencing have limited emergency services and tiny populations. At the same time, the local acceptance of regular seasonal fires as a routine occurrence can give an impression that they are not a significant issue when, in fact, they are.

3.3 Formal Professional Connectivity

Participants in this research project revealed their frustration about the information and communication silos that characterise formal communications between emergency service providers, especially during times of fire emergency. First responders seem unable to communicate with each other at a local level, due to incompatible communication technologies and/or their vertical decision making process. Thus firefighting volunteers can communicate with each other and with base control, but not with the ambulance service; and vice versa. This is because emergency organisations have given priority to secure internal communication channels and thus work within a framework of vertical integration.

While neighbours and local emergency workers want and need to work together, these aspirations are confounded by organisational systems which mirror out-dated military models of management and decision making, sacrificing interoperability in favour of security and confidentiality. This approach is diametrically opposed to the dispersed leadership and decision-making models employed in social connectivity settings, and by contemporary military organisations in times of battle or emergency. Indeed, the findings of the RacingThePlanet Inquiry documented major shortcomings in this respect:

Upon receiving Dr Waite's call [RacingThePlanet's medical director] and being told that people were burnt, the FESA Comcen [fire and emergency services agency communications centre] operator directed Dr Waite to hang up and call the ambulance. It appears from the Committee's evidence that FESA Comcen then took no action to alert FESA's regional officers as to a possible incident in their area. FESA Comcen did contact St John Ambulance a couple of minutes later to see whether they had received a call. However, upon being informed that St John had not been contacted by Dr Waite, FESA Comcen's response was that 'we will just have to wait for her to ring back' [24].

The Inquiry's findings include, as recommendation 8, that: "FESA, WA Police and St John Ambulance establish a uniform protocol for handling multiple emergency responses that does not involve callers having to make multiple calls to 000" [25]. Most Australians usually resident in urban or regional Australia in 2012, would have taken such interconnectivity for granted. It would seem unthinkable in other Australian contexts that bystanders supporting two critical fire casualties with life-threatening injuries would need to call an ambulance, separately from the fire service, and then ring a third time to connect with police.

More recently, the Waroona Fire Special Inquiry, which investigated bushfire in the mid-southwest of Western Australia, recommended greater efficiency in the integration of local knowledge and local resources. The Waroona district fire occurred in January 2016 and burnt more than 69 000 hectares (170 000 acres) of land resulting in the loss

of two lives and 121 homes in the small town of Yarloop. The Inquiry's recommendations were made in response to public feedback regarding the top-down and siloed responses and actions by State-based organisations (such as DFES and DPAW). This feedback suggested that these bodies failed to respond to the fire event in a timely manner or to incorporate local knowledge and expertise as efficiently as possible. Recommendation 15 of the report endorses the creation of a Rural Fire Service "to enhance the capability for rural fire management and bushfire risk management at a State, regional and local level" [26]. If established, the leadership structure for this entity will be regionally based and operate in collaboration with volunteer Bush Fire Brigades, Local Government, the Department of Parks and Wildlife and the Department of Fire and Emergency Services [26].

The findings from our research in the Kununurra region of Western Australia endorse a move to integrate the formal and informal layers of communicative ecologies. This integration will require significant thought and planning when implementing the Waroona Fire Special Inquiry recommendations. This is because there is a risk that another formal layer of governance at times of fire emergency may perpetuate complicated, barrier ridden communication structures (both at a social and technical level), rather than freeing these to be more inclusive of local needs and knowledge. Even so, the harnessing of community expertise is likely to reduce flawed, incomplete or untimely responses to bushfire emergencies.

3.4 MyFireWatch: Promoting Communication and Community Cohesiveness in Remote Communities

A comparison of historical interview data from the 1980s, and from the recent series of FireWatch interviews, indicate that living in remote Australia with its on-going communication difficulties has given rise to a hardy community within which resilience, flexibility, and interdependence compensate, to some degree, for the vulnerabilities associated with remoteness, especially at times of emergency and crisis. Interviews conducted in the late 1980s and the early 2010s reveal the on-going importance of relying upon neighbours, friends and local communication networks, a phenomenon termed "microgeographical exchange" [19]. In fact, the resilience and ingenuity of people living in remote communities who creatively integrate a series of old and new technologies counteracts to some degree the fragility and/or patchiness of each individual communication technology which, in concert, makes up the communications ecology of the area.

The provision of multiple channels of communication and the effective use of these channels is now a well understood core principle of emergency communications [27–30]. Organisational use of multiple communication channels to notify the public about emergencies such as bushfires mean that more people are reached, and some of the gaps caused by difficulties or breakdowns in communications are addressed. Despite the calls for the use of multiple channels of communication during bushfire emergencies, consecutive investigations and reports regarding disaster management in Australia point out the lack of supportive and/or alternative communication technologies and formats in regional and isolated communities [8, 31]. The 2015 bushfires which

occurred in the remote Goldfields-Esperance area of southwest Western Australia, where community members reported that they lost all their mobile communications during the peak of the bushfire “in an area where coverage was already considerably patchy” [32, 33], provide a recent example of this.

In the case of remote northwest Australia (more specifically the Kununurra region) non-town local residents already work with a mix of online and offline communications systems. These include landlines, mobile telephones, satellite telephones, long and short range radios and the internet which, when combined, augment community communications, especially in times of emergency. The MyFireWatch site is an additional communication source, accessible on a range of devices, and therefore provides a further early warning option in areas where people often rely on word of mouth from visual sightings to be kept up to date [34]. This is the context for the 2015 evaluation of the MyFireWatch service, a year after its launch.

4 Methodology

The development and deployment of MyFireWatch was informed by a social construction of meaning approach [35], supported by social learning theory [36] and an understanding of the co-creation of knowledge [37]. It also engaged with the literature around ‘communities of practice’ [38]. This conceptual framework asserts that people’s social interactions help form the meanings that they develop for themselves and share with others as a way of understanding and explaining their actions, their motivations and their position in the world. As Burr puts it, “In writing this book, then, I am contributing to what might be called ‘the social construction of social constructionism’” [39].

The subject of land/resource management in relation to bushfire is a highly-charged political area with divergent community groups constructing local practices of burning off areas of vegetative growth as either (1) something that is managed successfully (for the preservation of assets), or (2) as something that needs to be managed more effectively (for the preservation of biodiversity and the cultural value of the landscape). These differing opinions can be ascribed to those professionals who make decisions about fire mitigation and management on the one hand, and the residents who are affected by the impact of these fire mitigation approaches on the other hand [21].

The results below indicate that talking about fire, fire mitigation and MyFireWatch provides a (not always constructive) channel through which residents and other participants can reframe and restate their existing opinions around the politics of fire and fire management. The methods adopted for data gathering over the entire length of this project included scenario-based prototype development and side-by-side user-based testing of the prototype site (e.g. [1]); participant observer time spent with interviewees accessing online data concerning fire information (e.g. [23, 33]); reviews of bushfire investigations and reports (e.g. [40]); and, in-depth interviews which were then transcribed to provide a text based data set which was interrogated for emerging themes (this chapter; [7, 19, 21, 41]).

Both this chapter, and the precursor conference paper which it develops, and upon which it is based [41], concentrate on the Kununurra townspeople’s responses to MyFireWatch and include contributions from tourism professionals who live and work

in the Kimberley. Twelve participants took part in in-depth semi-structured interviews about the MyFireWatch service which were then transcribed and analysed to identify relevant themes [42, 43]. With only 4,573 people recorded as resident in the Kununurra townsite in the 2011 census, and with restricted numbers of these being adults working in the roles attributed to the interviewees, some details have been left vague to allow ‘plausible deniability’ on the part of the actual participants whose names have been changed in the record provided here. This paper deals only with residents’ perspectives; [7] focuses more centrally on the tourist experience.

The evaluation research reported here made clear that people in Kununurra believe their experience of wildfire represents a different kind of risk compared with wildfire in the more heavily populated southern parts of the continent. This perception also gives rise to concerns and comments about the various categories of visitors to the Kununurra townsite, including tourists on packaged trips, backpackers, and grey nomads. More controversially, the research project provided an opportunity for town-based residents to make comments about their constructions of local Indigenous culture, and the stories that some residents circulate about Aboriginal fire practices. Finally, a number of contributors provided commentary on the value of the MyFireWatch website itself and were able to contextualise its contribution within the daily life of Kununurra’s residents and visitors.

5 Empirical Data

5.1 The Kimberley Constructions of Fire

Ken summed up a majority view that fire in the Kimberley generally poses a different set of challenges compared with what happens with a big fire in the south.

Wildfire in the Kimberley is not the same as wildfire down south in the tall forests, and putting aside for one moment the RacingThePlanet disaster, generally the grass fires we see in the Kimberley are slow moving, slowish moving, and not of huge intensity. So the prospect of being trapped out, either on the road or on a bush track, or something like that, I think is probably much lower than it would be in mountainous Victoria or the southwest of WA, for instance.

Denise agrees: “fires up here are so different to like down south or over east where a lot of the tourists are from”. She describes her view in more detail by saying, “most of the fires don’t really affect people here, in that you almost never have a house or something burning down, because I think they are a lot easier to control.” However, when she tries to work out why she thinks this, she isn’t really certain: “I think, I guess, the timber is quite different. I can see some of the fires that happen around maybe Margaret River or around Perth area where the bush is like very, very dense, whereas up here it’s a bit more sparse, and yeah, I think they just burn differently”. She adds as an afterthought, “I don’t really know what difference it makes, but yeah”.

Mark is pretty sure that he knows what the difference is: “the difference between the Kimberley and elsewhere in the state, that month by month [time-based information regarding previously burnt out areas available on the website] is terribly important for

us, because what might have burnt in February may well burn again in October". On the other hand, Mark notes that an area that

burnt in August will not burn again in October [... that's] irrelevant in the Great Southern because we're talking scars lasting years [in the southwest] as opposed to being primarily grass fields driven by high rainfall. The Kimberley burns every year so we're on a year-by-year cycle as opposed to potentially a 20-year cycle.

One implication of this is that the amount of material available to burn is much less in the northwest than it is in the south. Mark's view of the MyFireWatch site is that "it's one tool. We must be educating people to supplement what that gives us with what the eyes give me, and equally the next step: 'if unsure, stay safe'". Eric underlines the importance of the visual check: "You do get your bushfire warnings, but a bushfire warning doesn't mean anything to anybody if you can see smoke in the distance. And up here smoke in the distance can mean, well, twelve kilometres down the road you're in the fire."

Ness agrees that people require a range of information sources, saying that the shire puts "notices on Facebook if there is a fire that the community needs to be aware of... [linked to] it must be the FESA [Fire and Emergency Services Authority of WA, now DFES, Department of Fire and Emergency Services] site, I think. We link to that site for the most up-to-date information. So we advise people to go to that site." This mix and match approach to resources and complementary information is in line with the kind of materials that Mark would like to see made available: "so for me where we were a little bit lacking was the other bits and pieces that sit beside the [MyFireWatch] tool, if that makes sense".

Visitors sometimes express surprise at the ways in which Kimberley residents manage their fire risks. Gail quotes some visitors as saying "well, where's the fire crews? Why aren't they putting it out? You know, at home in the Blue Mountains there'd be [...]". Gail's response is "Well, guess what?". She feels some impatience that people can be visiting Kununurra because of the beauty of its wilderness areas but be ignorant of the implications of having a tiny population in a huge geographical area. She acknowledges that "people don't understand. People from over east in highly populated areas. There's so much country [here], they just let it burn [...] You go on a scenic flight and the pilot goes to someone, "'Oh, there's a fire down there.' 'Oh yeah.' 'That's been burning for three weeks'. There's a level of nonchalance about it as well that concerns people".

Jane reinforces this perception of lack of concern. "I think we all become a bit immune to wildfire in the Kimberley because it's an everyday kind of occurrence in the dry". Whilst generally agreeing, Mark's understanding of townspeople's responses is more nuanced: "my interest in being preventative is directly proportional to how frightened I was last year. So you get a fright, you're particularly interested for a period of time and we slip back down the slippery slope into apathy, and I think that's human nature with respect to many things, be it cyclone, be it fire, be it flood, be it financial crisis, be it whatever it is". The implication of this is that MyFireWatch is also relevant and useful as a preventative/preparatory tool in proportion to the perceived risk that fire poses to Kununurra residents.

5.2 Tourists and Time Poor Holidaymakers

Kununurra and the Kimberley region are marketed as beautiful locations, attracting both wealthy (but time poor) tourists and longer-term, more cash-strapped, visitors: “You’ve got Tourism WA and Australia’s NorthWest and local businesses all pumping millions of dollars into marketing the area, to bring visitors”. Gail goes on to express her concerns around the ways in which the Kununurra area is advertised:

the perception of the tourist coming and the images that we put into our marketing is our waterways, our waterfalls have beautiful palm trees, our gorges. They expect to see something different than what they get [...] because] it’s savanna. It’s technically part of the savanna way. It’s maybe dry tropics, it’s not wet tropics, which you wouldn’t think sitting here because you’ve got a lush tropical garden that’s well watered.

At least one local understands the challenges faced by holiday-makers. He says: “I’m a photographer, an amateur photographer, so it affects me when I’m trying to get nice dry season photos. The smoke in the air is probably the biggest thing, the smell that you get in the dry season when we’ve had a big fire season”. This resonates with Gail’s perceptions: “you have people come on a special photography tour, or you have professionals who come to get great photos for marketing, and they’ll stay here three or four days and get up in the air because of the haze”. These considerations have a knock-on effect for tourism operators. “When they got here they wanted to do a flight. And they said, ‘Well, hang on a minute. What’s all this smoke doing because I don’t want to pay all this money to go on a flight and [not] be able to see anything’” (Wendy).

They can’t get that hero shot of sunrise or the hero shot of sunset because there’s so much smoke haze. So, yeah. It is a risk and a challenge for tourism because we put out, you choose an image, you choose what you’re portraying. You put it out there, and then go, please let them not burn everything close to town. You know, you take a risk and you’ve got to [...] you’re never going to know, but the fire haze in the sky, the, you know, everything from scenic flights to cruises to self-drivers are affected (Gail).

For people with front-line connections with tourists, the MyFireWatch site helps provide informed commentary about what to avoid, and also, the best places to visit. As Ken says: “we’ve done exactly the same, even this year, you know, planning a bush walk out there and say[ing], ‘No. That’s all been burnt. We won’t go there’”. This view contrasts with Ursula’s appreciation of the regenerative powers of the bush:

I like going past when it has burnt and [I’ve] seen the green flush come back because it’s that bright green and there’s not been a drop of rain and it’s just incredible that mother nature can spark things back into action without a drop [...] but it’s still, I don’t know, I feel sad when I go past and it’s all black and you just think, ‘Oh, it’s just terrible’. But yes, it takes a full wet season, and to the middle of the next dry season, before it looks attractive again because it is very, very rocky terrain and the grass kind of softens that.

These perspectives indicate that Kununurra residents who work with time poor/cash rich tourists are particularly aware of the need to manage visitors’ positive experiences of the Kimberley wilderness. Even in circumstances where wildfire has compromised the beauty of the locality, the town residents’ knowledge of relatively regenerated areas is harnessed to deliver the best possible holiday experience in the face of environmental

restrictions that may in fact be present at that time. The impressions of time poor/cash risk visitors are seen as being the responsibility of the tourist organisations to which they pay their money, and such comparatively wealthy visitors are constructed as the town's responsibility, benefitting from the informal social connectivity among and between people in the tourist industry and thus having access to privileged information, almost as if they were proxy locals.

5.3 Grey Nomads and Backpackers

The locals' treatment of the cash rich/time poor tourists differs from the ways they respond to time rich/cash poor visitors. Such travellers tend to schedule their own activities and entertainments. These visitors skew towards either end of an aged-based continuum, with the backpackers being the younger twenty-somethings and grey nomads tending towards being active senior citizens (60+). From the perspective of Ursula, who meets a number of these longer-term visitors in her volunteering role, "at this time of year the majority of our walk-through-the-door clients are grey nomads, or backpackers, or travellers". Ursula has worries about these visitors' general knowledge about fire risks in the Kimberley, but She places the locus of responsibility upon the people who provide front line services and stand to gain some financial benefit from the visitors: "I think to raise awareness in that group potentially do some sort of marketing or some sort of a display to the caravan parks and their staff."

While Ursula's view is that the MyFireWatch site offers value to this visitor cohort, if people will take responsibility for telling them about the service, other interviewees disagree as to how useful the website is, particularly for the grey nomads. "I think a bit of that is the age group of the grey nomads [...] although they're getting more savvy, more tech savvy, [but] I think they still want to have that interaction with a human being" (Wendy). As Wendy makes clear, her view is that face-to-face advice is preferred by the older traveller, and this is echoed by a resident who believes that this is the role of the Kununurra Visitors' Centre, because backpackers "want to know all the information they can, they can get, for free. Because that's what backpacking is all about". The same interviewee suggests that providing the services of the Visitors' Centre is good for "the grey nomads as well. [...] They want to speak to someone. They don't want to do things online. They don't want to look at a tablet".

Janos agrees that the issue around the perceived ignorance of grey nomads might be one of willingness to prioritise access to the relevant technology: "any tool is useful if you're prepared to use it. But, it's back to the end user, and some of the grey nomads that are coming through now won't even have a mobile phone that's fully functional. They won't have internet access". Eric disagrees profoundly with this perception. With a background in local government, he comments that "grey nomads and the backpackers do look at Shire sites as a way of trying to pick up information before they move into an area [...] they're travelling around Australia. They're all online [...] and looking for things to look up".

Rather than worrying about grey nomads' safety, Gail's concern is that these visitors may actually pose a fire risk to others. Partly because they don't realise that

Kununurra is actually quite a dry environment, her view is that when time rich/cash poor visitors use informal camping grounds their ignorance exposes the wider community to risk:

There's a lot of illegal camping and stuff that goes on that doesn't get managed that causes fires [...] people that camp on the side of the road, and they will camp that way. And people travelling, a lot of backpackers and people camping on the cheap. And I think the risk for us is people go into an area like this to see pristine green, because there's so much water here. And people have the misconception that Kununurra is tropical.

This perception is echoed by Helen, “obviously these people are actually camping, so a lot of them are from not around here. So they're maybe not so aware of the bushfires and bits and pieces”; and by Mark, “the unwashed, unclean, who aren't familiar with this locale and what the fire potential is in this locale, somehow we need to knock on the door and communicate with them, but speak once, speak to many, sort of technology”.

Eric's view is that the most important thing is to let people know that information about fire is readily available on the MyFireWatch website: “what is the one, the nomad's magazine they use for travellers? There needs to have an ad in there somewhere so they can get in touch with it too, because everybody needs to know that this [resource] is there”.

The implications of these views about the time rich/cash poor tourists is that the people of the town are not directly responsible for ensuring that these travellers have access to appropriate fire information. Instead, these visitors are constructed as people who might prefer face to face information that is in the form of some kind of drop-in service. The views about caravan park-based displays, and the advertisements in appropriate publications, imply that ‘someone else’ needs to take the responsibility. The comfortable view of most Kununurra commentators is that backpackers and grey nomads will look up information on shire websites; while a few see these “unwashed, unclean” as part of the fire-risk problem since they do not understand the complexities of fire in the area, believing erroneously that the Kimberley is a tropical wetland instead of being, in fact, dry savanna lands.

In contrast to the town's proactive management of the daily experiences of the cash rich/time poor tourists, accessing MyFireWatch is seen as something that falls within the ‘locus of responsibility’ of the backpackers and grey nomads; even as opinions differ as to how these visitors should learn of the site's existence. At the same time, some commentators fear that not only do these tourists not know enough to realise the importance of MyFireWatch, they may also pose a fire risk to themselves and others through not understanding how to relate to the environment.

5.4 Contributors' Thoughts About Local Aboriginal Practices

Whereas a number of Kununurra residents are concerned about the fire practices of people who may not know the area well, others have concerns about the Aboriginal population whose cultural roots stretch back for hundreds of generations. For example, Ursula comments:

a lot of people don't like walking through grass when they're walking back tracks to communities and things like that. And I've seen that in Wyndham in the past where they'll just light it up and get rid of the long grass because then they can walk through without having to worry about snakes or whatever.

Gail has a particular term for this kind of fire raising: "the big issue for us is this black fire. The Aboriginal lit fires. Sort of this perception, particularly among a lot of the young people that 'it's cultural for us to light fires'". Even so, Gail's view is that this reflects youthful error rather than traditional Aboriginal culture: "and they'll [the elders] go, 'Well, no, they're just not using it correctly. That's not how we would do it. We won't use fire in that way.' But there's this misconception among the younger generations that it's cultural".

As far as Helen is concerned, having had a number of fires close to where she lives beyond the main town site, a direct approach is one that works best:

You could see the different spots where, the ignition points where they'd started to burn them, they'd gone out and he [the manager of her workplace] counted 17 just over that night. And there were ones that started the big fire [...] the police have been to see a couple of the communities along the way and just told them, you know, that they're going to do their best to prosecute anyone. And it's been all quiet on that front since. We haven't had any fires since that week, which is good.

It would appear from the interviews cited that many of the businesses and organisations in Kununurra may not construct the local Aboriginal population as a target user group for MyFireWatch. Instead, local Aboriginal communities are perceived as people who may have a different relationship with both fire and the environment. The implication is that fire is seen as a tool, rather than a risk: practices such as using fire to address areas of long grass so that it cannot hide snakes, provide examples of this perspective. Further, some residents believe that the fire practices of (particularly) young Aboriginal people in the local area may be part of the reason why services such as MyFireWatch are required.

5.5 Feedback on the Website

Kate, who works in a front-line customer service role, is particularly positive about the MyFireWatch website:

I think it's just a unique service, I suppose, and it's something that is a really good service for the community, for people to understand where the fires are up to, both in our area and Australia wide. You're not relying just on the news or on hearsay. You've got some actual, real time proof that you can look at. So I think that's a really good service.

Grahame feels that other jurisdictions have access to greater publicly-available information about fires than has generally been the case in Western Australia. He argues that there is "an open system in other states where they can go on and view that there's something there, and then it's up to them to go and seek further information in regards to that incident". Mark would like additional information regarding the length of time since the most recent satellite update. His concern is that if information is "four hours old, and you're taking it as gospel now [...] I need to inform you that that's four

hours old. If it's 15 min old, it's live time, I don't need to interpret it, there it is, it's raw, it's now, it's current, you figure it out".

Helen is more of an everyday user: "I think that the MyFireWatch is [has] really got everything that you need to know", and Denise explains its particular relevance in the northwest of Western Australia: "It's difficult to get a concept of where something is in the Kimberley, because it is so big. You can say there's a fire along the Gibb River Road but that stretches for hundreds and hundreds of kilometres. So it's nice to be able to see a map that can actually pinpoint exactly where something's burning".

Participants in this study had also used the site for a variety of other localised functions. These included event planning; route planning for independent tourists; information for tourism operators to avoid taking visitors to already-burnt-out country; for environmental advocacy; and, as an early warning system for the protection of remotely based assets. Ursula particularly likes "the fact that you can go back by seasons to see what's been burnt, and it is quite dramatic when you see exactly how much gets burnt every season". She offers a specific context when this function is helpful: "when you're going camping it's a useful tool to see what's been burnt last year and going out and making sure that if you're going somewhere it's not going to be totally black from this year, and there's a bit of re-vegetation happened".

This increased range of uses means that the MyFireWatch site engages the community more widely than solely in risk-management contexts, but it also raises awareness about the usefulness of the site for managing risk in emergency situations, and planning fire response strategies [32].

6 Discussion and Conclusion

The aim of this most recent research trip to Kununurra was to interview a cross-section of residents about their experiences with the MyFireWatch site. This data was collected to help answer the research question "What cultural factors are influencing the take up and use of a participatory-designed fire information site". The interviews reveal general acceptance and a positive response to the MyFireWatch site from the Kununurra residents interviewed. What was interesting, however, is that residents took this repeat visit (the fourth in the research project) to continue discussions with the research team around issues of difference and the uniqueness of life in the northwest of Western Australia; the complexity of the local communications and technology ecologies compared with the environment familiar to town dwellers; the comparatively straightforward relationship that locals have with 'monied' tourists (cash rich/time poor), who pay to have their visit managed by people with local knowledge; concern and a general lack of confidence in backpackers and grey nomads who are more autonomous, with fewer financial resources, and constructed as often ignorant of the local fire conditions; and, the even more complex negotiations that characterise relationships between local Aboriginal communities and settler-background Australians.

The cultural factors influencing the take up of MyFireWatch include its use by Kununurra residents in their constructions of 'us' and 'them' in terms of the multiple purposes to which MyFireWatch is put. The local population positions the service as

another link in the net of interdependent and overlapping resources that constitute the bushfire communication ecology used by local community members to respond to fire-based threats and challenges. At the same time, this community differentiates their own experience of fire as being very different from the experiences of communities in the south. The more southern fire zones burn differently, and run the risk of greater financial damage, since property and population are more concentrated. At the same time, professionals are likely to be on hand to help mitigate the danger which means that the “locus of responsibility” [9] is more professional-linked than community-based. The implication here is that technologies such as MyFireWatch are more relevant in less populated areas without professionals on hand to mediate between local communities and external threats and risks.

By integrating MyFireWatch seamlessly into the set of resources that constitute the local communications ecology, and by exploring the site’s additional functions, residents of Kununurra help reduce the fragility and patchiness of the emergency communications options available to them. These actions affirm their cultural identity as people who are competent with technology and used to exercising a locus of responsibility and collaborating with others to make community-based decisions. Kununurra residents position their own identity as responsible, creative users of information and technology in the context of a fast-changing and complex environment. They contrast this self-perception with constructions of the “unwashed, unclean, who aren’t familiar with this locale and what the fire potential is in this locale”; the time rich/cash poor backpackers and grey nomads who choose not to, or cannot afford to, pay local tourist professionals to look after them.

The consensus is that the MyFireWatch site is of value across the board for all people living in and passing through the Kimberley area, but that the Indigenous population may not see it as relevant for them since it is less likely to inform their behaviour than their existing cultural practices. Kununurra residents acknowledge a significant challenge in communicating with transient visitors around the importance of fire-based information and the technological avenues through which it can be accessed. This communication challenge was generally constructed as a locus of ‘someone else’s’ responsibility, however. Thus Ursula recommended that MyFireWatch needed to “do some sort of marketing or some sort of a display to the caravan parks and their staff”, and Eric’s view was that a “nomad’s magazine” be used: “There needs to have an ad in there somewhere so they can get in touch with it [MyFireWatch] too, because everybody needs to know that this is there”. There is a diversity of opinion around whether or not nomads are tech savvy, and whether or not they take risks with fire in the environment through carelessness or a misunderstanding about risk in natural contexts. Even so, Eric conceded that “grey nomads and the backpackers do look at Shire sites as a way of trying to pick up information before they move into an area.”

Finally, it is interesting to note that, despite the research team using Kununurra as an investigative site over a three year period, and notwithstanding the RacingThePlanet tragedy, and given that people agree that MyFireWatch serves a useful purpose for locals and for travellers, and even in the face of findings that demonstrate tourists use tourism sites to look for safety information [16], neither the Kununurra Community Resource Centre, nor Shire of Wyndham East Kimberley, nor Kununurra Country Club Resort, nor the Kununurra Lakeside Resort, nor the Kimberley Grande Resort, nor the

nearby Lake Argyle Resort includes a link to the MyFireWatch site, or any other overt fire-risk information. Visitors need such links to access community-focused information as part of Kununurra's network of bushfire-risk resources; as part of the communication ecology of bushfire information. Perhaps the greatest cultural impediment to communicating the existence of community-accessible fire-related technological resources to people who choose to visit remote Australia is that the organisations which serve tourists prefer not to remind potential visitors that life can often get uncomfortable with smoke and haze; and sometimes becomes actively dangerous.

References

1. Haimes, P., Jung, J., Medley, S.: Bridging the gap: scenario-based design as a solution for delayed access to users. Paper presented at the Australian Council of University Art 2012, Perth (2012)
2. van der Velden, M.: Re-thinking participatory design: what can we learn from fairphone. In: Ninth International Conference on Culture, Technology, and Communication (2014). <https://www.duo.uio.no/handle/10852/42039>
3. Pitt, T.: Everything to Live For: The Inspirational Story of Turia Pitt, with L. Harkness. William Heinemann, Sydney (2013)
4. WALA: Inquiry into the 2011 Kimberley Ultramarathon, Economics and Industry Standing Committee, Western Australian Legislative Assembly, Report No. 13, August (2012). [http://www.parliament.wa.gov.au/parliament/commit.nsf/\(Report+Lookup+by+Com+ID\)/F75A6BCD99B1746848257A5C000A0160/\\$file/Report+No.+13+-+Final+-+20120816.pdf](http://www.parliament.wa.gov.au/parliament/commit.nsf/(Report+Lookup+by+Com+ID)/F75A6BCD99B1746848257A5C000A0160/$file/Report+No.+13+-+Final+-+20120816.pdf)
5. Cox, N.: Kimberley Ultramarathon organisers say 'We are not to blame'. Perth Now, 2 May 2012. <http://www.perthnow.com.au/news/western-australia/organiser-fronts-ultramarathon-inquiry/story-e6frg13u-1226344893459>
6. WALA: op cit, p. 12 (2012)
7. Holloway, D.J., Holloway, D., Green, L.: Geo-Based technologies, tourists and bushfires in Northern Australia. In: Refereed Proceedings of the 2014 ANZCA Conference, Queenstown, 14 p. (2015). <http://www.anzca.net/documents/2015-conf-papers/838-anzca15-holloway-holloway-green.html?path=2015-conf-papers>
8. Holloway, D.J., Green, L.: FireWatch: community engagement and the communication of bushfire information. In: Refereed Proceedings of the Emerging Issues in Communication Research & Policy Conference, Canberra (2013). <http://www.canberra.edu.au/faculties/arts-design/attachments/pdf/n-and-mrc-conference/NMRC-Conference-Proceedings-2013.pdf>
9. Jeurig, J., Becken, S.: Tourists and severe weather—an exploration of the role of 'locus of responsibility' in protective behaviour decisions. *Tourism Manag.* **37**, 193–202 (2013)
10. American Red Cross: Social Media in Disasters and Emergencies. American Red Cross, 5 August 2010. <http://www.redcross.org/www-files/Documents/pdf/other/SocialMediaSlideDeck.pdf>
11. American Red Cross: Social Media in Disasters and Emergencies: Disasters. American Red Cross (2011, Summer). <http://www.redcross.org/www-files/Documents/pdf/SocialMediainDisasters.pdf>
12. Pew Internet and American Life Project: Blogger Callback Survey (2006). <http://www.pewinternet.org>

13. Scherp, A., Schwagereit, F., Ireson, N., Lanfranchi, V., Papadopoulos, S., Kritikos, A., Kopatsiaris, Y., Smrs, P.: Leveraging Web 2.0 communities in professional organizations. In: W3C Workshop on the Future of Social Networking, Barcelona (2009). <http://www.w3.org/2008/09/msnws/papers/ScherpEtAlLeveragingWeb2Communities.pdf>
14. Sutton, J., Palen, L., Shklovski, I.: Backchannels on the front lines: emergent uses of social media in the 2007 Southern California wildfires. In: Fiedrich, F., Van de Walle, B. (eds.) Proceedings from the 5th International ISCRAM Conference, Washington, DC (2008)
15. Pennington-Gray, L., Schroeder, A.: International tourist's perceptions of safety & security: the role of social media. *Matkailututkimus* **9**(1), 7–20 (2013)
16. Jeurig, J., Becken, S.: op cit, p. 200 (2013)
17. Sless, D.: Our communication ecologies. In: Sless, D. (ed.) *The Informationless Society*, p. 4. Communication Research Press, Canberra (1995)
18. Hearn, G.N., Foth, M.: Communicative ecologies: editorial preface. *Electron. J. Commun.* **17**(1–2) (2007). <http://eprints.qut.edu.au/8171/1/8171.pdf>
19. Holloway, D.J., Green, L., Holloway, D.: Your neighbours are your friends: an investigation into microgeographical exchanges in the remote Northwest of Australia between 1987–2012. In: Refereed Proceedings of the 2013 ANZCA Conference, Fremantle, 11 p. (2013). <http://www.anzca.net/conferences/past-conferences/159.html>
20. Tacchi, J., Slater, D., Hearn, G.: *Ethnographic Action Research Handbook*. UNESCO, New Delhi (2003)
21. Holloway, D.J., Green, L., Holloway, D.: Politics of fire in northern savanna lands: communication. In: Refereed Proceedings of the 2014 ANZCA Conference, Melbourne, 14 p. (2014). <http://www.anzca.net/documents/2014-conf-papers/756-anzca14-holloway-green-holloway/file.html>
22. WA Parliamentary Inquiry: Transcript of Evidence Taken at Kununurra, Tuesday 24 April 2012: Session One, Inquiry into the 2011 Kimberley Ultramarathon, Economics and Industry Standing Committee (2012). [http://www.parliament.wa.gov.au/Parliament/commit.nsf/\(Evidence+Lookup+by+Com+ID\)/DD08E4F4112179D348257A0600185D2D/\\$file/Final+Transcript++John+and+Ann+Storey+-+20120424.pdf](http://www.parliament.wa.gov.au/Parliament/commit.nsf/(Evidence+Lookup+by+Com+ID)/DD08E4F4112179D348257A0600185D2D/$file/Final+Transcript++John+and+Ann+Storey+-+20120424.pdf)
23. Holloway, D.J., Green, L., Brady, D.: FireWatch: creative responses to bushfire catastrophes. *M/C J.* **16**(1) (2013). <http://journal.media-culture.org.au/index.php/mcjournal/article/view/Article/599>
24. WALA: op cit, p. 201 (2012)
25. WALA: op cit, p. 223 (2012)
26. Ferguson, E.: Reframing Rural Fire Management: Report of the Special Inquiry into the January 2016 Waroona Fire, p. 23. Government of Western Australia, Perth (2016). https://publicsector.wa.gov.au/sites/default/files/documents/waroona_fires_2016_-_1_-_report_final.pdf
27. Corvello, V.T.: CDC 2002 Crisis and Emergency Risk Communication. Centers for Disease Control and Prevention (2002). <http://emergency.cdc.gov/cerc/pdf/CERC-SEPT02.pdf>
28. Jordan-Meier, J.: *The Four Stages of Highly Effective Crisis Management: How to Manage the Media in the Digital Age*. Taylor & Francis Group, Boca Raton (2011)
29. Landesman, L.Y.: *Public Health Management of Disasters: The Practice Guide*, 3rd edn. American Public Health Association, Washington (2012)
30. Roy, D., Sharma, A., Kumar, A., Saurabh, V.: Location Identification for Rapid Evacuation from a Disaster Site: A Case Study from KAPS. Ahmedabad IIMA, Ahmedabad (2014)
31. Elsworth, G., Stevens, K., Gilbert, J., Goodman, H., Rhodes, A.: Evaluating the community safety approach to bushfire in Australia: towards an assessment of what works and how. Paper presented at the October Biennial Conference of the European Evaluation Society, Lisbon (2008)

32. O'Connor, A.: Esperance Fire Review to Look at Adequacy of Mobile Phone Coverage After Farmer Complaints. ABC News, 20 November 2015. <http://www.abc.net.au/news/2015-11-20/esperance-fire-review-to-look-at-mobile-phone-coverage/6959062>
33. Tomlin, S.: Esperance Bushfire Investigation Finds Region Poorly Resourced Against 'Unstoppable' Fires. ABC News, 29 March 2016. <http://www.abc.net.au/news/2016-03-29/investigation-into-esperance-bushfires-finds-fires-unstoppable/7274114>
34. Holloway, D.J., Haimes, P., Green, L.: Developing a user friendly firewatch site: debunking sociotechnological assumptions about internet users in remote communities. In: Refereed Proceedings of the Australian & New Zealand Disaster and Emergency Management Conference 2013, Brisbane (2013). (<http://anzdmc.com.au/archives/disaster.php>), <http://ro.ecu.edu.au/ecuworks2013/252/>
35. Burr, V.: *Social Constructionism*, 2nd edn. Routledge, London (2003)
36. Wenger, E.: Communities of practice and social learning systems. *Organization* 7(2), 225–246 (2000)
37. Fong, P.S.: Co-creation of knowledge by multidisciplinary project teams. In: Love, E., Fong, P., Irani, Z. (eds.) *Management of Knowledge in Project Environments*, pp. 41–56. Elsevier, Burlington (2005)
38. Wenger, E.: *Communities of Practice: Learning, Meaning, and Identity*. Cambridge University Press, New York (1998)
39. Burr, V.: op cit, p. 13 (2003)
40. Brady, D., Holloway, D., Green, L.: Firewatch: use of satellite imagery by remote communities in Northern Australia for fire risk communications. In: *Proceedings of the Eighth International Conference on Cultural Attitudes Towards Technology and Communication (CATAC)*, Aarhus (2012). <http://ro.ecu.edu.au/ecuworks2012/788/>
41. Green, L., Holloway, D.J.: Reviewing the value of MyFireWatch to the community of Kununurra. In: van der Velden, M., Strano, M., Hrachvec, H., Abdelnour Nocera, J., Ess, C. (eds.) *Proceedings of the Tenth International Conference on Culture, Technology, Communication: Common Worlds, Different Futures?*, London, pp. 214–227 (2016). http://philo.at/ocs2/index.php/london16/catac_16/paper/viewFile/341/147
42. Green, L.: Focusing upon interview methodologies. *Aust. J. Commun.* 26(2), 35–46 (1999)
43. Green, L.: In their own words: using interview materials when writing up qualitative research. *Aust. J. Commun.* 40(3), 105–119 (2013)