Wildfire risk awareness, perception and preparedness in the urban fringe in Aotearoa/New Zealand: Public responses to the 2017 Port Hills wildfire

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Abstract

Historically, most of the relatively small, but frequent wildfires that have affected communities in Aotearoa[1] /New Zealand have occurred in rural areas. Prior to 2017, few wildfires occurred in the margins of large urban areas, or what is often referred to as the urban fringe. Reflecting this, New Zealand wildfire research has previously focussed on managing risk within communities residing in rural areas and on small holdings in the rural-urban interface. In February 2017, the Canterbury region of New Zealand suffered a devastating wildfire on the Port Hills adjoining the city of Christchurch which resulted in the loss of nine houses and the evacuation of over 1400 residents, most of whom were living on small urban fringe properties. The Port Hills wildfire highlights the growing wildfire risk in the urban fringe and the need for research to support better engagement with residents in these neighbourhoods. This paper examines news media articles, related public comments and social media responses following the Port Hills fire to understand how residents responded to and made sense of the wildfire. The findings provide a preliminary indication of: urban residents' risk perceptions, interpretations of their personal fire experiences, social norms that shape discussion, underlying social conflicts and contexts, and their understanding of where the responsibility for actions lies. This paints a picture of a diverse public negotiating meaning through complex, often conflicting frames rather than a single homogenous community and lays the foundation for a future in-depth study of the affected neighbourhoods. The paper concludes that the time has arrived to awaken fire managers to the specific risks of wildfires on the fringe of major urban centres and ensure that they recognise that residents of the urban fringe represent a new audience with different contexts and needs. These urban residents will require more attention to ensure that residents are also awakened to the risks of wildfires and are adequately prepared for potentially devastating wildfires in the future.

Keywords: *urban fringe, rural-urban interface, risk perception, risk awareness, preparedness*

Recent years have seen a series of devastating wildfires encroaching on urban spaces around the world. Until recently, however, New Zealand had largely escaped this threat. Compared to many countries, wildfires in New Zealand are relatively small but frequent. From the 2005-2006 to 2014-2015 fire seasons, an average of around 4,100 wildfires burned approximately 4,170 hectares annually, primarily in rural areas with relatively few lives or homes lost according to National Rural Fire Authority unpublished data. Some of these fires have occurred in the *rural-urban interface*, or wildland-urban interface as it is also known. This rural-urban interface is the area of transition between rural and urban where houses and other urban buildings are intermixed with, or sit adjacent to, areas of vegetation (Radeloff et al., 2005). In New Zealand, this is made up of a spectrum from small, low-density lifestyle properties[2] generally surrounded by agricultural land, forest or bush, referred to as the *intermix*, to densely-developed blocks of even smaller suburban properties on the fringes of urban areas. The latter type of properties may have only one boundary bordering rural land or may be completely surrounded by other buildings. Such areas of sharp transition from urban to rural are referred to

1 Aotearoa is the indigenous, Māori, name for New Zealand.

2 Lifestyle properties or lifestyle blocks are small rural properties whose owners wish to live a rural lifestyle, often with small-scale agricultural activities, but for whom agriculture is not their primary source of income.

as the *true interface* or *urban fringe*. Although wildfires have occasionally occurred in the urban fringe in New Zealand, these have not usually resulted in significant losses.

This changed with the Port Hills fire on the southern boundary of Christchurch in February 2017, which burned 1661 hectares and resulted in the loss of nine houses and damage to five others on small lifestyle properties in the rural-urban interface. The fire necessitated the evacuation of at least 450 households, including about 1400 and potentially as many as 2800 residents, for 3 to 9 days (Christchurch City Council, 2017, 2018; Selwyn District Council, 2017) and led to nearly NZD $18 million in insurance payments (Insurance Council of New Zealand, 2017). While most devastation was experienced by those living on lifestyle properties in the outer range of the rural-urban interface, the majority of threatened households lay within the dense urban fringe.

Though relatively small by overseas standards, the 2017 Port Hills wildfire has highlighted a new scenario that is likely to be faced in New Zealand in future years, as several factors combine to increase the likelihood and severity of urban fringe wildfires. Like it will be for much of the world, climate change is predicted to create hotter, drier conditions for New Zealand, leading to more frequent and more severe wildfire events overall (Reisinger et al., 2014). Beyond the overall increased risk of wildfire occurrence, the changing landscape is also increasing wildfire risk and the resulting impacts in the rural-urban interface specifically. Retirement of rural land from grazing brings increased woody vegetation and, therefore, greater fuel loadings. Growing and urbanising populations have meant a rapid expansion of the rural-urban interface in New Zealand (Andrew & Diamond, 2013; Ministry for the Environment & Stats NZ, 2018) and overseas (Radeloff et al., 2018; Strader, 2018). This both exposes more people to wildfire risk and exposes wildfire prone lands to more human interaction, increasing opportunities for ignition (Radeloff et al., 2018).

Wildfires on the margins of cities shift attention toward the urban end of the rural-urban interface spectrum. This requires more targeted research to improve understandings of the make-up and needs of these communities and to ensure that residents understand and address the risks they face from wildfires. The current paper draws on news media and related social media responses from the start of the Port Hills wildfire to 14 months post-fire. This provides an initial examination of community responses to the fire as the basis for future, more in-depth research.

Reviewing international and national knowledge

To set the context for the current, exploratory study, we evaluated international and national reports of wildfires that have affected communities on the fringe of urban areas, alongside reports of community audiences and their risk awareness and preparedness.

Audiences, risk awareness and preparedness

Levels of fire experience, fire risk awareness or preparedness vary considerably across and within communities (Paveglio & Edgeley, 2017). International literature suggests that residents of the urban fringe have less awareness of wildfire risk and greater faith in the ability of fire services to provide protection than people in more rural parts of the rural-urban interface do (Paveglio et al., 2015). Although New Zealand research does not appear to have considered urban fringe communities directly, several researchers have connected experience living in rural areas with increased awareness of wildfire risk. A study in a wildfire-affected rural-urban interface community west of Christchurch revealed that newcomers with shorter residency had less awareness of wildfire risk and preparedness than longer-term residents (Jakes, Kelly & Langer, 2010). A clear difference in the knowledge of wildfire risk, fire restrictions and preparedness measures was also apparent between long-term rural and semi-rural fire users, non-land owners and suburban dwellers within three case studies across New Zealand (Hart & Langer, 2014). Likewise, research in Canterbury just prior to and during the Port Hills fire showed a strong perception among lifestyle block owners that those coming from urban backgrounds have less awareness of fire risk and prevention and pose a higher risk (Nicholas & Hepi, 2017).

Several studies (McGee, McFarlance & Varghese, 2009; Stoof, Langer, McMorrow & Oswald, 2012; Jakes & Langer, 2012) have demonstrated that residents in high-risk rural and rural-urban interface areas who have experienced a recent significant wildfire have an increased awareness of the wildfire risk. Perceptions of wildfire risk appear even stronger among people who were previously forced to evacuate (Champ & Brenkert-

Smith 2016), indicating that the nature of the experience matters. In a Northland, New Zealand study, the high level of wildfire risk awareness was found to be due to an understanding of the local environment, past wildfires, attachments to land, information passed down within Māori *whānau* (extended families) and from the local rural fire force (Langer & McGee, 2017). Residents with previous wildfire experiences also appear more likely to use fire safely and improve household preparedness. However, Hart and Langer (2014) noted that the serious nature of wildfires was not adequately appreciated by some township residents, who tended to remember previous fires as spectacles rather than events that put them at personal risk.

Langer and Hart (2014) also highlighted additional differences based on how people use fire, identifying four key audiences: rural and semi-rural fire-users who use fire as a tool; recreational fire-users who may have little fire knowledge; cultural fire users who use fire for traditional cooking and other practices; and non-fire-users. Rural and semi-rural fire-users use fire more frequently and are responsible for a plurality of wildfires with known causes (Doherty, Anderson & Pearce, 2008), so they have received significant research attention. The majority of New Zealanders, however, are in the latter category. They reside in urban areas, suburbs or small townships; do not use or have experience with fire; and pose little risk of starting a wildfire. This raises the question of whether New Zealand's urban dwellers, and their diverse communities, are aware of the risks that they face from wildfires today and into the future.

Connecting awareness or experience with action across diverse communities

For those attempting to encourage wildfire mitigation, raising risk awareness is only a first step and is often insufficient on its own. In a USA study, Olsen, Kline, Ager, Olsen and Short (2017) found that higher awareness of wildfire risk was only weakly correlated with preventative action. Moreover, advice from fire experts, friends or family was found to have little impact on residents' risk perceptions, compared with personal experience or judgements about the surrounding area.

Several studies suggest differences in how people interpret wildfire information and experiences that affect if and how they prepare for the future (Edwards & Gill, 2016; Eriksen & Wilkinson, 2017; Paveglio & Edgeley, 2017). Decisions about whether or not to undertake mitigation actions are made in the context of perceptions regarding: the efficacy of mitigation options, firefighters' capabilities, responsibility, gender and family roles, as well as competing interests such as costs and aesthetics (Martin, Martin & Kent, 2009; Eriksen & Gill, 2010; McFarlane, McGee & Faulkner, 2011; McCaffrey, Toman, Stidham & Shindler, 2013). Sword-Daniels et al. (2016) also argued that how people perceive, interpret and act upon natural hazard risk depends on a range of socio-psychological factors, including social identities, experiences, values and social norms. For example, where accepting and acting on risk can have negative implications for valued interests—such as financial costs of mitigation or the social and cultural costs of inhibited activities—people may resolve the threat psychologically by denying it exists. When wildfires do occur, diversity within communities also influences perceptions of the event and leads to differences in how community members learn and respond (Paveglio & Edgeley, 2017). This means that those seeking to encourage preparedness must first understand their audiences and the diverse, complex ways that people make sense of wildfire threats and experiences.

Across the broader rural-urban interface, practices must also be understood in the context of changing landscapes and the implications that those changes have on people's identities, their connections with the land, and the meanings associated with urban and rural practices. From a rural perspective, Burton (2004) highlights the importance of the meanings that farm practices hold and the role these have in shaping identity and standing within rural communities—where the visible outcomes of farm practices inform social judgements. An Auckland study by Curran-Cournane, Cain, Greenhalgh and Samarsinghe (2016) found that farmers on the rural side of the rural-urban interface perceived threats to their lifestyle and practice from encroaching urban development and lifestyle blocks, the arrival of newcomers with different values and understandings of good practice, and increasing bureaucratic burdens associated with farming and rural life. Literature from the USA suggests cultural variations between new and long-term rural-urban interface residents have a significant role in shaping perspectives on wildfire risk and appropriate management (Paveglio et al., 2015). These underlying contexts and meanings colour how people will interpret their situation and engage with those around them, but it is not yet known how residents in new urban fringe developments in New Zealand might experience this.

The need to understand urban fringe residents

As the 2017 Port Hills wildfire indicates, residents of small suburban properties at the urban fringe are at increasing risk from wildfire. However, New Zealand research to date has focussed on rural contexts and communities. Even studies into the wider rural-urban interface have approached this zone from a rural perspective. These studies have often considered residents in lifestyle properties and small townships in the intermix or temporary visitors in holiday homes or campgrounds, but the research has been framed in terms of how these urban expansions affect the rural space.

The review of research literature summarised above has not identified any New Zealand research addressing wildfire risk perception or mitigation from the urban side of the growing rural-urban interface. This urban fringe represents a different context, not only in terms of the landscape but also of the people living within it. Research is required to identify the particular characteristics of these communities while exploring how residents understand their wildfire risk and how they respond to wildfire events. The present work represents a preliminary attempt to address the apparent lack of relevant research and to identify avenues for further investigation.

Methods

News media reports published online and associated social media provide a starting point to understand urban fringe community audiences, their experiences of the February 2017 Port Hills wildfire, and their wildfire risk awareness and preparedness. These media articles and public responses provide a rich source of insights into community impacts and community issues. Online comments represent a space for social media users to participate in public debates, share experiences and challenge dominant media frames (Milioni, Vadratsikas & Papa, 2012), providing access to a wider diversity of views and revealing greater nuance beyond formal media discourse. We recognise that online commenters may not adequately represent the wider community (Friemel & Dötsch, 2015; Olteanu, Kıcıman & Castillo, 2018), as participants self-select and there is generally no means of determining their demographic attributes, location or other contexts. Moreover, comment sections are typically moderated by website hosts, further biasing which views are prioritised or suppressed (Hughey & Daniels, 2013). Finally, news and social media content cannot reliably be connected to actions (Olteanu, et al., 2018) and do not let research account for the behavioural influences of cost or other practical issues. Nonetheless, we see these resources as useful exploratory guides for developing research questions for further investigation. They provide an illustration of the social meanings and contexts which shape wildfire risk perception, preparation and response across the general public, and help to identify issues not addressed by previous, rural-focused research.

We identified articles from local and national New Zealand news media outlets between 13 February 2017 and 1 May 2018 through searching Google news and New Zealand news websites. Articles from international sources were excluded, as were articles that mentioned but did not directly discuss the wildfire itself, for example those discussing a pilot killed during the firefighting efforts or the subsequent crash investigation. A total of 230 articles were examined, including 166 published within one month from the start of the fire. We also examined public comments in response to the articles and to the Facebook pages of official organisations involved in the fire response, for example on the Christchurch Civil Defence and Emergency Management page, where the website permitted comments from the public.

Although interviews published in the media and online comments were made in public fora, names and usernames have been removed to minimise the risk of identification. For the same reason, specific sources have not been cited where these comments have been quoted. Analysis was carried out by a single researcher following the iterative process established by Pope, Ziebland, and Mays (2000). Although researchers inevitably bring a degree of experience and theory to their analysis (Baxter & Eyles, 1997), effort was made to allow themes and categories to emerge from the data rather than imposing pre-existing expectations.

Results: What have we learned from news and social media responses?

Our analysis highlighted some clear conflicts and divisions within the public discourse of online comments, even though the press media was portraying a relatively uniform community following a certain narrative. These disparities between media representations and public discourse underscored the need to view communities as complex networks, rather than monotypic or even as clearly segmented sub-groups.

Risk awareness and perception

Public awareness of wildfire risk formed only a minor part of the overt media narrative, with the issue raised in only 8 of the 230 articles examined. References to public awareness consisted almost entirely of fire experts advocating for public awareness. In contrast, implicit in many of the personal accounts reported in media and online comments was a clear tension between how many residents perceived the risk and the messages that experts were attempting to convey. Aligning with previous research suggesting low wildfire risk awareness among urban residents, the public view portrayed was one of surprise that wildfire could reach urban neighbourhoods. An expectation that wildfires can and will be controlled by authorities was also expressed in the media reports discussing the Port Hills fire:

> In this day and age, I can't believe that it's let to go that far. You know, so close to a central city like this. It's just unbelievable.
>
> (media quotation)

Several commenters criticised a lack of awareness which they perceived among their peers, particularly those living in or coming from the urban side of the boundary. Relevant comments included the following:

> Finally urban dwellers might understand…
>
> (online comment)

> When city people come to the country with no idea of the risk [sic].
>
> (online comment)

> People that choose to live in or near shrubland or forestland are sitting ducks. Some people seem to have lost their instinct for survival when it come [sic] to locating a home site. Floods, tsunamis, snow, earthquakes, fire never seem to enter into the decision making process…
>
> (online comment)

In contrast, fire officials quoted in the media and online commenters generally categorised rural residents as having greater fire knowledge. Media interviewees and commenters sometimes cited experience with farming, living in rural areas or living in Australia as evidence of their fire expertise. Notably, one small but highly active group demonstrated a high degree of awareness and preparedness. Several news articles and comments refered to an informal self-organised group of residents, located among lifestyle properties and led primarily by a resident with rural fire experience, which had taken actions to raise awareness among neighbours. They had also procured firefighting equipment. There were no press media accounts of similar efforts among the residents of more urban neighbourhoods.

Interpreting threat and loss

When describing areas where some property was destroyed and others were not, the difference was almost exclusively described in both official media and comments as "luck" or attributed to concentrated efforts by firefighters, with little reference to property characteristics or mitigations that might have influenced the outcome. An exception was the discussion of a house with a pool that was used as a water source for firefighting helicopters. Several commenters attributed this home's survival to the extra attention it received from firefighters.

Community responses to the wildfire were dominated by outpourings of empathy for those adversely affected with themes of rallying and uniting support. Several articles referenced offers of support services and from volunteers, with frequent reference to Christchurch's recent history of resilience in the face of earthquakes. While there was far less indication of how the community may have responded over the longer-term, a few lifestyle property residents interviewed around the anniversary of the fires mentioned increased bonding and proactive fire prevention in their communities. The available data did not allow an analysis of whether people's experiences or outcomes related to future actions. Again, we did not identify any evidence of supportive community actions among urban residents.

Social norms

Strong social norms shaped, and sometimes constrained, discussions. After the first few days, when the fire danger was waning and questions about fire risk and the official response were first raised, several commenters objected to these discussions. They said that they were inappropriate during or soon after the fire and should wait until the danger had passed or until an official review had been conducted.

> Forget the analysis until the raging fire has been put out. Lives and houses are the focus for now.
>
> (online comment)

The most noticeable social norms were norms proscribing *victim blaming*, or attributing fire impacts to the victims impacted, while requiring public displays

of compassion to those who had lost homes. These norms appeared to inhibit discussion about how affected property holders could have better mitigated risks. Media reports relating to the Port Hills wildfire were almost universally sympathetic to people who suffered losses. Only rare comments by officials hinted at criticism, for example:

> I understand their frustrations. I'm not entirely sure that it's justified in all cases. We tried our best to save their homes. There's a wee bit of personal responsibility but I'm not going to get into that too heavily because they won't like that.
>
> (media quotation)

There was far greater conflict, however, in online comments. These comments showed tension between empathy and criticism for failing to mitigate. For example, in an article featuring a photograph of a home taken shortly before it was destroyed, some commenters noted tall grass and pine trees surrounding the house while others condemned the implied criticism:

> My first thought was the long grass and rubbish lying around the house.... we have such an acute awareness about this in Aust. It's an invitation to disaster.
>
> (online comment)

> Compassion and kindness is what is needed for this family. What they don't need to read is judgments and hindsight by others not "walking in their shoes" that I think are cruel and unnecessary - classic trolls.
>
> (online comment)

Several additional comments in this discussion had been marked as deleted by the time we conducted our research. Other articles showed similar patterns, where critical discussions appeared to have been drowned out by expressions of sympathy and support.

Underlying social conflicts and contexts

Opinion pieces and online comments with references to ongoing cultural and political debates indicated how people made sense of their fire experiences, in the context of existing, interconnected mental frames. Several commenters ascribed wildfire risks to ongoing land use changes and debates over the value of agriculture or exotic forestry versus native bush. This theme was particularly strong among the few articles, opinion pieces and comments arguing the need to mitigate wildfire risk through addressing land use change. Some interpreted the fires as a reason to change towards less flammable native species, including an editorial in the predominant Christchurch newspaper (The Press, 2017), while pasture grasses and exotic pines were blamed as fuel for the fire.

> The hills are covered in grass fields and pine tree forests which are always dry. If we had native rainforest we might not be in this situation.
>
> (online comment)

> [I]f there weren't so many pines planted the native fauna would have been saved, so lets learn from this and not plant any more fire risk pines on the port hills.
>
> (online comment)

There was also a strong, often contrasting, narrative arguing that a turn away from pastoral agriculture had increased fire risk. For example:

> The reduction in livestock on the Port Hills has meant the build-up of long rank grass over many years. Lifestyle block owners don't always want the responsibility of owning livestock – or have the facilities or skills to farm them – so grasses and weeds proliferate.
>
> (media quotation)

> But it could all have been avoided if they had kept the grass short by ensuring it was grazed appropriately.
>
> (online comment)

Comments in this vein frequently connected wildfire risk with politic divides and the perception that agriculture is under threat from environmental interests, for example:

> Our high country is and will become the potentual [sic] for a fire ball I have said if you are not grazing this country we will create a situation that no one is going to be able to contain so as the greens get more country out of grazing as you see what happens over seas will be nothing what will happen here.
>
> (online comment)

A common and often related frame concerned what was perceived as an over-concern with political correctness and health and safety in society, for example:

> the PC brigade need to get over themselves as well, to many people sitting at desk's re-inventing the wheel, time to put some stock back on the port hills.
>
> (online comment)

These kinds of comments were often accompanied by comments praising what they referred to as "common sense" over official expertise, for example:

> Just one lick of common sense by some of these so called experts would be able to see this disaster happening again.
>
> (online comment)

Taken together, these frames illustrate clear social and cultural divisions in the meanings that people see and draw upon to interpret their wildfire experience. However, it would be simplistic to assume that these framings could be delineated across simple demographic or political lines. For example, one of the commenters quoted above who was advocating against pine trees and for a return to native species also criticised "the PC brigade" and advocated for pastoral grazing. This commenter illustrates the complexity of meanings that people draw upon in interpreting their situation, and the challenge of meaningfully defining community audiences.

Where responsibility for action lies

Both media narratives and public comments revealed contrasting perspectives on where responsibility lies for different aspects of wildfire awareness, prevention and mitigation. These debates were usually framed as either individual or official with less discussion of community, except as a means of social support during the crisis and initial recovery stages. Some areas of responsibility were largely agreed upon, but others were more contentious. This suggested a cultural or philosophical divide, with implications for promoting public awareness and action.

Discussions of prevention, preparedness or mitigation typically focused on how the official fire responses could have been better managed and how response messages could have been communicated to the community. There was far less discussion about the roles and responsibilities of the community or individual landowners to mitigate risk or prepare for wildfire. Even a news media article entitled *Analysis: What could have been done to stop the Port Hills blaze?* (Sachdeva, 2017) focused solely on official fire management, communications and evacuation processes and did not mention wildfire risk factors or possible preventative actions involving the public. Statements from fire officials encouraging residents to understand and accept the risks of wildfire and to take action to mitigate those risks were occasionally reported, but these represented a small minority of commentaries. Within the first month of the start of the fires, only 17 of 166 (10.2%) media articles reviewed mentioned community prevention, preparedness, mitigation or firefighting efforts. Of these, only eight (4.8%) articles mentioned actions that could reduce risks—such as planting less flammable species, grazing to reduce fuel load or creating defensible spaces. While there were several articles or opinion pieces that discussed types of plants that are more or less flammable, these were framed generally at the landscape scale rather than as actions that homeowners could or should take.

Equally important is the question of who raised an issue and where responsibility for appropriate actions was being placed. In most cases, it was fire officials and researchers who discussed risk factors, prevention and mitigation. The scarcity of discussion from other actors interviewed or in public comments suggests that this theme was generally not taken up by the rest of the community[3]. As noted previously, however, public discussion may have been suppressed by social norms against victim blaming. The news media may have also been unwilling to pursue this path of inquiry.

When individual action by the public was referenced, it was often still in the context of ultimate responsibility lying with official institutions. For example:

> The [affected residents] evacuated their property, which they kept clean of gorse and scrub, on the Monday… late on Wednesday the fire razed their property. The couple are well insured and do not ask for help or sympathy. They do, however, want answers as to why their house was not better protected from the fires and why they were not told their house had burned down. No-one has been to see to them to explain what happened. They wonder if a fire break or the spraying of fire retardant might have made a difference.
>
> (media quotation)

Discussions of the evacuation process followed a similar pattern, with conflicting views from the public concerning who bore responsibility for deciding to evacuate. Media reports largely referenced complaints concerning: Official evacuation notices that came too late to allow time for residents to gather possessions; mixed messages from official sources about the severity of the risk to homes; or the lack of clear communication channels for announcing evacuations.

3 Some residents were observed demonstrating wildfire risk awareness and sought information on mitigation actions they could undertake on their properties, at community meetings following the wildfire. However, this awareness and willingness to prepare was not evident online.

> They had only minutes to evacuate their house at the top of Worsley Rd where they have lived for three years. "We packed some things about 8am [on Wednesday] but things seemed fine," [affected resident] said. The couple could hear the fire from their home by about 1pm on Wednesday. At 2.15pm the police arrived to say they had to leave immediately. "I went outside and thought, "Oh my God," we've got to go," [affected resident] said.
>
> (media quotation)

> [Affected resident] and his family got their final warning to leave not from the police or the fire service, but a digger driver working at the bottom of the valley.
>
> (media quotation)

However, a strong counter-discourse also appeared in online comments. While the majority expressed empathy and support for those affected, a highly vocal minority criticised complaints about the evacuation and emphasised the need for personal responsibility in acknowledging the risk and preparing to evacuate ahead of formal warning:

> Suprising [sic] comment amount [sic] the amount of time to get out. I was packed to fill a car about 6 hours before I was evacuated. Its [sic] not like you couldn't see it coming?
>
> (online comment)

> … [we] had been watching the fire getting closer, and watching the weather forecast the whole time it was happening, the morning the wind was forecast to change we loaded up the car and a trailer with photos and essentials and after lunch took the decision to move everything and the dogs out to town. there had been plenty of warnings. common sense rules. We were lucky it didn't get to us but it's no good playing the blame game, no one is responsible for you but yourself.
>
> (online comment)

In contrast with comments suggesting homeowner responsibility for mitigation, those suggesting personal responsibility for evacuation were largely either unchallenged or actively supported. This may be due to a lack of conflicting social norms, or because personal responsibility for evacuation was more widely accepted.

Disagreements appeared strongest when discussing the role of individual residents or communities in firefighting. Some members of the lifestyle community fire group mentioned above attempted to defend their properties and those of their neighbours. Some group members lost homes in the fire so featured prominently in several news articles. Numerous supportive comments advocated for homeowner participation in firefighting and joined group members in attacking official firefighters' capability, primarily with reference to the perceived bureaucratisation of fire response versus local knowledge.

> Congratulations to the Dad's army people. Its not a PC situation. This group was prepared to respond instantly and they did help. If more people were prepared to protect their property, the damage would have been significantly less.
>
> (online comment)

There was also strong criticism of these efforts, depicting residents' efforts as ineffective and futile in the face of such a large fast-moving fire.

> While they [vigilantes] meant well, with little training and practice and that gear, and under those conditions, they were a danger to themselves and the people who probably would have had to haul their butts to safety.
>
> (online comment)

Notably, where untrained volunteers worked alongside official firefighting efforts and were uncritical of the authorities, they were almost uniformly praised. This suggests that the negative response shown by many to the community fire group may have been because they were framed in opposition to the official response, rather than as a result of their actions.

Conclusion

Our analysis of news and social media reports following the 2017 Port Hills fire indicates clear differences in wildfire risk perception among community residents. It also highlights complexities and divisions within these communities that influence how people make sense of their experience. This in turn may have implications for future preparedness.

The issue under consideration is not just a rural-urban divide. Many issues have surfaced in our analysis of online debates in particular. The way these debates have been framed appears to align with long-standing socio-political debates and identities in conflict, which may correlate with, but are not delineated by, where people stand in relation to the rural-urban interface. For example, discussion about wildfire prevention

makes frequent reference to political leanings, political correctness or health and safety conscious culture, a rural-urban divide, and valuing of expertise against a frame of what has been referred to as "common sense". These meanings are intertwined with differing views of what the landscape should be and how it is valued—for pastoral production, nativeness or aesthetics.

Overall, the press media framed individuals and the community as passive while institutions were held responsible for action. Different understandings of responsibility may help to explain the difficulty that fire experts face in promoting community action and, in particular, the weak correlation between awareness of wildfire risks and actions to mitigate those risks (Olsen et al., 2017). The relationship between awareness and mitigation actions may well depend on where the ownership of risk and responsibility is seen to lie.

We recognise the limitations of using news reports and social media comments as data sets. However, these findings lay the foundation and pave the way for more in-depth study of the communities affected by the Port Hills fire. Further research is needed to explore if this wildfire experience of urban fringe residents has changed their awareness of wildfire risk. Further research is also required to explore how residents' interpretations of their experiences and the social norms surrounding loss have influenced their decisions to mitigate their risk and prepare for wildfire. This fire has demonstrated the need to awaken fire managers and researchers to the necessity of exploring wildfire awareness and preparedness among urban fringe residents as a newly identified audience. This sector of rural-urban interface communities will require special consideration by fire and land managers, to ensure that residents are aware of the risks wildfires could pose and that they are adequately prepared for disasters that are likely to occur in the future.

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