



Behavioural responses to multiple crises: Summary report

ANU Centre for Social Research and Methods

Professor Nicholas Biddle, Charlotte Boyer, Associate Professor Ben Edwards, Emeritus Professor Toni Makkai

ANU Centre for Social Research and Methods
Australian National University

Abstract

This paper provides a summary of three separate papers looking at the impact and responses to the 2020 Black Summer Bushfire crisis, as well as the COVID-19 pandemic that followed. In *Bushfire resilience and bushfire behaviour* the research team provides a detailed literature review of the behavioural and social science literature related to bushfire prevention, preparedness, response and recovery, with detailed analysis of how community functioning and community resilience relate to bushfire preparedness. In *Wellbeing and the environment – the impact of the bushfires and the pandemic*, the project team analyses how a climactic event like that experienced in Australia can have large effects on public opinion and wellbeing, and whether that effect is maintained during another external shock (the COVID-19 pandemic). The final paper, *Bushfire recovery and response*, uses data from January 2021 to analyse how Australians feel about progress in recovery from the 2019/20 Black Summer bushfires, and what they see as the most effective policy responses for preparing for future fires. A key finding from the literature and the analysis summarised in this paper is the importance of community functioning or resilience prior to a fire event and during the recovery stage.

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**FIRE & FLOOD
RESILIENCE**

1 Introduction and overview

Australia has experienced three economic and societal shocks over recent months and years. Much of Australia has been experiencing severe drought conditions with 2019 reported as being the driest year since at least 1900, with average rainfall 40 per cent below the 1961-1990 average.¹ Many of the years leading up to 2019 had lower rainfall on average, and this has put significant strain on rural production and income, and has led to significant mental health and social challenges (Hanigan et al. 2016; Edwards et al. 2015).

Partly caused by the drought but also due to the fact that 2019 was Australia's warmest year on record, Australia experienced its most widespread and one of its most devastating summers of bushfires from September 2019 to February 2020, with more than 11 million hectares burned, significant loss of life, and more than three-quarters of Australians impacted either directly or indirectly (Biddle, Edwards et al 2020a). When predicting the costs of future bushfires, ANU researchers estimated that under various plausible climate change related scenarios, the costs of fires over the next 30 years will be considerable, up to \$2.2billion per year, or \$1.2billion per year in net present value terms. (Biddle, Bryant et al. 2020)

Most recently, Australia, along with the rest of the world, has faced a public health and economic shock unseen since the 1919 Influenza pandemic and the 1930-39 Great Depression. As of late March 2021, Australia has had 29,211 confirmed COVID-19 cases and 909 deaths. Infection and mortality occurred across two waves, with the first wave occurring in April and spread reasonably evenly across Australia's eight States and Territories, but the second wave (in July/August) being concentrated mainly in Victoria (and Melbourne in particular). Although vaccines have begun to have an effect on infection and mortality across the world, many countries have fared far worse than Australia and still have very high rates of infections and daily death tolls well above what Australia experienced at its peak. Australia is at the lower end of the distribution across developed democracies with robust reporting of cases, alongside Taiwan, New Zealand, Japan, Singapore, South Korea, and Norway.

This relatively low infection and mortality rate has been achieved by strict and widespread physical distancing regulations, which have led to a dramatic slowdown of the Australian economy, with Commonwealth and State/Territory governments forced to provide unprecedented social assistance. The Australian Bureau of Statistics (ABS 2020) estimate that:

'A combined group of around 2.3 million people - around 1 in 5 employed people - were affected by either job loss between April and May or had less hours than usual for economic reasons in May' and that 'Women continued to be more adversely affected by the labour market deterioration than men. Younger workers have also been particularly impacted.'

This paper provides a summary of three separate papers looking at the impact and responses to these multiple crises. In *Bushfire resilience and bushfire behaviour* (henceforth *Paper 1*) the research team provides a detailed literature review of the behavioural and social science literature related to bushfire prevention, preparedness, response and recovery, with detailed analysis of how community functioning and community resilience relate to bushfire preparedness. In *Wellbeing and the environment – the impact of the bushfires and the pandemic*, (henceforth *Paper 2*) the project team analyses how a climactic event like that experienced in Australia can have large effects on public opinion and wellbeing, and whether

¹ <http://www.bom.gov.au/climate/current/annual/aus/#tabs=Rainfall>

that effect is maintained during another external shock (the COVID-19 pandemic). The final paper, *Bushfire recovery and response*, (henceforth *Paper 3*) we use data from January 2021 to analyse how Australians feel about progress in recovery from the 2019/20 Black Summer bushfires, and what they see as the most effective policy responses for preparing for future fires.

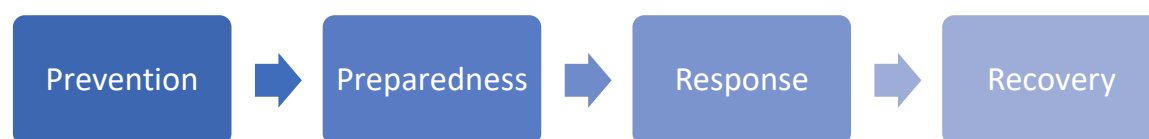
The primary source of data for these papers is a set of ANUpolls conducted in January, and August 2020 as well as January 2021, linked longitudinally at the individual level. Data has been collected from more than 3,000 Australians aged 18 years and over across all eight States/Territories in Australia, and weighted to have a similar distribution to the Australian population across key demographic and geographic variables. Data for the vast majority of respondents was collected online, with the remainder enumerated over the phone.

This paper is structured as follows. In Section 2 we provide a summary of the key points of the existing literature and outline the framework for the remainder of the analysis for this project. In section 3 we document exposure to the 2019/20 Black Summer fires, and compare anxiety and worry due to fires in January 2021 with that reported at the same time in 2020. We then outline the importance of community resilience and functioning for bushfire behaviour (Section 4 and 5). In the next two sections we outline views on environmental issues (Section 6) and bushfire effectiveness (Section 7), relating both to bushfire exposure. Section 8 provides some concluding comments, with more details on each of the sections and associated references available in the respective papers.

2 Literature review and existing frameworks

The four-stage approach of prevention, preparedness, response and recovery (PPRR) are consistently referenced in disaster management literature and practice, as the widely accepted phases of disaster or emergency management. The approach has been adopted in Australia and internationally and the Australian Government adheres to the PPRR approach within the Australian Government Crisis Management Framework and the National Strategy for Disaster Resilience (Elphick 2020; COAG 2011).

Figure 1 Disaster management phases



Source: Elphick 2020

Some criticism of the PPRR approach exists and states that it does not provide full consideration of all aspects of the disaster management spectrum, such as, ‘anticipation’ and ‘assessment’. Furthermore, Cronsteadt (2010) argues that ‘PPRR categorise available emergency treatments rather than describe a continuum or cycle of events’.

We use behavioural economics or insights as our underlying model of decision making in this paper and the project more broadly. Many of the bushfire and COVID-19 responses and interventions in Australia have assumed individuals follow a reasonably narrow model of decision making, described in Koh (2012), as *Homo Economicus*. That is, people who are ‘self-interested, rational agents. They analyze the costs and benefits of various options and choose

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the option that maximises their utility. They have stable, consistent preferences and the options they face are comparable to one another' (Koh 2012).

A key insight from the behavioural sciences though is that people are neither completely rational or irrational. Rather, people exhibit predictable biases that make it less likely they will achieve their own stated desires. There is a large and growing literature on these biases, outlined in detail in Akerlof and Kranton (2010); Kahneman (2011), Thaler (1999), Sunstein (2015), Mullainathan and Shafir (2013), Hardin and Banaji (2013), and Shafir (2013). These biases are summarised below:

- Bounded rationality and heuristics
 - We don't make the perfect decision, but a good enough decision
- Complexity, scarcity and cognitive load
 - Poverty increases the cost of bad decisions and makes them more likely.
- Loss aversion and the endowment effect
 - We care more about what we lose than what we gain.
- Framing and construal
 - We make decisions based on how the world appears, not how it is.
- Hyperbolic discounting and the power of defaults
 - We care about the present. A lot.
- Happiness and subjective wellbeing
 - Money buys happiness, but it gets more expensive.
- Identity, stereotype threat, social interaction and social norms
 - We care about how we see ourselves and how others see us.
- Fairness
 - We care about how much others have, not just how much we have

The EAST framework developed by the Behavioural Insights Team in the UK provides a useful practical approach to implementing this research in a public policy setting arguing that to 'encourage a behaviour make it Easy, Attractive, Social and Timely (EAST)' (Service et al. 2014). Further explanation of these four pillars follows.

1. Make it **Easy**
2. Make it **Attractive**
3. Make it **Social**
4. Make it **Timely**

Linnemayr et al. (2016) highlights that although previous application of behavioural economics to disaster preparedness and response is limited, 'the low cost and potentially high impact of behavioral economics-based interventions warrant further investigation and testing'.

How people intend to plan or manage a crisis is often different to how they actually behave when a crisis occurs. This gap between intention and action (also known as the intention-behaviour gap) is prevalent in two of the four disaster management phases: preparedness and response.

In the preparedness phase, people are obviously encouraged to prepare in case of an emergency. For example, people that live in a bushfire prone area are encouraged to adopt a home insurance policy that considers this risk. However, as Paton et al. (2006) highlights 'despite the attention directed to achieving this, the goal of ensuring sustained levels of preparedness in communities susceptible to natural hazard impacts has proved elusive'.

Further investigation into why people don't prepare and how to motivate them to take responsibility for being prepared and educated in case of disasters is needed.

Literature about bushfire and disaster response highlights the need to better and more impactfully communicate education and warning messages to communities during the preparedness and response phases. Parson et al. (2020) states that information access is a significant barrier to the capacity for disaster resilience in Australia, particularly in regional and remote areas' (Parsons et al. 2020).

To address communication barriers, various suggestions arise in the literature. Whittaker et al. (2020) states that 'rather than concentrating on attempts to reduce confirmation through enhanced messaging, it may be productive for fire and emergency services to give greater consideration to ways they might help people to confirm warning messages'. Whittaker et al. (2020) also suggests that 'warnings that are not personally meaningful to people are unlikely to motivate desired protective action, regardless of how they are worded' (Whittaker et al. 2020). Instead, it is suggested that 'warnings and advice that encourage people to evacuate as soon as a fire is threatening are more likely to be effective if they describe the threat posed, possible consequences, and how people can take action to reduce such consequence' (Whittaker et al. 2020).

To further enhance warning messaging, increasing trust in information sources is recommended by bushfire literature and Betsch et al. (2020) in regards to COVID. Betsch et al. (2020) states that information 'being easily understood and communicated through trusted and accessible channels, and when the necessary services are available, people are able to make informed choices, protect themselves, and comply with recommended practices'.

To enhance clarity and collection of messages, Linnenluecke and Griffiths suggest 'more informal and flexible mechanisms', which 'will require an integration of new technologies, "non-traditional" information sources (e.g., social networks), as well as media reporting, and also a preparation of the community to use, access, and possibly even provide information' (Linnenluecke & Griffiths 2013).

Emergency response literature continually refers to the importance of resilient organisations, communities and individuals. Community resilience is central to the preparedness, response and recovery disaster management phases. In Moreton's (2016) examination of four natural disasters in Australia, she identifies several pre-crisis protective factors, which assist in strengthening community response, resilience and recovery. These are:

1. Planning and preparation
2. Community identity and connection
3. Community cohesion and social capital
4. Community leadership and action (Moreton 2016).

3 Measuring exposure to bushfires

There are two ways to capture bushfire exposure in the data used in the analysis in the three paper. The first is through the postcode of a person's place of usual residence, which we can match against the postcodes identified by the Australian Tax Office as being in the disaster relief area. These areas (and our sample of affected residents) are spread across NSW,

Queensland, South Australia, Tasmania and Victoria.² Of the 3,249 respondents in our sample, 402 lived in a bushfire affected area. With and without weights, this represents 12.4 per cent of the January sample.

Not every individual who lives in a bushfire area is likely to have been directly affected though (the postcodes are geographically quite large), and there are likely to be people who live outside those areas who were either directly or indirectly affected. This could be because of second homes, travel to those areas during bushfire periods (i.e. direct effects), or because they have close family/friends in those areas or were affected by smoke from the fires (i.e. indirect effects).

We therefore also use a set of variables based on asking people explicitly about a range of exposure measures. Specifically, we asked respondents:

We would now like to ask you some questions about your experiences with bushfires. Thinking first about the bushfires that have occurred / are currently occurring over this spring and summer in Australia. Which of the following, if any, have you experienced?

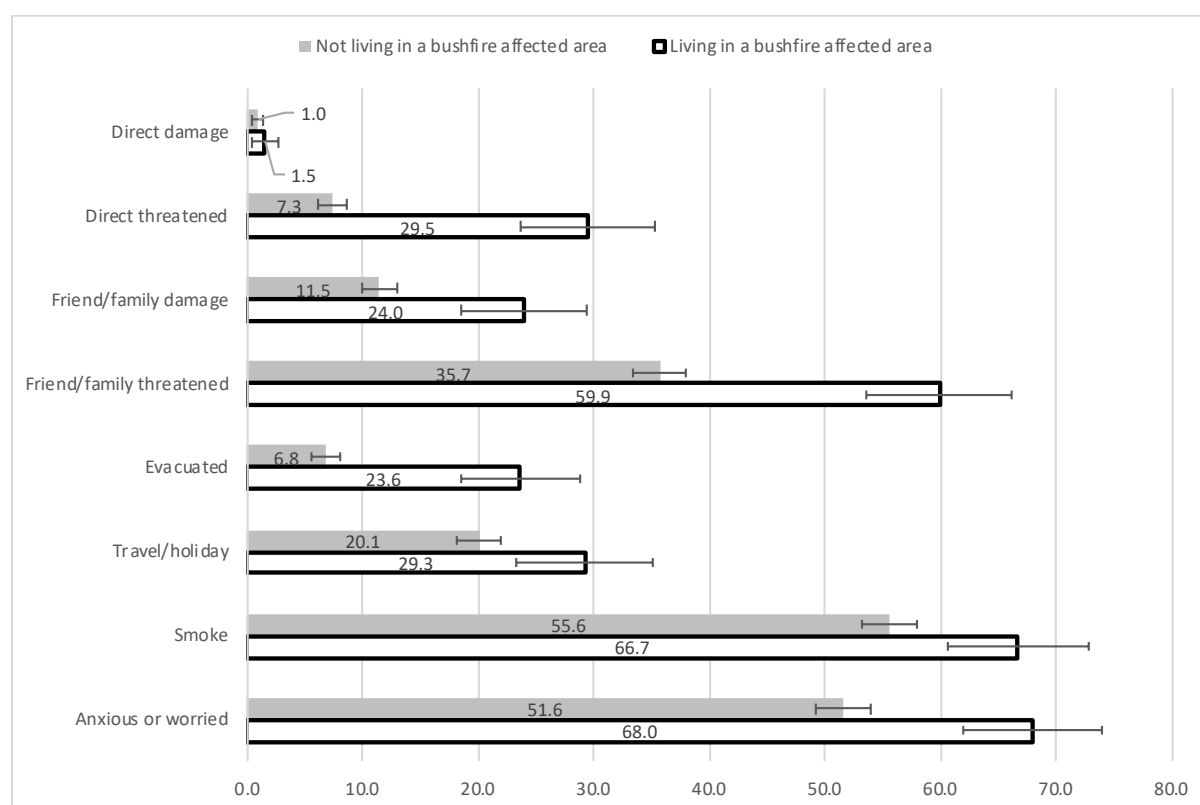
Eight forms of exposure were provided, with varying degrees of severity. These are listed below with the labels used in the remainder of the analysis.

- a) **Direct damage** - Your home or property (including pets or livestock) has been damaged or destroyed by the fires
- b) **Direct threatened** - Your home or property has been threatened but not damaged or destroyed by the fires
- c) **Friend/family damage** - The home or property of a close family member or friend has been damaged or destroyed by the fires
- d) **Friend/family threatened** - The home or property of a close family member or friend has been threatened but not damaged or destroyed by the fires
- e) **Evacuated** - You were advised by emergency services (directly or indirectly via media) to evacuate from the area in which you live or were staying in due to the fires
- f) **Travel/holiday** - Your travel or holiday itself, or travel and holiday plans have been affected by the fires
- g) **Smoke** - You felt physically affected by smoke from the fires
- h) **Anxious or worried** - You felt anxious or worried for the safety of yourself, close family members or friends, due to the fires.

In total, for our January 2020 sample, 78.6 per cent reported at least one form of exposure, with Figure 1 giving the percentages for each of the individual types of exposure, as well as the uncertainty around those estimates (as 95 per cent confidence intervals). The most severe form of exposure, having one's home or property damaged or destroyed, was only estimated to have been experienced by 1.0 per cent of the adult population. The subjective measures of exposure are much higher for those who live in disaster relief areas (Figure 1). In particular, someone who lives in a disaster relief area is 4.0 times as likely to say that their home or property was directly threatened and 3.5 times as likely to say that they were evacuated. Nonetheless, not every individual who lives in a bushfire area says they have been affected and there are many people who live outside those areas who have been.

² <https://www.ato.gov.au/General/Dealing-with-disasters/In-detail/Specific-disasters/Bushfires-2019-20/?anchor=Postcodesidentifiedfordeferral#Postcodesidentifiedfordeferral>

Figure 1: Exposure to bushfires and related events – by area of residence



Source: January 2020 ANUpoll

While we didn't ask the full set of questions on bushfire exposure during the 2020/21 bushfire season due to relatively low and concentrate bushfire activity, respondents in the January 2021 ANUpoll were asked 'We would now like to ask you some questions about your experiences with bushfires this **spring and summer**, (that is, since September 2020). Have you felt anxious or worried for the safety of yourself, close family members or friends, due to actual or potential fires this spring and summer?' [bold in original]. Across the entire January 2021 sample, 30.1 per cent of Australians were estimated to have experienced anxiety and worry. While this is substantially lower than the 53.4 per cent who reported anxiety and worry in January 2020, it does indicate the ongoing presence of anxiety and worry during a year in which bushfire activity was relatively low. There is a strong correlation between anxiety and worry in January 2020 and January 2021, with only 13.7 per cent of the longitudinal sample who did not report anxiety and worry in 2020 reporting anxiety and worry in 2021, compared to 39.6 per cent of those who did report anxiety and worry in 2020.

When first reporting on wellbeing during the bushfire period, we found 'there was no statistically significant difference in the change in life satisfaction between October and January between those who reported either direct or indirect exposure to bushfires and those who did not.' We did find a decline in life satisfaction for Australia as a whole, but this difference was consistent across the bushfire exposure measures, implying that all Australians may have been affected by the Black Summer (in terms of their subjective wellbeing), regardless of whether they themselves had any form of direct or indirect exposure.

There are no noticeable differences in the trends in life satisfaction during the COVID-19 period between those who lived in the bushfire areas and had either direct or indirect exposure to the bushfires. Change through time between October 2019 and January 2020 is slightly more

negative for those who reported indirect exposure to the Black Summer fires (p-value – 0.064 for the linked October 2019 to January 2020 dataset). Over the COVID-19 period, however, and particularly after the first wave of infections and into the second wave of infections, those with indirect exposure experienced a relative decline in subjective wellbeing compared to those who did not have indirect exposure. This may be an indication of a delayed effect of indirect exposure to bushfires on wellbeing, or potentially the effect of other external shocks (perhaps related to COVID-19) being more likely to be felt by those who had experienced indirect exposure to the bushfires.

4 Community functioning and bushfire related behaviour

Based on the literature review discussed above, it is clear that communities are key to effective prevention, preparedness, response and recovery to bushfires and other crises. The results summarised in Figure 2 suggest a relatively strong degree of community functioning across Australia, with more than or close to majority support for six statements related to the community in which a person lives.³ Importantly though, there was significant variation across Australia by demographic, socioeconomic, and geographic characteristics in terms of reported community functioning.

We analyse the factors associated with a model of community functioning. Older Australians (45 years and over, but particularly those 65 years and over); reported higher index values, or higher levels of community functioning. On the other hand though, those born overseas in a non-English speaking country (compared to those born in Australia) and Indigenous Australians had a lower index value. Geographically, those in relatively advantaged areas, and those living outside of a capital city had higher index values whereas those in relatively disadvantaged areas had lower values. Given the more direct benefits of living in an advantaged community (services and amenities), the relatively low levels of community functioning in relatively disadvantaged communities mean that those respondents may be doubly disadvantaged.

One of the more important findings from the analysis was that those who lived in an area affected by the 2019/20 Black Summer bushfires had a slightly higher index value. This result gives *prima facie* evidence that exposure to a crisis can help bring a community together. Those who were anxious and worried about COVID-19 (in August 2020) had a lower index value than those who were not. We could plausibly interpret the finding as an indication that living in a functioning community protects a person from being anxious and worried about an external shock (that is, as reverse causality).

5 Bushfire related behaviours

One of the ways in which a functioning community can help with crises like the 2019/20 Black Summer fires and the COVID-19 pandemic is through supporting behaviours and decisions that either prevent fires occurring in the first place, help communities and individuals be prepared, support rapid and effective responses and aid in recovery to bushfires. In the August 2020 ANUpoll, respondents were asked “The next questions are about your behaviour and decisions

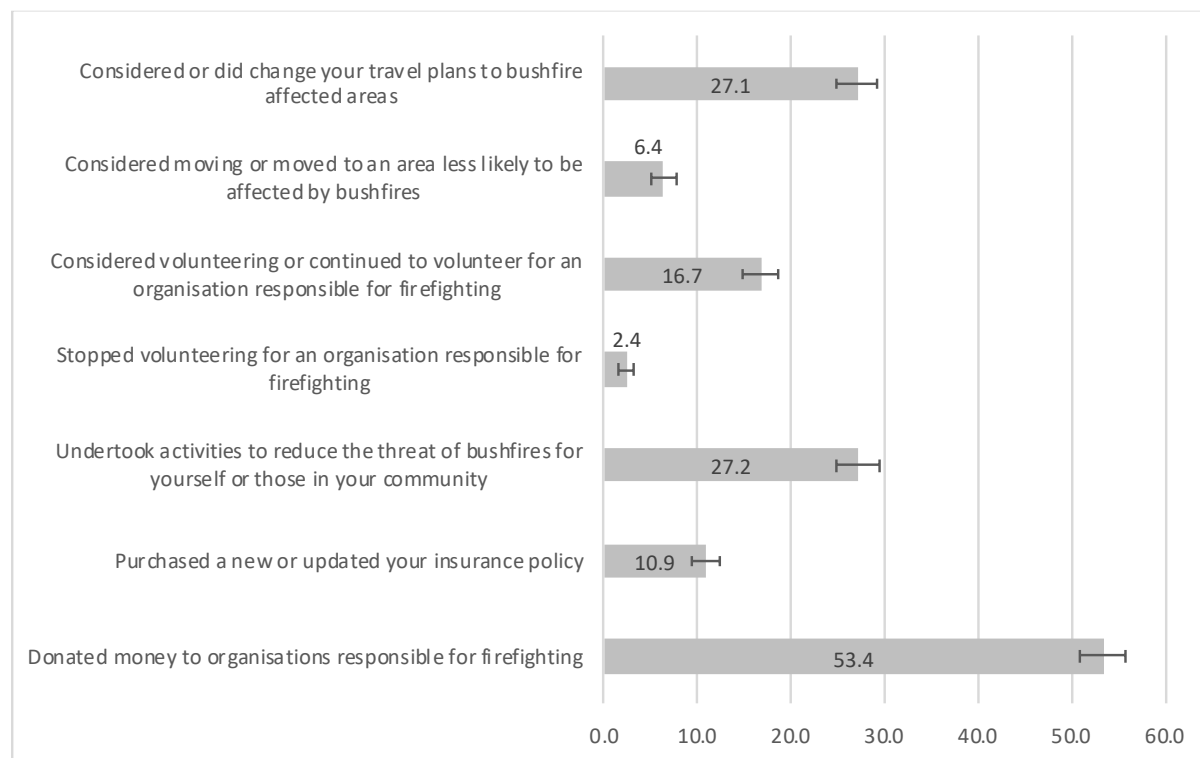
³ The first three statements are: People around here are willing to help their neighbours; You can count on adults in this neighbourhood or community to watch out that children are safe and do not get in trouble; People in this neighbourhood can be trusted. The second set of three questions were about how likely or unlikely someone in a person’s neighbourhood or community would be to do something about the following: If a fire broke out in front of your house; If the fire station closest to their house was threatened by budget cuts; and If a group of neighbourhood children were skipping school and hanging out on a street corner.

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since the bushfires that occurred over spring and summer in Australia. Since the 2019/20 Black Summer fires, have you undertaken any of the following actions?'

Figure 2 gives the proportion of people who answered yes to each of the seven actions. The most common action was to have donated money to organisations responsible for firefighting. This was undertaken by more than half (53.4 per cent) of Australians, according to estimations from the August ANUpoll. Very few Australians (2.4 per cent) stopped volunteering, with a much larger per cent (16.7 per cent) considering volunteering or continuing to do so.

Figure 2 Per cent of Australians who undertook certain bushfire related activities, August 2020



Notes: The “whiskers” on the bars indicate the 95 per cent confidence intervals for the estimate.

Source: ANUpoll, August 2020.

Living in an area in receipt of bushfire support was not associated with any of the bushfire related actions (controlling for demographic, socioeconomic and other geographic factors). However, after controlling for these factors there was a very strong relationship between self-reported exposure to the 2019/20 Black Summer bushfires and bushfire-related behaviour. Those who reported direct exposure to the Black Summer bushfires were more likely to have considered moving areas, were more likely to have considered volunteering, were more likely to have stopped volunteering, were more likely to have taken actions to reduce the threat of bushfires, were more likely to have changed or updated their insurance policy, and were more likely to have donated to bushfire related causes than those who didn’t report any form of exposure.

In addition, those who reported indirect exposure to the Black Summer bushfires were more likely to have reconsidered their travel plans, were more likely to have considered moving areas; were more likely to have considered volunteering; were more likely to have taken actions to reduce the threat of bushfires, and were more likely to have donated to bushfire

related causes than those who did not report any form of exposure. While this is not a causal model, these results do give some indication that bushfire exposure does change bushfire behaviour.

Highlighting the interaction between the multiple crises that have occurred in Australia in 2020, those who thought it likely they would be infected by COVID-19 were more likely to have reconsidered their travel plans, were less likely to have stopped volunteering; and were more likely to have taken actions to reduce the threat of bushfires. Those who were anxious or worried about COVID-19 were more likely to have reconsidered their travel plans, were more likely to have considered moving areas; were more likely to have considered volunteering, were more likely to have changed or updated their insurance policy, and were more likely to have donated to bushfire related causes.

Perhaps the most important set of findings from relate to the community functioning index. Specifically, those who lived in a more functioning neighbourhood or community as measured using the variable introduced in Section 4 were more likely to have considered volunteering, were more likely to have taken actions to reduce the threat of bushfires and were more likely to have donated to bushfire related causes. This clearly demonstrates the potential additional benefits from supporting resilient communities.

6 Views on the environment over the COVID-19 period and bushfire exposure

There is significant debate about the specific contribution of different causes to the spring/summer bushfire crises, including the role of arson and hazard reduction.⁴ There is a very strong scientific consensus though that climate change or global warming/heating is making such events more likely, last longer, and more intense (IPCC 2014). This is not only because of the direct effect of high temperatures on combustibility during the fire season, but also because of the difficulties of hazard reduction during hotter than average years and the decreased moisture due to prolonged drought (Garnaut 2019).

We hypothesise that the bushfires will have led to a greater importance placed on environmental issues, but that post bushfires and particularly since the spread of COVID-19 that this importance would have waned somewhat. We do find this to be the case. The important research questions though are what is the scale of this change, and are there characteristics that predict a greater or lesser change?

In January 2020 and August 2020 we asked the following question: 'We are now going to ask you some questions about the environment. How serious do you consider each of the following to be for Australia?', with the following eight potential environmental issues:

- a) Global warming or the greenhouse effect
- b) Loss of native vegetation or animal species or biodiversity
- c) Degradation of rivers, lakes and oceans
- d) Soil salinity and erosion
- e) Environmental damage resulting from logging of native forests
- f) Drought and drying
- g) Bushfires

⁴ <https://www.abc.net.au/news/2020-01-11/australias-fires-reveal-arson-not-a-major-cause/11855022>

h) Tropical cyclones

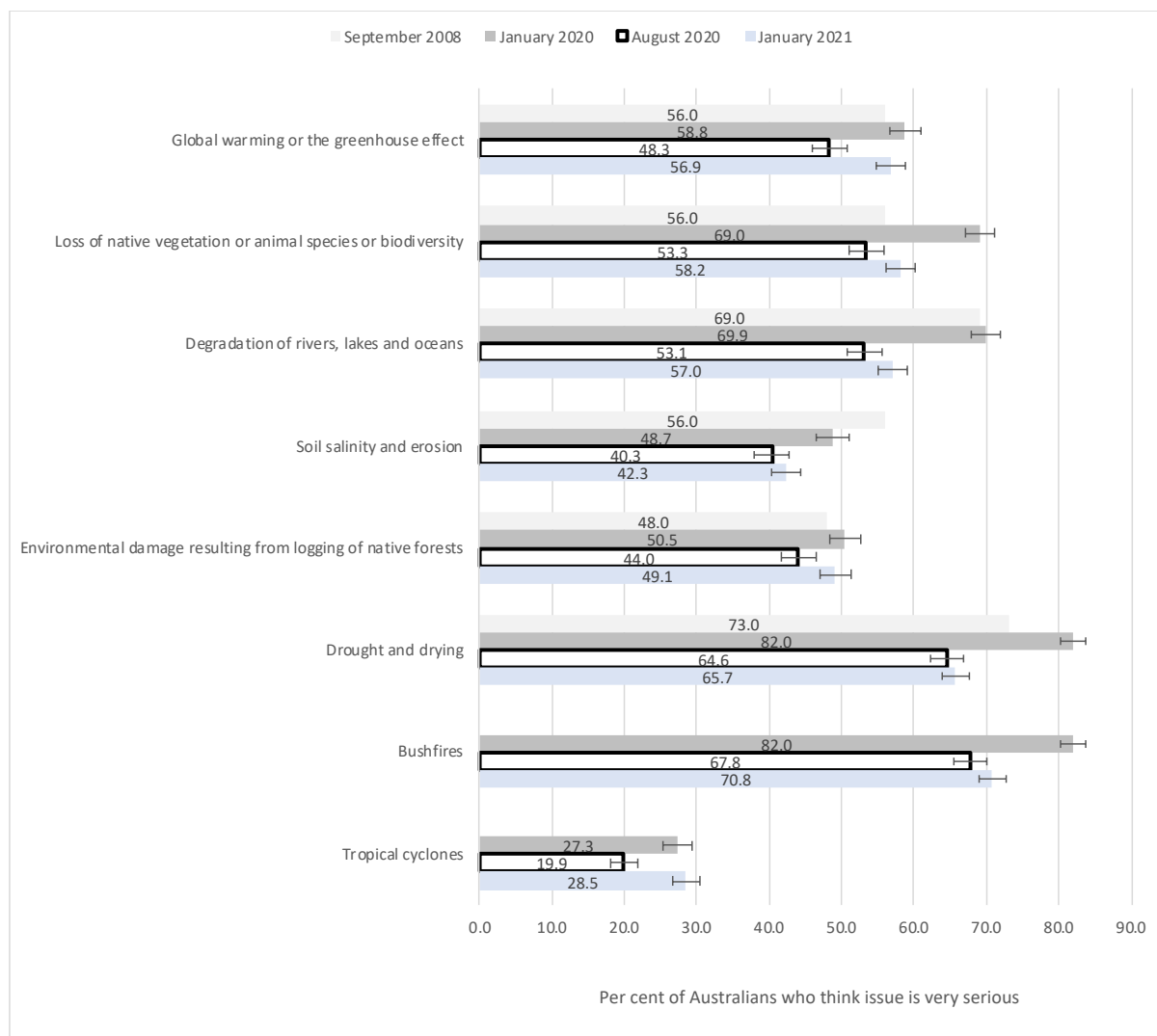
All of the potential issues were rated as being somewhat or very serious by more than three quarters of the population in January 2020, ranging from 78.6 per cent for tropical cyclones to 98.2 per cent for drought and drying. Clearly, environmental issues were very salient during the 2019/20 Black Summer crisis for a large proportion of Australians. There is, however, more variation in the proportion of people who thought the issues were very serious.

For all issues that were asked in both 2008 and 2020, apart from soil salinity and erosion, there was an increase in the proportion of people who think that the particular environmental issues are very serious (Figure 3), though not all of these changes are statistically significant. The two biggest percentage point increases were for loss of native vegetation or animal species or biodiversity (a 13.0 percentage point increase) and drought and drying (a 9.0 percentage point increase). Both of these may have been exacerbated or made more salient by the bushfires.

After reaching what appears to be a high value in January 2020, the per cent of people who reported each of the environmental issues as being 'very serious' declined between January 2020 and August 2020. The biggest (relative) declines were for tropical cyclones; and degradation of rivers, lakes and oceans. The smallest (relative) declines were for environmental damage resulting from logging of native forests; soil salinity and erosion; bushfires; and global warming. In absolute terms, in August 2020 the environmental issues that respondents were most likely to say were serious were bushfires (67.8 per cent), as well as drought and drying (64.6 per cent).

Between August 2020 and January 2021, there was an increase again in concern for many of the environmental issues, with none of the issues decreasing in the proportion of people who thought it was very serious. Over that period, there were three main groupings of issues. For three of the issues (soil salinity and erosion, drought and drying, and bushfires) there was a three percentage point increase or less between August 2020 and January 2021, that was not statistically significant. For a further two issues (biodiversity, as well as degradation of waterways) there was a significant increase between August 2020 and January 2021, but percentages were still significantly below those from January 2020. The final three issues (global warming, logging, and tropical cyclones) concern had returned by January 2021 to what it was in January 2020.

Figure 3 Per cent of population who think specific environmental issues are very serious – September 2008, January 2020, August 2020, and January 2021 ANUpolls



Source: September 2008, January 2020, August 2020 and January 2021 ANUpolls.

Those who reported indirect bushfire exposure experienced a relative increase in their concern for the environment compared to those who did not report indirect exposure. Those who were anxious or worried about COVID-19 in August 2020 had a relative increase in concern for the environment compared to those who were not anxious or worried. This may be tapping into a general level of anxiety about the future. Perhaps more importantly, there was a strong negative correlation between a measure of housing stress (being unable to pay rent or mortgage) and change in views on the environment. That is, those who experienced a negative economic shock during the early stages of the COVID-19 pandemic became less concerned about the environment than those who managed to avoid such a shock.

7 The bushfire recovery

In January 2021, respondents were asked two questions related to their satisfaction with bushfire recovery. When asked about recovery in all of Australia, 54.8 per cent were satisfied, and a further 5.9 per cent were very satisfied. Only 38.9 per cent of the sample said that their community was affected and therefore answered the question on bushfire recovery in their

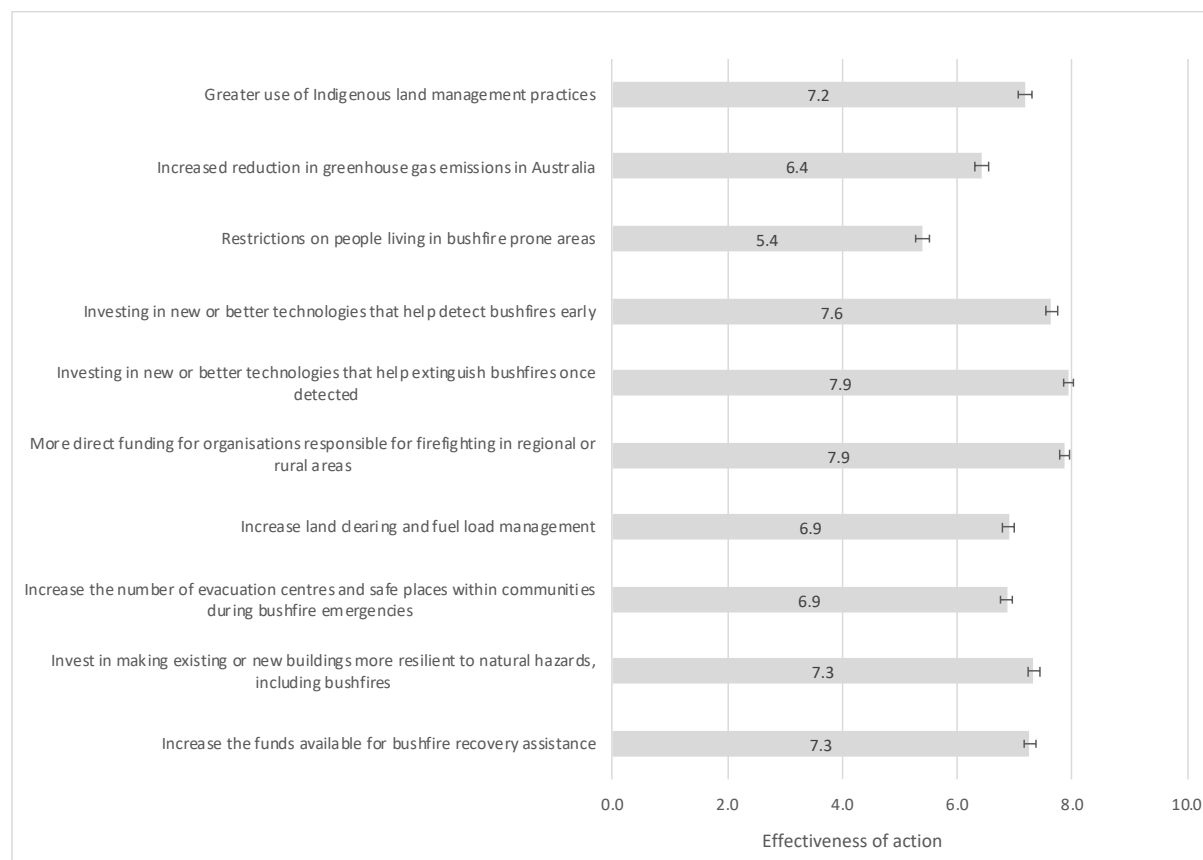
area. Of those who lived in a community that was affected, 68.2 per cent said that they were satisfied with the bushfire recovery, and 17.9 per cent said they were very satisfied.

Not only was there a greater level of satisfaction with the bushfire response in a person's local area compared to nationally, those who lived in a community that was affected by the bushfires were more likely to be satisfied with the national bushfire response. Those who said they were affected by smoke from the fires and those who said they experienced anxiety and worry due to the fires in January 2020 were less satisfied with the national recovery. While the sample sizes make it difficult to be too definitive, there is also evidence that those who had their own property damaged by the fires were less satisfied with the recovery. Taken together, satisfaction is heightened at the local level, but those who personally had direct or indirect exposure to the fires appear to be less satisfied with the recovery than those who did not.

In January 2021, we also asked about preparation for future fires. There were 10 possible policy responses taken in part from the Royal Commission into National Natural Disaster Arrangements. Although the general public are not experts on bushfire response and therefore the responses are not an indication of the potential efficacy of the responses, but rather an indication of public support and potentially willingness to pay through the tax system.

The two actions that have the highest level of perceived effectiveness (Figure 4) are: Investing in new or better technologies that help extinguish bushfires once detected; and More direct funding for organisations responsible for firefighting in regional or rural areas (7.9 out of 10 for both). The actions with the lowest level of perceived effectiveness are Restrictions on people living in bushfire prone areas (5.4 out of 10) and Increased reduction in greenhouse gas emissions in Australia (6.4 out of 10)

Figure 4 Perceived effectiveness of action for reducing the impact of bushfires, January 2021



When we analyse the factors associated with the average perceived effectiveness across all the actions, those who live in a community that was affected by the 2019/20 Black Summer fires were less likely to say the actions were effective. That does not mean that they are less supportive of the actions being taken, but rather that their own experience may make them question the effectiveness. Specifically, those who live in bushfire affected areas had a lower belief in the relative effectiveness of: greater use of Indigenous land management; new technologies for detection; and new technologies for extinguishment. However, they had a higher belief in the relative effectiveness of restrictions on people living in bushfire prone areas.

8 Concluding comments

People and countries across the world have been affected by the events of 2020, and these impacts are continuing into 2021. Australians have had a somewhat unique experience. Along with a limited number of other developed democracies, the level of COVID-19 infections and deaths have been quite low, even taking into account the second wave of infections that occurred in July and into August in Victoria. What is most different about Australia though is that the pandemic arrived very quickly after one of the worst natural disasters in Australia's history, with tens of millions of hectares of land burned, thousands of homes and houses destroyed, and dozens of lives lost in what has come to be known as the 2019/20 Black Summer of bushfires.

At the time of the bushfires, it appeared that overall life satisfaction in Australia had worsened, whereas concern for environmental issues increased. Wellbeing declined even further during the COVID-19 pandemic (and particularly during the first wave of infections) but concern for a range of environmental issues declined between January and August 2020. Those who reported indirect exposure (due to the effect of the bushfire on family/friends, smoke in the area in which a person lived, and general anxiety and worry) experienced a relative worsening in life satisfaction between April and May 2020, but a smaller decline in concern for the environment between January and August. The effects of the bushfire on attitudes and wellbeing appear to have lingered long after the last fire was extinguished.

Responses to bushfires, drought and the current global pandemic start with the physical and health sciences. Australia is only likely to return to some form of pre-COVID normality if and when vaccines are available in sufficient quantities and delivered to a sufficient number of people to generate herd immunity. Fire suppression, fire detection, and flora/fauna maintenance are vital to reducing the incidence and costs of catastrophic bushfires. The results summarised in this paper show that there is significant, but not complete, support for some of these interventions with the Australian public appearing to need some additional convincing on their effectiveness.

For both bushfires and public health emergencies, however, the effectiveness of any technological innovations will be determined in part by the way in which the general public and the relevant workforces make decisions. A vaccine for COVID-19 will be far more effective if people trust it and trust those who administer it. An early warning system for bushfires will be more effective if the warnings are heeded. Firefighting resources will be able to suppress more bushfire incidents if properties are well maintained and owners/residents are prepared prior to the height of the bushfire season.

A key finding from the literature and the analysis summarised in this paper is the importance of community functioning or resilience prior to a fire event and during the recovery stage. Investments in community functioning and resilience, even if they ostensibly have no direct relationship to bushfires, can in and of themselves reduce the incidence/costs of fires and perhaps more importantly increase the returns to other investments.