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The social justice issues of smoke im/mobilities

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ABSTRACT

In 2014, the Hazelwood mine fire burned for 45 days. Local communities were impacted by smoke and ash, and there were reports of raised carbon monoxide levels. Local news and social media reported residents experiencing numerous physical symptoms of smoke inhalation, including bleeding noses, coughing, wheezing and chest tightness. Paper masks to filter particulate matter were made available to residents to wear outside. The dust and ash constantly seeped into homes and offices, which required cleaning daily and sometimes multiple times during the day. Smoke was free to move across physical and bodily boundaries while those most vulnerable were hampered by lack of movement: pregnant women, the elderly and children were advised to leave the area. However, this suggestion to 'simply' move ignored the context of a community disproportionately impacted through years of economic decline and societal change. This paper explores the unequal mobilities of smoke and people that arose as a result of this event and draws on concepts of mobility justice (Sheller 2018) and emergency mobilities (Adey 2016) to reflect on the political dimensions of uneven mobility in times of crisis.

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Introduction

In February 2014, the township of Morwell, located in Victoria's Latrobe Valley approximately 150 km from the State's capital, Melbourne, was confronted by bushfires that rapidly spotted into the Morwell open cut coal mine adjacent to the Hazelwood power station. The resultant mine fire burned for over six weeks, shrouding the surrounding communities in smoke (Fisher, Torre, and Marshall 2015). Local communities within the Latrobe Valley, but especially Morwell, were impacted and at times 'overwhelmed' (Teague, Catford, and Petering 2014, 257) by smoke, ash and concerns about raised carbon monoxide levels from this fire. Local news and social media reported residents experiencing numerous physical symptoms of smoke inhalation, including bleeding

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noses, coughing, wheezing and chest tightness. Paper masks to filter particulate matter were made available to residents to wear outside. The dust and ash constantly seeped into homes and offices, which required cleaning daily and sometimes multiple times during the day. Yet while smoke was free to move across physical and bodily boundaries those most vulnerable were hampered by lack of movement. Pregnant women, the elderly and children were advised to leave the area, yet this suggestion to 'simply' move ignored the context of a community disproportionately impacted through years of economic decline and societal change.

With the exception of the 2019–2020 Black Summer bushfires, the Hazelwood mine fire differed from south-eastern Australia's more usual bushfires because of the extended length of time Latrobe Valley communities were affected the smoke. The impact of this event was not only compounded by its length (lasting a period of weeks rather than days), but by the ways in which the smoke was contained within the physical geography of the Valley, and what community members perceived to be a poorly coordinated intervention by authorities. Local communities became increasingly concerned about the perceived health risks of exposure to the smoke and gas emissions from the burning coal, noting increased ill health in themselves, family members, neighbours and friends (as presented in submissions made to the *Hazelwood Mine Fire Inquiry Report* 2014). While this harmful smoke was free to move across physical and bodily boundaries, those most vulnerable were hampered by a lack of movement. In a disadvantaged community such as this, relocating was mostly impossible. It was not affordable to stay in a motel for the six weeks of the smoke event for most people. People still needed to work locally, children needed to attend school, the work of caring for families needed to continue, and older members of the community were concerned their properties would be at risk of damage if they vacated their homes (Walker, Carroll, and Chisholm 2017). Nor was there a coordinated relocation scheme set up by authorities, which meant that one-off offers of holiday homes by people such as the then Victorian premier, Denis Napthine (Hatch 2014), were not practical. Such an apparent lack of concern for their safety reinforced community perceptions of their low worth to the broader Victorian population. As one community member explained, 'we were left to our own devices and forgotten – nobody cared. It didn't matter if we lived or died, we were expendable' (quoted in Yell and Duffy 2018, 68). The Hazelwood mine fire, initially treated as a fire emergency, 'evolved into a chronic technological disaster … and a significant and lengthy environmental and health crisis' (Teague, Catford, and Petering 2014, 28).

This paper draws on data from the Hazelwood Health Study, a 10-year longitudinal study funded by the Victorian Department of Health and established to assess potential health and wellbeing outcomes for people who may have been exposed to smoke from this mine fire. However, while focused on the specific event of the Hazelwood mine fire, the impacts this disaster had on vulnerable communities offer insight into the challenges we face in an era of climate change. As is demonstrated on a larger scale by Australia's 2019–2020 Black Summer bushfires and the 2023 wildfires in much of the Mediterranean, in north Africa and in Canada (Copernicus Atmosphere Monitoring Service 2023; European Union Science Hub 2023), there is inherent danger when human and non-human entanglements are poorly acknowledged in the unfolding of disaster events. In the context of wildfires, the capacities of people to act, move and operate do not match the temporal and spatial scales at which smoke – and its capacity to cause

harm – can travel. These movements can exacerbate already present and deeply embedded inequalities.

Mobilities associated with emergencies have tended to focus on how im/mobility is constituted through specific practices of governance that operate as Foucauldian technologies of power or as exceptions to the practices of everyday life (Adey 2016). As Phil McManus (2021) points out in his discussion of the fire and smoke of Black Summer, what we find in such framing is a mechanistic view of air as air *quality*, something to be maintained, or as air *pollution*, something to be fixed. Fire management does not account for health impacts, and health authorities do not inform fire managers of health impacts. This framing of air also disregards the smoke-related health burden of fire, such as premature mortality and exacerbation of cardio-respiratory conditions (Borchers Arriagada et al. 2020). Nor does it account for issues of vulnerability in some members of the community, or the grief felt in knowing that, in the case of bushfires, the burned remains of wildlife – of 'directly incinerated or asphyxiated creatures' – have contributed to the smoke inhaled (Verlie 2022, 311). Instead, such ways of thinking about air quality bring about a system of 'bureaucratic governance' (McManus 2021, 245) where fires are managed by one agency and the health impacts of smoke by another. In the case of the Hazelwood mine fire, this was evidenced in the governance response to the mine fire, where air quality advice was issued by the Environment Protection Authority (EPA), and health advice by the Department of Health. This led to frustration from residents, who wanted coordinated information about the health impacts of what was in the smoke. What is not considered in such a division of labour and responsibility are the physical and mental health effects of an invisible 'enemy' that seeps into the home without respect for boundaries between a 'safe' inside and a 'dangerous' outside, conditions that were obvious to those in the Latrobe Valley in the unfolding of the Hazelwood mine fire event.

We argue that the movement of smoke poses different social justice questions to those posed by scholars working in the field of emergency mobilities and mobility justice. Nonetheless, a mobilities framework not only offers insight into various forms of movement or stasis compelled by an emergency but also the ways in which im/mobilities are 'governed, freighted with meaning and significance, and lived and experienced' (Adey 2016, 33; see also Salazar 2021). This is especially important when we consider the differing temporal and spatial scales of emergencies. In the case of the Hazelwood mine fire, this means acknowledging smoke's capacity to cross numerous physical and bodily borders, and that the toxicity of smoke may be especially hazardous in already vulnerable communities made even more so by their inability to escape. Therefore, the unfolding of an im/mobilities event has important political and social justice implications because these responses 'could be seen as much more than a symptom of events, but *productive of the emergency itself*' (Adey 2016, 33; emphasis in the original).

In this article we explore the political dimensions of such uneven spatial, temporal and scalar mobilities. Understanding how these unjust im/mobilities are already entrenched within everyday lives (Sheller 2018) is imperative if we want to address a climate-changed future and how this then may inform notions of a just transition. We start with an overview of the work of mobilities scholars considering the connections between emergencies and mobilities, not only with respect to the urgent movement and governance of people in response to crisis but also in consideration of 'vital' mobilities, of 'what needs to be

moved to enable and sustain life' (Sodero 2019, 110). This is followed by a short section outlining the background of the Latrobe Valley and its role in the state of Victoria's coal and energy production. We then discuss the health and wellbeing impacts of the 2014 mine fire, impacts understood by members of the community as representative of the disregard that government and industry had for their wellbeing. Drawing on a mobilities framing, we end with a reflection on how learnings from the Hazelwood mine fire may contribute to addressing the challenges of fast and slow onsets of a climate-changing world, where poor relations between human and the non-human have led to the difficult and dangerous contexts in which we now reside.

Im/mobility and crises

Peter Adey (2016) describes the relations between mobilities and emergencies as an 'inescapable pair': an emergency gives rise to the production and governance of im/mobility, while im/mobility occurs 'in, because of, or through emergency' (Adey 2016, 32). This pairing is borne out by research that has tended to focus on the conditions and governance of crises (Honig 2013). There are two important considerations to this framing of emergency mobilities. First, mobility is always shaped by the 'structures and hierarchies of power' (Hannam, Sheller, Urry 2006, 3), and while people do move all the time, this is prescribed by notions of movement defined as essential (such as in the movement of labour) or permitted by 'actors who have the (legal) power to label them as such' (Salazar 2021: 21). Following on from this point, 'mobile bodies are frequently marked by categories and labels' (Adey et al. 2021, 3) in ways that define bodies in various contexts as having the right or permission to be mobile or, conversely, are deemed threatening or capable of harm and therefore subject to containment (Dorreboom and Barry 2022; Mezzadra and Stierl 2020; Tazzioli, Garelli, and De Genova 2018).

Second, underpinning this framing of mobilities are assumptions that people prefer to remain in place, which then positions migration as 'an *abnormal* human behaviour that responds to crisis' (Zickgraf 2018, 71, emphasis added). Emergency mobilities are assumed to be exceptional events 'and yet are normal to the precariousness of modern existence that they demand sustained attention' (Adey 2016, 34). Nonetheless, assumptions about mobility as exceptional reflect a western view that most people will choose to remain in place, thus in the case of migration in response to a crisis, migration is positioned as a problem to be solved (Zickgraf 2021). This in turn has implications for those remaining in place who are then categorised as unable to migrate and therefore 'stuck' or 'left behind' (Zickgraf 2018). However, these assumptions about the workings of mobility are becoming increasingly important in the context of environmental change brought about by climate change, such as wildfire and flooding, but also war, terrorism, pandemics, among other crises. These events are 'are notoriously mobile, and difficult to predict, spreading like wildfire, cascading across different societal systems (Little 2006) or lurking unseen as "rising tide" type emergencies' (Adey 2016, 35). Emergency mobilities in the contemporary world are therefore less the exception; we are just as likely to be trapped or stranded in a location as to be forced to move and relocate rapidly.

Recent emergency mobilities research has included a more critical exploration of the experiences of emergency mobility, in particular how governance, ethics and politics each shape how bodies are im/mobilised (Adey 2016). For example, managing an

emergency often entails the transportation of medical equipment and staff, medicine and blood products, all of which are mobilised to sustain life. These 'vital mobilities' (Sodero 2019) highlight a different scale of emergency mobilities, that of the microscopic whereby bodily borders are traversed so reminding us that 'we are all permeable' (Sheller 2013, 199) – a state of being made clearer during the height of the COVID-19 pandemic. These differing scales of im/mobility are at work in the context of the Hazelwood mine fire and raise important considerations for issues of social justice in disadvantaged and vulnerable communities.

The Latrobe Valley characteristics and coal-fuelled history

The Latrobe Valley is a major service centre for the broader Gippsland Region, particularly in the provision of retail, entertainment, education and health services. Its population of 75,900 in 2020 is estimated to increase to 83,200 by 2036 (Regional Development Victoria 2022). Important industries include timber processing, paper product manufacturing, agribusiness. However, it is brown coal that has been the major industry for this region. Brown coal has been and remains a major resource for the power-generating industry located in this region. The Latrobe Valley and the wider Gippsland region contains one of the world's largest brown coal reserves (16 per cent of world's brown coal reserves; Department of Education and Early Childhood Development 2012; Wiseman, Campbell, and Green 2017). The State Electricity Commission (SEC) was formed in 1919 following the decision to extract these coal reserves in order to power the state's electricity grid (Gibson 2001). Since this time, the Valley's coal-fired power stations have produced up to 90 per cent of Victoria's electricity supply, shaping the Valley's economic, political, social and cultural landscapes (Duffy and Whyte 2017). Employment opportunities resulted in recruitment of post-war migrants from the United Kingdom, the Netherlands, Poland, Ukraine, Germany, Italy and Malta (Zubrzycki 1964). These immigrants, together with their families, have made strong contributions to the region's social and cultural sense of community. Prior to privatisation of the SEC in the late 1990s, the mines and the electricity supply industry provided 'significant job and apprenticeship opportunities for all members of the community, including those with disabilities and vulnerabilities' (Teague, Catford, and Roper 2016, 85). The confidence offered by public sector ownership of the mines and ready access to employment, principally through the SEC but also through other state and Commonwealth departments and statutory authorities (Hunter and LaMontagne 2008) led to perceptions of this post-war period as idyllic, with security of employment, housing and services that could provide more prosperous futures for both migrants and locals, as well as for the towns and communities of the Latrobe Valley (Duffy and Whyte 2017).

The health of Latrobe Valley communities is intimately linked to the power industry (Duffy and Whyte 2017). Following privatisation and the restructuring of the SEC in the late 1990s, the Latrobe Valley has changed dramatically in character. No longer the 'economic and cultural centre of the whole industrial region' (Read 1996, 29), the Valley was transformed 'into the most disadvantaged location in regional Victoria by most social and economic indicators' (Tomaney and Somerville 2010, 4). These changes led to 'an overarching sense of despair' (Cameron and Gibson 2005, 274). The influx of a low-socio-economic status (SES) and welfare-dependent cohort, attracted by the relatively

cheap housing, led to the region being labelled 'The Valley of the Dole' (Proctor 2005: 22). Exacerbating economic and social decline, employment by electricity-generators and associated industries has led to longer-term health concerns, such as the extensive use of asbestos in housing and industrial applications and subsequent exposure to carcinogens (Hunter and LaMontagne 2008; Lee et al. 2009). Thus, Latrobe Valley communities have borne the economic and health costs of privatisation while economic benefits have been directed to Melbourne's domestic, industrial, and commercial consumers (Birrell 2001). The continued lack of trust in authorities today has its origins in this history of post-privatisation disadvantage (Duffy et al. 2016) that have significant, ongoing impacts on the wellbeing of these communities (Duffy and Whyte 2017; Gibson, Cameron, and Veno 1999). Like most of Australia's coal mining communities, the closure of coal mines in the Latrobe Valley region will have significant impacts on employment, housing, services and population (MacNeil and Beauman 2022). Nonetheless, the Latrobe Valley's reputation for entrenched inter-generational disadvantage (Weller 2020) is intertwined with just transition and environmental justice concerns.

Pernicious movements of smoke and ash

In many parts of Australia, bushfires are common and expected events, sometimes with tragic consequences. In the case of the Hearnes Oak and Driffield bushfires that resulted in the mine fire, these risks were relatively short term. However, the Hazelwood coal mine fire, which lasted for 45 days, was different. The Latrobe Valley communities' experience of relentless waves of smoke, ash and raised carbon monoxide levels (especially within the mine pit) was unlike the experience of a 'typical' Australian bushfire. And although Morwell was particularly affected, depending on wind direction, the smoke and ash reached Moe, Newborough, Traralgon and other towns. As one community member explained: 'If there was an east wind, Traralgon got it, if there was a west wind Moe got it. It went far and wide' (focus group interview, cited in Wood et al. 2015, 7). Indeed, the smoke plume from the mine fire could be clearly identified in satellite images showing its extent across this region (Reisen et al. 2016). The smoke's swift changes of direction and distance it travelled is dramatically captured in the animations based upon modelling undertaken by the air quality team at CSIRO (available at https://hazelwoodhealthstudy.org.au/research-areas/air-quality-assessment). More importantly, subsequent Hazelwood Health Study research has shown that this smoke was hazardous.

There is limited research specific to health outcomes from coal mine fire smoke; however, pollutants are similar to those generated from wildfires (Melody et al. 2019). The *Hazelwood Mine Fire Inquiry* (2014) reported that:

> Pollutants emitted during the Hazelwood mine fire included carbon monoxide, particulate matter, nitrogen dioxide, sulphur dioxide, polycyclic aromatic compounds, volatile organic compounds, dioxins and furans, and metals. Particulate matter is a complex mixture of very small particles and liquid droplets that can combine to make dust, soot and smoke. Exposure … has been linked to adverse health effects. (pp.23–24)

Those participating in a pilot study in 2014 reported a range of health effects (quoted in Wood et al. 2015, 8):

> The first couple of weeks were the hardest. My daughter had two nose bleeds, she had a horrible cough as well.
>
> We all had stinging eyes, headaches, sore throats. Some people had nausea.
>
> Every single day through the thickness of that smoke I felt tight in the chest, I had a sore throat, my eyes were sore and red – and I'm not asthmatic, I'm healthy.
>
> Fatigued, exhausted, emotionally – just wrung out.

Health professionals anecdotally reported that residents presented to them not only with respiratory and other physical effects, but also with more general health and wellbeing concerns related to the fire. These and other debilitating health effects of exposure were confirmed and reported in the first *Hazelwood Mine Fire Inquiry*, where the symptoms listed included:

> headaches, nausea and vomiting, sore and stinging eyes, blood noses, shortness of breath, raised blood pressure, tight chest, sneezing, coughing, tiredness, raspy voice, sore throat, mouth ulcers, rash, diarrhoea, chest pain, sinusitis, ear infection, gastric upset, fatigue/lethargy, confusion, decrease in concentration, unusual/metallic taste in mouth, loss of appetite, and bleeding gums. (Teague, Catford, and Petering 2014, 309)

These anecdotal reports have been supported by findings from the Hazelwood Health Study, which showed an increase in hospitalisations, ambulance call outs, prescribed medications and general practice and specialist services (Carroll et al. 2022; Shao et al. 2020; Smith et al. 2023; Xu et al. 2020).

Burning brown coal releases a plethora of poisonous heavy metals and toxic chemicals, including sulphur dioxide, mercury, particulate matter and nitrogen oxides. Releases are infrequently monitored and poorly controlled in Victoria (Environment Victoria). In Australia, the outdoor air quality standards (National Environment Protection Measures) for PM2.5 particles are 25 micrograms per cubic metre as a 24-hour average. In the case of the Hazelwood mine fire, Fisher, Torre, and Marshall (2015, 6) point out that 'at peak times the concentrations of particles and carbon monoxide were very high and exceeded standards' and that 'the smoke contained numerous contaminants, with particle and CO concentrations exceeding standards'. While there is limited research available regarding the detailed emission characteristics of open cut coal mine fires and their possible effects on human health, the World Health Organization in 2018 reported that high levels of exposure to PM2.5 results in heart and respiratory diseases and is responsible for lung cancer in human beings (WHO online line news release, 2018). These particles are considered especially dangerous to human health because they bypass many of our body's defences. Air quality during the mine fire event was of considerable concern to Latrobe Valley communities, and more specifically the concentrations of major pollutants because of the ways they cross into the body and cause harm.

While the smoke containing these pollutants was highly mobile across this region, residents and workers were not, and this immobility was especially the case for vulnerable members of the community. The direct experience of this and its compounding effects of trauma has been reported:

> The thing is it was actually quite traumatic the whole time and not being in the position to leave, and then being told well you're a bad parent because you're leaving your kids here,

> making you feel bad, your children telling you their house hurts them and they don't want to come home from school, because they were evacuated to another town … does a lot to a parent. And people saying 'Well you could have left if you want to leave' … and this was also coming from people in official positions, saying well if you want to leave no one's stopping you. Well I'm sorry, but circumstances are stopping me. Plus I had nowhere to go … Where are you supposed to go, how are you supposed to afford, six weeks off … ? I contacted my bank to get our home loan deferred, they said unless the government declare it as an emergency area, not going to happen. (Focus group September 2015; quoted in Yell et al. 2019, 76)

People were advised to remain indoors as much as possible on high-risk days associated with high levels of coal mine fire-related fine particles (or PM2.5; Johnson et al. 2019; Johnson et al. 2020), and to not exercise outside. Yet, this did not protect communities from dust and ash that constantly seeped into homes and offices, requiring daily and sometimes multiple cleaning during the day, for the period of the mine fire, as Wood et al. (2015, 9) reported from participants:

> And then there was the ash and the coal dust. It covered absolutely everything. Even that alone. Cleaning that up or even just living with it. My house in Traralgon, which is a fair way away was just covered in that fine coal dust and ash. Every single surface throughout my house.

> It was horrible. They couldn't do anything. They were stuck in their homes. They were using all manner of things like towels and rolling things up to put under doors and trying to protect themselves from all of the cracks and crevices in their house. There were truckloads of coal dust seeping in through the walls and ceilings and every time as fast as they cleaned it up it was back again.

Rather than an expected emergency response or assistance with recovery, community members felt abandoned (Yell et al. 2019). At this time, Melbourne was holding its second White Night festival, an all-night event celebrating contemporary arts, and a number of Latrobe residents talked about the apparent lack of concern for the community associated with the State's electricity production. For those battling the smoke conditions it appeared that authorities were more concerned with ensuring Melbourne's electricity supply. As one participant stated:

> They have that light festival down in Melbourne, and they were so happy to have their festival while we were the ones that were paying for that with our lives, and that went through the community, that was just complete shock that these people could go off and have a party at our expense. (Focus group September 2015; cited in Yell and Duffy 2018, 61)

Such a perception was not contradicted, nor addressed in the initial lack of health advice from authorities. While the Environment Protection Authority began releasing smoke alerts from Day 3 of the fire, associated health advice was not provided until Day 5. This sense of abandonment included the notable absence of an official representative from the Department of Health at the first public meeting in Morwell, which did not take place until Day 5 of the fire (Duffy et al. 2016; Yell et al. 2019). Air quality monitoring in the area of the town closest to the mine did not commence until Day 13, even though elevated readings of carbon monoxide were made on Day 7 by Country Fire Authority HazMat technicians. Discussions between the Incident Controller, Scientific Advisor and the Public Information Officer determined that a 'shelter in place' warning to

residents be made (Yell et al. 2019, 96), yet such an alert was not made public as the Chief Health Officer believed it sent 'a concerning and unnecessary message to the community' (Yell et al. 2019, 97). While advice to avoid heavy outdoor physical activity was given on Day 9, it was not until Day 17 that the Chief Health Officer advised 'at risk' groups – those over 65, pre-school children, pregnant women and anyone with pre-existing respiratory or cardiovascular conditions – to consider temporary relocation, with the community at large asked to consider breaks away from smoke and to avoid outdoor physical activity (Yell et al. 2019, 99). Information was disseminated via media releases on official websites, which was ineffective for this region owing to a high proportion of elderly residents, leading to lower-than-average internet connectivity (Macnamara 2015). Compounding this, the overly technical nature of information provided proved unsuitable for the general public, leading to increased alarm for a community lacking the context to interpret the data. No apparent effort was undertaken to use plain language information about the health implications of exposure to prevailing pollutants (Teague, Catford, and Petering 2014).

Im/mobility, justice and trans-corporeal toxicity

Efforts to manage the potential impacts of the smoke's mobility raised some curious geographical imaginings of place. At a macro-scale, artificial borders were imposed by authorities attempting to contain and respond to the immediate emergency associated with smoke. One specific example is the designation of 'Morwell South' used by authorities as a means to determine those community members most vulnerable to the risks of smoke exposure. However, there is no suburb called Morwell South; rather it seems that this terminology was used to refer to the area south of Commercial Road, which is the area of Morwell closest to the Hazelwood mine and power station. Given this area's proximity to the mine fire, a monitoring station was installed in this area and 'allowed determination of the worst-case community exposure' (cited in Teague, Catford, and Petering 2014, 283). However, Morwell residents were angry and upset by the Chief Health Officer referring to 'Morwell South' since this drew an apparently arbitrary line through the township, and therefore suggested that the smoke was immobile and its negative impacts were attached specifically to people in a particular area. CSIRO modelling demonstrated the smoke concentration was higher closer to the mine (Johnson et al. 2019), nevertheless the smoke was experienced across the town.

The mobility of the mine fire smoke raises a range of environmental justice issues related to the health impacts of smoke exposure. Research conducted four years after the mine fire found that adults who had been exposed to $PM_{2.5}$ particles had decreased respiratory reactance; that is, there is a decreased capacity for the lungs to stretch and a potentially accelerated lung ageing in exposed populations (Holt et al. 2021). As Michael Abramson, the chief investigator of the health study, stated, this is 'probably not reversible' (quoted in Lu 2021, online). Specific groups of people were designated by the emergency managers as more vulnerable to such respiratory issues through a mapping process that nominated certain places as dangerous because of their proximity to the mine fire. Such a mapping sought to address the immediate health impacts of smoke, yet this process minimised the shifting mobility of smoke as its movement interacted with wind currents and the physical geography of the Latrobe Valley. While organisations

and businesses at the time of the fire made decisions about staff evacuating the region, the representation of the emergency as located in a specific place was reinforced in the subsequent research parameters determined by the Victorian Department of Health for the Hazelwood Health Study. The focus of the health study's research on respiratory impacts has been confined to residents who lived in Morwell at the time of the fire and not those who worked in the town, first responders living outside of Morwell, or those who lived elsewhere in the Latrobe Valley (Lu 2021).

At a micro-scale, however, we find that human bodies experience the movement of smoke in quite different spatial and temporal ways. Smoke readily crosses bodily borders and its contaminants can become trapped, which has toxic implications. PM2.5 particles are dangerous to human health because they bypass the body's defences offered by nose hair and mucous (which can trap larger particles) and can penetrate deeply into the lungs and irritate and corrode the lung's alveolar wall, consequently impairing lung function (Xing et al. 2016). PM2.5 particles can be composed of numerous types of chemicals and substances, such as free radicals, metal and organic components that may induce body injury through processes of oxidisation (Xing et al. 2016). These toxins initiate a range of assemblages comprised of human bodies and non-human particulate matter, the more immediate effects of which are evidenced in the range of respiratory, gastric and neurological symptoms noted above. Stacy Alaimo (2010) uses the concept of *trans-corporeality* to capture the material interconnections between human bodies and non-human natures, that 'all creatures, as embodied beings, are intermeshed with the dynamic, material world, which crosses through them, transforms them, and is transformed by them' (Alaimo 2010, 435). Alaimo advocates for such a term so as to acknowledge 'the often unpredictable and unwanted actions of human bodies, nonhuman creatures, ecological systems, chemical agents, and other actors' (2010, 3), that there is potential toxicity in the emergent entanglements of the 'ultimately unmappable landscapes of interacting biological, climatic, economic and political forces' (Alaimo 2010, 2) that are already present in the event of an emergency. In the case of the Hazelwood mine fire, the consequences of creating these more-than-human assemblages as a result of breathing in the mine fire smoke may not be made known for some time – indeed, up to 20 years or more as suggested by ongoing plans for the health study. We want to make clear that in our focus on Latrobe Valley communities, we are not suggesting these communities lack agency or capacity to determine action, rather that the smoke emergency highlights not only the importance of addressing the spatial and temporal impacts of non-human mobility, but also the range of scales at which harm can be caused. In this case, smoke and ash needed to be (re)moved to ensure and sustain human health.

Conclusion

A relational view of mobilities justice, one that considers the importance of our bodily relations in and with place, provides an avenue through which to interrogate the different spatial and temporal scales of injustices arising out of unequal human and non-human mobilities and the more-than-human assemblages that arise out of these relations. Mimi Sheller argues in *Mobility Justice* that mobilities research provides a framework that helps interrogate the injustices arising out of unequal mobilities and

does so by 'focus[ing] attention on embodied and material practices of movement, digital and communicative mobilities, the infrastructures and systems of governance that enable or disable movement' (2018: xv). Governance decisions around spatiality and mobility during this crisis and a policy failure to consider socioeconomic disadvantage exacerbated the immobility of people exposed to the Hazelwood mine fire smoke and constrained their capacity to escape the highly mobile and harmful smoke. The poorly coordinated intervention by authorities made visible the lack of adequate infrastructure and systems of governance to protect vulnerable and disadvantaged communities. The impacts of the Hazelwood mine fire (as documented by the Hazelwood Health Study) demonstrate that when everyday life is disrupted (for example, by a crisis like this one) those everyday assumptions of who can move, when and how are brought into question.

Our approach seeks to better understand how the political dimensions of uneven mobility shaped the emergency arising out of the Hazelwood mine fire because of the sets of emotional and bodily relations that were impacted: disturbed relations between bodies and the home, the affective relations between regional mining communities and the metropolitan capital, relationships of care within communities, and the effects of smoke moving through and within bodies and emotions such movements aroused. We also wish to emphasise that members of the community were active in raising concerns about the impact of smoke on communities and finding solutions. The response to the mine fire and more specifically, the inadequate communication with the community, reignited community activism. One important avenue was social media where members of the community questioned and challenged the poor response from government and other authorities and assisted in creating a stronger sense of community for some. The push from the community was instrumental in securing the long-term Hazelwood Health Study to investigate the health impacts on the community of the mine fire (a fuller discussion of this activism is provided in Yell et al. 2019 and Yell and Duffy 2018).

Nonetheless, the issues of im/mobility raised by the mine fire highlight the challenges of fast and slow onset of a climate-changing world where poor relations between human and the non-human have led to the difficult contexts in which we now reside. The im/mobilities people experienced during the Hazelwood mine fire offer insight into the consequences of the increased risks of wildfire under climate change, and how we must address the impact of smoke-related disasters on communities, bodies and their environments. These challenges require urgent consideration at these spatial and temporal scales and how they inform the development of complex assemblages of human, non-human and more-than-human if we are to transition in ways that are ecologically sound and socially just. Our challenge lies in understanding and addressing the nuances and complexities of the socio-technical systems we inhabit. The consequences of climate change have been inequitably distributed, having greater impact on those with already compromised health and those who are socially, economically and politically marginalised (Heyd 2021, 24). Understanding unequal mobilities is imperative if we want to bring about a just transition to a low-carbon future and find ways to address the impacts wrought by climate change on human and more-than-human environments.

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