



# Lessons learned from Australian bushfires

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This report constitutes a final working manuscript for the headlined project. The official project report, to which reference should be made, can be found on the Lund University's website.

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Lucas Hovart, Tove Frykmer and Margaret McNamee

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### Abstract

This report presents insights gained from an international exchange project aimed at strengthening wildfire preparedness and response in Sweden through lessons learned from Australia, a country with extensive experience in managing bushfires. The study examines governance structures, community engagement, and communication strategies related to bushfire preparedness and resilience. Field observations and stakeholder discussions revealed the critical importance of integrating community-based knowledge, clear communication systems, and shared responsibility frameworks across agencies and residents. Australian experiences demonstrate that effective wildfire management extends beyond technical and operational measures to include social preparedness, adaptive capacity, and recovery support. The findings contribute to ongoing efforts in Sweden to develop holistic wildfire strategies that incorporate both institutional coordination and public participation.

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## Preface

This report summarizes findings from Brandforsk project *Learning from bushfires in Australia* (contract no. 224-003). The project funds travel and accommodation for doctoral student Lucas Hovart to allow part of his research to be conducted in Australia to benefit from learnings in Australia where experience of wildfires, or bushfires as they are called locally, as a complement to his ongoing research in Sweden. Lucas Hovart's time and supervision is funded through FORMAS project *Not my responsibility* (contract no. 2022-01843).

The Brandforsk project is supported by a small reference group comprised of:

- Per Blomqvist, RISE
- Martin Olander, BSL
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# 1 Introduction

## 1.1 Background

Recent findings from the International Panel on Climate Change (IPCC) indicate that we can expect more extreme weather events in the future and a longer fire season in Northern Europe (IPCC, 2023). A recent study in Sweden has indicated that while wildfires have been relatively stable in terms of burned area there are indications that the prevalence and impact of large events is increasing, probably due to climate change (Sjöström and Granström, 2020). Large wildfires imply significant loss of forest materials with serious commercial implications, but also the loss of buildings in the wildland urban interface (WUI) where both wildland and buildings co-exist. Recent large fires in Norway and Sweden in 2014 and 2018 lead to the loss of almost 200 structures (Vermina Plathner and Sjöström, 2021). In the Swedish context, large wildfires remain a comparatively unfamiliar risk for decision-makers and residents than other climate-related hazards. However, the governance challenges they raise, particularly concerning preparedness, coordination, and responsibility, are shared across multiple types of climate-induced disruptions. For instance, while wildfires constitute a distinct hazard, they are also one manifestation of broader climate change-driven societal stresses, alongside floods, extreme rainfall events, heatwaves, and disruptions to critical infrastructure such as electricity, transport, and communication systems. Such stresses induce similar needs in terms of societal protection.

The need for societal protection in Sweden is defined in the Civil Protection Act (CPA, SFS 2003:778). The CPA requires municipalities to provide for the safety of their citizens by the provision of rescue services, including but not limited to the municipal Fire and Rescue Services (FRS). The Government has charged the Swedish Civil Contingencies Agency (MSB), as the central regulatory agency with overall responsibility for the implementation of the CPA. Until 2021, inspection was delegated to the County Administrative Board in each County; but from 2021 inspection has reverted to MSB in view of the overarching responsibilities for incident response which can require capabilities which go beyond the municipal or county borders necessitating sharing of resources and capabilities which may be outside of municipal expertise (MSB, 2022). The approximate structure of national, regional and local authorities is summarized in Figure 1. The picture of relevant stakeholders with a vested interest in wildfires is further complicated by the fact that forest owners are typically private companies, where the mandate of the FRS to make decisions concerning their forest management is tenuous.

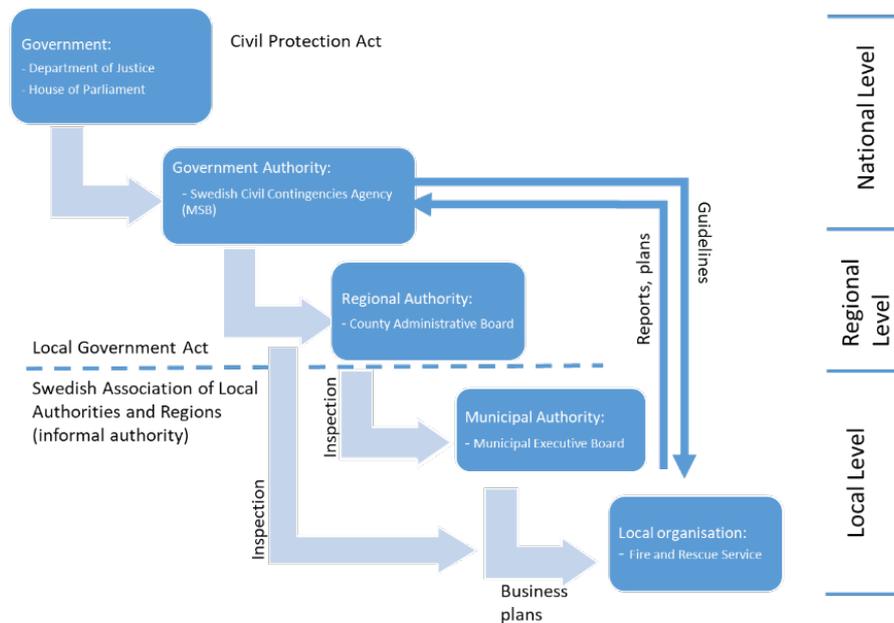


Figure 1: Overarching hierarchical structure of responsibilities and activities for various authorities at local, regional and national level in Sweden. Modified based on Gustavsson, Carlsson et al. (2021).

In 2022, FORMAS awarded Lund University and RISE Research Institutes of Sweden a project to investigate the question of responsibility relative to wildfire preparedness and response, and its division between various stakeholders with a vested interest in wildfire safety in Sweden. The project, called *Not my Responsibility – Improved Wildfire Preparedness through Cross-Sectoral Dialogue (NoMR)* (contract no. 2022-01843) builds on both an understanding of wildfire fuels in Sweden, their ignition and propagation, and wildfire stakeholders. The FORMAS project has its focus on Sweden and Swedish conditions. Recently, the opportunity for a closer collaboration with several research teams in Australia arose which would potentially offer significant advantages when improving wildfire preparedness in Sweden by learning from Australian experience. Funding was sought from Brandforsk and awarded for an exchange between Lund University and these groups in Australia. This report presents a summary of the exchange and reflections on the experience.

## 1.2 Aims and Objectives

The travel to Australia aims to add a depth of understanding of community projects and stakeholder involvement in wildfire prevention and response by visiting research groups in Australia working in the field of bushfire research, to gain experience from the Australian perspective. The researchers which Lucas Hovart has visited are all working in the field of bushfire safety from different perspectives:

- 1) Alex Filkov at the University of Melbourne leads the FLARE Wildfire Research Group and is particularly interested in wildfire fuel behaviour.
- 2) Jaco Fourie is a lecturer at the School of Management of the University of New South Wales and is particularly interested in wildfire governance from the perspective of multi-institution collaboration contexts.

- 3) Erica Kuligowski is principle research fellow at RMIT and is particularly interested in community bushfire safety with a specific look into problematics related to egress.

All groups are excellent in their field and provide opportunities for Lucas to learn from the point of view of a country with far more experience of wildfires than Sweden. In addition, contact was established with a group who were awarded funding in the same call, with one project partner at the University of Canberra, Australia, Elise Remling. This contact led to a seminar held for exchange of information between the ongoing projects.

It is believed that this exchange with Australia will ultimately feed into recommendations for community engagement and stakeholder involvement in Sweden, learning directly from a country with significantly more extensive experience of the issues at hand. Although Australia and Sweden differ in their historical exposure to large wildfires, their community and stakeholder landscapes share important functional similarities, including private land ownership, increased expectations placed on individual preparedness, and the need for coordination between emergency services, local authorities, landowners, and residents. These similarities allow insights from the Australian context to be meaningfully reflected upon and adapted to Swedish conditions, despite differences in scale and frequency of events.

The objectives of the project are mainly the following:

- Learn from on-going activities in Australia concerning stakeholder involvement
- Learn from on-going activities in Australia concerning community engagement
- Align interview questions with input from international experts
- Collect data in Australia for comparison to Swedish data
- Develop a network of contacts in Australia for further development at a distance after return to Sweden.

### 1.3 Report disposition

This introduction is followed by a short presentation of the FORMAS project *Not my responsibility*. Thereafter an overview is given of each of the main University visits and a summary of key outcomes.

Finally, the conclusions from this study and their relevance for the Swedish context are presented. While the empirical focus of the report is on wildfire preparedness, the lessons presented in the conclusion are relevant within a broader climate change context involving preparedness and responsibility-sharing across a range of climate-driven societal risks.

## 2 The scope of the Wildfire problem

Wildfires affect ecosystems, economies, and communities across every inhabited continent. Once viewed largely as seasonal or region-specific events, wildfires are now increasing in frequency, intensity, and geographic reach, driven by a combination of climate change, land-use practices, and human activity. This chapter outlines the global scope of the wildfire problem, starting with a global overview before zooming in on Sweden and Australia.

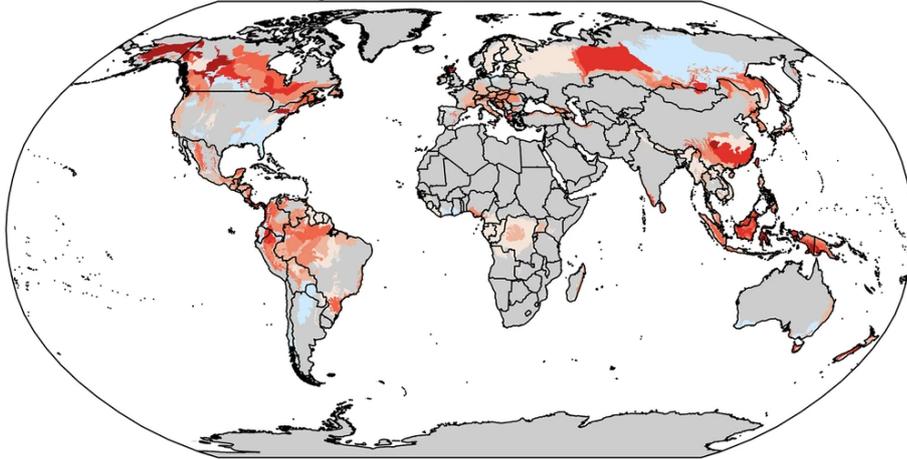
### 2.1 International overview

Fires burn approximately 3-5 million km<sup>2</sup> per year and emit some 8 billion tonnes of CO<sub>2</sub> to the atmosphere (Jones, Abatzoglou et al., 2022). Research indicates that there is a general increase in area burned and fire occurrence but that there is a significant amount of geographic variability (Flannigan, Krawchuk et al., 2009). According to Doerr and Stantín (2016), even while data points to a decrease in the number of wildfires in the US between 1991-2015, there is an increase in both the area burned and the cost of suppression. Therefore, no simple description of the global wildfire problem is possible. In connection to southern boreal forests, Zhu, Xu et al. (2023) recently noted a massive expansion of wildfire and its impact on areas with continuous permafrost, potentially adding to permafrost thaw.

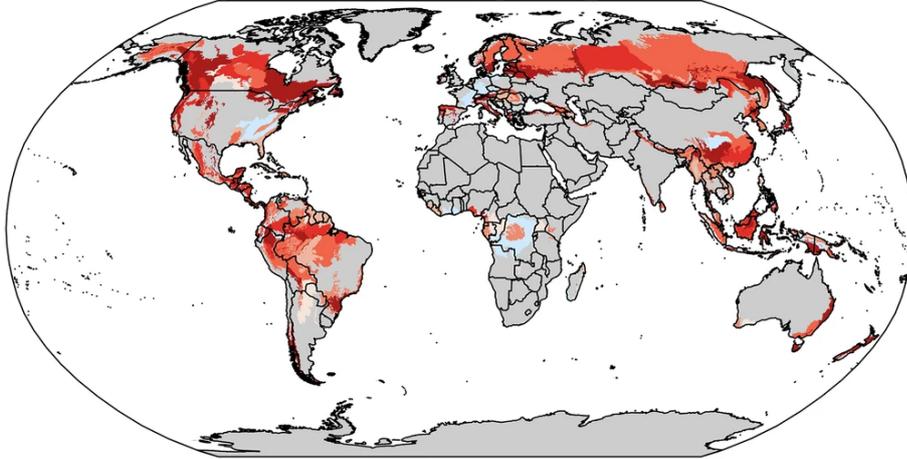
According to Abatzoglou, Kolden et al. (2025), there is evidence for an increase in the odds of extreme regional forest fire years globally. In Figure 2, reproduced from Abatzoglou et al. (2025), there are significant increases in the number of fires, specifically the number of very large fires and the fire carbon emissions in many parts of the world. In their study, they collate changes from 0% to in excess of 600%. This increase coincides well with actual and predicted increases in global day-to-day temperatures (Liu, Fu et al., 2025).

The majority of wildfires do not necessarily present a risk to society and may even contribute to ecosystem health, however, they are a significant risk to human health either intimate with the fire or at significant distances (Jones et al., 2022). In their detailed analysis, Jones et al. (2022), noted that burned area correlated positively with fire weather, which corresponds to our own findings in previous studies (Pagnon Eriksson, Johansson et al., 2023). Increasing temperatures globally naturally corresponds to increasing fire weather with also results in increasing burned area, even if it does not strongly correspond to an increased frequency of wildfires.

**a) Number of Fires**



**b) Number of Very Large Fires**



**c) Fire carbon emissions**

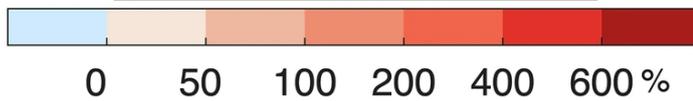
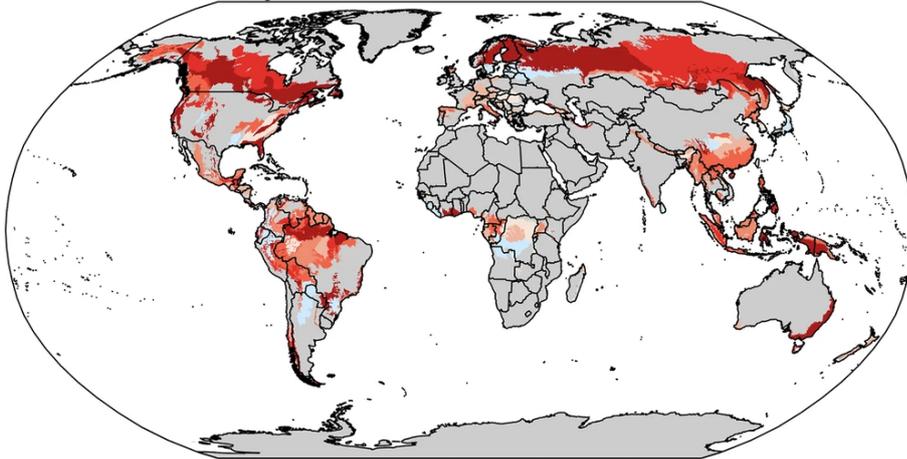


Figure 2: Fire characteristics during extreme regional years globally. Reproduced from Abatzoglou et al. (2025).

## 2.2 Wildfires in Sweden

According to Sjöström and Granström (2020), the area burned due to wildfires has remained at a relatively constant level since the early 1900's, although they note that there are indications in more recent years that the overall severity of fires has been increasing in recent decades. Indeed, in Figure 2, it is clear that in terms of all variables investigated by Abatzoglou et al. (2025), we have seen an increase in Sweden, in particular in terms of large fires and fire carbon emissions while the increase in the number of fires is relatively minor.

The relatively minor increase in the number of wildfires, is corroborated by the data presented in a recent thesis by Björck (2024), see Figure 3.

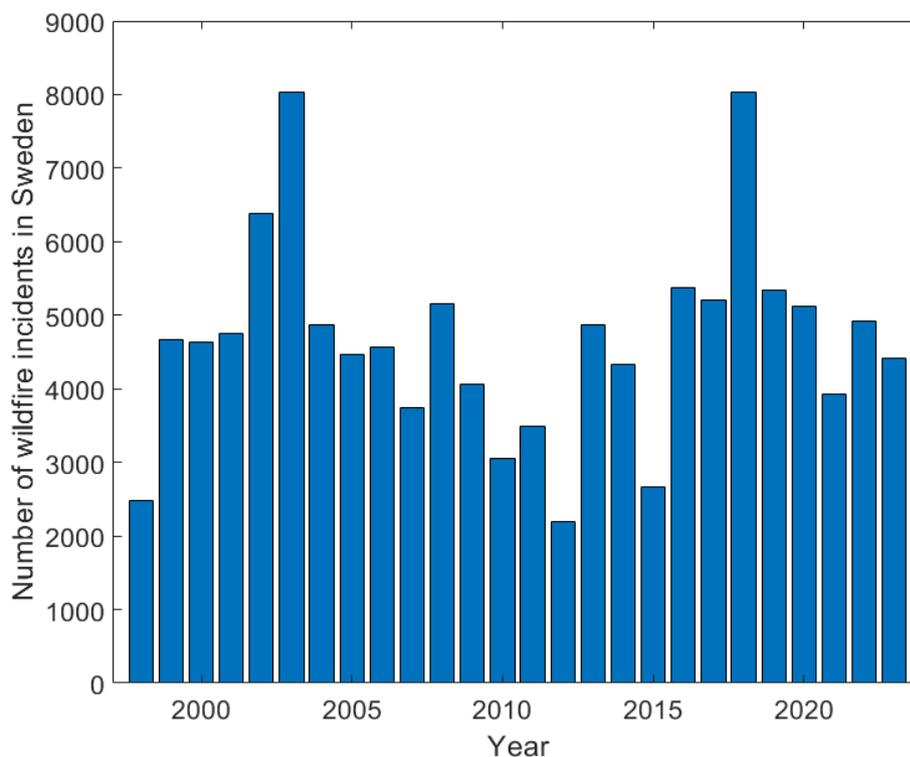


Figure 3: Number of wildfire incidents in Sweden. Reproduced with permission from Björck (2024).

## 2.3 Wildfires in Australia

As illustrated in previous sections of this chapter, there is evidence that more extreme fire events are occurring and will likely continue to do so (Jolly, Cochrane et al., 2015; Sharples, Cary et al., 2016). In Australia, this was particularly apparent in the fire season of 2019/2020, where record temperatures and drought created the perfect conditions for the most extensive wildfires ever experienced in south-eastern Australia (Filkov, Ngo et al., 2020c; Nolan, Boer et al., 2020). In a study from 2020, however, it appears that the number of wildfire fatalities in Australia is very variable (Haynes, Short et al., 2019). In particular, several large events have led to large numbers of civilian deaths, e.g. Black Sunday 1926 (ca 40 deaths), Black Friday 1939 (ca 80 deaths), Hobart 1967 (ca 65 deaths), Ash Wednesday (ca 80 deaths) and Back Saturday 2009 (with ca 170 deaths).

### 3 Not my responsibility – Improved Wildfire Preparedness through Cross-Sectoral Dialogue

The NoMR project began 1<sup>st</sup> December 2022. This chapter contains a short overview of the aims of the project and findings to date together with an introduction to how the travel to Australia enriches ongoing research.

#### 3.1 Project overview

In most developed countries the cost of fire is estimated to at least 1% of the Gross Domestic Product (GDP), a number which has been largely unchanged for decades. Indeed, the total cost of fire in the USA has been estimated at USD 328.5 billion, which was 1.9% of the U.S. GDP (Zhuang, Payyappalli et al., 2017). Global loss due to wildland fire is presently greater than at any time in the past and expected to increase. Estimates of the total cost are varied depending on what direct and indirect costs are included, e.g. the cost of fire suppression and insurance claims for the 2017 wildfire season in the US was \$US14B but the overall cost (including health and remediation costs) was estimated to \$US100B (Roman, Verzoni et al., 2020). While the cost of wildfires in Sweden has not been as much studied as those in the US, it is reasonable to assume that these costs are significant and will continue to rise. Efforts to impact on the prevalence and cost of wildfires requires good fire management which places an emphasis on focussed efforts to change the hazard evolution rather than on specific fuel management. This requires a cohesive strategy, but cohesion is difficult when wildfires can cross significant tracts of land, numerous municipalities, several forest owners and local, regional and governmental agencies. In combating wildfires, the focus is often on incident management; but this is too blunt a tool, where priorities may not align sufficiently during an incident and resources may be stretched. There is a need, in advance of actual operational incident management to ensure a thorough understanding of the priorities of all key stakeholders and to reach consensus ahead of the event.

In light of this need, FORMAS funded the NoMR project in 2022. The project is comprised of six WPs arranged as shown in Figure 4.



Figure 4: Overview of FORMAS project *Not my Responsibility – Improved wildfire preparedness through cross-sectoral dialogue (NoMR)*.

The work packages in figure 2 in green or with a green outline indicate the parts of the study relating to stakeholder (cross-sectoral) dialogue and community engagement.

### 3.2 The Swedish Wildland Urban Interface

The wildland urban interface (WUI) is the portion of forested areas in Sweden of greatest interest for the FRS and various authorities as this is the portion of forested areas where structures and people are most prevalent. A recent study of the WUI in Sweden (Vermina Plathner and Sjöström, 2021) indicated that at least 14% of all landed area in Sweden and 23% of all structures are located in the WUI. Further, the WUI exists across the whole of the country even though the greatest concentration of WUI is in the south of Sweden and close to the major city centres. In contrast, commercial forest owners have a vested interest not only in the WUI regions but also in the areas largely covered by forests. The same study by Vermina Plathner and Sjöström (2021) indicated that wildfires are most prevalent in vegetated areas with no housing followed by fires in the WUI. The prevalence of FRS personnel and equipment (manned or unmanned stations) is at its lowest for the vegetated areas without structures and while it increases for the WUI, fire stations are still sparse in the intermix region with >25km to the nearest fire station in most cases. Commercial forest owners are likely to have the greatest presence in forested areas with low or no housing and are a natural first line of defence against wildfire in such areas. This initial study is, however, based on the definition of the WUI developed for North America and there is some indication that a new definition is needed for Swedish conditions where very low density housing is common in many highly forested areas. The application of a new definition developed specifically for Sweden could mean that the availability of FRS support is even worse than this initial overview indicates.

### 3.3 Community wildfire risk

Given a sound understanding of the WUI for Sweden, there is a pressing need to define hazards and exposure of structures (both housing and critical infrastructure) and assess vulnerabilities to begin to address mitigation needs. Recently, a method has been developed to assess the hazard, exposure and vulnerability of structures in Sweden to wildfires, see Figure 5 (McNamee, Pagnon Eriksson et al., 2022).

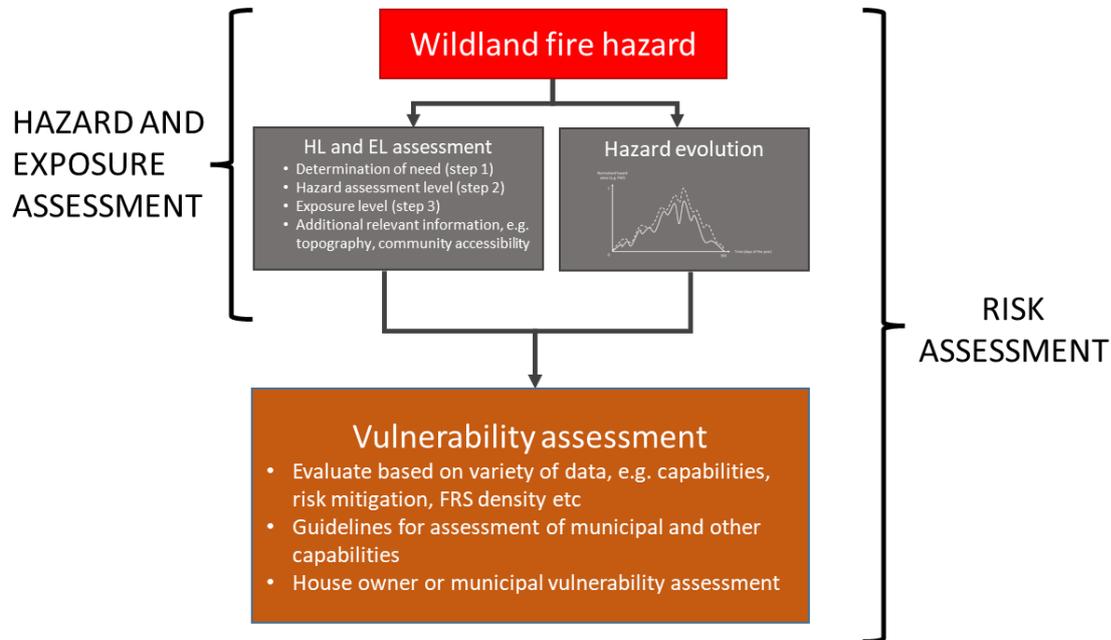


Figure 5: Risk assessment for wildland fire hazard in Sweden. Modified based on (McNamee et al., 2022).

For the risk assessment methodology to be effectively implemented, there is a need for both a technical understanding of the hazard, exposure and vulnerability AND significant cross-sectoral dialogue. Problem-solving requires the development of a common view of what problems need to be solved before a common approach can be accepted and implemented (Uhr, 2009). A common understanding is needed of the fuel types in forest, what hazards these represent and how they should be managed. A detailed fuel map has been developed by MSB (<https://msb-bbk.metria.se/>); but there is only tenuous understanding of the fire performance of these fuels and how this should be efficiently managed. Further, a common understanding of what the hazard and exposure mean in terms of vulnerabilities and their mitigation is presently lacking.

### 3.4 Cross-sectorial dialogue

NoMR aims to develop a common understanding between stakeholders by improving our fundamental knowledge of the wildfire hazard and exposure, identification of vulnerabilities and their mitigation. Cross-sectoral dialogue will be used to foster a common picture of joint and organisation specific responsibilities to improve preparedness for future wildfire incidents. Therefore, activities in NoMR improve preparedness for future wildfire incidents through a two pronged approach: 1) Improving our understanding of the fire performance of wildland fuels and the impact of wildfire management, and 2) cross-sectoral dialogue to

develop a common picture of division of responsibilities and actions concerning wildfire management specifically for Sweden, see Figure 6.

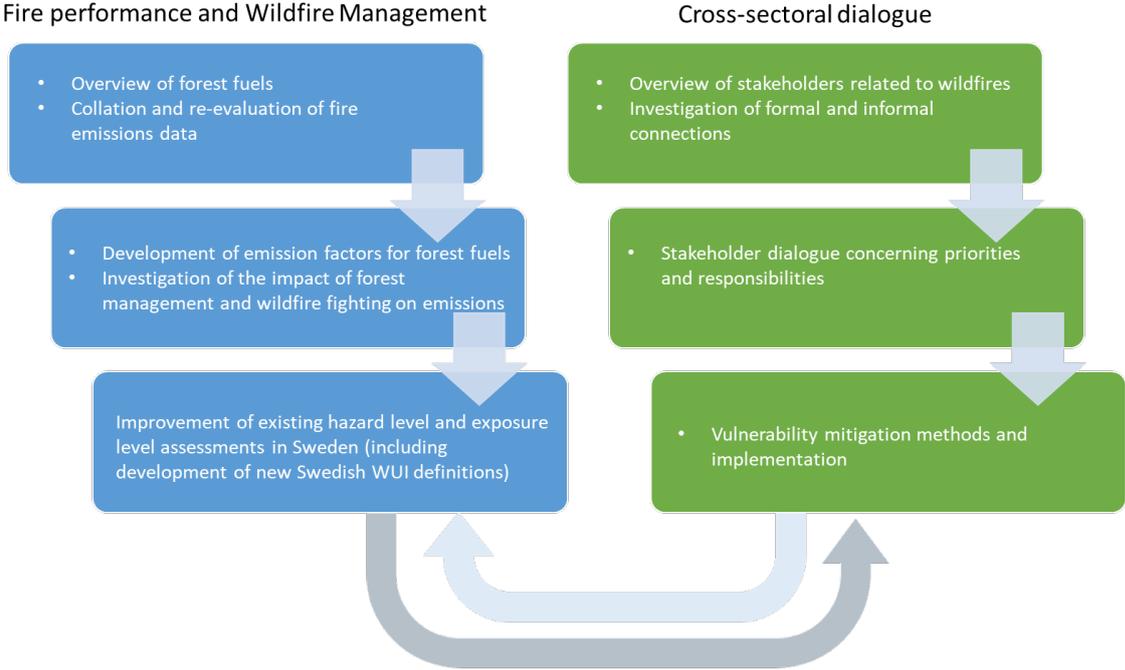


Figure 6: Overview of the two-pronged approach in the NoMR project.

## 4 Exchange with Alex Filkov at the University of Melbourne

Lucas Hovart arrived in Melbourne Australia in November 2024 to spend the first two months at University of Melbourne, Creswick Campus. During this time he learned from the Flare Wildfire Research Group around Professor Alexander Filkov and his teams (see e.g. El Houssami, Mueller et al. (2016); Alexander, Thomas et al. (2018); Cawson, Hemming et al. (2020); Filkov, Ngo et al. (2020a); Filkov, Duff et al. (2020b); Filkov et al. (2020c); Filkov, Tihay-Felicelli et al. (2023)). Professor Filkov received his PhD in Ecology (Physical and Mathematical Sciences) from Tomsk State University, Russia. His previous work focused on development of a new deterministic and probabilistic model to predict forest, grass, and peat fire hazards; understanding thermal properties and smoldering of peat; field and laboratory investigation of forest and grass fires and their impact on structures; understanding influence of radiation on ignition of different materials; and conducting prescribed burning experiments and studying spotting mechanisms. Recently, his interests have expanded to understanding the drivers of wildfire outcomes in communities.

This placement provided both academic collaboration and direct exposure to living in a bushfire-prone environment. Figure 7 shows the entrance to the campus.



*Figure 7: Gate to the Victorian School of Forestry at the University of Melbourne Creswick.*

The Creswick campus borders extensive bushland, which is highly exposed to fire risk during the summer months. The stay coincided with the height of the fire season (December–January). As part of the introduction, Lucas was required to prepare a personal bushfire safety plan and complete an online training course on safe behaviours during elevated fire danger. These resources emphasised preparedness, evacuation planning, protective equipment, and the principle of leaving early rather than attempting to stay, whether for evaluating the risk individually or to defend the property. These trainings also highlighted the importance of reliable, real-time information as the foundation of safety.

Central to this was the VicEmergency app, which provides live updates on fire danger ratings, hazards, ongoing incidents, and evacuation calls. During the Grampians fires of December 2024, for example, the app allowed for tracking the fire's scale and proximity even as Creswick's skies turned dark with smoke. On another occasion, while travelling by train from Sydney, the app confirmed that the smoke visible from the window marked an active fire zone, see Figure 8.

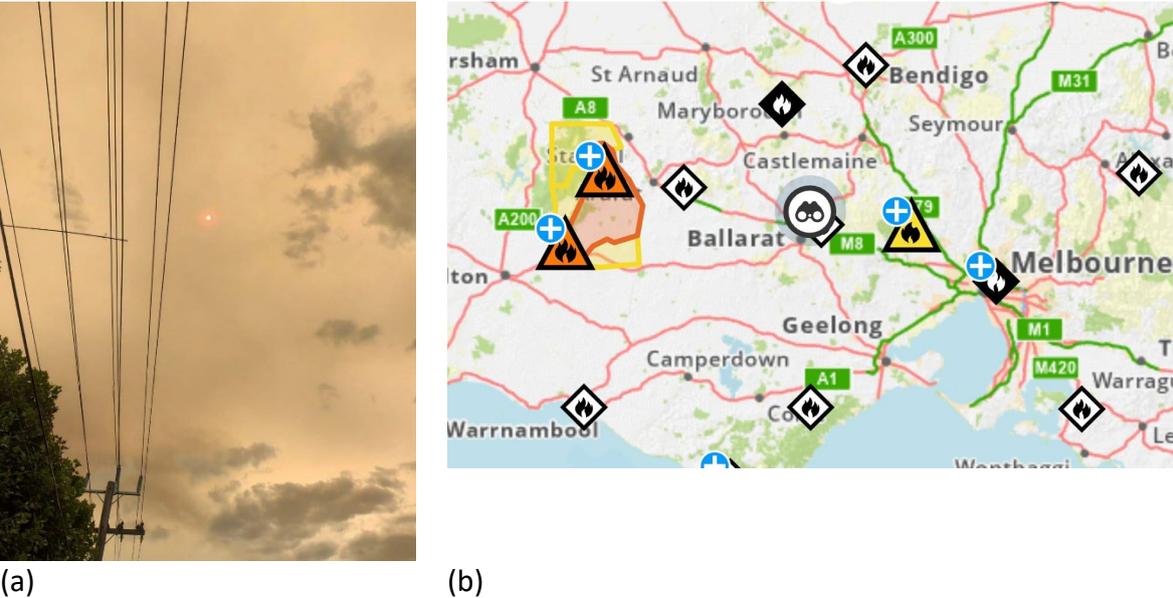


Figure 8: Two images from the wildfire in the Grampians in December 2024. (a) shows the view of the sun taken from the streets in Creswick, (b) shows the information available in the VicEmergency app.

This period of immersion offered more than theoretical knowledge. It provided a lived understanding of how bushfire preparedness is embedded into daily life in Australia. The experience of applying safety plans and tools in a real fire context deepened insights into both the challenges and the practical realities of community-level bushfire preparedness.

Such insights were reinforced by the direct experience of a bushfire in December 2024. On a day rated *extreme* under the Australian Fire Danger Rating System (AFDRS), a fire ignited approximately 4 km from Creswick, along the main road connecting the locality with Ballarat, the nearest large town. The fire, which broke out in the late afternoon, spread towards Ballarat rather than Creswick.



*Figure 9: Photo showing the plume of the bushfire near Creswick campus from Ballarat. Photo by Julio Najera Umana from the Creswick Flare Team.*

During the incident, the previously completed training proved valuable in guiding swift and structured responses. To access support and observe community reactions, Lucas went to the local grocery store (see Figure 10) before joining residents at the town tavern. There, conversations with community elders highlighted their approach: although they had not evacuated in advance as recommended, they remained alert and well-informed through mobile applications, official websites, and continuous observation of weather conditions. Gathering at the tavern also provided a space to share perspectives and collectively assess the situation.



*Figure 10: Photo of local grocery store. Photo by Lucas Hovart. Reproduced with permission of the photographer.*

The fire was declared under control by early evening, coinciding with a sharp drop in temperature and the arrival of rain. This event offered an opportunity both to apply response training in practice and to observe the effective behaviours of community members during an unfolding wildfire.

## 5 Exchange with Jaco Fourie at University of New South Wales (UNSW)

The next stop on the travel was to spend three weeks with Dr Jaco Fourie and his team at the University of New South Wales (<https://www.cacgcs.unsw.edu.au/>). Dr Fourie is a Lecturer in the UNSW School of Management and Governance. He was awarded his Ph.D. in Organization and Management Studies from UNSW Sydney at the beginning of 2021. Since completing his PhD he has been participating in research on governance in crisis situations, in particular wildfires. His research explores governance in polycentric and heterogenous organizational fields. He is presently conducting studies of wildfire stakeholders in Australia and has already provided important input to interview questions planned for Swedish stakeholders.

Collaboration with Dr. Fourie informed the design of the interview guide later used in community-based fieldwork. A parallel exercise was also undertaken in which Australian interview material was reviewed by Lucas and Swedish interview material by Jaco Fourie. This cross-reading enabled comparative discussions of the two contexts. The analysis highlighted the applicability of responsibility frameworks in Sweden from a community perspective, while also identifying a research gap concerning organisational dimensions of shared responsibility.

The UNSW placement further included participation in an article workshop where earlier work was critically examined by senior experts. Feedback received during this activity contributed to the finalisation of a paper draft that has since been submitted to, and accepted by, the *International Journal of Disaster Risk Reduction*.

## 6 Exchange with Erica Kuligowski at Royal Melbourne Institute of Technology (RMIT)

The final leg of the Australian exchange was to spend approx. three months at RMIT to learn from Dr Erica Kuligowski and her team concerning community response to wildfires and community engagement (see e.g. Benjamin, Albert et al. (2020); Haghani, Kuligowski et al. (2022); Gwynne, Ronchi et al. (2023); Forrister, Kuligowski et al. (2024); Sun, Forrister et al. (2024)). Dr. Erica Kuligowski is an ARC Future Fellow and Vice-Chancellor's Senior Research Fellow in the School of Engineering at RMIT University. With a PhD in Sociology and MS and BS degrees in Fire Engineering, she has led interdisciplinary research studies of human response to hazards and disasters to improve the safety of people in buildings and communities around the world. At RMIT, Dr. Kuligowski leads research projects studying how households protect themselves during disasters, and in the process, collects human response data using both traditional (surveys, interviews and focus groups) and newer techniques (social media messages, GPS-based mobile phone signals, and virtual reality experiments).

A central theme that emerged from this period concerned community engagement. Knowledge gained in Victoria was grounded both in institutional perspectives and in direct accounts from residents living in fire-prone areas. Their testimonies formed the basis for a deeper understanding of how bushfire preparedness and response are lived in practice.

### **Institutional and community engagement**

In Victoria, several institutions contribute to bushfire safety, with the Country Fire Authority (CFA) standing out as a key actor, see Figure 11. Established in 1945, CFA is a federation of local fire brigades with a strong volunteer base and deep roots in rural communities. Its members not only bring local knowledge to emergency response but also play a prominent role in community education, distributing materials and maintaining visibility in towns. This presence reinforces a culture in which fire risk remains a constant part of public awareness.



*Figure 11: Logotype of the Country Fire Administration.*

Since 2020, municipal governments have also been formally encouraged to take a more active role in community engagement. However, the flexibility granted to councils results in varied approaches, ranging from monitoring public messaging to organising regular events that sustain conversations on bushfire preparedness. This engagement is visible in the physical landscape of small towns, where CFA stations, siren towers, designated ovals (open fields used for staging or temporary refuge), and emergency relief centres are integrated into the infrastructure and serve as reminders of collective responsibility.

### **Preparedness strategies**

The fire danger rating system in Australia ranges from a moderate danger to catastrophic danger, see Figure 12. The most prominent element of bushfire safety messaging is the “leave early” strategy, which is now strongly emphasised by emergency services following the tragic outcomes of past stay-and-defend attempts. “Leaving early” typically means evacuating the day before, or on the morning of, a declared extreme-risk day.



*Figure 12: Overview of the Australian bushfire danger rating system.*

An “extreme” fire danger rating indicates conditions in which fires are likely to exceed suppression capabilities. At the highest level, “catastrophic,” public communication is unambiguous: lives may be lost if no action is taken. In practice, however, not all residents leave early. The fire danger rating system nevertheless heightens alertness and prompts individuals to review their plans. These plans often include selecting an evacuation

destination, coordinating with household members, preparing supplies, and anticipating the loss of essential services such as power, water, and telecommunications, see Figure 13.

## Survival Options



**LEAVE EARLY**

- > When the Fire Danger Rating is Catastrophic, leaving early is always the safest option.
- > Leave early destinations could include homes of family and friends who live outside the risk area, a nearby town or other built-up area.

**ALWAYS THE SAFEST OPTION**

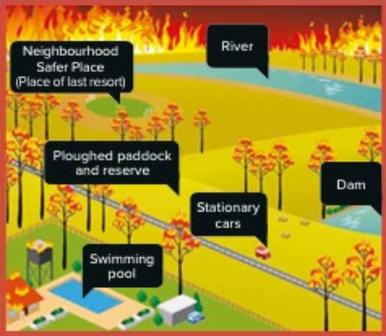


**WELL PREPARED**

If leaving the high risk area is no longer an option, there may be options close to where you are that could protect you. These include:

- > a well-prepared home (yours or your neighbour's) that you can actively defend
- > private bushfire shelter (bunker) that meets current regulations
- > designated community fire refuge
- > think about how you will get there.

**YOUR SAFETY IS NOT GUARANTEED**



**LAST RESORT**

In situations where no other options are available, taking shelter in one of the below may protect you from radiant heat:

- > Bushfire Place of Last Resort (Neighbourhood Safer Place)
- > stationary car in a clear area
- > ploughed paddock or reserve
- > body of water (i.e. beach, swimming pool, dam, river, etc).

**HIGH RISK OF TRAUMA, INJURY OR DEATH. GUARANTEED**

Figure 13: Various survival options as recommended by the CFA.

While official guidance stresses evacuation, some residents still prepare to stay and defend. In these cases, measures may include installing sprinkler systems, choosing fire-resistant building materials, maintaining independent water and electricity supplies, and equipping the property with protective gear and firefighting tools. Testimonies also highlight the importance of mental preparation, as defending a property is reported to be physically exhausting and psychologically traumatic. Many accounts describe experiences of post-traumatic stress following such attempts, which is why remaining on site is no longer openly advised by authorities.

### Limits of preparedness and the role of readiness

The research findings underline that preparedness alone does not guarantee safety. Evacuation may be hindered by road closures or smoke; defended homes may still be lost; and firefighting brigades cannot prioritise every property, even their own members' houses. Outcomes are therefore contingent on circumstances, limiting predictability and underscoring the need to navigate uncertainty.

Community members appear to address this uncertainty through a form of readiness, understood as the ability to adapt in real time. Interviews revealed that residents monitor

multiple information sources, including official apps, websites, and social media, while also interpreting weather signals and sensory cues. Continuous communication with neighbours, friends, and family further supports decision-making. This triangulation of information allows communities to adapt dynamically to evolving conditions, complementing formal preparedness measures.

### **Recovery considerations**

Finally, the research highlighted that recovery begins during the fire itself, not only after. Once evacuated, residents expressed immediate needs for information, emotional support, and a sense of agency. As in preparedness, certainty is limited. While institutional assistance exists, it does not provide instant solutions: insurance processes are often delayed, clean-up costs vary, temporary accommodation is disruptive, and emotional impacts can be long-lasting. Some families reported profound grief and stress, with consequences persisting well beyond the event.

These findings suggest that communities are relatively well supported in preparing for and responding to bushfires, but less equipped to deal with the challenges of recovery. Addressing this gap remains an important area for future work, not only in Australia but also in comparable contexts such as Sweden.

## 7 Exchange with the Centre for Environmental Governance (CEG) at University of Canberra

The network-building was further developed through a workshop with the Centre for Environmental Governance (CEG) at the University of Canberra. It was suggested that NoMR took the opportunity to connect with the centre due to their participation in a FORMAS project which was granted funding at the same call (*Living with wildfire*, <https://lifiproject.com>). The two projects are investigating wildfires from somewhat different angles, but connecting the research groups could bear potential for future collaboration.

In April, NoMR project member, and co-supervisor for Lucas, Tove Frykmer travelled to Australia to visit Lucas in Melbourne and to further network with Jaco Fourie at UNSW. She also contacted senior research fellow Elise Remling at CEG in Canberra to suggest a meeting where experiences could be shared. After receiving a positive answer, Elise and colleagues at CEG invited Tove and Lucas to present the NoMR project and experiences so far in the centre's *Sustainability Seminar Series*. The series' goal is to advance knowledge and generate innovative solutions for complex environmental challenges, and it does so through promoting the dissemination of high-impact, transdisciplinary research and the engagement and discussion between academics, decision-makers, and practitioners.

The seminar took place on April 10. Tove visited the centre in person while Lucas took part through the Teams meeting. Before the seminar, Tove was invited to lunch with Elise and colleagues Leonie Pearson and Jane Alver. At the seminar, around 12 researchers took part in person and around 5 persons joined online. Tove first provided an introduction to Sweden's crisis management policies and frameworks, to facilitate information sharing. Thereafter, Tove introduced the participants to the NoMR project, and Lucas shared preliminary insights regarding the consolidated framework for responsibility in wildfire management, which was worked on during the year, in particular through input from Jacko Furie at the University of NSW. During the seminar, conversations around the presented information took place between the participants and Tove/Lucas. Afterwards, Tove and Elise continued with an informal chat around similarities in research and potential ideas for collaboration, for example around community preparedness and educational material, which could feed into the NoMR project.

## 8 Side activities

Alongside the core placements, several complementary activities contributed to broadening the overall experience.

An informal meeting was held with residents of Marysville, a town destroyed during the Black Saturday fires of 2009 and subsequently rebuilt. Their accounts provided insight into the rapid progression of the fires and the long-term recovery process. This visit highlighted the absence of discussion about recovery and the challenges it poses. Questions of shared responsibility for wildfire preparedness often focus on pre-fire preparedness and response during fire. While recovery is addressed in research, it remains an area under development. Hearing direct accounts for the large challenges of recovery from residents of a community nearly entirely destroyed and rebuilt reveals the importance of including such considerations in frameworks in order to address resilience holistically.

Fieldwork was also undertaken on Indigenous-managed lands, offering exposure to traditional forest management practices and cultural perspectives on fire and land stewardship. This provided a valuable dimension to understanding bushfire resilience in cross-cultural contexts. Observations from this activity revealed key differences in forest management practices between state management and indigenous lands, leading to different development and impacts of wildfire. By comparing indigenous and state owned or private lands, one can notice how different values are prioritised and how it translates into elevated or mitigated fire risk. This dimension points towards the importance of negotiating trade-offs by highlighting values and security trade-offs.

Academic engagement included participation in the Society for Risk Analysis (SRA) conference, which facilitated exchanges with scholars from Australia, New Zealand, Singapore, and the United States. This conference offered a unique opportunity to receive feedback from multiple international experts on the research undertaken in Sweden. Additionally, it contributed to a larger dissemination of the results from the NoMR project and the communication of capacities available in Sweden for international cooperation.

The stay concluded with a visit to the Grampians region, an area heavily affected by recent bushfires. Observing this landscape offered direct insight into how physical spaces are organized to support bushfire resilience. A hike was organized to explore the area by walking to several infrastructures used to monitor the region and the risk of bushfires. Fire towers were approached and their installation discussed. A discussion also occurred about the most recent fires experienced by the community and the challenges they pose regarding the touristic attraction provided by the Grampians.

## 9 Conclusions

Australia has a significantly high frequency and size of wildfires than Sweden. Nonetheless, there are indications that Swedish wildfires are likely to increase in the future (Sjökvist, Axén Mårtensson et al., 2013; Sjökvist, Björck et al., 2016). Australia's long-standing exposure to large-scale bushfires offers valuable lessons for countries such as Sweden, where climate change is expected to increase wildfire frequency and severity. The lessons learned from this research exchange offer the following main insights:

1. **Shared Responsibility:** Effective wildfire management requires clear definition and coordination of responsibilities across government levels, emergency services, landowners, and communities. Shared responsibility is not one size fits all but needs to be tailored to the community and the local agency structure.
2. **Community Engagement:** Continuous engagement through education, preparedness programs, and local volunteerism builds trust and collective resilience. In particular, community engagement fosters community awareness a willingness to take on both legally bound responsibilities and more informal responsibilities.
3. **Information and Communication:** Tools such as the VicEmergency app and consistent fire danger rating systems play a crucial role in enabling informed decision-making and timely evacuation. Similar information is partially available through the 112 app in Sweden but could be developed more to leverage more information.
4. **Preparedness and Readiness:** Technical preparedness must be complemented by readiness — the ability to adapt dynamically to changing fire conditions through situational awareness and local collaboration. Disaster literacy is essential for well prepared and ready communities.

For Sweden, these insights underscore the need to strengthen cross-sectoral dialogue, foster community participation, and integrate social dimensions into wildfire preparedness and policy. Such improvements will benefit beyond wildfire management as they cover needs observed through several hazards across Sweden: floods, storms, disruption to critical infrastructures. Building networks of trust, accountability, and shared learning will be essential to improving national resilience as hazards related risk continues to evolve.

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# Research Team

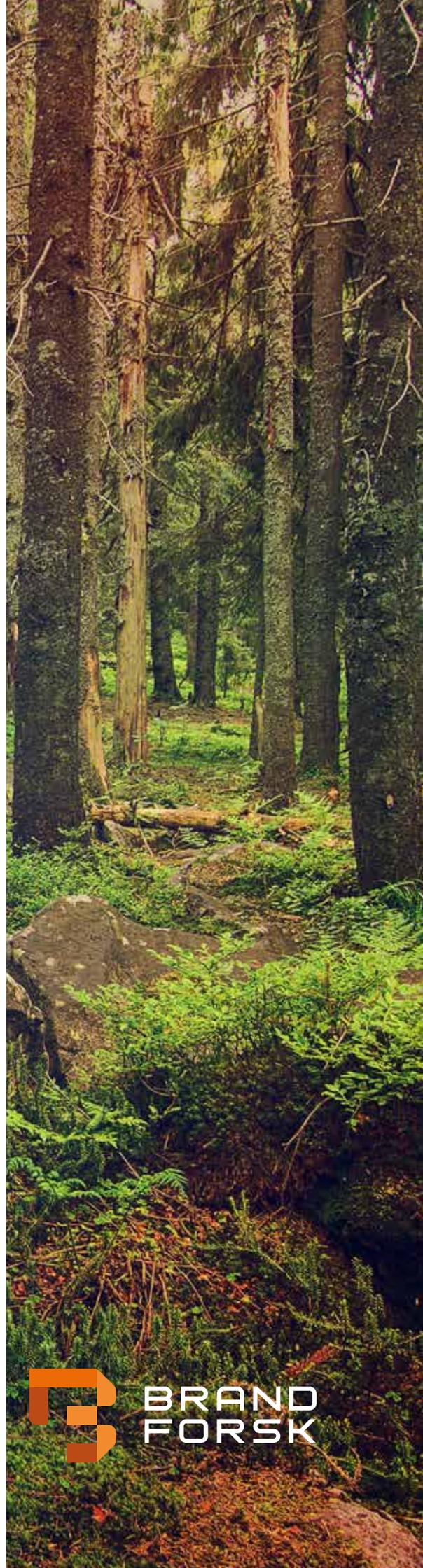


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