Resident and community recovery after wildfires

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Tara K. McGee[1], *Sarah McCaffrey*[2], *Fantina Tedim*[3,4]
[1]Department of Earth and Atmospheric Sciences, University of Alberta, Edmonton, AB, Canada; [2]Rocky Mountain Research Station, USDA Forest Service, Fort Collins, CO, United States; [3]Faculty of Arts and Humanities, University of Porto, Porto, Portugal; [4]Charles Darwin University, Darwin, NWT, Australia

9.1 Introduction

Recovery after a wildfire is a process, both at the community or larger scale and for individuals. The United Nations Office for Disaster Risk Reduction (UNISDR) defines recovery as

> *The restoring or improving of livelihoods and health, as well as economic, physical, social, cultural and environmental assets, systems and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and 'build back better', to avoid or reduce future disaster risk.*
>
> *UNISDR [1].*

Despite the growing wildfire social science literature and increasing impacts of wildfires worldwide, most social science wildfire research has focused on pre-fire mitigation and preparedness. While recent years have seen an increase in research that has focused on during fire dynamics such as evacuation decision-making, there remains little research specific to wildfire recovery [2].

This chapter draws on existing wildfire social science literature to examine the recovery of people and communities after wildfires. First, models of disaster recovery are presented. Then the recovery of people is examined, including the honeymoon period of increased social cohesion immediately after a wildfire, disillusionment as residents deal with challenges including insurance and rebuilding, distress that residents experience and adjustments they make during the recovery process, and increased preparedness that may occur during the recovery process. Community recovery after a wildfire is then examined, including aid provided after a wildfire, rebuilding, and building back better.

9.2 Disaster recovery frameworks

In the US, the Federal Emergency Management Agency (FEMA) and the Substance Abuse and Mental Health Services Administration (SAMHSA) have developed a model which identifies three phases (Fig. 9.1) to show the emotional highs and lows

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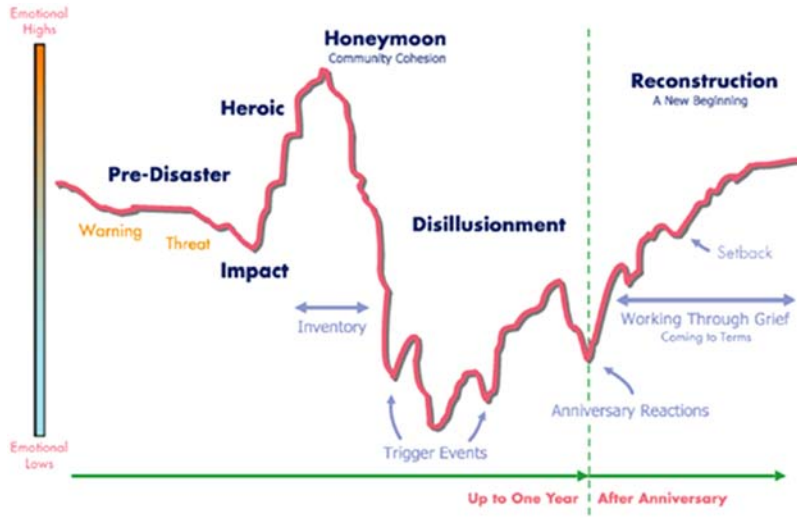

Figure 9.1 FEMA/SAMHSA phases of disaster collective reactions model. *SAMHSA*, Substance Abuse and Mental Health Services Administration.
Source: https://www.samhsa.gov/programs-campaigns/dtac/recovering-disasters/phases-disaster

experienced by people after the disaster and initial relief period: honeymoon, disillusionment, and reconstruction [3]. The honeymoon phase is where people experience emotional highs as they receive disaster assistance, community members bond as they help each other, and people are optimistic that everything will return to normal quickly. This model indicates that this phase typically lasts a few weeks. The disillusionment phase involves emotional lows as people deal with insurance and other challenges, and social networks that were stronger during the honeymoon phase may become divided, and community conflict may occur. The reconstruction phase involves a feeling of recovery where people adjust to a new "normal" while continuing to grieve losses. The model indicates that the reconstruction phase often begins around the 1 year anniversary of the disaster. The three phases of the FEMA/SAMHSA model [3] provide a valuable framework for examining wildfire recovery of residents, discussed in Section 9.3.

Chang has developed a framework of indicators of community and regional recovery: regaining predisaster conditions and attaining a new normality (returning to a stable state) [4]. More recently, Thomalla et al [5] distinguish four different approaches to community recovery, drawing from the international disaster literature:

(1) Early restoration (ER) which involves replacing lost assets and getting lives back to normal as quickly as possible [5];
(2) Linking Relief, Rehabilitation, and Development (LRRD) which focuses on reducing gaps between humanitarian aid and development cooperation [5];
(3) Build Back Better (BBB) which focuses on improving predisaster conditions, which may include more emphasis on environmental sustainability, stronger buildings, and other hazard mitigation, to name a few [5]; and

(4) Empower local communities (ELC), which involves reducing vulnerabilities and root causes of disasters to empower communities [5].

The existing wildfire recovery literature provides insights into the ER and BBB approaches, which are discussed in Section 9.4.

9.3 Wildfire recovery: Residents

Although wildfire recovery studies are limited, they provide evidence for all three of the FEMA/SAMHSA phases.

9.3.1 Honeymoon period

The community cohesion and emotional highs that characterize the honeymoon period early in the recovery process have been found after wildfires [6–8]. The 2002 Rodeo-Chediski fire in the US that burned 189,541 ha and destroyed 426 buildings was the worst wildfire in Arizona's history at that time. Carroll et al [6] conducted interviews 5–6 months after the fire and found evidence that residents and organizations "pulled together," with people sharing food and supplies and providing transportation and information. This increased social cohesion continued after people returned to their homes with neighbors providing shelter and social support to each other [6]. It therefore appears that the honeymoon period can extend well beyond the short phase identified in the FEMA/SAMHSA model.

9.3.2 Disillusionment

In contrast to the honeymoon period where residents experience emotional highs, emotional lows predominate in the disillusionment phase. Pujadas-Botey and Kulig [9] conducted research 4–7 months after the 2011 Slave Lake wildfire in Alberta, Canada, which burned 22,000 ha, caused the evacuation of more than 10,000 residents, and destroyed 333 single-family homes, 11 multi-family homes, six apartment buildings, three churches, 10 businesses, and part of the Government Center in the Town of Slave Lake, and 56 properties outside the town of Slave Lake. Residents in the Town of Slave Lake received little or no warning before the wildfire entered town [10], so many had very little if any time to prepare before they had to leave their home and community. These researchers found that during this phase of the recovery process 4–7 months after the wildfire, parents experienced high levels of stress due to constant concerns about the future of their families, survivors guilt, and disagreements with local authorities about being able to clean up their burned property. Families in their study underwent many adjustments, including re-evaluating life goals and priorities, establishing new routines, changes in attitudes, changes in interactions within the family and community, and new values and perceptions [9].

During the disillusionment phase, community conflicts may occur, and people may attach blame for the impacts of the wildfire [6]. Conflict often focuses on perceived

inadequacies of firefighting effort and aid provided to residents. For example, Rodriguez-Mendez et al [11] studied the 1994 Tyee fire in the State of Washington, US, which burned 54,632 ha and destroyed 35 homes and cabins in the small rural town of Entiat. The researchers conducted interviews 1 month after the fire and found that some residents in Entiat blamed the federal government for their land management and firefighting strategy. Edgeley and Paveglio [7] recently conducted a study 1 year after the 2014 Carlton Complex fire in Washington State, US, which burned 103,599 ha, destroyed 256 houses, and caused other impacts to infrastructure. These researchers identified conflict over the firefighting efforts, with some participants unhappy with the Department of Natural Resources' fire management response. Interestingly, the authors report that a group of residents filed a lawsuit against the Department, claiming that the disaster was preventable [7]. However, these researchers found that some residents affected by the Carlton Complex fire were not critical of the government's firefighting response, causing conflict amongst residents. In addition, FEMA was blamed for not providing Individual Assistance during the recovery process [7], which includes services for temporary housing, home repair and replacement, unemployment insurance, legal services, income tax credits, and crisis counseling [12]. Carroll et al [13] also found that there was conflict around the distribution of helping resources from agencies including FEMA and the Red Cross when they studied six wildfire case studies in the western US.

The disillusionment phase also involves challenges associated with insurance. Many people who lose a home in a wildfire are under insured, and some are not insured at all [14]. For example, Mockrin et al. [15] found that lack of or inadequate insurance posed challenges to rebuilding after three wildfires in Colorado: The Fourmile Canyon Fire (2010) which destroyed 168 homes and burned 2501 ha; High Park Fire (2012) which caused one fatality and destroyed 259 structures; and the Waldo Canyon Fire (2012) which caused two fatalities, 347 homes were destroyed, and 30,000 people were evacuated. However, even if residents are insured adequately, dealing with insurance companies can cause distress during the disillusionment phase after a wildfire. For example, McGee [16] surveyed residents 1 month after the Horse River (Fort McMurray) wildfire and found that dealing with insurance was one of the challenges faced by survey respondents once they returned to Fort McMurray.

9.3.3 Reconstruction

In the reconstruction process, residents affected by a wildfire may continue to experience distress and have setbacks as they adjust to the "new normal." A few studies indicate that distress can continue several years after wildfires have occurred. Kirsch et al [17] examined the public health impacts of 2011 Bastrop County Complex Fire in Texas, US, which was the most destructive wildland urban interface fire in Texas history. The wildfire caused the death of two people, destroyed 1645 homes, and burned 13,786 ha of land. The researchers found that in 2015, 3.5 years after the wildfire, households exposed to the wildfire were still significantly more likely to report symptoms of depression and higher stress than those who were not exposed.

Pfitzer et al. [18] completed research 3 years after the 2009 Black Saturday wildfires in Victoria, Australia, to examine the psychosocial adjustment of residents who had serious burn injuries that required complex medical treatments. The researchers found that one-third of the 13 participants suffered high to very high levels of distress, and 58% fulfilled some or all criteria for posttraumatic stress disorder. Participants also experienced significantly impaired physical health functioning. Although some participants experienced little distress 3 years after the wildfires and others had a decline in stress levels over time, some patients had high levels of distress throughout the 3-year period or experienced an increase in distress later in the recovery process. Researchers have also found that residents can experience psychological distress due to damage to the natural environment after a wildfire. One year after the 2011 Wallow Fire in Arizona, US, Eisenman et al. [19] found that higher loss of solace from the landscape (solastalgia) and adverse impact from the fire were associated with significant psychological distress.

The increased social cohesion of the honeymoon phase may continue during the reconstruction phase. In a study 5 years after the Rodeo-Chediski fire, Carroll et al [20] found there was still evidence of local residents and organizations continuing to support each other 5 years after the fire, clearly indicating that the increased social cohesion that occurs in the honeymoon phase can continue for a long time. In contrast, researchers in Australia found that the period of increased social cohesion may not last. In a study after wildfires in East Gippsland, Australia, Whittaker et al [21] found that social cohesion increased among residents and rural landholders and that divisions in the community that existed before the wildfires were broken down after the wildfires, with people sharing donated goods and working together to clean up after the wildfire. However, the researchers found that after an initial period of increased cohesion, the social divisions gradually re-established as people began to recover.

Although there are mixed findings regarding whether residents will implement recommended mitigation measures to their property as part of the reconstruction process [22], there is some evidence that people may undertake measures to increase their preparedness so that they can respond effectively during a wildfire. In the study after the 2011 Bastrop County Complex fire in Texas, US, Kirsch et al [17] found that 4 years after the wildfire, more than half of respondents were more prepared and had a 3-day supply of food and water, family meeting place, evacuation route, copies of personal documents, and plans for pets and/or livestock. Those in the area during the 2011 fire were more likely to be more prepared than those who were not in the area at the time when the fire occurred.

9.4 Wildfire recovery: Community

9.4.1 Early Restoration

Evidence to date indicates that most approaches to wildfire recovery tend to use on the ER approach, which focuses on replacing lost assets and getting lives back to normal as quickly as possible after a disaster [5]. For residents, the ER approach enables them

to return to their "new normal" quickly in the reconstruction phase. At the community level, this ER approach fits the need for government authorities to be seen to be taking immediate action after a disaster [5]. This strong desire to rebuild quickly was apparent after the 2016 Fort McMurray Horse River wildfire where large "Together we will rebuild" billboards were set up by the Regional Municipality of Wood Buffalo on the highway into Fort McMurray shortly after the fire. Similarly, after the 2003 Canberra (Australia) wildfires, MacKenzie [23] examined the rebuilding process and found that planners who were involved in the rebuilding process responded to

> *social and political pressures from elected officials and senior bureaucrats to return the community to a stable state as soon as possible. Many designers and residents complained that things were happening too slowly.*
>
> *Mackenzie [23], p. 351*

Municipal governments may try to streamline the rebuilding process after a wildfire to make it easier and faster for residents to rebuild. In their study of the 2010 Fourmile Canyon Fire in Colorado US, Mockrin et al. [24] found that Boulder County tried to speed up the rebuilding process by hiring a recovery coordinator for 2 years, and waiving the requirement for site-plan review if the homeowner's new building was no more than 530 square feet larger than the destroyed home and if they applied for a building permit within 2 years of the fire. After other fires in the Colorado Front Range between 2010 and 2012, Mockrin et al. [15] found that Larimer County reduced building permit fees for those who were under- and uninsured; and Colorado Springs simplified site-plan review by allowing the use of previous plans and master plans, and reduced fees for site-plan review and utility reconnection.

Despite pressure from governments and homeowners, and efforts to streamline the rebuilding process, rebuilding after wildfires may be slow. Alexandre et al. [25] examined rebuilding and new building development after wildfires across the US between 2000 and 2005 and found low rates of rebuilding, with only 25% of burned homes rebuilt within 5 years [25]. After the 2010 Fourmile Canyon Fire in Colorado, Mockrin et al. [24] found that 34 months after the fire, only 30% of those who had lost homes had rebuilt and were living in the home, 20% were in the process of rebuilding, and 50% were not yet rebuilding. Similarly, in Canberra, Australia, MacKenzie [23] found that 40% of homes destroyed in the 2003 wildfires were rebuilt 3 years later.

Although rebuilding has been found to be slow, Alexandre et al. [25] found high rates of new housing development within fire perimeters 5 years after US fires between 2000 and 2005. Interestingly, the researchers found geographic differences in housing development rates, with higher rates inside the fire perimeter in some states and lower development rates inside fire perimeters in others. In the states of Kentucky and West Virginia, the number of buildings within the fire perimeters increased even though there was a decline in housing within the surrounding counties. In contrast, in the states of California, Arizona, Colorado, Wisconsin, and most of Utah, there were lower development rates within fire perimeters than in surrounding counties.

The evidence to date indicates that most approaches to wildfire recovery tend to focus on ER. While this approach benefits residents and governments that wish to

return to normal as quickly as possible, it may miss the opportunity to rebuild in a way that will reduce future wildfire risks. For example, after the 2003 Canberra (Australia) wildfires, MacKenzie [23] interviewed design professionals involved in rebuilding homes after the fires. He found that their resident clients who needed to rebuild after the Canberra fires started out the process by wanting to build a safer home, but the designer encouraged them instead to build larger homes to maximize their investment or meet a desire for the ideal home.

9.4.2 Building back better

Following the 2003 Canberra fires, MacKenzie [23] found that some planners recognized that building back as quickly as possible may not lead to the best outcome. As a development assessment officer said:

> *So I think that whole issue of slowing down the whole decision making process [was important], and I can understand why it happened so quickly because they were desperate to normalise their life again […] I think the ones who worked through a very deliberate process ended up with a better outcome than the ones that moved very quickly.*
>
> *Mackenzie [23]*

BBB is a guiding principle of the Sendai framework for Disaster Risk Reduction 2015−20 [26]. As stated in the Sendai framework,

> *In the post-disaster recovery, rehabilitation and reconstruction phase, it is crucial to prevent the creation of and to reduce disaster risk by 'Building Back Better' and increasing public education and awareness of disaster risk.*
>
> *UNISDR [26], p. 14*

BBB provides an opportunity to reduce the vulnerability of communities to future wildfires by implementing mitigation and preparedness activities during the recovery process. Construction standards can be used to ensure that homes are rebuilt to be more resistant to wildfires. One of the most comprehensive construction standards is the Australian Standard AS3959—Construction of Buildings in Bushfire-prone Areas, which was developed in 1999 with revisions in 2009 and 2011. This standard prescribes the minimum level of construction required for new houses and extensions to reduce the risk of ignition from a wildfire while the fire front passes. In the US, California Public Resources Code 4290 and 4291 set out requirements for vegetation management within 100 feet of structures, and minimum fire resistant building codes for new structures.

A small group of researchers has studied BBB after wildfires. After the 2009 Black Saturday fires in the State of Victoria, Australia, Mannakkara et al [27] examined measures implemented by governments to facilitate rebuilding that is more resistant to wildfires, including categorizing property into high-, medium-, and low-risk areas; a revision to the Australian Building Code to include more stringent design and

construction specifications; and stricter implementation of the wildfire management overlay to ensure that homes were designed and constructed appropriately. In the US, Mockrin et al. [15] examined how fires between 2010 and 2012 encouraged building back better in Boulder, Larimer, and Colorado Springs Counties in the state of Colorado. While all three counties had WUI regulations before the wildfires, the researchers found that after wildfires Boulder and Larimer counties did not lessen requirements to facilitate rebuilding, while Colorado Springs strengthened their regulations by encouraging home location changes if they reduced fire hazard, improved access, or reduced land-use impacts.

9.5 Conclusion

Research shows that residents affected by an EWE or smaller wildfire follow the steps in the recovery process identified in the FEMA/SAMHSA model. Studies after wildfires clearly identify a honeymoon phase where residents experience stronger social cohesion, with mixed findings regarding how long this honeymoon period lasts. The disillusionment phase, including community conflict, blaming, and dealing with insurance is also apparent in studies of recovery after wildfires. During the reconstruction phase, many residents continue to experience distress as they try to return to their "new normal." In some instances the increased social cohesion in the honeymoon phase may continue throughout the reconstruction phase. There is evidence that some residents will increase their preparedness after experiencing a wildfire.

At the community level, wildfire recovery studies indicate that there is strong emphasis on rebuilding quickly after a wildfire, in line with the ER approach identified by Thomalla et al. [5]. However, there can be significant delays in rebuilding after wildfires. The ER approach serves residents who wish to return to normal as quickly as possible and political leaders who want to be seen to be acting quickly after a disaster; however, this can limit opportunities to reduce vulnerability in the event of a future wildfire. BBB is advocated by the UN as part of the Sendai Framework for Disaster Risk Reduction. In the context of wildfire recovery, BBB can include a variety of activities including building codes and construction standards for buildings constructed after a wildfire, vegetation management requirements, to name a few.

Additional research is needed in several areas. Further study is needed to examine how long the period of increased social cohesion lasts after a wildfire. More research is also needed to examine residents' efforts to increase their preparedness during the recovery process. Finally, additional research is needed to examine rebuilding during the recovery process to reduce vulnerability in the event of a future wildfire.

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