Chapter 11
Challenges of Post-Disaster Recovery in Rural Areas

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11.1 Introduction

Although disaster losses frequently occur in rural and agricultural areas, a significant majority of the existing disaster research has focused on urban areas and coasts, often overlooking rural populations and communities (Cutter et al. 2016; Tierney 2013). Our research-based understanding of the recovery of housing post disasters in rural areas is even more limited, again with much of the current scholarship focused on urban areas and cities (Ganapati et al. 2013). Furthermore, the majority of the limited studies that have taken place in rural communities have focused on environmental or technological disasters, such as mining-related incidents, and not on more frequently occurring events such as disaster losses from flooding (Scott et al. 2012).

Rising disaster losses and increasing frequency of events across the United States coupled with a current political climate that does not result in a national consensus demand more local responsibility for disaster recovery, when less federal aid is offered as a result, making rural disaster studies a particularly pressing issue. Even if recommendations to address climate change are taken, communities will continue to experience increasing impacts and will be expected to take on a greater percentage of the burden for disaster recovery (Coppola 2016). Research has shown that disaster impacts can best be mediated at the local level, where the most effective risk reduction measures can be undertaken and the most effective policies enacted. Thus, there is a "silver lining" to shift to more local disaster recovery and adaptation attention. Unfortunately, achieving success in risk reduction is far more challenging for communities that lack sufficient resources to ensure the success of these measures and much less have the resources to fund their own adaptation programs (Haddow 2016a, b).

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Even in larger urban areas, resources are often scarce at the local level, where the government is facing pressures to balance budgets and cut expenditures while also experiencing reductions in federal support. The limited tax base of more rural communities makes these pressures even more acute, exacerbating many of these impacts and lessening the community's ability to invest in resilience. These challenges can result in underinvestment in preparedness and hazard mitigation, at a time when those investments are most needed (Skertich et al. 2012). This creates a magnifying effect on what is already a classic example of a "wicked policy problem" (Aldrich and Meyer 2015). The term "wicked problem" denotes those policy challenges for which solutions are not definitive; there is no means to fully test a solution; there is no ability to learn from trial and error because the consequences of attempts at solutions are high; there is no clear set of potential solutions; the problem can be considered a symptom of other problems; multiple explanations exist for the problem and may be contradictory; and the government is liable for the consequences of the actions generated (Rittel et al. 1973).

Crises and catastrophes often have no clear technical or policy solution, a characteristic of wicked problems. They also involve multiple stakeholders and present ripple effects. In other words, a wicked problem is without a clear solution, in a context that further limits the available responses to the issue.

This chapter will begin by summarizing the current literature on post-disaster recovery and resilience in rural areas, followed by presenting a case example from Northern Louisiana,[1] and concludes with some recommendations for strengthening the resilience of rural areas. In order to begin this discussion, it is important to define just what is meant by *rural*. There are several definitions that might be considered, all of which are premised upon being outside of an area defined as urban. The US Census has utilized various definitions over time, with the earliest definition being simply places outside of cities and towns with populations of under 2500 persons (Ratcliffe et al. 2016). More recent definitions also consider density, but the basic definition remains that of areas outside of urban areas. According to the US Census, rural populations declined from 54.4% of the overall US population in 1910 to 19.3% in 2010 (Ratcliffe et al. 2016). This chapter will use the term rural in the broader sense, simply taken to mean areas that are not defined as urban in character. A more specific definition is not feasible given the wide range of definitions utilized within the limited literature and the failure of much of that literature to clearly delineate the bounds of rurality. What is clear, however, is that many rural communities are losing population and in some cases economic viability, a challenge to their ability to adapt to the increasingly frequent and diverse disaster events.

The following map (Fig. 11.1) illustrates the location of rural census tracts across Louisiana.

[1] The abbreviated case study included in this chapter is based upon an ongoing recovery effort. As a result, there is limited data available regarding final outcomes of the recovery process. Over the span of 2017–2018, the time frame during which this chapter was being written, the impacted communities have continued to seek ways to work with the federal and state government to continue their recovery and to improve their adaptation. I would like to thank Olivia Porter for her assistance in locating media and reports about the community's progress.

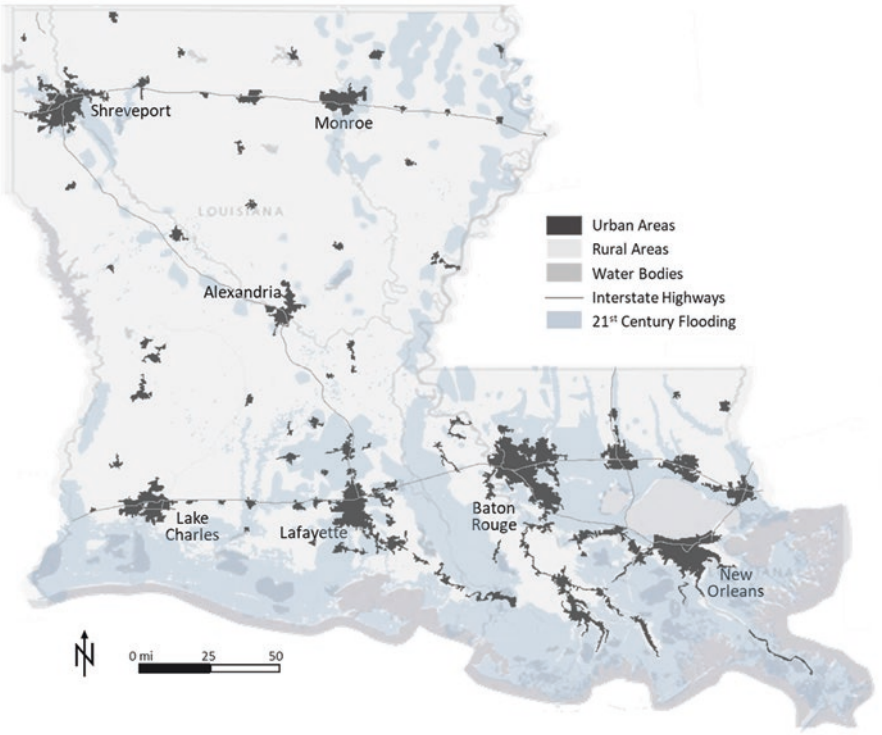

Fig. 11.1 Map showing the distribution of rural and urban areas in Louisiana. Both urban areas (>50,000 people) and urban clusters (2500–50,000 people) are defined by the 2000 US Census. (Data retrieved from the 2000 US Census Summary File 3)

The state of Louisiana received a disaster declaration on March 13, 2016, DR-4263, based upon several days of flooding that had primarily impacted the northern portions of the state. The flooding began in the northwestern portion of the state, sweeping from Shreveport down through Central Louisiana and along the I-20 Corridor, causing extensive damage across both smaller urban areas and rural areas.

The following map (Fig. 11.2) illustrates the extent of the flooding.

11.2 Literature Review

11.2.1 Is There a Difference Between Rural and Urban Areas?

The current literature broadly presents two differing views of the inherent differences between urban and rural areas when it comes to disaster vulnerability and recovery. Some researchers describe rural communities as having more limited capabilities than urban areas, significantly lacking in resources, unable to fully benefit from the resources made available after a disaster, failing to deliver basic

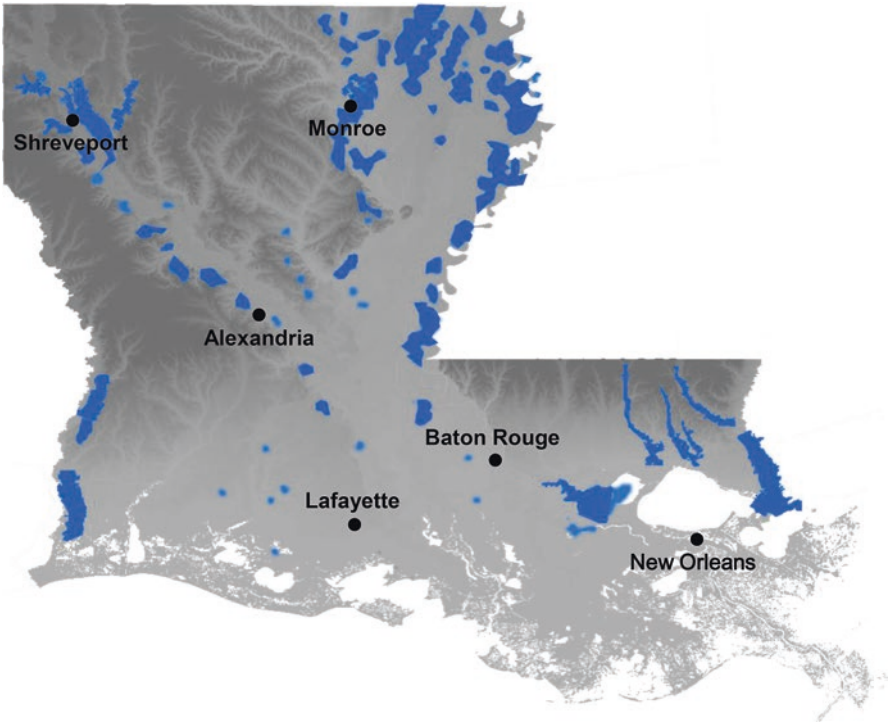

Fig. 11.2 Louisiana flooding in March 2016. (Flood map from Fig. 1.1)

services day-to-day, and quickly losing social support systems in the face of systemic pressures such as shrinking local economies (Downey 2016; Mogle 2017; Tierney 2013; Doherty 2004). This particular view of rural communities is succinctly stated by Tierney, who describes rural communities as "under resourced places in which the capacity to anticipate, cope, and adapt has been seriously compromised (Tierney 2013, p. xv)."

Seen through this lens, larger jurisdictions, such as those in urban areas, have an inherent advantage in terms of larger budgets and staff capacity for building code enforcement. These larger and more resourced jurisdictions can also engage in other resilience promoting actions such as having a "rainy day" fund or investing in resilient infrastructure (May 2013). Communities that are able to maintain a rainy day fund, for example, can begin work without waiting for federal dollars to be made available and can afford to wait several months for reimbursements (Landy 2008). They are also better able to participate in more effective emergency management networks, characterized by crossing sectors and organizations, which have been found by much of the research to improve recovery outcomes (Demiroz et al. 2013). In rural areas, particularly those further for urban centers, these networks, when they exist, have a tendency to be more centralized and include fewer actors (Demiroz et al. 2013).

The second view presented by the research is that rural communities can, in some cases, have a greater sense of self-reliance, stronger social bonds, a defined sense of community, and access to natural resources (Cutter et al. 2016). In other words, rurality can confer certain advantages when it comes to resilience. Cutter, Ash, and Emrich used an index titled the Baseline Resilience Indicators for Communities (BRIC), a model that looks at six different capitals (social, economic, community, institutional, infrastructural, and environmental), in order to analyze whether the rural nature of a community had an impact on resilience. These different capitals align with many of the key elements discussed in the resilience literature, and with several areas in which distinctions are drawn between larger and smaller, or urban and rural communities.

In their research Cutter, Ash, and Emrich found a great deal of variation from region to region and rural community to rural community. However, they did find that community capital variables were generally more prevalent in rural communities, while economic resilience variables were more prevalent in urban areas. Such findings support the assertion that rural communities often possess greater levels of social capital but are also facing extensive challenges relative to their economic base which detract from the benefits of the greater social capital.

However, an interesting finding of the study was the extent to which there was regional variation. Across the United States, the research found pockets of lower economic resilience along the Arkansas, Mississippi, and Louisiana border, as well as increased housing vulnerability due to a prevalence of mobile home building stock in the south. It is worth noting that North Louisiana is included in one of the regions of the country where a greater correlation between rurality and vulnerability was found. Cutter, Ash, and Emrich speculated that the increased vulnerability in certain areas had to do with a history of economic disparities along racial lines and thus the weaker social capital that results from the subcommunity economic differences (2016). The role of racial and economic disparity has been explored by other researchers in the context of disaster vulnerability and will be discussed further below. Given prior experience of the author working within North Louisiana, as well as upon informal conversations she has had with local rural leaders, both of these factors can be said to be present in the flooded areas of North Louisiana.

Another area in which rural communities are at times described as having an advantage is in the complexity, or lack thereof, of local governance structures. In other words, although larger governments with more departments may be more able to provide manpower for disaster recovery, a more centralized and flexible governance structure can present certain advantages. Rural communities may often have a less complex local government landscape to navigate in disaster recovery, but they are also far more cash strapped, have a less diversified economic base, and are less able to maintain a rainy day fund (Caruson and MacManus 2011; Waugh 2013). This advantage may be eliminated by the concurrent difficulties that arise in interacting with disaster recovery mechanisms that require a certain amount of cash reserves and staff capacity.

Recent research into disaster recovery by Mogle found that recovery committees can be more difficult to establish in communities that lack a lot of manpower and are

already reeling from the resources required to navigate complex governmental recovery processes (2017). These committees are a key component of the national framework for disaster recovery and are expected to mirror state and federal frameworks, serving as the key mechanism for receipt of technical assistance. A recovery committee was established in North Louisiana following the 2016 flooding and was negatively impacted by the lack of personnel available to serve the necessary functions. Under the National Disaster Recovery Framework, there are six Recovery Support Functions (RSFs), each focused on a different aspect of recovery, such as economic recovery and housing. These RSFs each require staffing and local engagement in order to successfully participate in a recovery process.

Mogle also found that recovery committees have a very steep learning curve before they can become effective, a challenge exacerbated by limited pre-disaster capabilities (2017). Jurisdictions that have been able to invest in pre-event planning, relationship building, and training around recovery have an inherent advantage. Unfortunately, this is not feasible in communities that are already stretched far too thin. This lack of institutional capacity can have negative impacts on families and households, particularly in the context of a federalist structure that leaves the primary responsibility for emergency management at the local level (Mogle 2017). In fact, comparative research into international disaster recovery has found that recovery in a democracy is negatively impacted by variations in institutional quality, leading to more disparate outcomes than might be found under a more centralized government structure (Persson and Povitkina 2017).

Returning to a broader comparison of urban and rural areas, Caruson and MacManus argued that urban areas might be more vulnerable due to having a wider range of vulnerable populations, infrastructure with greater vulnerabilities, and other limitations (2011). However, even this research recognized some advantages for urban areas, such as greater eligibility for grants and better access to financial resources. These advantages may be more readily available to rural communities that are in sufficient proximity to urban areas so as to participate in regional partnerships or benefit from collaboration and partnerships. In fact, Waugh found that rural populations on the fringe of urban areas could access more assistance than those located at a greater geographic distance, observing empirically the impacts of distance from the urban core that had been reported anecdotally in North Louisiana (2013).

Similarly, Brody and Gunn, looking at community resilience through the lens of development along the Gulf Coast, found that rural jurisdictions contained more pervious surfaces, an indicator of reduced flood risk correlating to the environmental capital included in the Baseline Resilience Indicators for Communities index, but were also experiencing a greater percent loss of wetlands (2013). This finding could also be explained by the fact that the urban areas had already destroyed much of the previous wetland cover which exacerbated their flood risk, while the rural areas were perhaps embarking down the same path. It is interesting to note that although limited development may confer some advantages to rural areas, the lack of building codes may mean that the development, when it does occur, will have even greater detrimental impacts. This is particularly concerning in terms of disaster recovery,

because research in rural areas following disasters have found a greater increase in housing growth in rural areas as opposed to suburban. This is sometimes a function of post-disaster migration away from urban areas, such as what occurred after Hurricane Katrina. This type of migration often drives the most vulnerable away due to rising housing costs as disasters often have a detrimental impact on the affordability of housing (Ganapati et al. 2013). Ganapati found that growth in rural counties after Hurricane Katrina was impacted by domestic migration and resulted in an increase in the percentage of mobile homes. One unfortunate downside to efforts to increase resilience through building codes can be the inability of former residents to afford to rebuild at the new improved standards. This can drive gentrification of urban areas and push the urban poor out to the suburbs or further out to rural communities, both to lower-lying areas and in flood plains. Areas inland from New Orleans received urban residents, some from the iconic Lower Ninth Ward, after Hurricane Katrina only to have these resettlers experience flooding during Hurricane Isaac in 2012 and the August 2016 storm.

Yet another framing of rural resilience involves utilizing the lens of adaptive capacity, built upon the assumption that rural communities are more likely to have a culture of adaptation to challenges and of living with the environment. Cox and Hameln, looking at adaptive capacity in rural Canada, described resilience as the foundation of rural life (2015). In their analysis, rural resilience is treated largely as an offshoot of a broader ethos of adaptation. However, they did find that many rural communities lacked the civic infrastructure to fully participate in resilience planning and that this type of planning effort might not be realistic for smaller rural communities, even when efforts are made to make the process accessible and resources are provided. This finding speaks to the need to adopt a wide range of resilience strategies that can take into account the unique nature of different communities, including the presence of civic infrastructure and governance structures, many qualities which are assets if appreciated and supported in ways possibly different from urban. It is not just offering what is offered to the urban communities but investing the effort to determine what approaches would be supportive of the adaptive skills the rural areas already have as well as the different challenges they experience.

In the communities with which Cox and Hameln interacted, they found governance issues, economic issues, and limitations in capacity that limited the ability to engage for resilience. These limitations, although in the Canadian context, are strikingly similar to the findings from other researchers in US rural jurisdictions. These similarities perhaps open the door for lessons from international contexts and not simply from the United States, arguing that the challenges faced by agricultural and rural communities across the world may share certain similarities and provide valuable lessons.

This chapter will argue that rural communities are in fact facing different challenges in terms of their ability to increase disaster resilience, practice risk reduction, and successfully recover following a disaster. These challenges are exacerbated by the increasing media and policy focus on cities, as the leaders in the climate resilience movement, with much less attention paid to the successes and challenges in

rural America (Haddow 2016a, b). While it is certainly true that cities have been innovative and influential in the climate adaptation movement, it must also be recognized that urban leaders often have greater control over the physical infrastructure, stronger social connections (particularly those that garner resources), and access to more financial resources (Haddow 2016a, b). Furthermore, while direct property losses are much worse in urban areas, due to the concentration of population and the financial value of the built environment, relative impacts are far worse in rural communities (Cutter et al. 2016). This results in a challenge for drawing comparisons, as most damage data is considered in terms of the number of units or the population impacted, with little consideration for the percent impacts upon a particular community. These impacts can be assumed to be magnified in a close-knit, smaller community. However, as the literature has shown, rural communities do have strengths upon which to focus when building resilience, and these should not be discounted in favor of a simplistic assumption that rural jurisdictions are at a significant disadvantage in terms of disaster recovery and resilience.

11.2.2 Challenges Faced by Rural Communities

One of the primary challenges faced by rural communities, even before a disaster, is a more limited ability to not only provide basic services, such as health care and access to broadband, but also extensive limitations in their ability to take action to reduce risk through hazard mitigation (May 2013, 2016). Rural areas in the United States often lack zoning and building codes or lack the capacity to fully enforce existing codes (May 2013; Schwab 2016). At a more fundamental level, rural communities have been struggling to maintain even basic government services in light of economic conditions and changing rural environments and economies, such as the loss of jobs and displacement of small farms (Doherty 2004; Waugh 2013). Rural populations have been declining, with a drop of nearly 200,000 people between 2010 and 2016, due to factors such as outmigration of young adults, fewer births, and an aging population. At the same time, job growth in rural counties following 2011 was substantially lower than in urban counties and the poverty rates much higher (USDA 2017). This has led to the disappearance of support and social systems, at the same time that necessary services such as health services are becoming less available (Doherty 2004).

These challenges have been described as a slowly growing crisis, even outside of a more traditional natural disaster. According to Doherty, even among communities with high levels of social capital and cohesion, a crisis can disrupt the sense of balance and negate the benefits of social capital (2004). This can be particularly problematic when there are competing narratives regarding the origins of the crisis, such as when there are questions around responsibility and impacts and when the detrimental effects are concentrated on particular segments of the population (Aronoff and Gunter 1992). At times the benefits, such as those from economic development, can be concentrated solely in particular segments of the population

while exacerbating vulnerabilities of other segments. Questions of responsibility, particularly around industrial accidents or hazardous materials incidents, can have detrimental effects on rural communities' social capital and on the ability to recover.

The preexisting capacity deficits, coupled with the long-term impacts of sustained crises, leave rural communities unable to fully take advantage of the resources that become available following a disaster (Downey 2016). Bolin and Bolton found this to a be a problem as far back as the late 1980s, finding that rural disaster victims tended to receive aid from less government sources and less total aid (1986). For example, one rural community in Texas struggled to recover following a tornado due to the lack of nonprofit organizations and infrastructure needed to both accept and distribute funds and donations to the victims (Mogle 2017). As with previous examples, the experience of this community illustrates the value of adaptive recovery models that do not demand as much inherent staff and organizational capacity at the local level.

One study of local governments in Pennsylvania, primarily rural governments, by Skertich, Johnson, and Comfort, found four key contributing factors related to the demands and constraints placed upon the provision of public safety and public health services, despite the legal requirements that these services be provided. These contributing factors are (1) the actual legal requirements for the provision of these services, (2) reductions in available economic resources as a result of fiscal stress, (3) cutbacks in personnel as a result of efforts to balance municipal budgets, and (4) increasing demand for services as infrastructure ages and increasing numbers of vulnerable people are living in regions (Skertich et al. 2012). Limitations in levels of household and individual preparedness were also found to have an impact on the success of public safety and public health efforts. As the research shows, communities are facing legal requirements to provide services which they lack the resources to provide while also facing extensive pressures to further cut budgets and staffing. These challenges are difficult to navigate without the added strain of a disaster on aging infrastructure and a vulnerable population.

In their study, Skertich, Johnson, and Comfort found that local governments had turned to both consolidation and privatization as a solution to the complex demands and constraints described above. This approach, which also included utilizing volunteers and placing personnel in dual roles, served to mask the actual limitations that the communities faced. These limitations become glaringly obvious when a disruption occurs. Communities in Pennsylvania were found to have utilized one of three key strategies: (1) increased reliance on technology, (2) reduction of engagement with community participation and preparedness efforts, and (3) increased reliance on larger organizations such as regional or neighboring governments. These three strategies all carry different implications for disaster recovery. The second and third strategies, in particular, can be seen to have very negative impacts on the ability to recover, as in the case of lessened preparedness and reduced community participation that might also negatively impact social capital and civic engagement but, also in case of the third strategy, should the larger organizations have impacts that exceed their own abilities and therefore be less able to render assistance to the smaller jurisdictions that have also been impacted.

Overreliance on partners who may not always be available can result in further decreasing local capabilities. The third strategy, in particular, might be less viable for rural areas that are further removed from larger urban centers.

Revisiting the broader question of whether there is a tangible difference between urban and rural communities, it is clear that the resource constraints described above impact all communities in some way. However, as shown by the current literature, they may have particularly devastating impacts on rural communities where the demands placed upon local government far exceeded its ability to perform. Cutbacks in personnel and other resources are likely to have a direct impact on resilience, as well as on the ability to recover following a natural disaster. Simply stated, when resources are strained during day-to-day operations, there is no capacity to absorb the added demands created by a disaster. Planning is another area in which these constraints have a disproportionate impact.

11.2.3 Constraints to Planning

Another challenge that rural jurisdictions face is limitations in their ability to plan successfully for hazard mitigation and for post-disaster recovery. As might be expected, lower capacity for planning and program management related to hazards has been found to be a concern in rural areas (Waugh 2013). Research by Berke and Campanella found that more immediate and pressing concerns, such as those described in the preceding paragraphs, eclipsed efforts to plan for longer-term issues such as disaster recovery (2006). This inability has detrimental effects on successful recovery management, either because a plan has not been developed or due to the lack of a knowledgeable constituency, as can be created by a robust planning process, who are more likely to support sound risk reduction policies. In fact, this relates directly back to the finding that government capacity to protect its population has direct impacts on the degree of human suffering following a disaster (Persson and Povitkina 2017). If a community cannot effectively plan or prepare, then loss of life and other impacts will be greater.

Most federal assistance programs are premised on risk sharing and risk reduction, both of which require extensive preplanning and a full understanding of risk. In other words, communities that are unable to successfully engage in risk reduction through robust planning and forward looking policies face a substantial disadvantage, even in their interactions with federal programs. This is in keeping with the findings from Persson and Povitkina that disaster prevention can be considered a public good to which access is uneven (2017). They found that democratic institutions fail to protect their populations well in the face of poor planning or incompetence in public administration, both of which can arguably be said to be more prevalent in rural areas due to a lack of capacity and resources. In other words, inadequate planning processes significantly impact government's ability to protect the population.

In keeping with this concern, research into hazard mitigation plan quality found that rural communities faced significant disadvantages in the development of their

plans, including an aging population base, fewer resources, greater isolation, a lack of in-house expertise, limited resources for hiring consultants, inferior housing stock, and poverty (Horney et al. 2017). These challenges impact both infrastructure and social structures, going beyond the traditional scope of a hazard mitigation planning process but clearly impacting the jurisdiction's ability to successfully implement a hazard mitigation strategy. Difficulties in not only hiring consultants but doing so effectively are particularly problematic, given how limited local resources are. Research by Mohr et al. found that smaller rural communities had the most challenges with contracting for services (2010). This is the result of several factors including the fact that smaller governments receive fewer bids, therefore losing the advantages of competition, and have a more difficult time enforcing contract provisions with limited staff or volunteers. Regional planning, as well as regional project implementation, may provide a usable alternative for some communities, but rural jurisdictions are often at a disadvantage in terms of resource allocation through regional mechanisms (Horney et al. 2017).

Program management, in particular, is negatively impacted by the limited borrowing ability and low revenues that small governments often face. However, other organizations such as faith-based organizations may play a key role in supporting local government when they are present and have sufficient capacity (Horney et al. 2017).

11.2.4 Social Capital

The literature on disaster recovery and resilience indicates that social capital plays a key role in a successful recovery and is perhaps particularly vital when other resources are lacking. The suggestion that social capital might play a larger role in rural disaster recovery is an important consideration for this chapter. In order to fully discuss social capital, it is important to begin with an operational definition. This chapter will utilize definitions from Aldrich and Lalone, two leaders in the academic discourse regarding social capital and its applications to the disaster context. Aldrich defines social capital as "networks that connect individuals to each other through weak or strong ties" (2017, 358). This definition emphasizes the connectivity and relational aspect of social capital.

Lalone provides the following definition, which is similar to Aldrich's framing, but also explains some of the mechanisms through which social capital becomes beneficial: "Social capital refers to the resources of support that are embedded within social networks, and that are cemented and reinforced through relationships of trust and social norms emphasizing reciprocity and mutual assistance" (2017, p. 3). This framing of social capital as mutual assistance is one that is seen in much of the literature regarding the beneficial nature of social capital in rural disaster recovery. The literature further distinguishes between bridging and bonding capital, in which bonding capital links similar individuals, such as family members, and bridging capital links people with different backgrounds, typically through

institutions or other organizations. These types of institutions and organizations are often more prevalent in urban areas than they are in more isolated rural communities. A third type of social capital, linking, will be discussed later in this chapter.

Reciprocity, a key component of social capital, has historically been a norm in many farming and mining communities across the rural United States where families supported each other with labor, food, and other resources when employment and crops fluctuated (Lalone 2012). This history of reciprocal assistance can have a tremendous impact on the ability of a community to come together following a crisis and provide support to each other. Bonding social capital, in particular, can increase the prevalence of emergent social action but can also have the unintended effect of reducing the likelihood of seeking external or formal aid, a problem when impacts exceed the capacity of local resources to fully address all needs (Aldrich and Meyer 2015).

A 2012 study of the mobilization of social capital in a rural Appalachian region in Virginia following a 2011 tornado found mobilization of labor and supplies in the response to the event. Local churches quickly came together to provide goods and shelter, families and neighbors stepped into assist with debris, and people came from across the region to provide assistance. In fact, the community response was so successful that formal shelter only remained open for 2 days and the level of community support overwhelmed the state emergency management structures, particularly by the number of volunteers and donations. Local government in neighboring jurisdictions including emergency managers also stepped in to help (LaLone 2012).

This is a clear example of a tradition of reciprocity, between neighbors and also across a broader geographic region, laying the foundation for a more successful disaster recovery. At the same time, it also serves as an example of the difficulty that formal emergency management structures have in coordinating with these existing structures. In this instance, the formal mechanisms do not appear to have impeded the informal recovery mechanisms, but that is not always the case. In some instances, there is a direct conflict between the formal and informal structures, with opportunities for utilizing local capital discarded or, at worst, detrimental impacts on existing social capital as a result of disaster recovery. A highly publicized example of the rural social capital confronting the official urban is the "Cajun Navy" – boat owners from rural Louisiana coastal areas who rushed to New Orleans to help rescue those marooned on rooftops after Hurricane Katrina only to be turned away at the parish line because they had no official role and could have been subject to liability cases. Some managed to get through the barriers to help and now they are considered an emergency group and continue to respond to events such as the recent floods in North Carolina from Hurricane Florence.

Aldrich writing about the role of social capital in disaster recovery described the majority of the post-disaster needs as collective action challenges, situations in which a collective identity and willingness to work together becomes crucial (2017). Social capital, which provides a mechanism for informal mutual aid, is a key asset for collective action challenges. Strong networks, particularly those that include bridging capital, can provide access to resources and information regarding the

trustworthiness of different actors and the best means to both access and utilize resources. Rural communities in closer proximity to urban areas or in larger regions may benefit more from these types of networks. In some cases, bonding social capital can even act like informal insurance. However, by that same token, a disaster can negatively affect social cohesion due to displacement, the extent of losses, or uneven impacts – leading to the creation of a corrosive community (Aldrich and Meyer 2015).

As previously mentioned, researchers have argued that the bonds from social capital are stronger in some rural communities than they are in urban areas because of the prevalence of long-standing relationships based upon reciprocity and mutual assistance, both creating these relationships and becoming stronger as a result of them. This might result in an advantage for communities that do possess strong social capital, as access to social capital can provide resources when other resources are lacking and can correlate to civic engagement which has tangible benefits for the economy and recovery more broadly. Research following an earthquake in Tokyo found that voter turnout was a better indicator of post-disaster population growth than other economic indicators, damage levels, or population density (Aldrich and Meyer 2015).

In fact, research has found that community ties, shared goals, and other intangibles can matter just as much as political and government infrastructure in terms of successful disaster recovery (Ireni-Saban 2012). There is also a documented positive correlation between the number of nongovernmental organizations and social groups active within a community and post-disaster population recovery (Aldrich and Meyer 2015; LaLone 2012). Social capital can also have an empowering impact or even a therapeutic impact for groups that are often considered vulnerable such as women (Ganapati 2012).

In the context of a disaster, these ties can serve to connect communities to power structures and decision-makers, through linking capital – a third type of social capital that extends beyond the immediate community. Social capital can also allow groups to mobilize far more easily and to assist their members through informal assistance and insurance mechanisms. However, social capital may also have occasional negative impacts as it can prevent people from leaving disaster-impacted regions and can support the mobilization of certain groups that might utilize their capital and access to the detriment of others. This is seen in the frequent resistance to post-disaster placement of temporary housing by those neighborhoods in which temporary mobile home parks or to the placement of trailers on personal property while homeowners repair their damaged homes. This is more often the case in more affluent neighborhoods, for example, where the resistance can be based in part upon the exclusion of particular groups such as renters but also upon fear that home values will be reduced (Aldrich and Meyer 2015).

One of the most immediate and important decisions following a disaster is whether to stay or go. Strong community bonds reduce exit, an effect that may have both positive and negative impacts on disaster resilience and recovery. On the one hand, a community in which people come together with a shared commitment to recovery will have certain advantages in terms of the mobilization of resources and

manpower, as well as in community reinvestment and the maintenance of a tax base. On the other hand, an unwillingness to consider leaving may have a negative impact on individual and family recovery, particularly when the community is unable to fully recover and support the recovery of housing, infrastructure, and the economy. Unfortunately, all of these factors have the potential to impact household recovery negatively.

Although social capital plays a key role in effective disaster response and recovery, researchers have found that a failed response can have a detrimental impact on community bonds (Ireni-Saban 2012). This is a concern due to the fact that as communities face an ever-growing array of threats, the potential for a failure becomes even greater and the resulting erosion of social bonds can further damage the community's ability to respond in the future. Given the more significant challenges faced by rural communities, and the value of social bonds within those communities, this is a particularly pressing concern. Furthermore, the erosion of social capital may have longer-term detrimental impacts upon the community as a whole eroding the day-to-day systems of reciprocity, which enable the success of the rural community.

11.2.5 Vulnerability

Much of the research on post-disaster recovery has looked at the exacerbation of social vulnerability as a result of the disaster, as well as at the disparate impacts that result across socioeconomic and demographic characteristics. Although the majority of this research has not explicitly considered differences between rural and urban areas, it is possible to apply the lessons from this research to the rural context. One particularly relevant finding is that recovery in rural areas tends to concentrate socially vulnerable populations in a different physical displacement pattern than what is seen in urban areas (Cutter et al. 2016). This concentration of vulnerability has cascading impacts on the ability to successfully recover, much less to build resilience. Caruson and MacManus argued that true assessments of vulnerability should also consider the ability to manage events and their impacts, not just the socioeconomic and demographic characteristics of the survivors (2011). In other words, the impacts of vulnerability may be exacerbated within the rural context where there is a concentration of socially vulnerable populations coupled with a lessened ability to manage events and their impacts.

Minority racial status and lower-income social class, which have been shown empirically to correlate with higher levels of vulnerability, may also have disparate impacts in rural areas, particularly those with complex histories of racial and economic disparities, as well as ongoing tensions. Research by Highfield, Peacock, and Van Zandt looking at the impacts of Hurricane Ike on Houston found that hazard exposure, structural characteristics, and socioeconomic characteristics were all predictors of structural damage (2014). However, "…even after controlling for [all of] these factors areas with higher proportions of non-white residents and lower-

valued homes received more damage than their counterparts in predominantly white areas despite being further from or outside high-risk areas" (p. 289). In other words, the increased damages and impacts to nonwhite residents and lower-valued homes were found to be the case even outside of the areas of highest risk. This finding is particularly troubling, as it shows that the greatest correlation with disaster impacts was not the characteristics of the event or the condition of the structure but the race of the impacted households. The authors speculated that these disparate impacts had to do with a history of lack of investment by local government in infrastructure and maintenance within the minority communities.

Similarly, a comparison of economic recovery in New Orleans and Gulfport, Mississippi, following Hurricane Katrina, and focusing on the effects of race and poverty, found a greater negative effect on recovery from race outside of urban areas. The research found that community heterogeneity had a positive impact on recovery and that the plight of minorities outside of urban areas did not garner the media coverage and attention that it did in urban areas (Downey 2016). This has significant implications for rural communities that are not heterogeneous and have complex histories of economic and racial disparities. In fact, the social capital of the white residents may enable their recovery at the expense of others.

Perceptions of recovery both within one's own socioeconomic group and looking across groups also appear to be impacted by race and class. A 2017 study of the recovery from the 2011 tornadoes in Joplin, Missouri, and Tuscaloosa, Alabama, found a distinct difference in the ways in which white residents and residents of color perceived the impacts of race, class, and gender on recovery (McKinzie 2017). The study found that white people reported a leveling effect, in which they felt that recovery and disaster impacts rendered community members equal, while people of color often disagreed. The researchers speculated that the history of race relations in both of the cities had an impact on the ways in which race impacted recovery perceptions across the two cities. These differing perceptions of recovery, including the assumptions that a leveling effect has taken place, may in fact contribute to the creation of a corrosive community.

Aranoff and Gunter in their research on communities that successfully avoided the creation of a corrosive community found that three key factors were crucial to avoiding the corrosive community: (1) effective prior leadership, (2) self-identification as a "survivor community," and 3) ties of residence and occupation. In other words, the perception of having social capital as well as the existence of bonding capital had a positive impact on the community's ability to avoid becoming a corrosive community (1992).

Another important consideration relative to the nexus between perceptions and vulnerability is the role that subjective perceptions of individual vulnerability play, particularly in terms of human decision-making around preparedness and risk reduction. Kusenbach and Christman found differences in the perception of risk and social inequalities between experts and individuals within the community 2013). This difference in perception has real implications for populations, such as the population they focused on – that of individuals and families living in mobile homes – because these populations can be considered vulnerable based upon their

housing stock and economic characteristics but may not see themselves in that light and may not respond positively to messaging that requires them to see themselves as a vulnerable population. Rural coastal Louisiana residents who experienced the impacts of the BP oil spill resisted strongly the characterization of being vulnerable, or victims, a requirement of receiving compensation for their fisheries being "oiled" (Laska et al. 2015).

In their research of at-risk mobile home communities, Kusenbach and Christman found that some of the respondents felt a sense of agency and control that did not necessarily align with their risk-reduction efforts. In fact, many respondents had undertaken little to no preparation and had very limited resources but still considered themselves to not be vulnerable (2013). This perception may have to do with resilience characteristics that were not visible to the researchers, but they may also have to do with a lack of understanding regarding the actual level of risk. In other words, the perception of resilience might negatively impact preparedness and self-protective behaviors. The authors go on to suggest that the perception of vulnerability is itself a component of vulnerability, as a condition has to be seen as a problem in order to be responded to. This raises the question of whether or not rural communities might perceive themselves as being more vulnerable than urban. In the case of the communities impacted by the 2016 flooding, there was a definite understanding that their resilience was impacted by a lack of resources and access to power structures, both of which correlated to distance from the capital (Personal communication 2016).[2]

This also creates a nexus with considerations around social capital and perception of inherent resilience and self-sufficiency, such as those held in some rural communities. It may well be the case that focusing on a message of resilience, which is in closer alignment to individual perceptions of the community, will be more effective. This aligns with Aranoff and Gunter's finding, mentioned previously, that self-identification as a resilient community has a positive impact on resiliency.

Aranoff and Gunter identified three key strategies that communities utilized in order to navigate a lack of resources, a component of the community vulnerability described above, in the face of larger needs: (1) making do, (2) taking charge, and (3) working within the system (1992). These strategies have clear applications to disaster recovery, but making do in particular is relevant to this discussion of perceptions, as its utilization required recognition of the community's preexisting socioeconomic place and acceptance that inequities would remain. This recognition may have negative impacts on the resilience of a community, as it may impact the communities' perception of its own resilience.

[2] Personal communications with local officials and community members in late 2016.

11.2.6 Local and State Responsibilities: The Role of Federalism in Rural Recovery

In the context of disaster impacts that exceed a local jurisdiction's capability to successfully respond, there is often an assumption that the next level of government, state, and the federal will intercede and assist. As a result, many assume that an overwhelmed local government can simply request assistance. Although federal aid can be considered generous, it is surrounded by false expectations regarding speed and the needs it can meet (Landy 2008). It also often includes requirements for local match and administration that can be very challenging for a small local jurisdiction. In order to fully understand how to improve recovery and resiliency, it becomes imperative to truly understand the role that our federalist system plays. In the context of homeland security, there is a good bit of confusion regarding the federal and state roles, much less the distinction between local and state. Outside of warfare, public safety is a state and locally incorporated city or county responsibility when the impacted area is not incorporated. Police, fire, and public health all reside with the state itself, although local governments can be granted rights and responsibilities by the state constitution. The federal government may provide training and equipment, as well as occasional grants, but the states serve as intermediaries (Eisinger 2006).

Generally speaking, the US Constitution only recognizes the federal and state governments. The states are sovereign jurisdictions with their own constitutions that establish local government rights and responsibilities. The extent to which the state can intervene in local decision-making varies, with home-rule states enforcing strict limitations (Col 2007). The federal government tends to provide aid to the state, which then can assist localities. This can be done through block grants, grant programs, and other mechanisms (Landy 2008). The state is the primary decision-making entity. In some cases, feuding between local entities has a negative impact on assistance received as competition between entities can harm the relationship with the state.

11.2.7 Cooperation and Networks

Recent research in emergency management has found that effective disaster recovery, particularly in communities that are lacking in resources, requires a shift in mind-set towards interagency cooperation. Cooperation and regional networks can also be a mechanism through which local communities can support each other in meeting their responsibilities relative to public safety. However, maintaining such networks can be very difficult and require extensive, continual resource investments (Bowman and Parsons 2013).

This constitutes a paradigm shift for many government departments or the entire communities, particularly when they are used to sharing some minimal information but not sustaining consistent action-based involvement with partners (Bowman and

Parsons 2013; Skertich et al. 2012). However, integrated emergency management, which is characterized by the use of networks, is far more effective at coordinating with other entities, both locally and vertically. Resources-strapped rural communities can benefit greatly from this kind of coordination and may help communities learn how to collaborate in post-disaster recovery when the emergency response collaboration is practiced.

Research by Bowman and Parsons into what constitutes functional and effective emergency management networks found that the best partners are often other jurisdictions and state agencies (2013). They found that the most successful networks function as performance regimes with a focus on actions and goals. They also found that counties with higher capacity tend to interact less with smaller towns and jurisdictions, a missed opportunity for the smaller governments, and that counties win geographic proximity to state actors engage more fully with the state. These findings have real implications for rural communities seeking to engage in functional networks.

As this indicates, rural communities face certain disadvantages when attempting to work within network structures, including negative impacts from population instability and economic downturns (Bowman and Parsons 2013; Caruson and MacManus 2011). One study by Choi and Kim found that power, defined as the ability to get things done, is a determinant of network effectiveness (2007). The research looked at several types of power within networks: structural (formal power within the design of the network), resource, actor, cognitive, and political. Unfortunately, rural emergency managers operating within a network that includes larger partners may be lacking in all of these forms of power. Cognitive-based power, stemming from local knowledge, might be an asset in some situations. However, formal emergency management structures, including the systems for engagement with the nonprofit sector, often fail to really utilize local knowledge or to take into account community values and norms. This results in an inability to make the best use of local nonprofits and community-based groups that are best suited to serve the impacted community. Ireni-Saban identified this phenomenon following Hurricane Katrina, and it is a recurring concern across other disasters (2012). For rural communities, where informal actors are most important, the lack of appreciation for local knowledge and community values and norms is particularly problematic.

11.3 2016 Louisiana Flooding

The flooding in March of 2016 impacted many communities in the northern areas of Louisiana. Although there are some larger population centers that were impacted, generally speaking, Central and Northern Louisiana communities have more of an agricultural and industrial economy than Southeastern Louisiana. These communities, like much of rural America, have suffered from the economic downturn and general changes in the national and state economies. A review of existing hazard mitigation plans, such as the one for Ouachita Parish (the county

upon which this case focuses), reveals a backlog of needed infrastructure work. The parish, and its incorporated jurisdictions, also struggles with blighted properties and a general lack of safe and affordable housing (Ouachita Parish 2018).

The storm-impacted communities suffered extensive damage to housing, infrastructure, agriculture, and economy – all of which were already strained. Ouachita Parish reported an estimated 9500 flood-damaged homes, with around 5400 homes reported to have been completely flooded (Robichaud 2017). FEMA approved approximately $94 million in housing and other needs assistance through its Individual Assistance Program relating to the March flooding (FEMA 2017). Infrastructure impacts throughout the northern region were severe as many access roads, highways, waterways, and railways in these rural communities were reported flooded due to record river crests (Vagell 2016). Damage to these transportation routes caused cascading impacts to the many industries dependent upon them (US Economic Development Administration 2017). Road flooding also affected rural school bus routes and caused school closures across the region (Associated Press 2016). In total, FEMA reported having provided more than $47 million to repair infrastructure and conduct emergency work in the communities affected by the spring flooding (FEMA 2017).

Impacts on the agriculture industry were also significant, partly due to the rain event having occurred just after the state's corn planting season (Gautreaux 2016). Thus, impacts to agriculture included lost revenues from damaged crops and the cost of replanting flooded fields, as well as crop yield losses, lost livestock, and costs associated with relocating surviving herds (McClure 2016). Total impacts to the agricultural industry from the March flooding event totaled over $80 million (Louisiana Office of Community Development Disaster Recovery Unit 2019).

In addition to the damage to the agricultural industry, economic impacts of the flooding in the northern region were also felt by the area's small businesses. Businesses having to evacuate during the rain event suffered lost revenue as well as damage from floodwaters. By December 2016, the Small Business Administration had approved over $15 million in Business and Economic Injury Disaster Loans to business in the region affected by the flooding (Louisiana Office of Community Development Disaster Recovery Unit 2019). Additionally, Louisiana Economic Development approved 698 loans of more than $36 million in assistance to small businesses affected by the flooding (LED 2016).

The rural nature of many of the impacted communities, coupled with the distance from the state capital and a lack of experience navigating the federal public assistance process, led to a failure to fully document damages. Local officials and volunteers reported limited assistance from the state in damage documentation and repeatedly voiced concerns that they were not equipped to fully document damages. Although local officials did request additional assistance and did work to bring political pressure to bear, the subsequent flooding of more populous areas closer to Baton Rouge further impacted their ability to access the needed technical resources (Personal communication 2016).[3]

[3] Personal communications with local officials and community members in late 2016.

The distance from the capital followed by the flooding of communities with much stronger linkages to the state government led to a perceived lack of investment in Ouachita's recovery and to the perception that other areas of the state constituted a higher priority for the state government (O'Donoghue 2016). This was reflected in challenges around damage assessment, in variations in resource allocation for studies, and in direct access to key decision-makers.

These disparities were further exacerbated when areas closer to the capital, including many suburbs, were flooded in August of 2016. The August flooding diverted attention from the remaining needs in North Louisiana and re-impacted some of the areas that had flooded in March (Grueskin 2018). Although there is little data currently available regarding the status of the recovery, anecdotal data indicates an ongoing struggle to fully recover including many of the challenges that the literature would indicate might be expected.

Efforts at the state and local level to address regional resilience to extreme weather events like the March 2016 floods are underway, yet much of this planning is still in the development stage. Following the March and August 2016 flooding, a state agency initiative to develop regional "watershed coalitions" was created by the Louisiana Resilient Recovery Initiative. In 2018, Governor Edwards issued the Executive Order JBE18–16 that formally created the Council on Watershed Management. The council is comprised of individual parish government entities, OCD, CPRA, GOHSEP, the Department of Transportation and Development, and the Department of Wildlife and Fisheries. The council is tasked with creating a floodplain management plan based on watershed data. The plan is in the development stages, with an implementation goal of March 2019 (Louisiana Watershed Initiative 2019).

Ouachita Parish has successfully worked with the state and federal government to initiate a recovery planning process. Public meetings took place in July of 2018, over 2 years after the flooding. They were focused on how the parish might become more resilient (Merritt 2018; Ouachita Strong 2018). This process is still ongoing, but local officials hope that it will lead to greater investment in the resilience of the community (Personal communication 2018)[4] . Thus, it is evident that efforts at the state and local level are underway to address future resilience to flooding events like that experienced by Northern Louisiana in March 2016. It is too soon to know how successful they will be.

11.4 Conclusion and Recommendations

There are three key recommendations that emerge from the research: (1) planning for community resilience should consider means to build upon existing social capital while also increasing local social capital; (2) networks and interaction between peers may be the best means to improve recovery outcomes in under-resourced

[4] Personal communications with local officials and community members in 2018.

communities; and (3) disaster recovery processes must take into account the differences between communities and actively strive to ensure equitable access to resources as well as equitable outcomes.

These recommendations support the increased resilience of all communities, not just rural, but they are particularly relevant to communities that have a shortage of capacity or financial resources.

Recommendation #1

Both informal social capital networks and formal policy/planning channels are critical to achieving community resilience (LaLone 2012). These channels are often overlooked by traditional emergency management actors, who focus more on command and control and do not understand the contributions that arise from social capital (LaLone 2012). Social capital can be increased through the nurturing of community relationships of reciprocity and trust (Ireni-Saban 2012). Aldrich and Meyer found that social capital can also be increased through what they termed time banking, building a history of time spent together at regular gatherings, and supported through spatial design (2015). In other words, it is simply creating spaces and reasons for individuals to spend time interacting with each other and building a "bank" of time spent together. It can also be built through face-to-face interactions, supportive policies, institutional support, and leadership programs. The Ouachita Strong Resilience Strategy planning process has sought to identify ways in which to foster community relationships but has also brought to the forefront several preexisting tensions.

Several key barriers to resilience can be overcome through the increasing of social capital. As Rivera and Settembrino observed, a community may face few environmental hazards but still suffer from social and economic pressures and problems that have a negative impact upon their resilience (2013). Key barriers to building resilience in the face of these pressures are mistrust of the government and the lack of access to resources. These barriers can be mediated through an increase in bonding and bridging social capital, as individuals foster relationships that increase their access to resources and personal connections to those within the government. Furthermore, focusing on community capacity building has been found to be more effective than focusing on reducing administrative shortcomings (Ireni-Saban 2012). Such an approach might be tied into existing planning processes or might be accomplished through partnerships and networks.

Recommendation #2

Research has shown that informal peer-to-peer and bottom-up interactions can be more effective at building resilience than formal planning processes and that these types of interactions can be crucial to the success of even formal processes (Brunner 2016). These interactions can take place at any time and are most effective when there is a long history of network building. The resulting relationships can provide direct assistance but can also assist impacted communities with navigating the large amounts of information that are made available following a disaster. In fact, there are multiple clearinghouses purporting to provide information vital to disaster resiliency and recovery, but the filtering of that information is largely left up to the

users (Brunner 2016). When that user is already operating at diminished capacity and struggling to meet basic demands, the time necessary for successful filtering is simply not available. Peers can provide a much-needed source of input regarding what resources may be most useful, as well as what the trade-offs might be for any particular resource being considered, both during planning processes and following a disaster.

This begs the question of how these types of interactions can be promoted and whether government can work to develop empathetic relationships with community members in order to facilitate collaborative actions when disaster strikes (Ireni-Saban 2012). These types of collaborative relationships will support the creation of emergency management networks, an invaluable resource at any phase of the emergency management cycle, while also increasing social capital. A workshop in 2012, comprised of 80 practitioners in the field of climate adaptation, found that building relationships, having the right people at the table, and promoting collaboration within and across groups was the most successful at promoting the adoption of adaptation measures (Brunner and Nordgren 2016).

Additionally, the government can also make policies that show that local knowledge is valued and that focus on the community as a whole and do not just treat households and individuals as being without social context.

Recommendation #3

Whenever permissible through programmatic and regulatory mechanisms, recovery resources should be targeted towards building local capacity (Downey 2016). These resources should also be rendered flexible and adaptable, in order to meet distinct local needs (Brunner and Nordgren 2016).

One of the key recommendations that emerges from the research is to identify the ways in which recovery processes can become better able to meet a wider range of community needs.

There are various ways in which the state government can assist local jurisdictions that are suffering from a lack of resources. One strategy, utilized after Hurricane Katrina by the state of Mississippi, is to assist local governments with borrowing money for recovery (Landy 2008). This can help local jurisdictions to weather the immediate shortfalls and to be able to remain solvent while awaiting reimbursement. Landy goes so far as to suggest that all localities be required to have a rainy day fund but perhaps to receive assistance in creating one. Additionally, partnerships with the state government along with coordination with regional entities can help to ensure that local and regional projects do not compete against each other for similar pots of funding (Brunner and Nordgren 2016).

One means through which differing community needs might be addressed is through additional empowerment of local FEMA representatives, allowing for greater use of bureaucratic discretion and for decisions to be made at the local level. This would require moving away from the strong oversight mentality and towards a focus on improving recovery outcomes (Landy 2008). Another means of increasing local adaptability and flexibility might be to create a version of CDBG that includes fewer requirements.

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