Joplin, Missouri has been at the heart of westward expansion for over a hundred years and has a rich history of mining and railroads. Today, Joplin is still well-connected to the surrounding towns and cities, with a daytime population of close to 240,000 despite being a city of only 50,000.

2011 Tornado

Tornadoes are a relatively common occurrence in the Midwest, an area colloquially known as “Tornado Alley.” Tornadoes occur most frequently in the United States, and are known for being unpredictable and incredibly powerful. On May 22, 2011, an EF-5 Tornado (the most powerful category of tornado) struck the heart of Joplin, Missouri, leaving 161 people dead, over 7500 structures damaged, and close to 10,000 people displaced.

Project Overview: Understanding Partnerships

“When you or your agency are responding to a disaster, that is not the time to exchange business cards.” Some version of this adage was often quoted as I interviewed people from a variety of organizations in Joplin, Missouri and the surrounding areas affected by the 2011 EF-5 tornado that hit on March 22. The importance of partnerships in disaster relief should be not be understated, but with each partnership comes a new set of people and a new set of challenges.

The objective of our research is to better understand and predict how the agencies involved in a disaster relief effort will act and interact. Initially, we collected data from people involved in relief operations to ensure that our approach is grounded in reality. Each set of data will be used to develop parameters and distributions for a model of network behavior when combined with data from other disasters. The data will also be used for a series of case studies on the behavior of organizations involved in disaster relief work. Joplin was the first location that we visited, and we are excited to build on the data collected as we expand the scope of our study.

In March of 2013, I had the pleasure of interacting with some of the hard-working individuals and agencies that have invested, and are continuing to invest, in rebuilding Joplin. This report provides an overview of some of our initial results, including background, definitions, and links to where you can look for future updates on our work.

Highlights of our case study include:

- Relationships in response to the tornado in Joplin, Missouri tended to be fairly strong
- 65% of the partnerships that were relied on during the relief effort were new
- 75% of the partnerships relied on during the Joplin relief effort had a high degree of flexibility and investment in the relationship, regardless of the level of experience an agency had in Joplin prior to the disaster

We are in the process of reaching out to agencies in New York City, and are looking for more participants for future interviews and some upcoming experiments. Please contact us if there are agencies that you would recommend we interview.
Rebuilding Together: Forming new partnerships after the Tornado

Initial case study results showed that 67% of the partnerships observed in the aftermath of the disaster came from new relationships.

In person and by phone we were able to interview over 40 agencies involved in the relief effort in Joplin and learn about over 250 partnerships. The agencies interviewed ranged widely in size, from international agencies to one-person operations. Initial results indicate that roughly 33% of the partnerships relied on during the relief process were established prior and are ongoing.

The remaining 65% of the partnerships observed began after the tornado and can be split into two categories: (A) partnerships that have already ended or have a planned ending date (49%), and (B) partnerships that appear to be continuing in perpetuity or have no expected end date (18%). In this work we also explored the specific combinations of agencies that could make up a partnership and calculated statistics for each. In addition, we looked at the strengths of partnerships for each combination (as seen in Figure 2).

The different relationship combinations provide a unique insight into the operations of a disaster. Notable dynamics included:

- 59% of the Bus-Bus partnerships were established prior to the disaster
- 43% of Gov-Gov relationships were established prior to the disaster. The remaining 56% were one-time, with an average length of 5 months
- NGO-Gov: 74% were one-time and 7 months long on average
- Bus-Cons: 75% were one-time and an average of 11 months

In Figure 2 the relationship strength is measured according to agencies trust one another and may share similar values or strategic plans. In Figure 2 it should be noted that, on average, the partnerships observed in the Joplin relief effort were relatively strong and built with good relationships.

In Figure 1 we asked questions about the strength of partnerships. Here we present the average strength for different combinations of agencies using a method developed by Donaldson and O’Toole (2000), adapted for disaster relief.

**Agency Types and Definitions**

In our research we grouped the agencies interviewed into one of four categories. If any agency fits more than one definition, they were classified by what types of aid they provided.

1. Non Governmental Organizations (NGO): This group includes churches, soup kitchens, and other community organizations or nonprofit 501(c)(3)’s.
2. Government Organizations and Agencies (Gov): This group includes government entities at any level (local, state, or federal), as well as public schools and other agencies that are funded and operated through a government structure.
3. Businesses (Bus): This includes both for-profit and non-profit businesses that sell goods and services and are not funded solely by charitable donations.
4. Advisory groups, VOADs, LTRGs, and other Consortiums (Cons): This includes all organizations that may not be distributing or dealing with tangible goods, but are coordinating or assisting in the relief effort by providing a place for communication and/or serving as a distributor of information.
Maintaining Strong Partnerships

As seen in Figures 2 and 3, it’s important to note that not all relationships are as strong or long-lasting as others. The types of agencies involved, and their prior experience in the disaster, can have a profound impact on the efficacy of the relationship.

One result shown in Figure 3 is that local agencies have less belief in local partners than in external partners, but external agencies tend to view other external partners and local partners with the same regard. This is surprising but could be explained by the fact that many of the business and government agencies have a high degree of belief (as seen in Figure 2). Another interesting result is that NGO-Cons were the strongest NGO partnerships observed (Figure 2).

An aspect of partnership strength that we observed was that volunteers are a valuable resource in the relief effort, especially when skilled. One of the big issues that can impact a partnership is how well volunteers are utilized when they are shared with another agency. Volunteers are the lifeblood of some agencies. When volunteers are mismanaged, it can be detrimental to the sending agency as well as to the partnership. If an agency plans on accepting volunteers, it may be important to have a project ready even when another agency is managing the projects. Mismanaging resources from another agency is one of the easiest ways to wreck a partnership.

More Communication & Experience = “Optimistic View”

Finding: The more experienced and connected an agency, the more likely that agency will be generally satisfied with the pace and direction of recovery.

Proposed Reasoning: In the course of our work, we noticed that there seemed to be a relationship between the optimism of the study participant about the overall relief effort and the number of partnerships in the disaster area, particularly if some partners were large and had previous disaster relief experience. This finding is consistent with previous work in the area of social networks. When a network is very dense and interconnected, it is more likely that agencies in the network share a common perspective. This can be extremely beneficial if it helps the agencies involved to achieve all the necessary goals. However, if a network is not sufficiently diverse some needs could go unnoticed. For this reason it is important that relief networks have a clear avenue for feedback, such as an open and effective Long Term Recovery Group/Committee).

Figure 3. In our research, we explored if there was a difference in relational strength for different agency pairs. One factor we looked at was prior experience in the disaster area. There are four pairs (E-E, E-L, L-E, and L-L) where the first agency was the type interviewed:

- External Agency (E): An agency that was not working in Joplin prior to the Tornado
- Local Agency (L): An agency that was working in Joplin prior to the Tornado

Leaving a Good Impression

One thing observed in the course of the project was that disaster survivors tended to speak more highly of organizations that sustained a longer-term presence in the impacted community, even if it was in a reduced operational capacity. This is not to say that agencies should stay indefinitely or invest beyond their area of expertise; rather, if an agency would like to maintain relationships for long-term preparedness they should slowly scaling back efforts rather than leaving abruptly. Staying at least partially invested can lead to more referrals and recognition within the relief and survivor communities.

Thank You

Thank you to all the individuals and organizations who participated in this research and made it possible. It would have been far more costly and time-consuming to collect this data without help from many of the people who participated in this research. We hope you enjoyed participating in the research. Please contact us if you are interested in future research or have any feedback!
Next Steps: Agent-Based Network Models

In the next stage of our research, we plan to use Agent-Based Simulation to develop a scalable network model that will depict how many organizations might interact during the course of a disaster relief operation. Agent-Based Simulation is a modeling technique that allows one to develop behavior profiles (agents) that vary slightly in some way (size, type, location), and then prescribe a set of rules for interaction. When the simulation is run, these agents will interact with one another according to the rules of the simulation, while also attempting to achieve an individual or global goal.

A good analogy to how this agent-based model would work is an ant colony where each ant is a bit different (e.g., weight, strength) but operates according to a basic set of rules when foraging for food, greeting another ant, or fleeing an enemy. The goal of the colony is to survive and grow amid different environmental challenges. In our simulation, we will look at how NGOs, government organizations, businesses, and consortiums can work together to achieve the common goal of helping people recover after a disaster.

Additional References for More Information on our Work


Acknowledgements

Natural Hazards Center (NHC) and in part by the United States Department of Homeland Security (DHS) through the National Center for Risk and Economic Analysis of Terrorism Events (CREATE) under award number 2010-ST-061-RE0001. However, any opinions, findings, and conclusions or recommendations in this document are those of the authors and do not necessarily reflect views of the University of Colorado NHC, the DHS, or CREATE. This research was also supported by the National Science Foundation (NSF) under awards #1034730 and #1034740, Dissertation Improvement Grant #1261058, and a Graduate Research Fellowship to Mr. Coles.