Slow Road to Recovery: Small Rural Community Resilience in Illinois after the Mississippi River Floods of 2008

Preliminary Findings

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Cover Photo: Mississippi River at sunset during the June 2008 flood (photo: A. Kolleck)

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Introduction

At 1:30 in the morning of June 18, 2008 the levee that protected the Warsaw Bottoms and the small community of Meyer, Illinois failed (Figure 1). A total of 17,029 acres were inundated. As described by a long term resident of Meyer:

> *"The water just busted underneath the dam, slow at first, and then just washed out down to right there. This was all fields, and it scoured everything out, and you can see what it left; it's worse than a wasteland, it's just rocks and water. That's all that's left."* (Meyer 1)

Figure 1. Aerial view of the Canton dam (Lock and Dam No. 20) with breeched levees in Meyer, Illinois (photo: Nathon Fox).

This event was one of many that were part of widespread flooding along the Mississippi in June and again in September. Six levees failed or were overtopped in Illinois. Many areas not protected by levees were also inundated. Western Illinois University's Institute for Rural Affairs estimated that about 200,000 acres along the Mississippi in Illinois were flooded.[1] The flooding was a result of abnormally high rainfall throughout the upper Midwest. Illinois communities along

[1] Christopher Merrett, IIRA director, personal communication.

the Mississippi experienced major floods in 1927, 1960, 1965, and 1993, as well as 2008. Some researchers predict that such events will become more frequent as the climate changes.[2]

While prolonged rains often contribute to flooding, not all flood events have catastrophic consequences.[3] As noted by Oliver-Smith and Hoffman: "Disasters do not just happen. In the vast majority of cases, they are not 'bolts from the blue' but take place through the conjuncture of two factors: a human population and a potentially destructive agent that is part of a total ecological system, including all natural, modified, and constructed features."[4] We can change these systems to reduce impacts on people.[5] Several of our research participants noted that the 2008 floods were not as destructive as they could have been because of federal, state and local mitigation efforts initiated in response to the 1993 floods. But how do these changes affect the future of small communities or the individuals in them?

We initiated this research to look closely at the affects of floods on small communities and how these communities respond to a disaster like a flood. Our fundamental question is: what makes some communities resilient? Our basic assumptions are: 1) people live or work in the floodplain for strong personal reasons, and this is tied to their quality of life; 2) people behave as part of communities, or social networks; and 3) how they are organized to respond to a disaster in both the short and long term affects community resiliency. These assumptions guided our research. But we also assume that the people who experienced the flood directly know best what worked and did not work within their communities. Therefore, we intended to let people speak for themselves as freely as possible, then to summarize their experiences and situate them within the context of long term regional trends. Our analysis relied on verbatim transcriptions of interviews and focus group discussions. It is important to note that the results summarized in this report represent what our participants think are the causes and results of the flood and may not conform to the opinions of government agencies.

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[2] According to the Union of Concerned Scientists, "River flooding may become more common and extreme because of the interaction of more frequent rainstorms with urbanization and other land management practices that increase pavement and other impervious surfaces and degrade the natural flood-absorbing capacities of wetlands and floodplains. "(Kling, G.W., K. Hayhoe, L.B. Johnson, J.J. Magnuson, S. Polasky, S.K. Robinson, B.J. Shuter, M.M. Wander, D.J. Wuebbles, D.R. Zak, R.L. Lindroth, S.C. Moser, and M.L. Wilson. 2003. Confronting Climate Change in the Great Lakes Region: Impacts on our Communities and Ecosystems. Union of Concerned Scientists, Cambridge, Massachusetts, and Ecological Society of America, Washington, D.C.) See also, Pinter, N., A. A. Jemberie, J. W. F. Remo, R. A. Heine, and B. S. Ickes. 2008. Flood trends and river engineering on the Mississippi River system, Geophys. Res. Lett., 35, L23404.

[3] Gruntfest, E. 1995. Long-term Social and Economic Impacts of Extreme Floods. U.S.- Italy Research Workshop on the Hydrometeorology, Impacts, and Management of Extreme Floods, Perugia, Italy.

[4] Oliver-Smith, A. and S. Hoffman. 2002. Culture and Catastrophe: The Anthropology of Disaster. SAR Press, Santa Fe, New Mexico, p.3.

[5] This is the main recommendation of the 'Galloway Report' prepared for the U.S. President in response to the 1993 flood (Sharing the Challenge: Floodplain Management into the 21st Century. Report of the Interagency Floodplain Management Review Committee. Washington, DC. June, 1994). The committee also recommended including all levels of government from national to local in planning these changes.

This research was funded by the National Science Foundation's Cultural Anthropology Program specifically to study the resiliency of rural communities after the 2008 Mississippi floods. Our goals were: 1) to document the response and recovery process in detail from the perspective of those impacted; 2) to contextualize the 2008 recovery within broader social processes; 3) to identify those factors that may contribute to community resiliency; and 4) to make recommendations.

This research is not affiliated with the study conducted by the University of Illinois, Office of Sustainability. That project was initiated under contract from the Illinois Department of Commerce and Economic Opportunity for the Governor's Long Term Recovery Council. Governor Blagojevich created the Long Term Recovery Council in August 2008 to develop policy recommendations. Their report includes all Illinois counties affected by the 2008 floods and provides a valuable analysis at the county level. We hope our research will complement their work by focusing in more detail on smaller communities within four of the counties included in their report.

In order to understand why a community may be more or less resilient, it is important to understand how the particular community has been affected by regional trends. We pay particular attention to farm consolidation, loss of manufacturing, retail consolidation, job and population loss, and school consolidation. We also consider how these may interact with the floods to affect sense of community and quality of life.

Research Methods

We selected four contiguous counties that were affected by the floods (Mercer, Henderson, Hancock and Adams) for in-depth study.[6] All communities located in these counties that experienced flooding in 2008 were included in this study (Table 1). All but Gulfport were also flooded in 1993. Keithsburg is a small city located on the Mississippi River that relies heavily on tourism associated with the river. Parts of the city were flooded in 1993 and again in 2008 as a result of levee failure or overtopping. Gulfport is an incorporated village directly across the river from Burlington, Iowa. It was completely inundated when a levee failed in 2008. Carman and Shokokon are unincorporated communities within Carman Township. Carman is higher in elevation and only a few structures were impacted by the floods of 2008. Shokokon is comprised mostly of houses located directly on the river. Residents feel a strong aesthetic connection to the river. It is not separated from the river by a levee. Residents there experience flooding whenever the river levels exceed flood stage. Most of the houses are elevated. Pontoosuc is a small incorporated village. Like Shokokon, it is not separated from the river by a levee. Prior to 2008, only the homes in the lowest elevations were elevated. Dallas City and Warsaw are small cities

[6] This is a qualitative study that analyzes the way people talk about issues to identify important themes and develop insights. For a quantitative analysis at the county level, see: Long Term Recovery Council, 2009, Aftermath of the Floods of June 2008 & Recommendations for Long Term Economic Recovery. Prepared by the Office of Sustainability, University of Illinois, Urbana-Champaign.

that once had manufacturing economies in addition to shipping associated with the river. Both are located on steep slopes and only small parts of the developed areas of the cities are in floodplain. Some homes and commercial structures in Dallas City were damaged by flooding in 2008. In addition to several homes being damaged in Warsaw in 2008, that city also suffered damage to its water and sewage treatment plants and its main grain elevator. Meyer is a very small unincorporated community in Lima Township. It was completely inundated when the levee failed near the Canton dam in 2008 (Figure 1). It was also flooded when levees failed in 1960 and 1993.

Figure 2. Flood damaged house near Gulfport, Illinois (photo: D. Casagrande).

TABLE 1. COMMUNITIES INCLUDED IN THIS STUDY

Community	Political organization	County	Flood protection
Keithsburg	municipality	Mercer	levee
Gulfport	incorporated village	Henderson	levee
Shokokon	unincorporated village, part of Carman township, mostly privately owned with homes on leased lots	Henderson	elevated structures, no levee
Carman	unincorporated village, part of Carman township	Henderson	Most of town is above 500-year flood elevation
Dallas City	municipality	Hancock	none
Pontoosuc	incorporated village	Hancock	mostly elevated structures, no levee
Warsaw	municipality	Hancock	some areas within levees, other small areas unprotected
Meyer	unincorporated village, part of Lima township	Adams	levee

We conducted six focus group discussions at the Bott Center in Warsaw, the Henderson County Health Department in Gladstone, and the Pontoosuc Village Hall between March 7 and 18, 2009. The 60 focus group participants included community leaders and home and business owners impacted by the floods. It was our goal to encourage participants to discuss any issues they felt were relevant as long as they pertained to flooding. We began focus group discussions by asking participants to write individual words that came to mind when thinking about the flood on index cards.[7] We asked participants to talk about the words they wrote, and then let the conversation take its course. Later in the conversation we asked specific questions that were not already addressed (Appendix A). All focus group discussions were audio recorded and transcribed verbatim for content analysis. We used themes identified in the focus groups to develop questions for in-depth interviews with individuals (Appendix B). These interviews began in February 2009. Interviewees include 31 community leaders, elected officials, emergency managers, homeowners and business-owners impacted by the floods. In some cases we conducted follow-up interviews with the same people to clarify concepts or elicit more detailed information. We have remained in contact with interviewees to monitor recovery progress. We plan to continue this relationship into the foreseeable future. Most interviews were conducted in people's homes or at flood sites. All interviews were audio recorded and transcribed verbatim for content analysis. The privacy of interviewees has been protected.[8] Throughout this report we present direct quotes from interviews or focus group discussions to illustrate points or provide examples of opinions. The quotes are identified by the code name assigned to the interview.

[7] This is known as a 'freelist.' It is a reliable method for stimulating conversation and also helps researchers identify key issues or concepts that are important to the study participants. (Bernard, H. R., 2002, Research Methods in Anthropology: Qualitative and Quantitative Approaches. Walnut Creek, CA: AltaMira Press. Pp. 282-285).

[8] Participants in audio recordings are not identifiable because personal data were not discussed while recording. No audio files or interview transcription files include information that would identify the participant. Each file is assigned a code name. A password-protected Excel file with each interviewee's personal information is the only document matching the code name to an individual's identity.

Forty-five hours of audio recordings were transcribed for content analysis. Our intent was to let important themes and concepts emerge from the way participants talked about their experiences rather than impose our interpretation beforehand.[9] We identified 101 important themes or concepts. Each passage of the transcription in which a person was talking about a theme or concept was coded for that theme or concept. Next we identified relationships between themes and concepts; for example, whether they tended to occur together in conversation or were common across interviews. We grouped these themes together into new themes; eventually creating a hierarchy. Finally, we applied our interpretation of why themes tended to group together or to dominate discussions.

The content analysis described above was supplemented by a review of archives and relevant documents. These included news reports, government publications about the floods and relevant laws and policies.

Results

What Worked

The content analysis revealed several themes related to what the study participants indicated worked well in responding to the 2008 floods. These included individual as well as institutional responses. The following are listed in order of importance.

- Most participants agreed they knew when the river was going to crest. Most interviewees indicated that they received adequate warning about potential flooding. Unlike 1993 no loss of life was reported as a result of the 2008 floods.

  "…and we got about a 3 day jump on the flood… we were very fortunate down at the water that we got we knew it was coming and we started sandbags." (Warsaw 2)

- There were key local people (e.g., levee captains) who were familiar with the structural integrity of the levees.

- Most everyone was able to evacuate people and important personal items. In most cases, close social networks allowed people to stay with friends and relatives and also allowed them to move and store equipment.

- Communities were able to quickly organize labor for sandbagging. Several interviewees remarked that there was an overwhelming response of volunteer help from surrounding communities. Host

[9] The qualitative approach we used is known as 'grounded theory,' in which novel ideas or hypotheses are inductively generated from textual data, as opposed to testing hypotheses specified beforehand (Gibbs, G., 2002, Qualitative Data Analysis: Explorations with NVivo. London: Open University Press. Pp. 165-174). All transcriptions were imported into the NVivo software package for coding and analysis (Nvivo qualitative data analysis software, 2009, QSR International. Version 8).

communities were able to organize quickly to feed and care for volunteers. Community centers like the Warsaw city hall were quickly turned into centers of food distribution for volunteers. However, some smaller communities did not have adequate shower facilities for volunteers.

- The 1993 FEMA payments allowed homeowners to elevate their houses or relocate to less flood-prone areas within the community. This reduced the damage in 2008. Although in some cases houses that were not raised high enough were damaged in the 2008 floods.

- Many people were able to effectively use pumps to keep the water at bay (individual and community level).

- Municipalities were able to secure federal monies to repair infrastructure (for example, the city of Warsaw water pump intake was relocated within 12 months of the flood).

- Federal funding allowed for repairs on the pumps and levees damaged by the floods at the municipality and drainage district level soon after the flood.

- Municipalities were able to be reimbursed for funds expended during the floods.[10]

- Increased access to technologies like cellular phones greatly facilitated crisis response at both the individual and community levels. However, some individuals who became *de facto* crisis coordinators incurred high cell phone bills.

What Didn't Work

The content analysis revealed several themes related to what the study participants felt did not work well in response to the 2008 floods. These included individual as well as institutional responses. The following are listed in order of importance.

- By far one of the most common themes we encountered was loss of 'institutional memory.' By institutional memory, we mean the ability of institutions like municipal governments, emergency responders, volunteer agencies, or churches to maintain accurate information that is critical to future flood response.

  "… and one thing that I did at that first long term recovery meeting I was telling you about: I took my laptop and I took minutes and that was considered a very revolutionary idea. Nobody thought about taping minutes, so there really has to be… record keeping… and who's going to maintain the records of this so that you have some memory, collective memory." Carman 1

[10] Again, we should note that this statement represents the perspective of the people we interviewed and not necessarily the actual money dispersed.

Many political office holders or emergency response personnel who accumulated important information in 1993 were no longer in office in 2008. Thus the 'memory' of these institutions is impaired. Channels of communication and information sharing also become less effective. Furthermore, information that was maintained from 1993 was often not useful in 2008 because of changes in higher level personnel or policies. For example, one city spent critical time trying to locate resources like sandbags. This required identifying contact information for specific people. In a future flood, that contact information might either be lost or the people who were contacted may no longer occupy key positions.

> *"… the day after we were out of trouble and it was not going to do any more damage, I was sitting there writing every name down. All the way from John Sullivan, Phil Hare, on down… everyone that we had dealt with…generals and National Guard people. And I got done and I thought 'you know if it doesn't flood for another 10 years, this list is worthless.'"* (Warsaw 2)

- Two years after the floods, many homeowners are still waiting to hear from FEMA as to whether individuals will receive a "buy-out" from the government. This uncertainty precludes both individual decisions about relocation and/or flood mitigation as well as planning for infrastructure investment at the community level. For example a small town cannot make decisions about roads, water, or sewers without knowing the effects of the FEMA buyouts on residential properties. This has significantly slowed the recovery of small communities as compared to 1993 when FEMA buyouts are perceived to have happened more quickly.

- A common theme was frustration with navigating multiple bureaucracies and difficulties completing applications for assistance. This includes acquiring resources during the flood and requesting assistance after the flood.

  "I think that was what was so frustrating for the home-owners was not knowing who to contact, and the games to go through to get answers. And that's not how it should be, not with some of these people in need." (Warsaw 8)

- Changes in government agency policies, especially FEMA, from one flood to the next were cited often as a source of frustration and impediment to decision making. Successful recovery actions of small communities or individuals in 1993 often no longer apply due to changes in policies between 1993 and 2008.

- Difficulties traveling to work were discussed extensively. Very few of the individuals interviewed were employed in the communities they lived in; many worked in Iowa. Thus, commuting to work, often crossing the Mississippi River, is a daily part of life. Flooding caused bridge closings and detours that often resulted in 50 - 60 mile detours. Coupled with the seasonal high prices of gasoline (over $3.00/gallon) this placed additional pressure on those directly influenced by the floods. Some individuals simply stopped going to work while others incurred longer commutes and higher transportation costs as a result of the flood.

- The inability to transfer grain from storage units (both individually and cooperatively owned) resulted in losses (Figure 3). Harvested grain is not covered by crop insurance. For individuals, this creates the conundrum of whether to focus initial response efforts on the livelihood/business or personal/household items. This also created a potential shortage of licensed drivers and equipment to evacuate the grain.

- Locating supplies for sandbagging. Although most interviewees agreed that there was sufficient labor to sandbag, it was very difficult in some cases to locate supplies for sandbagging.

- Although interviewees overwhelmingly expressed appreciation for the National Guard, they noted fewer National Guard resources in 2008 than in 1993. Interviewees also observed that National Guard troops had to travel longer distances than in 1993, thus limiting the actual amount of time they could dedicate to working in the community. They also noted that the response would have been more effective if troops had been deployed sooner.

Figure 3. Flood-damaged grain bins in the Warsaw Bottoms six months after the flood (photo: D. Casagrande).

Decline of Small Communities

Participants in this study clearly believe that the floods have accelerated negative economic and population trends that their small communities were already experiencing. Although rural populations at the county level have remained stable over the last several decades,[11] there was a significant population loss prior to that. This was in large part a result of the farm crisis and farm consolidation of the 1980s. Small communities, in particular, experienced population and tax base losses. As indicated in Table 2, the communities in our study continued to experience population decline since 1990.[12] Participants in our study cited numerous specific examples of families that migrated out of the communities after the floods of 1993 and 2008. The populations of these communities have not recovered since either flood. Pontoosuc and Meyer lost the most population after the 1993 flood because they are located entirely within the floodplain. Gulfport did not flood in 1993. Two years after the 2008 flood, approximately one third of the residents have returned.[13]

The long term population declines in these communities are part of regional and even global economic trends. Retailers and manufacturers that operate on a global basis have transformed the rural Midwest. According to Irwin and Clark[14] the opening of a Wal-Mart in a rural area can be a mixed blessing. A new low-cost retail store can draw customers from nearby towns, thus stimulating the local economy; however this depends in large part on the regional distribution of Wal-Mart and other box stores. A study conducted in rural Iowa[15] indicated that in communities hosting Wal-Mart stores, total sales fell over a 10-year period. Stone found for example, drugstores, florists, and stores specializing in apparel, sporting goods, jewelry, cards and gifts, and other products typically sold in a Wal-Mart store suffer sales losses.

TABLE 2. U.S. CENSUS POPULATION DATA FOR THE COMMUNITIES IN THIS STUDY[16]

	1980	1990	2000	2008
Keithsburg	1058	747	714	688
Gulfport	n/a	209	207	n/a
Carman	n/a	398	366	340
Dallas City	1395	1037	1055	974
Pontoosuc	556	264	171	159
Warsaw	1842	1882	1793	1603
Meyer	n/a	81	42	n/a

[11] H. McIlvaine-Newsad, C. D. Merrett, W. Maakestad, and P. McLaughlin. 2008. Slow Food Lessons in the Fast Food Midwest. Southern Rural Sociology. 23(1) 72-93. See also the Final Report of the Long Term Recovery Council.

[12] Note that the 2008 figures are estimates and do not reflect the affects of the 2008 floods. 2008 estimates are not available for Gulfport or Meyer.

[13] Rich Meyers, Gulfport Village President, personal communication, June 2, 2010.

[14] Irwin, E. and J. Clark 2006. The Local Costs and Benefits of WalMart. http://aede.osu.edu/programs/ComRegEcon/retail.htm. The Ohio State University. Columbus, Ohio.

[15] Stone, K. 1997. "Impact of the Wal-Mart Phenomenon on Rural Communities." In *Increasing Understanding of Public Problems and Policies*, Farm Foundation, Oak Brook, IL, pp. 189-200.

[16] Populations for Gulfport, Shokokon, Carman and Meyer were compiled from U.S. Census block data.

In addition, because Wal-Mart also competes with wholesalers as well as other retailers, the effects on wholesalers may be felt locally as well. Basker[17] noted evidence of a negative effect on wholesale employment as the result of Wal-Mart's entry into rural communities.

The city of Warsaw has one grocery store that relies heavily on purchases associated with river-based tourism and camping. Few local residents regularly shop at the market. They prefer to take advantage of low prices and one-stop shopping available at Wal-Mart across the river in Keokuk, Iowa. We should also note that most residents in Warsaw and the other towns in this study do not work in Illinois, but rather work in manufacturing or services across the river in Iowa, where large retailers are also located.

Warsaw, Keithsburg, Pontoosuc, Meyer, and Dallas City were losing retailers, population, and economic diversity prior to 1993. Many of the commercial properties in the central business districts of Warsaw and Keithsburg are vacant. Participants in our study overwhelmingly agree the floods have had negative effects on these local economies. Prior to 1993, the town of Meyer was relatively self-sufficient with a U.S. Post Office, grocery store, commercial fish house, grain elevator, and tavern. Only the tavern, grain elevator and commercial fish house reopened after the flood of 1993. Before the flood of 1993, 80 people had primary residences in Meyer. That number dropped to 25 after the 1993 flood. Thirteen full-time residents have returned since the 2008 flood. Two years after the 2008 flood, about 60 of the 207 residents of Gulfport have returned. The remaining individuals are waiting for notification about FEMA buyouts.

> *"… and a good part of that is the farms are getting bigger, but a lot of it is that people just got tired of battling the flood, because the government won't fix their levees. So they moved out. They sold out. They built houses out on the bluff and farmed in the bottom, and it's just frustrating. Don't mean nothing to me, financially, it's just I was born in this bottom and I feel it."* (Meyer 1)

Trends, whether positive or negative may be accelerated by a disaster.[18] The town of Meyer provides an example of accelerated decline. The size of a community can also influence the complex recovery process. Larger communities have a larger resource base compared to smaller communities.[19] Economic and population decline make it difficult for small communities to take advantage of government recovery resources because their tax base is limited. For example, leaders from two of the smallest communities mentioned that they were struggling to meet a 25% match for federal assistance programs. This finding is consistent with the Long Term Recovery Council Report, which found that smaller counties were less resilient.

[17] Basker, E. 2005. Job Creation or Destruction? Labor-Market Effects of Wal-Mart Expansion, *Review of Economics and Statistics* 87(1):174-183.

[18] Haas, J.E., Kates, R.W., & Bowden, M.J. 1977. Reconstruction following disaster, MIT Press, Cambridge.

[19] Tobin, G. & Montz, B. 1997. The impacts of a second catastrophic flood on property values in Linda & Olivehurst, California, Quick response report, www.colorado.edu/ hazards/qr/qr95.html.

The increasing number of rural poor tend to not be associated with farming.[20] However, farm consolidation has resulted in the depopulation of rural communities, the decreasing number of farms and the increasing number of acres farmed by individual families or business entities.[21] As technology advances, the number of individuals needed for on-farm work decreases. Thus, the size of the social networks decreases, while the power of the individuals involved in the networks increases.

> *"So all those farmers down there had a very active role in the area, and when that levee broke, that was their livelihood. And you had that many people that were concerned about it. We had one situation of this person that inherited some land from his mother and the house on this land was going to get some backed-up water in it, and instead of coming to help at the levee, he gets our sandbags and loads them off to put around the house. Now that was no support to the levee. So in turn, the bigger and bigger the company gets the less and less people you have to help keep that levee in check. Because now the people don't have a stake in it, unlike me, where you try hard to make sure that levee won't break."* (Warsaw 3)

As the number of individual farmers and farms decrease, the burden (both economic and physical) to maintain infrastructure accrues to fewer individuals. For example, drainage district[22] membership decreases as farms consolidate. Rural population decline has also resulted in school consolidation.

> *"Politically speaking the more people you have living in a community, the better chance of getting help. If you got one person living in the bottom or you got 200 living in the bottom…when the bottom needs a new levee and you are a politician what are you going to say, well it's easier to move that guy to the hill and forget the levee."* (Warsaw 1)

Response Phases

> *"...family [helped] on moving stuff out of the house, but as far as working on the levees, we just called up friends and those guys called their friends. We put things on the radio saying we needed help, our church was real active. I mean, we had literally hundreds of people show up there to help in the flood fight"* (Carman 3)

[20] Duncan, C. 1992. Rural Poverty in America. Auburn House, New York.

[21] H. McIlvaine-Newsad, C. D. Merrett, W. Maakestad, and P. McLaughlin. 2008. Slow Food Lessons in the Fast Food Midwest. Southern Rural Sociology. 23(1) 72-93.

[22] A series of federal and state laws beginning in the late 1800's provide the legal basis for the creation of drainage districts. The intent was to promote the drainage of wetlands to promote health and agriculture. In Illinois, locally elected boards of drainage district managers have the legal authority to levy taxes to fund levee and ditch construction and maintenance, and to operate large pumps that lower the water table within the district to allow for agriculture. Districts included many farmers in the past. With farm consolidation, the area included in a district remains the same, but fewer famers operate larger farms. This results in declining membership. Several of the levees that failed in Illinois in 2008 were owned and maintained by agricultural drainage districts in cooperation with the Army Corps of Engineers.

A dominant theme that emerged from this study is that no one responds to the floods alone. People rely heavily on social networks for help in making decisions, moving items, accessing financial assets, and navigating federal programs. Our content analysis revealed that a different type of social network is affiliated with each of three 'response phases:' an immediate phase, a secondary phase, and a long term response phase.

Immediate Response Phase

Narratives collected in this study show that an individual's first priority is to protect life and one's most valuable items, like medication, photographs and/or irreplaceable personal property. We refer to this as the 'immediate phase.' As the quote above suggests, the social network associated with this phase is almost entirely comprised of family and neighbors. Nearly every one of our study participants relied on their immediate family and closest neighbors to assist them in moving household items, evacuating vulnerable family members, or relocating farming equipment. People also rely heavily on past experiences with disasters to know how to respond. Quite often someone who has not experienced a previous disaster must rely on neighbors who have experience.

> *"I knew that the river was coming up, but I didn't think it was getting as bad as it was. So I ran over and talked to another gentlemen and asked 'what's going on?' and he told me 'now you need to get grain out and you need to start moving some of your things.' And I said OK."* (Carman 4)

> *". .. somebody came banging on my pickup truck and told me, you know, the waters coming in and that we need to try to get out, so a few of us jumped in trucks and we tried to drive out the road, well the water was coming in so fast that it would have swept my vehicle away, so I turned back around and I drove my truck up on to the levee, and if it weren't for the older guys that had been through a situation like this, I think I would have been in trouble, you know, I looked to them to tell me exactly what to do."* (Carman 4)

As small towns continue to experience declining population, these social networks are over-taxed, and family and neighbors are separated by greater distances. As population decreases, the ability to share knowledge about past disasters also declines. Furthermore, some vulnerable people may no longer have friends or neighbors to help them evacuate.

Secondary Response Phase

Narratives collected in this study show that after threats to life and valuable items have been addressed, priorities shift to protecting personal structures and community infrastructure. Social networks shift dramatically as people cooperate to shore up levees or protect important public resources like drinking water plants. Institutions like drainage districts, churches, municipalities, and government agencies interact with families, volunteers and institutions from other communities to organize labor and resources to protect infrastructure. Our study participants

talked mostly about sandbagging to reinforce levees or protect houses and public works. Note the importance of sharing information among friends in the first quote below. The second quote below stresses the breadth of the social network.

> *"One thing we've learned from the family right there… we've always turned our bags sideways against the river and we've been real careful, you know, to have wide base to come up, with our walls this year when we had the plastic, that eliminated a lot of that, but they turned their sandbags around, because they won't roll in. So that's something else that we need to think about. I mean, every time somebody has broad ideas, unique ideas."* (Pontoosuc Focus Group 1)

> *"I mean, these churches just came out of the woodwork and said 'what can we do for you?' you know, the church groups bring food down to the people that are sandbagging and bring water down. And some of the businesses in Burlington would bring food over, and it was just those little things that just kept you going, saying that these people do care about you and they do care about your community, you know?"* (Carman 4)

> *"Even at our farm, that we have in Dallas City, we had a number of people come in and offer their help to help sandbag everyday and just load sandbags of sand, you know, and bring them over and they'd bring their trucks, their own trucks, their own gas and haul the bags to the barn and set them all up, so yea, just a number of people helping other people all the time."* (Pontoosuc Focus Group 1)

The news media play a large role in drawing attention, resources and volunteers to communities. Both regional and national level media outlets covered stories as the river crested. Coverage dropped off significantly in the months following the flood. So while the news media is crucial for helping communities attract outside resources during this second phase, the media's role diminishes during the long term phase. Only regional media coverage may periodically revisit affected communities as they recover in the months and years following the flood. Participants in our study are very appreciative of the attention and resources the news media bring, however they are not always comfortable with the way in which the situation is portrayed. For example, an international news agency was interested in stories about hometown heroes.

> *"…she kept asking him questions about his individual effort. And he said 'you have to understand that this is a community crisis, this is a community experience and it's not just me, its' not just this place, but it's everybody…' "* (Carman 1)

Other news reporters were interested in showing how communities pull together in times of crisis. Although some people appreciate the attention, long term problems like how to obtain federal assistance begin after the attention of the media is over.

Institutional memory, or the lack of it, is a significant factor in a community's response to a disaster. Of particular importance are county or municipal Emergency Management Agencies (EMAs) or Emergency Service Disaster Agencies (ESDAs). Other critical institutions include

elected officials, drainage district commissioners and *de facto* community organizers. The ability for institutions and individuals to respond in a timely manner during this secondary phase is largely dependent on institutional memory. For example, the ability to locate sandbags, mobilize drainage district volunteers, and ability to navigate multiple bureaucracies for immediate assistance all rely on key people with past experience.

Volunteers are often not knowledgeable about local infrastructure, nor do they necessarily have experience with floods. It is very important that local institutional memory exists in order to best utilize the resources at hand. In addition to institutional memory, communities need key leaders with experience and clear response plans.

With declining population in small rural areas, local communities must rely more on help from people who are not actually from the town and may lack important knowledge. Local leaders and families begin to expand their social networks beyond the borders of the community. Over time these networks will become more important, but individuals in the network may have less of a sense of obligation to, or knowledge of, a particular locality. We call these social networks "de-localized." They are becoming more common in rural areas. In this research, it appears that so far the negative effects of de-localized social networks are offset by knowledgeable local leaders like levee captains. But we note above that there are increasingly fewer people to fill these roles. For example, if someone lives in Warsaw, Illinois, but works at the Wal-Mart in Keokuk, Iowa, that person may have access to a very powerful social network that spans geographic space and includes opportunities to seek economic assistance. However, this network is increasingly less grounded in a place like the Warsaw bottoms. So, while more assistance might be available, necessary local institutional memory might not.

Nearly every study participant who needed to access state and federal resources complained about difficulties navigating multiple bureaucracies.

> *"…something simple as sandbags, he had to go through four governmental departments. And guess who had the sandbags? The Corps of Engineers. The Corps of Engineers knew we needed sandbags but they couldn't give them to us because we had to go through someone else. We didn't have the time, the river was rising almost an inch an hour, we didn't have time to go through Springfield, Washington and back to Rock Island to get the sandbags."* (Meyer 1)

Disasters often bring out the best in people. This probably explains the news media interest. This secondary response phase is characterized by cooperation among community members. Animosities are often suspended and differences in socio-economic status and political views and power are ignored. In contrast to the altruism of the first and secondary response phases, the long term phase reinforces differences between people within rural communities.

Long Term Response Phase

The final response phase includes recovering financial losses or otherwise regaining financial stability. This may include being reimbursed for flood related expenses or repairing damaged infrastructure. These repairs may be personal or public, and include structures such as private grain bins or public water and waste treatment plants. Other actions individuals may pursue include permanently relocating residences or buying flood insurance. On the public level, drainage districts or municipalities may repair levees and undertake local level mitigation planning. Finally, communities located in the floodplain may also lobby for long term solutions to flooding like dredging the river, increasing the levees to 500-year strength or wetland restoration. Differing viewpoints within communities about each of these issues become pronounced as the social solidarity of the secondary response phase wanes. This creates potential divisions and contributes to the psychological stress.

Municipal and county governments, drainage districts, insurance brokers, and banks become critical institutions for interacting with federal agencies during the long term response phase. Individuals who have greater access to, or knowledge of, these institutions will have greater long term recovery success. Each individual's political network becomes more important during the long term response phase. The gaps between the 'haves and have-nots,' in terms of both financial and political resources, as well as knowledge, become clearer. Government agencies, church leaders, family and friends all try to help individuals negotiate problems, but in the end it becomes "up to the individual" to succeed or fail.

> *"I did some training through the United Methodist church so that we would be helpful with the long term recovery and we realized it was fragmented. Everybody was looking for their own self interests…you just ask a lot of questions and you rely on yourself and your family. Farmers are the [group] who will be most self-reliant, because they'll call each other and they have a sense of neighboring and they'll do things for each other."* (Carman 1)

Some people are more vulnerable if they are marginalized from key institutions and political networks. In the long term, this can increase the gap between rich and poor, which threatens long-term community resiliency.

Important long term FEMA flood mitigation strategies include "buy-outs" or the relocation of homes or businesses to reduce the number of people living or working in flood zones. Another option is to pay for residents to 'flood proof' homes. This most commonly involves elevating a home (Figure 4). Individuals must apply for buy-outs through a local government agency that submits all requests as a package. The local government, be it an incorporated village, municipality or county, must agree to hold the land in perpetuity after structures are removed. Therefore, even if an individual home or business owner may want to sell out, they can only do so with local government commitment. This can lead to local disagreements about the future of communities or neighborhoods. Neighbors and friends may begin to question each other's

commitment to community. In addition, it is not certain whether the buy-out requests will be approved, which can lead to additional disagreement. Two years after the 2008 floods, many participants in our study were still waiting for approval. This makes it difficult for people to plan as a community. In some cases, people are simply financially incapable of remaining in the flooded community. We found that families with the lowest level of income tend to leave these small rural communities, find housing in larger towns or cities, and don't return.

Figure 4. Repaired elevated house in Meyer, Illinois two years after the flood (photo: D. Casagrande).

Processes we documented during the long term response phase contribute to de-localized social networks and the problems associated with them we described above. Several farmers in our study have relocated their homes out of the floodplain, or plan to do so, but continue to farm the floodplain.

> *"So we got six commissioners in the two districts, not one of them lives in the river bottom. When this happened in September, none of these commissioners even knew it was happening."* (Meyer 1)

The proportion of second homes, or weekend homes, in floodplain communities is increasing. Political networks are organized around special interests or regional problems, and are not necessarily tied to a particular place. The resilience of a local community is compromised as social networks gradually become detached from place.

The long-term response phase is also very stressful because individuals must struggle with difficult long term decisions like permanently relocating their residence or changing occupations. Frustration with bureaucracy increases as responses from federal agencies drag on.[23] This phase is also characterized by depression because people must reconsider their sense of place and loyalty to their community. Our identities are very much tied to where we live and who we live with. We think of ourselves as members of communities we can count on and this requires a strong shared sense of place. When commitment to place and community are questioned, we are also questioning who we are. This can be extremely stressful.

This is also the response phase during which individuals must try to evaluate future risk, which also adds psychological stress. Dealing with risk requires one to evaluate multiple trade-offs. There are different kinds of uncertainty associated with each of these trade-offs (e.g., the probability of another flood, uncertainty about federal policies, or guessing what neighbors will do). The psychological challenges of uncertainty and complexity can be overwhelming.

> *"…the stress of FEMA. In 93 they were very helpful. This year they have been horrible. They were initially wonderful; they came right off the bat, helped us out. We were sort of led to believe that they would help us 12 to 18 months out. We're farmers, and you just can't make a decision just to build tomorrow and then be disqualified."* (Warsaw Focus Group 1)

Quality of Life

We discuss quality of life here for three reasons. First, it is sometimes forgotten that a primary goal of public policy is to increase quality of life. Second, measures of economic productivity are not perfect representations of quality of life.[24] Third, our unit of analysis is the community and quality of life directly affects community resiliency. Communities are groups of people interacting with each other to pursue shared goals. In this case, the primary goals are to reproduce livelihoods and quality of life. These goals are the primary reasons that these communities exist at all. When quality of life declines, people lose their incentive to cooperate, become disillusioned, or simply leave.

[23] The Disaster Mitigation Act of 2000 requires communities to have disaster mitigation plans to qualify for mitigation funding. Some community leaders fear that this will add an additional layer of bureaucracy at the county level.

[24] Throughout history and across cultures we see examples of economically productive miserable people. Some scholars are highly critical of the misuse of GDP (Gross Domestic Product) as a measure of well-being. Quite often economic activities that harm people are considered to generate wealth as measured by GDP. High divorce rates in America provide an interesting example. When a couple divorces, they create separate households and acquire expensive legal bills. These contribute to GDP, but the people are certainly not happy.

Participants in our study were eager to discuss their accomplishments and future plans. But they also described a steady, long term erosion of quality of life that is worsened by each flood. Most obvious, is the affect of people moving out of communities. Several interviewees stressed the importance of having friends and family nearby—often within view—for maintaining a sense of well-being and security. They expressed sadness as their communities shrink.

> *"…your neighbors are people you depend on, and that's one of the sadnesses of this part of the county, which we call the bottoms, is that many people have moved away. They have moved quite literally to higher ground… up on the bluffs. So that there are really only a few people who are living on the bottoms currently, my son and his next door neighbor are the only two that I am aware of right now and everybody has moved elsewhere. So your sense of community changes and even though they stay in touch with each other, it's just not the same. The landscape has changed and the memories are going to change."* (Carman 1)

> *"…but mainly the people I am talking about have moved out, but there are still strong people left in the community but that sense of community has just disappeared."* (Warsaw Focus Group 3)

People invest time, energy and pride in shared resources like schools and churches, which become symbols of community pride. Losing a school because of insufficient population or resources has a profound negative impact on sense of community and place. Likewise, public institutions like post offices and local businesses legitimate sense of community and promote optimism. Quality of life for many participants in our study is also tied to their family history in the floodplain. When asked why people struggle to return to flooded communities, a common response is that parents or grandparents lived there.

> *"…. It goes back that far. They were in the midst of trying to start their farming operation as the 5th generation as the flood came along, and the 6th generation is now living on that farm and you need to know that family-type agriculture is very different than any other kind of business there is. It's almost like the soil is in your blood because you are tied to the soil in that way."* (Warsaw Focus Group 1)

> *"My grandfather came here you see that house right down there (I do) my dad was born down there on that farmstead in 1906 in a log cabin and my grandfather and grandmother came down here about the 20th of December in 1894."* (Warsaw 1)

> *"I wouldn't live here, but actually want to buy property just because I want to keep it in the family… because it's family. And it was my grandfather who built the house, and my father added on to the house and it's a beautiful place."* (Pontoosuc Focus Group 3)

Being close to the river provides important aesthetic and recreation benefits for the quality of life of our interviewees. Many people in our study emphasized their preference to hunt, fish or simply enjoy watching wildlife in the immediate area of their home.

> *"And I enjoy it down here. I like to watch the migration of all the waterfowl and stuff like that, and I'm on the river and you see something different everyday and never a day goes by that I don't see eagles, you know, or I don't know, before I came down here, it was just, I don't guess I saw in my whole entire life three eagles in my life, you know, until I came down here."* (Meyer 2)

It is also difficult to farm in the floodplain while living in another location. In this case, quality of life is based on convenience and economics, but has other unexpected implications. For example, it is very important for wives and children to be able to "keep an eye" on their husbands or fathers while they work. Living on the land one farms enhances the ability of families to respond quickly to medical emergencies.

When asked why they prefer to live in these communities, several interviewees said small rural communities are quiet and have no crime as opposed to bigger towns. Often, when people leave small communities, they can only find affordable housing in larger towns or cities while also remaining close to friends and family or where they work.

Finally, risk and uncertainty negatively impact quality of life. In addition to periodic reminders of risk, it is difficult to remain optimistic about an uncertain future.

> *"…so when I started to hear in the news that these high waters were coming and the predictions sounded very much like 93, I actually went through an emotional experience similar to Post Traumatic Stress Disorder, because I was seeing all of these things that had happened in 1993 when we ended up having to move grain out of grain bins in the middle of the night."* (Warsaw Focus Group 1)

Personal emotions we documented in our study include discouragement, anger and feelings of marginalization. These emotional responses are commonly directed at federal, state, and local agencies.

Recommendations

Immediate Response Phase

- Continue to build on successful methods for communicating the status of current flood conditions and immanent risk. The Illinois Emergency Management Agency (IEMA) and National Weather Service provide real time information on river levels. In addition, many of our interviewees were highly skilled at accessing real time river gauge data from the Army Corps of Engineers and National Weather Service and communicating that information to friends and neighbors. There is no doubt in the minds of our study participants that this information saved lives. Although most residents of areas at risk of flooding knew about river conditions, some failed to appreciate the immediate danger of the situation.

- Include storage space located away from floodplain for personal items and grain in emergency response planning.

- Appoint a volunteer Emergency Management Assistant in each community who would be capable of ensuring vulnerable community members can be evacuated (especially elders without family nearby).

- In some cases, volunteers would be helpful before floods to help evacuate people who might not have friends or family nearby. This might also include crisis counseling to convince recalcitrant residents to leave.

Secondary Response Phase

- To supplement local institutional memory; develop an online database or interactive 'sharing' website of emergency agencies and individuals who either might need or have resources to share.

- IEMA operates the State Emergency Operations Center in Springfield, Illinois. The various agencies that must respond to a disaster are coordinated there. The Emergency Operations Center was activated in response to the 2008 floods. Local entities requesting support communicate with the Emergency Operations Center through county or municipal Emergency Management Agencies (EMAs) or Emergency Service Disaster Agencies (ESDAs). Our interviews at both the local and state level indicate that in several cases EMAs and ESDAs were ineffective links in this chain of communication.

- Full time professional emergency response personnel (ESDAs or EMAs) should be members of the community, however they should not reside in areas prone to flooding. Volunteer Emergency Management Assistants who live in vulnerable areas could be designated. These volunteers would be trained, and would know they would be reimbursed for expenses incurred such as high cell phone bills or fuel spent obtaining critical supplies.

- Although communities hosting volunteers from other communities were able to provide food, volunteers sometimes lacked access to showers or laundry machines. Mobile laundromats in trailers were successfully deployed in Louisiana after hurricane Katrina.

- When possible, efforts should be made to reduce bureaucratic impediments to disaster response.

Long Term Response Phase

- Revitalization of local communities through economic diversification would allow more people to work in their communities. This would reduce commuting times and expenses

incurred during floods, and also enhance sense of place and help keep financial capital in communities. Two critical impediments to investment are uncertainty and risk.

- Uncertainty is a primary impediment to community planning, financial investment and personal well-being. Therefore, public policies should be structured to reduce uncertainty whenever possible. For example, FEMA could have a consistent congressionally-mandated and funded policy to always offer voluntary buy-outs to any home or business in a 100-year floodplain. This would greatly facilitate local mitigation planning by reducing uncertainty and allowing local institutions to act more quickly. It would also reduce financial and psychological hardship individuals encounter while waiting for approval.

- Additional resources could be dedicated to helping people "learn how to live with the river" rather than fight it. For many study participants, levees are believed to be necessary to sustain current agricultural practices.

  "In September they had some rain up north, no levee, at 14 to 14.5 foot, Canton stage, water backed up almost to [deleted]'s house...Well that tells you, if they don't fix the levee, you can't farm this. You cannot farm it. The risk is way higher than the reward would be." (Meyer 1)

  But levees increase flooding in communities trying to adapt to a constantly changing river without relying on levees.

  "We would like to see them take the levee down at Green Bay…Turn it into wetlands, turn it back to nature, let it go back to the way it used to be, the way it's meant to be. You know, because Pontoosuc has been here for…I don't know. Our house is one hundred years old, so I image that this town is older than that…1858, or something like that." (Pontoosuc Focus Group 2)

  "When it comes to this river flooding people's homes, that levee over there, they should break it and flood the farm ground. Pay the farmer for crops…but these are people's homes, keep people in their homes, take care of people first before you do farm ground. And see, that's not what goes on. Farm ground gets protected first." (Pontoosuc Focus Group2)

  Several participants expressed concern about relying too much on levees.

  "Levees are human constructions and they fail. They always fail eventually. They create a false sense of security." (Keithsburg 1)

  Some study participants are open to exploring new agricultural practices without levees.

  "The [drainage] districts would be more agreeable with [removing levees] if we would come up with some sort of insurance program and they could still farm the land…to remove those levees which are more prone to flooding, but to have some program in place to have them protected

financially, rather than having them go back and fight floods every year and putting people's lives at risk." (Army Corps 2)

Wetland restoration, elevated structures, and flood-tolerant agricultural practices[25] could begin to reverse many of the negative social trends described above and diversify local economies through increased recreation opportunities and aesthetic value. Some communities are already collaborating with the Illinois Office of Water Resources to "learn how to live with the river."[26]

- Federal, state or local governments could reduce social divisions that occur within communities during the long term response phase by insuring that all people have the same ability to access FEMA resources.

- Nearly every interviewee in our study believes that dredging the river bottom to allow for additional storage of water during a flood is a long term solution.

- When possible, efforts should be made to reduce bureaucratic impediments to long term recovery efforts.

General Recommendations

- People strive to achieve quality of life by organizing themselves as communities. Long term recovery should be evaluated at the scale of the community in addition to the county. It is not difficult to quantify well-being at the community level.[27] This would complement and clarify county-level economic analyses. Community-level data should also be included when evaluating or modeling floodplain management alternatives. We advocate adopting the ecosystem services approach for regional watershed planning, and including a robust quantitative analysis of quality of life.[28]

- Our research findings on the effects of flooding within communities emphasize the need for equitable representation of local communities in regional watershed planning. This is consistent with the recommendation of the Interagency Floodplain Management Review Committee[29] to include all levels of government in regional floodplain planning.

- Several interviewees insisted that the level of the lake above the Keokuk dam was not lowered to allow for additional storage despite widespread knowledge that a large volume of water

[25] In addition to crop insurance, farmers in other states are experimenting with alternative, high-value, bio-fuel crops that are tolerant of inundation.

[26] Paul Osman, IDNR Office of Water Resources, personal communication, 3 June 2010.

[27] See: Myers, D. G., and E. Diener. 1995. Who Is Happy? *Psychological Science* 6:10-19; and Veenhoven, R. 2002. Why Social Policy Needs Subjective Indicators. *Social Indicators Research* 58:33-45.

[28] Millennium Ecosystem Assessment. 2005. Ecosystems and Human Well-Being: Synthesis. Island Press, Washington, DC.

[29] Sharing the Challenge: Floodplain Management into the 21st Century. Report of the Interagency Floodplain Management Review Committee. Washington, DC. June, 1994.

was moving downstream. The dam at Keokuk is designed to allow for water to pass over it without slowing the water and causing flooding in such a situation. However, most of our study participants are convinced the lake should be lowered and that there is a lack of communication between the government agencies and private utilities that operate the various dams along the river.

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Appendix A: Focus Group Questions

Start with a freelist exercise (provide index cards) “Please write down all the words, just individual words, that come to mind when you think about the floods.”

Follow up by going around the table and asking people why they wrote what they wrote.

1. Could you tell us about the floods and how they affected you?

2. Have you been involved in a natural disaster before?

3. Who do you rely on to get information about how to solve problems?

4. How do people in your household earn income (in addition to farming)?

5. If you needed $10,000, could you get it, and from whom?

6. Based on everything we’ve talked about, what do you think “should be done”?

Appendix B: Individual Interview Questions

1. Could you tell us about the floods and how they affected you?
2. Have you been involved in a natural disaster before?
3. What were the most important things you lost?
4. What are some problems you have encountered in your recovery efforts?
5. What did you expect to be the role of FEMA or other agencies?
6. How has life changed for you as a result of the floods?
7. How do people in your household earn income (in addition to farming)?
8. How has your family income been affected by the floods?
9. Do you think you will continue to live in the same place you lived before the flood? If yes, what makes this place important to you?
10. Do you ever think of giving up?
11. How do you think those around you feel about the problems you have described? (Are they moving away? Will they come back?)
12. When you think of "quality of life" what are some of the most important things that come to mind? (Or "what gives you meaning in your life;" or "what do you need to be happy?")
13. What do you think about farm consolidation (Or "the trend for fewer people to be farming larger amounts of land")?
14. Are the people who live around you getting poorer or wealthier?
15. Do you find yourself having to drive farther for things you need?
16. How do you deal with the risk and uncertainty of climate or weather?
17. Who can you go to when you need to get things done? (political connections)
18. If you had to evacuate tomorrow, who would you rely on to help? (kin)

19. If you needed $10,000, could you get it, and from whom? (economic relationships)

20. For each of the people above, how often do you talk with them, and how are you related to them?

21. Based on everything we've talked about, what do you think "should be done"?

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