

AN EXPLORATORY STUDY OF PRELIMINARY  
DAMAGE ASSESSMENTS IN NORTHERN ILLINOIS

By

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Bachelor of Science in Emergency Management

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Macomb, IL

2012

Submitted to the Faculty of the  
Graduate College of the  
Oklahoma State University  
in partial fulfillment of  
the requirements for  
the Degree of  
MASTER OF SCIENCE  
July, 2014

AN EXPLORATORY STUDY OF PRELIMINARY  
DAMAGE ASSESSMENTS IN NORTHERN ILLINOIS

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## ACKNOWLEDGEMENTS

I would like to thank my committee members Dr. Phillips, Dr. Neal, and Dr. Focht for their assistance during this process. I could not have completed this task without their assistance. Each one of them gave me a different perspective of the scholarly world. My time in graduate school would not have been the same without them. I will truly miss our time together.

Additionally I would like to thank Dr. Jack Rozdilsky for igniting my interest in the field of emergency management. Without your advice and guidance I never would have made it to this point.

I would also like to thank my Mother Kelli, Step-Father Kevin, Grandmother Margarette, my late Grandfather LeRoy, Brother Sean, Sister Marissa, Fiancé Kaeley, Aunt Jeannine and the rest of my family. You are my world and without you I would not have been able to make it through this experience. I strive to achieve great things because of all of you. I love all of you with all my heart.

Never stop challenging yourself.

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Date of Degree: JULY, 2014

Title of Study: AN EXPLORATORY STUDY OF PRELIMINARY DAMAGE  
ASSESSMENTS IN NORTHERN ILLINOIS

Major Field: Fire and Emergency Management Administration

Abstract: Preliminary damage assessments are conducted as a requirement for presidential disaster declarations. Historically the process of conducting damage assessments has been ignored by disaster literature. The implications of damage assessments affect how a community recover from a disaster. This paper uses qualitative methods to examine the damage assessment process in two counties in Illinois following the floods of 2013. This exploratory study examines many aspects of damage assessments including training, team composition, methods of conduct, and uses of data. The findings from this study aim to provide more insight into this topic, opportunities for future research, as well as best practices for practitioners.

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## CHAPTER I

### INTRODUCTION

Preliminary damage assessments are the first step in acquiring aid for overburdened county and municipal governments. Very few studies have explored this function of emergency management. This study attempts to better understand who conducts damage assessment, how they are conducted, and what they are used for.

#### **Significance of the Study**

In the field of emergency management, responding to a disaster with adequate resources is necessary for a successful response and recovery (Kamel & Loukaitou-Sideris, 2004). Although research exists on the phases of response and recovery, little regarding preliminary damage assessment is available (McEntire & Cope, 2004; McEntire, Souza, Collins, Peters, & Sadiq, 2012). Emergency managers attempt to attain an idea of the damages and community needs, after a disaster strikes, through the process of damage assessment (McEntire & Cope, 2004; Downton & Pielke, 2005). A preliminary damage assessment is a key step in the response process as it helps officials determine the level of response needed (Kamel & Loukaitou-Sideris, 2004; Downton & Pielke, 2005). Preliminary damage assessment is also the first step in disaster recovery (McEntire & Cope 2004; Phillips, 2011). State and federal agencies require information

from the damage assessment to allow the aid process to begin allowing communities to help themselves recover (McEntire & Cope, 2004; Phillips, 2011).

### **Statement of the Problem**

Based on information gathered from the FEMA website, instructions for conducting preliminary damage assessments are accessible for practicing emergency management officials via online and traditional classroom training. Training gives the participant an idea of how the process would work from an administrative point of view. Training also describes how organizations should fill their forms and submit damage assessment data. However, very little information from this training details who performs damage assessments or how to conduct an assessment in the field. This study will shed light on who conducts such assessments and how they actually accomplish it in post-disaster field conditions.

### **Context and Field Study Setting**

In the summer of 2013, the State of Illinois experienced flooding severe enough that the Governor requested a presidential disaster declaration. This request necessitated that county level emergency managers submit preliminary damage assessments to the State of Illinois. Flood related disasters often create situations that make a preliminary damage assessment difficult (Downton & Pielke, 2005). The effort created unique challenges to the damage assessment process, whatever standards and norms that existed may have been bent or broken in order to assess damages. Using a case study approach, this study documents how field workers conduct preliminary damage assessments

Being a recent flood, county officials had fresh memories of the event. As a result, a research opportunity developed to study PDAs. Although this study will focuses

on damage assessment in general, the recent flooding in Illinois essentially became the focus.

### **Implications for Research, Policy, and Practice**

This study has several benefits. First, by examining the process of damage assessment, we can make available more knowledge of the bureaucratic system of emergency management. The information on the relationship between disaster impacts and resulting aid is scarce. Second, the administration of training and conceptualizing definitions also leave room for researchers to explore further relationships. Finally, from this study researchers may be able to add to the study of recovery.

Policy implication from this study affect all levels of government and non-profit organizations. Consistency or lack of it in the training and conduct in the damage assessment process may lead to new policy. Cooperation between agencies with different needs and goals is another issue that policy makers can address. The limitations put on some agencies by policy could potentially be changed to allow for a more accurate damage assessment.

The officials who conduct damage assessments can also gain from this research. Different training, team composition, methods of conduct, and uses for the data provide a window into operations. Practitioners can gain from the positive outcomes of the assessment process by emulating best practices. Gains can also come from the negative outcomes by foreseeing issues to address or avoid.

The study of actual field conduct of preliminary damage assessments provides insight into commonly accepted best practices. The approach to the initial response and

recovery activities could improve from these findings, especially related to training, experience, and conduct of preliminary damage assessments.

### **Overview of Coming Chapters**

The following chapters explore the development of this study. They outline the conceptualization, organization, conduct, analysis, and discussion of the study.

Chapter 2 provides a detailed literature review on existing damage assessment research. The review covers the general process of assessments, the training, methods, challenges, and standards in damage assessments. This chapter provides insight into past studies and lays a foundation for this study.

Chapter 3 details the methods used to conduct this study. A qualitative research study requires that methods be explicit. This chapter provides the rationale for qualitative case studies. Sample selection, credibility and trustworthiness are also explained in this section.

Chapter 4 provides an analysis of the data collected during the study. Information details the events of the disaster from the viewpoints of respondents. The stories of two counties performing damage assessment after a flooding event are presented.

Chapter 5 reviews and discusses the data and potential implications of the study. Topics that arose in each county are examined.

## CHAPTER II

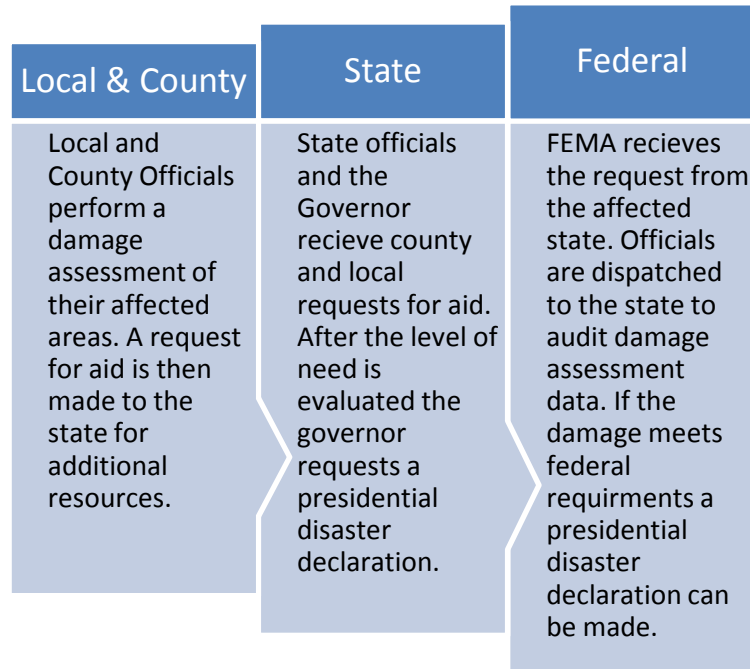
### LITERATURE REVIEW

Currently, little research exists on damage assessment. This chapter describes the damage assessment process using what little extant research exists. Damage assessment is more than just an action performed by officials. Training, team, composition, methods of conduct, and use are all part of the process. Assessments take place in a variety of circumstances, with many role players and variation of outcomes. Whether an assessment is accurately performed or not can affect the aid that a community receives. The existing literature attempts to explain many of these aspects of the process.

#### **Conducting a Damage Assessment**

Municipal and county emergency management officials typically perform preliminary damage assessments (PDAs) with assistance from technical experts (McEntire & Cope, 2004; Phillips, 2011). For example, depending upon the type of disaster, various engineers and other technical experts assist in data gathering in hazardous situations. Essentially, it is the responsibility of the county and local officials to submit the preliminary damage assessment to the state. The governor and the state determine the need for federal aid. If a need exists, the governor requests federal aid from the President in the form of a presidential disaster declaration. (See Figure 1)

Figure 1



Assessments do not occur at a single point in time; officials conduct numerous assessments as the response and recovery to the disaster develops (Downton & Pielke, 2005; McEntire et al., 2012). At different points in time, officials may conduct the assessment in stages. Local officials make the initial assessments in many cases; these assessments have minimal detail and lead to the preliminary damage assessment. Assessing community needs and acquiring a federal declaration are the primary uses of a PDA. A technical damage assessment requires collection of large amounts of data on each damaged structure. Different situations may require more than one assessment depending on the disaster type and other factors such as political pressure (Sylves & Búzás, 2007). Once submitted to state and federal emergency management officials, state and federal representatives may conduct another assessment with the county and local agencies to verify the accuracy of the preliminary assessment.

Typically, county and local agencies (usually emergency management agencies or EMAs) shoulder responsibility for assembling teams of professionals to conduct damage assessments. Damage assessment teams can be composed of people from varied backgrounds and experiences. As a disaster unfolds each affected jurisdiction must assemble a team of people, with varied backgrounds to fit the unique needs of each disaster. With such variation of backgrounds, groups must employ a range of methods to conduct a damage assessment. PDA teams have a variety of methods, each with potential benefits and drawbacks, to conduct a damage assessment. Ideally the team composition and method will facilitate a more accurate assessment.

Agencies such as the American Red Cross (ARC), Salvation Army (SA), National Weather Service (NWS), or insurance companies may conduct their own damage assessments as well. Many agencies may perform their own damage assessment in order to acquire a specific set of information. This is important as organizational goals during the damage assessment may affect the accuracy of the assessment (McEntire et al., 2012). This may also be true for departments on the county or local damage assessment teams.

### **Challenges to Damage Assessment**

Research shows that the accuracy of damage assessments is lacking (Boswell, Deyle, Smith, & Baker, 1999; Downton & Pielke, 2005). Problems include communications, duplication of work, training, and differences in data collection (McEntire et al., 2012). Accuracy in damage assessments is vital to disaster funding, accurate response, and appropriate aid (Kamel and Loukaitou-Sideris 2004; Downton & Pielke, 2005). Assessment becomes more accurate over time, as multiple assessments occur over time (Downton & Pielke, 2005).

According to (Downton & Pielke, 2005; McEntire et al., 2012), it is not clear whether the process of preliminary damage assessment is a standardized procedure. Scholars in the field differ on the stance of standardization in relationship to emergency management as a bureaucracy. Some argue that standardization is beneficial (Schneider, 1992), while others believe autonomy, creativity, and decentralization are keys to effective emergency management (Stallings & Quarantelli, 1985). The idea that training and a lack of consistency potentially lead to inaccuracy has been stated (McEntire et al., 2012).

Other challenges that affect the conduct of damage assessments as well. Every disaster creates unique situations. Flood waters recede at varying rates and create access obstacles to responders. Tornadoes and hurricanes create debris that can impede investigations. Terrorist events may preclude assessments as agencies gather data for criminal prosecution. Damage assessments can also be political in nature as their outcomes typically affect the acquisition of federal aid (Platt, 1999; Sylves & Búzás, 2007; McEntire et al., 2012).

### **Methods of Data Collection**

Situations created by disasters make conducting a damage assessment a difficult task. Emergency managers and their damage assessment teams employ an array of methods in conducting a damage assessment in an attempt to gain the most accurate measure of damage in spite of disaster-generated obstacles. The three most common methods of information collection include windshield surveys, door-to-door assessments, and fly overs (McEntire & Cope, 2004; Phillips, 2011; McEntire et al., 2012). Technology used to determine potential damage levels in the wake of a disaster such as



geographic information systems and access to satellites have also become an important tool in the preliminary damage assessment process. With each method also comes the need for specialized education or training. This is especially true with GIS and satellite mapping.

Driving through an affected area and assessing the damage from the vehicle or the street is a windshield tour. This method is effective when homes potentially have structural damage and approaching them is hazardous to the officials performing the assessment. Therefore, this method is best suited to determining the level of damage that causes visible structural damage. However, this approach results in the lack of information gathered on homes with intact exteriors and damaged interiors. Earthquake and flood damages are difficult to assess in this manner, as damage is not always visible (Phillips, 2011).

Door-to-door assessments create more reliable information since officials can converse directly with residents. This method provides officials with a clear view of damage as well as creates political benefits for responders. A door-to-door assessment is most effective when damaged communities are accessible and structural damage does not limit the ability to approach a residence (Phillips, 2011). Dependent upon the organization conducting the assessment, officials doing the assessments may require access to the interior.

Officials often use a fly-over when the extent of damage exceeds local ability to assess damage in either of the previously stated methods. A fly-over can provide a general assessment of damage. Yet, this method has drawbacks since the ability to fly can be difficult for some jurisdictions. The difficulty in flyovers comes from the cost of

flying as well as access to willing pilots with appropriate equipment. In addition, obtaining site-specific information can be difficult (Phillips, 2011).

Other miscellaneous methods of collecting preliminary damage assessment data also exist. The use of geographic information systems (GIS) to assess damage is quickly becoming an essential part of damage assessments (Yamazaki, 2001; Eguchi, Huyck, Ghosh, Adams & McMillan, 2010). Other tools such as advanced computer models remotely develop a picture of potential damage following a disaster (Pistrika & Jonkman, 2010). These methods estimate hurricane, flood, and earthquake damage and have little application to other disaster settings. Other methods of data collection for the assessment may exist but nonexistent in the literature currently.

### **Accuracy**

Insurance agencies, weather service, and emergency management officials collect data for different reasons with different methods resulting in a lack of consistency and accuracy (Boswell, Deyle, Smith & Baker, 1999). In the wake of a disaster, emergency management officials determine the level of aid required by each community (Boswell et al., 1999; Lindell & Prater, 2003; Kamel & Loukaitou-Sideris, 2004; Downton & Pielke, 2005). Accurate preliminary damage assessments inform emergency management officials on a range of critical decisions. Data associated with the loss of life, social, economic, and resource needs allow emergency managers to make decisions (Lindell & Prater, 2003; Kamel & Loukaitou-Sideris, 2004). Presidential disaster declarations allow the government to supply aid in the form of money to states in need. Data collected by emergency management officials in preliminary damage assessments are the basis for determining presidential disaster declarations. Data gathered in preliminary damage

assessments also inform volunteer agencies of community needs, which helps agencies to match resources with needs.

Still, PDAs are historically inaccurate due most frequently to time required to perform them, the duplication of reports and involvement of various agencies in the process (Boswell et al., 1999; Downton & Pielke, 2005). As damage assessments progress over time, they become more accurate (McEntire & Cope, 2004; Downton & Pielke, 2005). Most initial or preliminary damage assessments of flood related disasters are accurate within 79% of final damage totals in dollar amounts (Downton & Pielke, 2005). In a study of 42 counties, accuracy in preliminary damage assessments ranged from extreme over-estimation, as high as 2433% of actual, to extreme under-estimation (Downton & Pielke, 2005). In cases of large disasters, accuracy improves; data collection is more systematic and checked by various agencies. Collection methods allowed by certain types of disasters create inaccuracies in assessments. Organizational interest in data collection also plays a factor in the data accuracy (Downton & Pielke, 2005).

Accurate data collection allows emergency management officials to make better informed decisions based on community needs (Drabek & Hoetmer, 1991; Lindell & Prater, 2003; Kamel & Loukaitou-Sideris, 2004; Downton & Pielke, 2005). Disaster specific and inter-organizational challenges affect the accuracy of preliminary damage assessments. In the case of the Paso Robles earthquake, multiple government agencies and non-profit agencies performed damage assessments using different forms, making the data difficult to use (McEntire et al., 2012). Accurate data in preliminary damage assessments can affect how the government and nonprofit sectors respond to a disaster.

Another major gap in preliminary damage assessments is the lack of consistency, which this study attempts to investigate.

### **Standardization**

In the United States, federal, state, county, and local agencies perform emergency management tasks. Research on local emergency management describes the need for standards in practice to increase the accuracy and effectiveness of operations as well as regional comparability of operations (Alexander, 2003; McEntire & Myers, 2004). Some authors argue that a decentralized government allows for more flexibility in disasters but adhering to standards allows for an easier flow of operations (Drabek, 1987; Stallings & Schepart, 1987; Schneider, 1992). Others disagree.

A decentralized approach to emergency management is seen most often during the response phase of disasters (Stallings & Schepart, 1987). Agencies typically respond to events in ways that fit the situation. In many ways, this resembles the concept of emergent norms (Schneider, 1992). The rigid bureaucratic form of government often falls apart in high stress situations when quick decision making is necessary. Traditionally, emergency management literature validates the need for decentralized bureaucracy to meet unique needs (Stallings & Quarantelli, 1985; Drabek, 1987; Drabek & Hoetmer, 1991). Decentralization in preliminary damage assessments is important in situations in which require a tailored approach. A single method for assessing damage may not be necessary; new and multiple methods are needed to assess damage more accurately.

Traditional depictions of decentralization reveal underlying structures. Some suggest that a more centralized government can provide resources to meet needs. In a case comparison of two localities affected by a tornado, Stallings found that a more

centralized locality was able to coordinate a response independently whereas a decentralized community needed more assistance (Stallings & Schepart, 1987). Other arguments for centralization focus on the interdependencies of government and the clarity that centralization provides (Schneider, 1992). Preliminary damage assessment forms and training can and do benefit from these facets of centralization (McEntire & Cope, 2004).

A standard can be viewed as a baseline for how an operation should be conducted ideally (Alexander, 2003). Standards also establish definitions and measurements that can be used across multiple agencies (Alexander, 2003). Currently, many standards in emergency management have been promulgated. They apply to the both plan development and training exercises. Not all of these standards, however, are enforced rigorously or nationally (Alexander, 2003). Due to the frequent multi-agency conduct of damage assessments, a standard would help to improve the quality and accuracy of damage assessment (Dynes, Quarantelli & Wenger, 1990).

Discussions on the variety of damage assessment collection methods raise questions regarding training, forms, methods, and other factors that affect how standardization of the preliminary damage assessment process (Dynes et al., 1990; Downton & Pielke, 2005; McEntire et al., 2012). In some cases, information collected by agencies after the same event differed greatly (Dynes et al., 1990; Downton & Pielke, 2005). Standardizing would allow for a wider range of agencies to assess damage more consistently (Alexander, 2003).

Interpretation of definitions can also play a factor in determining the level of damage during a preliminary damage assessment. FEMA breaks damage into three categories (See Table 1) (Federal Emergency Management Agency [FEMA], 2013b).

The definitions provided to those conducting preliminary damage assessments leave room for conflicting interpretations. The forms currently used by the State of Illinois for preliminary damage assessments do not provide the consistent definitions.

Table 1 FEMA Damage Assessment Definitions

<b>DEGREE OF DAMAGE</b>	<b>DEFINITION</b>
<i>Destroyed</i>	Total loss of structure, structure is not economically feasible to repair, or complete failure to major structural components (e.g., collapse of basement walls/foundation, walls or roof.
<i>Major Damage</i>	Substantial failure to structural elements of residence (e.g., walls, floors, foundation), or damage that will take more than 30 days to repair.
<i>Minor Damage</i>	Home is damaged and uninhabitable, but may be made habitable in short period of time with repairs.
<i>Affected</i>	Some damage to the structure and contents, but still habitable.

Standards allow local and regional agencies from different jurisdictions to train, exercise, adopt similar forms, and implement programs and operations similarly during preliminary damage assessments (Alexander, 2003). Specifically, training allows agencies to adopt consistent best practices for different operations during a disaster (Alexander, 2003; McEntire & Myers, 2004). FEMA currently provides national training programs, exercises, and templates for a variety of emergency management jobs and functions.

### **Research Question**

PDAs a function performed by emergency management agencies at the municipal and county levels prior to a disaster declaration. The literature discussed above describes the current state of preliminary damage assessments. Across the board, conduct of preliminary damage assessments is inconsistent and results in inaccurate data when compared to final total loss data. A variety of decisions have direct impacts on how a

community recovers from a disaster and uses preliminary damage assessment data.

Variation in preliminary damage assessments leads to ambiguity and resists comparisons.

This study also aims to explore the degree of standardization in the training of preliminary damage assessments. More research on the conduct of preliminary damage assessments will provide insight into the successes and failures of this function.

Therefore, the research questions addressed in this study are:

1. What kinds of training do people obtain to perform damage assessments?
2. Who conducts damage assessments?
3. How is damage assessment conducted?
  - a. In what ways are standardized instruments integrated into damage assessment?
4. For what purposes are damage assessment data used?

## CHAPTER III

### METHODOLOGY

This is a qualitative study, which is appropriate for research that focuses on a process (Lofland & Lofland, 2006). The following sections describe the uses of qualitative research and how it applies to this study. I collected data via interviews, on the training received by county employees and how officials conducted PDAs. The use of qualitative interviews allowed for detailed information gathering not possible in a survey. The use of face-to-face interviews allowed for a more intimate conversation between the researcher and respondent (Lofland, 1971; Guba, 1979; Stallings, 2003; Lofland & Lofland 2006). Below, I first discuss the rationale for qualitative research in this study. Second, I justify a case study approach and include a discussion of sample selection. Third, I describe how I validated the research instrument was validated. Finally, I describe the interview process, data storage protocol, and the study's limitations.

#### **Qualitative Study**

This study will rely on qualitative methods, which represent the bulk of disaster studies to date. From Prince's seminal work on the Halifax explosion studies, researchers have documented social processes and theoretically-grounded explanations for disaster-related phenomena (Prince, 1920). Prince used interviews, observations, and documents



to track social changes. Since Prince, research conducted within sociology, psychology, and anthropology have contributed to an even wider acceptance of qualitative methods (Phillips, 1997; McEntire, 2004). Disasters, as a field of study, create unique situations where quantitative methods fail to capture how people connect to the event or process (Stallings, 2003). Qualitative research is particularly well-suited to understanding how people within organizations (such as an EMA) respond to the dynamic environment encountered when disaster occurs.

Another foundation in the field of disaster studies is field work. This originates with the Chicago School of Sociology which promoted the idea that students should go to the field to gather data. From this school, Enrico L. Quarantelli, with a strong disciplinary base in sociology, co-developed the Disaster Research Center (DRC) at The Ohio State University. Quarantelli ran some of the earliest disaster related studies with the National Opinion Research Center (NORC), focusing on panic (Quarantelli, 2002). The NORC studies, operated by Charles Fritz, would become the first semblances of disaster research in the United States. Later Quarantelli accompanied by others at the Ohio State University, Russel Dynes and Eugene Haas, submitted a grant request for a study on “Organizations under stress.” After initial denial the Office of Civil Defense (OCD) and Air Force Office of Scientific Research (AFOSR) pursued the proposal (Quarantelli, 2002). From this situation the DRC was born and along with it the tradition of qualitative disaster research.

The DRC sustained an environment where disasters were studied qualitatively. Support for qualitative research echoes in the work of those who studied with Quarantelli

(Neal, 1984; Phillips, 1997; Stallings, 2003). Many methods and tools for qualitative research come out of Quarantelli's work in disaster research (Quarantelli, 1987).

Thus, this study follows a long research tradition of using qualitative methods to explore how PDAs. Typically, qualitative methods such as interviews allow a researcher to gain access to deep, rich information through conversational questioning (Lofland, 1971; Geertz, 1973; Guba, 1979; Phillips, 1997; Lofland & Lofland, 2006). Detailed information from individuals, rather than generic numbers or survey responses, allow the interviewer to glean insight into the process not possible from other methods. This study depended on the researcher fully receiving the impressions of the subjects.

Preliminary damage assessments by governments are often executed in a manner that yields poor data. By looking at numbers alone, it is difficult to determine what influences the outcome of damage assessments other than the chaos of disasters themselves. The use of qualitative research allows the researcher to identify the interactions within the system that may contribute to the problems with PDA (Guba, 1979). For the purpose of this study, it is important to understand each agency's conceptualization of preliminary damage assessments and the conduct of their personnel. Questions provided in qualitative research are adaptable and allow a strong connection between the interviewer and respondent (Lofland, 1971; Guba, 1979).

In qualitative research, it is acceptable to allow the interview to be scalar-dependent (Lofland, 1971; Guba, 1979). In some cases, unforeseen topics may come up that are integral to the study. Scalability allows qualitative research to expand when necessary to identify information needed to answer the research question properly. At times respondents may interpret questions and answer them in a manner that is not

applicable to the main question of the study. With qualitative research it is possible to hone in on areas and refocus the conversation as needed.

Flexibility is another quality of qualitative research, which fits the proposed research questions. Respondents may provide information that was not originally a priority of the study. Face-to-face interviews allow the researcher to take conversations to depths not anticipated (Lofland, 1971; Guba, 1979; Stallings, 2003; Phillips, 2014). Qualitative research allows the interviewer to view a topic holistically. Particular interviews may result in information that requires the researcher to expand or flex the scope of the study as needed. For the purpose of this study thick, rich, holistic data typical of qualitative research is ideal (Guba, 1979; Phillips, 1997). In short, these factors further highlight why qualitative research works well in new, uncharted research areas.

### **Case Study**

Case study approach in qualitative research is suggested for several reasons. Increasing knowledge and gaining clear understanding are products of case study research, which support the goal of this study (Guba, 1979). Case studies provide a vehicle for holistic descriptions of the context of an individual situation (Guba, 1979; Merriam, 1988; Phillips, 1997; Phillips, 2014). Most importantly, a case study allows the interviewer to identify patterns within an organization (Bogdan & Biklen, 1982; Merriam, 1988). Patterns identified within a case allow the interviewer to reveal common patterns in a particular phenomenon (Guba, 1979).

Finding patterns within each case will allow for comparability between cases. Each of the two cases in this study will be located within a county in northern Illinois. This area was selected as it was primarily the impact zone (Killian, 2003). Variation

between counties and their experiences was expected and therefore each county is considered a case study independent of the other (Killian, 2003). For this study, it was necessary to conduct interviews at the county level.

Some concerns need to be addressed when selecting a case study method. In case studies, there often exists a concern that the process is not conducted systematically and is inherently biased. It has also been suggested that case studies do not follow a pre-defined set of methods. To address both of these concerns, this study relied on guidance ensure objectivity and consistency in conduct (Yin, 2014).

Generalizability is often a concern in case studies as well. Yin explains that case studies can in fact be generalized analytically rather than statistically. This study attempts to address the shortcomings of case studies with rigorous methods and accountability.

Comparative interviews within and across multiple agencies describe the process of PDA and the extent to which standards exists or to which people attempt standardization. In addition, the conditions that impinge upon abilities to conduct PDA should be discernible. A case study of these organizations and their relationship to preliminary damage assessments is ideal due to the deep context provided in this format. Case studies of these organizations allow for cross-jurisdictional comparisons that would not be otherwise possible. Though emergency management organizations are similar in structure and function, local decisions can impact the outcome of an event. The use of multiple cases allow for a richer description of the process.

### **Sample Selection**

Comparative interviews within and across multiple agencies describe the process of PDA and the extent to which standards exists or to which people attempt

standardization. In addition, the conditions that impinge upon abilities to conduct PDA should be discernible. A case study of these organizations and their relationship to preliminary damage assessments is ideal due to the deep context provided in this format. Case studies of these organizations allow for cross-jurisdictional comparisons that would not be otherwise possible. Though emergency management organizations are similar in structure and function, local decisions can impact the outcome of an event. The use of multiple cases allow for a richer description of the process.

I use a purposive sample, a common practice in qualitative disaster studies. . Realistically, one has to go to the site of an event to gather data. That site and its characteristics may not be representative. Nonetheless, the rich, thick descriptive and analytical qualities of qualitative research reveal contextual information so that readers may make inferences to their own context (Phillips, 2014). The cases selected perform similar functions in a similar region in the state of Illinois. Participants for this study were identified through non-random snowballing. Non-random snowball sampling can provide deep context for a study (Quarantelli, 1987; Killian, 2003; Stallings, 2003). In this case, non-random sampling allows the researcher to target respondents in the organizations whose involvement was critical and who might otherwise not be selected in a traditional random sample (Killian, 2003; Stallings, 2007).

Preexisting contacts assisted in referring the primary participants of the study. These contacts suggested cases and individuals that would fit into the scope of this research project. I did not select all referred candidates For the purpose of this study, respondents must have had preliminary damage assessment training, conducted preliminary damage assessments, and identified which damage assessment methods

where employed. In order to gain a clearer picture of the processes interviewees from different departments, I sought out both fully involved, partially involved, paid, part-time, and volunteer members. (Killian, 2003). The literature suggests that a purposive sample is beneficial in cases where a random sample would have potentially missed key respondents (Stallings, 2003). In this case the selective sample was only those who interacted with the assessment process. In some cases it was possible to include all types of employees. In other cases the recruitment of respondents proved fruitless due to a lack of interest on the part of the potential respondent.

Multiple factors in the case selection process allow for the best use of each interview. The counties selected conducted preliminary damage assessments after the floods of summer 2013. They performed damage assessments in the recent past, which allowed questions relating to implementation to be salient. They are also of similar size for comparability. As this study aims to compare counties (cases), purposive sampling is ideal in making relevant comparisons.

Each case in this study involved six to seven respondents. This sample size was limited by ability of the researcher to gain access to respondents as well as a lack of interest from those less familiar with the process of damage assessment. It is important to note that interviews concluded at a point where theoretical saturation of responses appeared to be met (Glaser & Strauss, 2009). Theoretical saturation is point in which the researcher no longer finds additional information on during the interview (Glaser & Strauss, 2009). This is the point where respondents become predictable in their responses.

## **Interview Guide**

The questions raised in this study focus on understanding the process of conducting PDAs. The interview guide for this study attempted to get at the characteristics of people conducting preliminary damage assessments and the conditions under which they attempted to complete their work. All of the questions in the guide were open-ended to allow the respondent to guide the interview in the way he/she feels comfortable. The prompts began conversations about individual understanding of the preliminary damage assessment methods used in their jurisdiction. All questions posed to the respondents were open-ended and allowed for follow-up conversations (Phillips, 2014). The questions asked attempt to describe the scope of the preliminary damage assessment process as implemented within and across different jurisdictions.

The interviews began with a question on how the specific jurisdiction conducted its PDA. This question allowed me to obtain a holistic understanding of how each county conducts damage assessments. Ideally, responses to this question would provide a good starting point for the interview in allowing the respondent to detail agency operations.

The second question asked respondents to describe the training process in their own jurisdiction. Varying levels of training may exist as there are few standardized training processes in emergency management (Alexander, 2003). This question will examine how each jurisdiction defines and interprets preliminary damage assessments. Training is integral to the research question since it is a major factor in standardization (Alexander, 2003). In theory, variation in training (or lack of standardization) could affect how damage assessments are conducted.

The third question focused on who does PDA training. Many agencies conduct damage assessments independently, often using their own definitions and procedures (Downton & Pielke, 2005). Understanding where the training originates and who is facilitating the process provides insight into the different methods of damage assessment training. How the process is defined and who defines it provides a baseline for comparison among jurisdictions.

The fourth question asked respondents about their experiences with PDAs. An open-ended question allowed descriptions of both past and current damage assessment practices. This question also allows the researcher to gauge the respondent's history in relationship to the function of damage assessment. Respondents with extensive experience in preliminary damage assessments may have different opinions from those less experienced. This question also provided an opportunity for the respondent to reflect on past experiences and hopefully assist with more complete answers for the final questions.

The next questions asked respondents what agencies, departments, or organizations were involved in the damage assessment process. To understand how damage assessments are conducted, it is important to know not only how the process is actually conducted but also which agencies are involved. If necessary, a follow-up question about individual agency training was posed.

I also included a question on how the agency used the information to see if case specific motivating factors influenced the conduct of the PDA. This question, more than others required a follow up from the researcher in order to explain its intent to the respondent.



The interviews closed with an open-ended question that asks the respondent to offer other comments not previously made. Closing comments may be suggestions, concerns or parting thoughts. The respondent can also verify the information collected during the entire interview (Guba, 1979).

In many cases interviewees answered all or the questions in varying amount of detail without ever being prompted. With the flood event being so recent in the minds of those who were interviewed many details came out in conversation sparked by the first question. The researcher was able to readdress the questions when more detail was needed by asking the respondent to go back to a previous point or to elaborate on a comment. The entire interview guide can be found in Appendix C.

### **Data Collection and Data Storage**

The literature on qualitative research suggests that a process known as triangulation be used to verify the information gathered (Webb, Neal & Phillips, 1995). The process of triangulation involves gathering information from different sources in different formats such as newspaper, internet, video, and interviews. A portion of the data on preliminary damage assessments comes from freely accessibly Internet sites. The sites included things such as newspaper articles, training documents, and maps. Another source of data came from interviews with participants of the study as well as observations made by the researcher and the respondents. It was also made possible to view videos of actual damage assessments that took place as well as photos from the damage assessments. Once all data was collected, it was stored in a safe location in accordance to the Institutional Review Board (IRB) documentation. The process of data collection and storage in this research project is the product of best practices suggested by past

researchers and the IRB. A full document detailing the data collection process and data storage can be found in the back of this paper (See Appendix A).

### **Secondary Data Sources**

The first step in data collection was mainly intelligence gathering through the internet. The literature review on preliminary damage assessments created a framework for understanding function but still left gaps related to practice. Using keyword searches of “preliminary damage assessments,” “training,” “Illinois,” and “forms” I was able to find websites with relevant information. Government-based websites provided access to information not available in academic literature. Collecting information outside of interviews allowed for triangulation of information (Phillips, 1997; Killian, 2003; Phillips, 2014). This helps to bring what was being said in interviews and what is already documented together.

Government sites provide most information regarding the process of damage assessment and local news sites provided information on the situation as it unfolded. The State of Illinois’ emergency management agency website provides forms on how to record damage assessment results. Other websites provide information on the Presidential disaster declaration process and preliminary damage assessments’ role in that process. Information collected from the web was primarily used to generate a narrative describing the events leading up to and proceeding the floods.

### **Interviews**

The interviews provided the most important part of PDA data collection. As preexisting contacts were the primary source of participants, initial outreach was informal. A phone call or e-mail was the initial point of contact to the potential

participant. Once briefed on the scope of the research project, a meeting date and time with the potential participant was established. The researcher arranged times and places that allowed for multiple interviews on certain days. At most three interviews were held on the same day.

Before conducting the interview, the respondent consented to the interview process. A consent form developed and approved by the IRB allowed the researcher to provide details on the study as well as inform respondent of their rights. The consent form explained the study's risks and potential benefits.

I recorded all of the interviews with the consent of the respondent. Recording interviews allowed the researcher to transcribe them in the words used in the conversation (Stallings, 2007). All of the respondents agreed to the use of audio devices before the interview. Typically once I had consent was received and the respondent signed the IRB documents the interviews began.

On the average, the interviews lasted about thirty minutes. Some interviews ran over due to a respondent with much to say. Other interviews ran short, typically this only occurred when a respondent did not feel they were an authority on the topic.

All of the respondents were involved in the PDA process. Most of interviewees were emergency management employees, but employees from departments such as building inspection, storm water, and department of transportation participated as well. Participants ranged from full-time, part-time, paid, and volunteer staff. It is also noteworthy that participants also fit into different hierarchical positions with some being at the management level and others being at the implementation level. In all the samples

from both cases represented a wide array of employees involved with the damage assessment process.

### **Data Processing**

Upon completing each interview, I stored the audio file and my notes in a secure location until I transcribed the interviews. Handling note taking and transcription allows clearer understanding of what took place in each interview. Handwritten notes help mitigate problems of sole reliance on audio recordings (Lofland, 1971; Guba, 1979). Handwritten notes allowed the interviewer to add detail not picked up in an audio recording to the interview. For example, audio recordings cannot include non-verbal communication, hypothetical questions, or general impressions by researcher. Literature suggests that researchers should not only take notes during the interview but also after the interview. As time progresses, information about each interview is less accurate than when the interview first took place (Lofland, 1971; Guba, 1979). Handwritten notes were the primary backup to audio recordings, which could have potentially failed.

The organization of notes was critical in the processing of data. As per the recommendation of many mentors, interview notes were typically organized into the C Model put forward by Quarantelli (Quarantelli, 1987; Phillips, 2014). The C-model looks at the four Cs of a phenomena: conditions, characteristics, consequences, and careers (Quarantelli, 1987). Characteristics are typically the goal of qualitative research. The characteristics of preliminary damage assessment will help frame the other three Cs in the model (Lofland, 1971; Quarantelli, 1987). The organization of notes and memos allowed for easy transition into the coding process once the interviews have been transcribed.

Transcribing audio recordings was one of the final steps in data collection before data analysis could begin. Final transcriptions must follow the actual interview as closely as possible (Phillips, 1997; Phillips, 2014). Loose transcriptions create uncertainty in the analysis process and ultimately lead to a lack of validity in the data altogether. Audio transcriptions, unlike handwritten notes, took days to complete (Guba, 1979).

Once transcribed, files were stored and secured until the analysis phase. The researcher took all precautions to maintain the anonymity and integrity of the data in the storage process. The removal of all identifying text and audio was a primary goal to be achieved before the coding process could begin.

### **Data Analysis**

Analyzing qualitative data can be somewhat difficult for inexperienced researchers. This study employs methods demonstrated by best practices in qualitative research known as coding (Strauss, 1987). This research also took advantage of qualitative research software designed to assist in the coding process: NVivo. Relationships were established using codes built by the researcher in the program.

Common methods for analyzing qualitative data include coding. Codes were developed in two phases, open coding and then a domain analysis of the resulting open codes (Spradley, 1979). Codes are groups of information pulled from transcriptions. Information is grouped by categories of similar statements. In the initial phases of analysis, open codes allow the data to shape the codes. Open coding is a tool used to capture categories from the data (Strauss, 1987). Open coding assumes the researcher carefully reads the entire text of each document while coding. In this study open codes

were initially built on the questions posed during the interview process. Using the interview guide as a starting point for coding is a recommended practice (Phillips, 2014).

### **Credibility and Trustworthiness**

In order to maintain credibility and trustworthiness, some best practices were used as an individual researcher. First data collection for this study employed a method in qualitative research commonly known as triangulation (Webb, Neal & Phillips, 1995). As noted above in a different context, I gathered the data a number of sources other than interviews. The internet served as a source for gathering information on training and procedures. News outlets provided articles on how the assessment process was to be conducted. Also video of damage assessment briefings was acquired through the internet. Second, I used a member check to assure accuracy in the transcription process. A member check is the use of a respondent to verify the accuracy of an interview. Finally I kept an audit trail of field notes and methods decisions.

### **Summary**

The qualitative research process requires an intense amount of attention to detail and the ability to remove ones predispositions in order to allow the respondents, and their responses to speak for themselves. This study used respondents from two counties who were involved in the damage assessment process. Within reasonable limits of the researcher all steps to assure the quality and integrity of the data were taken. As well, the analysis of the open coding process and use of Spradely's domain analysis (1979) were verified and substantiated by credible individuals. The qualitative process described in the chapter aimed to give the reader the best possible description of the events that

occurred in Illinois. The description and process of qualitative research are in line with best practices.

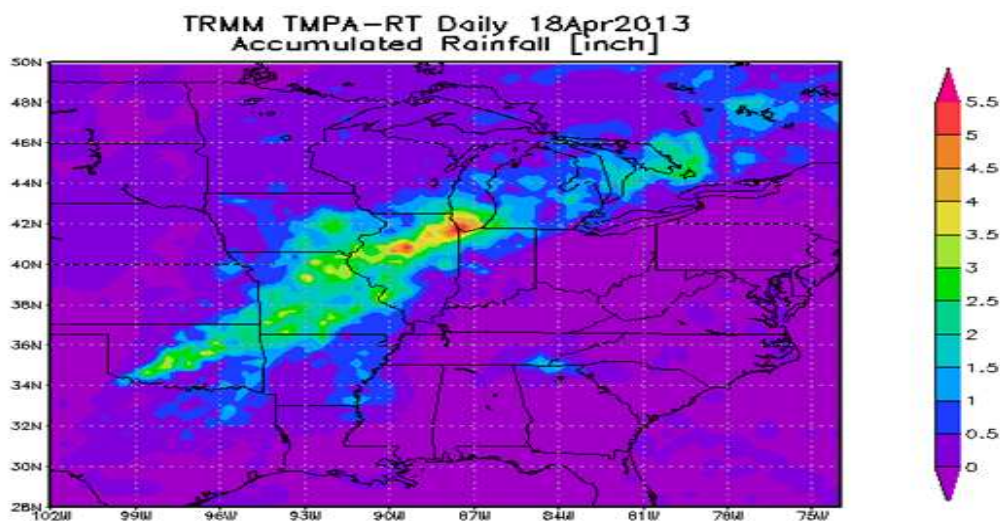
## CHAPTER IV

### RESULTS

#### **The Illinois Floods of 2013**

On April 18, 2013, 5 to 7 inches of rain fell over the northern region of Illinois and southern Wisconsin in a 24 hour period (Savtchenko, 2012; National Weather Service [NWS], 2014) (Figure 2). According to the NWS, areas in Illinois experienced rainfall of up to 2 inches per hour (NWS, 2014). The larger than normal rainfall was only exacerbated by snowmelt and highly saturated soil (Savtchenko, 2012). A warmer than average spring and high levels of rainfall precipitated one of the largest floods ever recorded in Illinois history (Savtchenko, 2012; LaVista, 2013; NWS, 2014).

Figure 2



Source: NASA



Just days after the rainfall, USGS reported 53 stream gauges used to measure stream depths reporting levels at or above flood stage (LaVista, 2013). Of these 53, 20 reported floodwaters at levels never recorded before in the Illinois region (LaVista, 2013). The Fox, Des Plaines, Rock, Dupage and the Mississippi Rivers were initially most affected. Floods of this magnitude had not been seen since the 1993 Mississippi river floods.

In response to the rapid onset flooding, the Governor of Illinois declared a state of emergency as his first step to bringing federal aid to the affected areas. The state of emergency allowed the State of Illinois to provide county and local government agencies with additional resources to fight the flood waters (Illinois Emergency Management Agency [IAEM], 2013c). Although traditional flood fighting techniques failed and many homes were affected.

By April 19<sup>th</sup> the Governor had seen enough damage in a majority of the affected regions to request a federal disaster declaration (IEMA, 2013b). As this was the worst flood possibly on record the request for a federal declaration came quickly, just one day after the rain began to fall. Initially, the request for federal aid only included 38 counties (IEMA, 2013a). With the federal aid requested, the governor also asked that FEMA assist with the damage assessment for this historic event (IEMA, 2013a).

By May 10<sup>th</sup>, the first round of counties evaluated by FEMA received a federal disaster declaration (FEMA, 2013b). In total, 46 of Illinois' 101 counties were approved for a federal disaster declaration (FEMA, 2013a)(See Appendix F). FEMA 4116 DR, as the event was named by the federal government, resulted in 62,000 individual assistance applications and a price tag of over 400 million dollars (FEMA 2014). The interviews

conducted for this study focus on what happened between the governor's request for a declaration and the resulting federal aid.

### **Case Demographics**

In total, I conducted 13 interviews over two separate cases in Illinois. Each case represents a county which was affected by the 2013 flooding. Participants included those who had some role in the damage assessment process. The counties in this study, similar to others in the northern region of Illinois, are home to an urban rural mixed use. There existed many similarities to surrounding counties including population, median household income, and square mileage. To maintain anonymity specific numbers cannot be disclosed. Furthermore, the counties in this study shall be referred to as County Alpha and County Beta

### **County Alpha Information**

Of the 13 interviews conducted for this study, 7 interviews were conducted in County Alpha. All respondents were male. Emergency management employees accounted for 4 of the respondents with the other 3 respondent coming from departments with the responsibilities of building codes, water resources, and permitting.

### **County Beta Information**

The remaining 6 interviews were conducted in County Beta. Of the respondents from County Beta, 4 were male and 2 were female. In this case, departments related to building codes, water resources and permitting accounted for 4 of the respondents and emergency management accounted for 2 of the respondents.

## Coded Results

Upon completion of the data collection process, 13 interview transcripts from the two counties were analyzed and coded. The coding process began with a series of open codes based off of the research instrument (interview guide) and the research notes taken after each interview. The second round of coding consisted of building a taxonomy of the existing codes and further coding each case.

### First Round Open Coding

Both County Alpha and Beta were coded together initially to determine the total references for each code. The result of this analysis can be seen below (Table 2).

Table 2 First Round Code Results

Code Name	Sources	References
Method of Conducting PDA	13	76
Hurdles	13	44
Who Conducts the PDA	13	30
Successes	10	25
Training	13	24
Using the data	13	20
Recommendations	12	19
Disaster Experience & Frequency of Floods	10	11

(Code Name refers to the title of the code. Sources refer to the number of interviews per code. References refers to the number of times a code was referenced across all interviews (Both Alpha and Beta))

The method of conducting a preliminary damage assessment code was applied to all pieces of text that referred to a way damage assessment data was collected. This code encompassed a majority of the discussions that took place. This was not a surprise as it was an essential part of the research question and at the heart of every discussion. As

noted in Table 2, the code was referenced 76 times, far exceeding the next most referenced code.

The code “hurdles” is a result of the respondent descriptions of the events. The code did result in a large amount of references from the interviews. Hurdles was defined as a piece of text where the respondent explained a phenomena that made the process of damage assessment more difficult than expected or than it needed to be in the respondents’ eyes. Although this code was not directly taken from the instrument, it was developed out of the research notes taken after each interview. In a word frequency analysis of this code it became clear that perhaps this code was not as biased as first thought. Words such as cumbersome, duplication, wasteful, and clunky reoccurred and warranted future exploration. The code “hurdles” was referenced 44 times in all 13 interviews.

Who conducts the preliminary damage assessment was the third most referenced code in the analysis. This code refers to the people who actually perform the damage assessments. This code identified the part-time, full-time, county, non-county, or non-government organizations that participated in a preliminary damage assessment. This code was based off of the research interview guide.

Through the interviewing process it became particularly clear that some people felt proud of things that went well. The result was the development of the code “successes.” Although hurdles and successes were not included in the instrument they did become evident in the researchers notes. “Successes” during the damage assessment process were referenced 25 times in all interviews.

The purpose of this study, to determine how damage assessment is performed, drew much of its basis from the training related to the process. The code for training encompassed both the amount of training, who delivers the training, and who receives the training. Other topics such as definitions were also covered under this code.

How each entity used the disaster data resulted in variation from respondents, therefore use became a more in-depth topic. Each respondent would describe how they believed the data was used after it was collected. This code provided great insight into how different people from different backgrounds believe the data is useful or irrelevant. Although it was not referenced many times the implications from the references are great.

The “recommendations” code is as its name implies, recommendations from the professionals to other professionals. Finally, the disaster experience and frequency of floods code was used to code any pieces of text where a respondent referred to a past event or how many times they had performed a flood based damage assessment. The final code was based on the interview guide and was particularly weak as far as its ability to requisite a response.

### **Domain Analysis**

Domain analysis creates a taxonomy of information captured during the interview process. In most cases, the layers of codes were determined intuitively through information found in the transcripts. Each code was essentially made to provide more depth to the initial code. Below is the analysis from both County Alpha (Table 3) and County Beta (Table 4)

The domains of methods use to conduct preliminary damage assessments were created using responses from interviews as well as literature on preliminary damage

assessments. Door to door, windshield tours, aerial surveys, and GIS are all assessment procedures that emerged from previous studies and also became prevailing themes during the interview process. The other code was created as a catch all for those methods not consistently mentioned in subsequent interviews nor in the literature. In both County Alpha and Beta this code remains the most referenced.

The code “hurdles” also remained at the top of the list for both cases. The domains that were developed for this category differentiate whether a hurdle was generated by the disaster event, agent or person. They are considered a strict inclusion semantic relationship to hurdles. In both cases, the agent-generated hurdles far exceed the disaster hurdles. The domain “other” was added to identify pieces of text that referred to hurdles such as a lack of technology or technological error.

“Who conducts the preliminary damage assessment” domains are divided into those who are employees or associated with the county and those who are not associated with the county. They are considered a strict inclusion semantic relationship. Text referring to county employees from different departments was coded within those who are associated with the county. Text referring to people such as local, state, federal, and NGO who participated in the damage assessment process were coded under the domain “not from county.”

The domains for “training” were developed as interviewees explained the levels of training involved in damage assessments. The county, state, and federal training codes were created to compartmentalize text that fit into these categories. They are considered a strict inclusion semantic relationship as well. The “other training” code was created to house pieces of text that described training that did not fit the other domains. In the

“other” domain was mainly used for text describing Red Cross training. In both cases county and state training were referenced more than federal or other training.

The coding of disaster data generated many domains. The domains were determined by interviewee responses. The use of data to update maps was a frequent topic and popular domain. This would be considered a functional semantic relationship. National flood insurance program (NFIP) compliance is a code that came out of interviews of those who work with water resources departments. The use of damage assessment data for debris, a federal declaration, and gauging community needs all also came up as reoccurring themes in the usage of data.

The codes “successes, recommendations, and disaster experience and frequency of floods” were standalone codes that did not require second round coding. Although it would have been possible to further code these topics, consistency in the codes made their categories sufficient.

The description of each case and the interviewee’s depiction of the process of damage assessment are described below. The details of each case are divided into sections that describe the preliminary damage assessment process, starting with the training and ending with the hurdles experienced while out in the field.

Table 3 Code Results for County Alpha

<b>Code Name</b>	<b>Sources</b>	<b>References</b>
Method of Conducting PDA	6	31
<i>Door to Door</i>	4	5
<i>GIS</i>	5	5
<i>Windshield Tour</i>	4	5
<i>Aerial Survey</i>	3	3
<i>Other</i>	1	3
Hurdles	6	18

<i>Agent Generated Hurdles</i>	5	19
<i>Other</i>	1	2
<i>Disaster Generated Hurdles</i>	0	0
Who Conducts the PDA	6	14
<i>Not from the County</i>	5	12
<i>From County</i>	6	11
Training	6	13
<i>State Offered Training</i>	5	9
<i>County Offered Training</i>	4	8
<i>Federal Training</i>	5	5
<i>Other</i>	1	1
Recommendations	6	12
Using the data	6	8
<i>Federal Declaration</i>	5	5
<i>Planning Updating maps threats</i>	5	5
<i>NFIP Compliance</i>	2	3
<i>Gauge the community needs</i>	2	2
<i>Debris</i>	1	1
Successes	3	6
Disaster Experience & Frequency of Floods	3	3

First round codes are shown in with a white background, domains are shown with the shaded background

Table 4 Code Results for County Beta

<b>Code Name</b>	<b>Sources</b>	<b>References</b>
Method of Conducting PDA	5	45
<i>GIS</i>	3	12
<i>Aerial Survey</i>	3	7
<i>Door to Door</i>	4	5
<i>Other</i>	1	3
<i>Windshield Tour</i>	1	1
Hurdles	5	26
<i>Agent Generated Hurdles</i>	5	25
<i>Disaster Generated Hurdles</i>	2	2
<i>Other</i>	1	2
Successes	5	19
Who Conducts the PDA	5	16



<i>From County</i>	4	12
<i>Not from the County</i>	3	8
Using the data	5	12
<i>Planning Updating maps threats</i>	5	8
<i>NFIP Compliance</i>	3	4
<i>Debris</i>	3	3
<i>Federal Declaration</i>	3	3
<i>Gauge the community needs</i>	2	2
Training	5	11
<i>County Offered Training</i>	3	7
<i>State Offered Training</i>	4	6
<i>Federal Training</i>	3	3
<i>Other</i>	0	0
Disaster Experience Frequency	5	8
Recommendations	4	7

First round codes are shown in with a white background, second round codes are shown with the shaded background

### **Case of County Alpha**

**Training.** Training for damage assessments was an element of the interview process was on the minds of many interviewees from County Alpha. Flood waters had subsided and the county was in the late stages of recovery and beginning the plan revision process. One of the most important jobs was to determine how officials could learn from this event and implement changes. Although training was a predetermined question in the interview guide, respondents eagerly discussed how training would need to adapt in the future. It was made clear that three or more levels of training currently exist for those involved with damage assessments. The federal, state, and county each provided training with varying levels of detail and goals. As one respondent described, “the trainings are similar; just at different granularity.” Respondents in two interviews explained that some organizations such as the ARC provide training to its personnel who perform damage assessments.

**Federal.** The training that all respondents first alluded to was the training offered by the federal government. FEMA uses an online platform to deliver classes to professionals through what is known as independent study courses. The training, IS-772, was described as a one to two hour course where one would learn the basics of conducting a damage assessment. Upon completion of the course the person receives a digital certificate of completion. The training can be found online at <http://training.fema.gov/EMIWeb/IS/courseOverview.aspx?code=IS-772>.

Damage assessment training from FEMA online courses was the minimum for all of those involved in damage assessment in County Alpha. For at least two individuals, FEMA's online course was the extent of their training. The other respondents described their participation in state and county training as well.

**State.** The training that most respondents initially identified as "the damage assessment training" was that offered by the Illinois Emergency Management Agency (IEMA). The training provided by the state was a two day process. On the first day, one would learn how to fill out a damage assessment form and why this practice was important. The form is provided by the state and meets FEMA requirements. The form solicits a variety of information on damaged structures; a copy of the form is included in Appendix D. The form is supposed to be a standard that all counties submit to the state. The second day of training focused on debris management. Respondents explained that the relationship between damage assessment and debris management class is warranted due to their overlapping nature.

The location of the training was important because access to training could be an issue. It was explained that training was held for counties at the request of the state.

Typically, a single county will offer to host state trainers. The training is first opened to those within the county such as county employees and municipal partners. In some cases, counties partner and hold training jointly at a mutually beneficial location.

One of the questions asked how training sessions resemble each other since one was classroom-based and two days long and the other was online and two hours long. As one respondent described it, “The state training resembles the federal training but is more practice based. The state wants to make sure all parties know how the forms work.” Other respondents answered similarly explaining that the federal government sets the framework and the state fills in the rest.

**County.** County Alpha developed a form and training for damage assessments in response to prior damage assessments. Although the state forms and training aim to create a standard across all counties, County Alpha decided that changes to the form would benefit their needs. The county-specific form is primarily based on the state form in that all categories required by the state still exist. The difference lies in the details that the county requires for its use. For the most part, County Alpha included sections in their damage assessment forms that ask for contact information from victims. This information is not necessary for the state but can provide an opportunity for the county to aid the victim or follow up if needed. Neither the form nor the process of damage assessment change drastically from what the federal and state training prescribe. The county training is instead considered a refresher in the wake of a disaster.

Due to historical issues with definitions and operational understanding of damage assessments, County Alpha developed what was described as “just in time” training. This training is used to bring the county officials and those involved in damage assessment up

to current requirements. County Alpha had developed this training in response to issues in the damage assessment for the spring floods. Officials are hopeful that the refresher training will assist in creating a more detailed and consistent assessment in the future.

**Summary.** Three distinct levels of training were explored through the interviews in County Alpha. Although not all respondents attended all three, each level served its purpose. Those who received the damage assessment training came from several departments and backgrounds. Each participant played a different role in the assessment process. For some, general training on the overall process of damage assessment is sufficient. Those with the job to organize and facilitate the assessments require additional training.

**Who Conducts the Assessments?** The careers of those who perform the damage assessment was an integral part of the study. In County Alpha there were wide variety of people who conducted damage assessment. There were those affiliated with the county and those who were not affiliated with the county. The role of each agency represented in the damage assessment is also discussed.

**County Affiliates.** Similar to other counties in the region, County Alpha bears a majority of the burden when it comes to assessing damage. Once the flood waters have settled and it is possible to assess damage the county emergency management agency composes teams to go out into the field. In other disasters team compositions may differ but in floods each person plays a specific role.

During the spring floods of 2013 County Alpha performed damage assessments on two occasions. An initial assessment to gauge the impacts to the community and a second assessment done in concert with FEMA and IEMA. Aside from the GIS

employees, one person would represent each department in the assessment process. A typical assessment team would be composed of approximately 3-4 people from the county, and 7-8 with the state and federal government accompaniment.

Employees from the county emergency management agency were members of the damage assessment teams that went out into the field on both damage assessments. Employees from this department had training from both the state and federal government. Their training parlayed with their experience with past disasters determined their role in the damage assessment teams. As stated by one respondent, although emergency management is typically a coordinating role, this situation is one of the few times were they are in field.

In situations such as floods, vehicles able to traverse impassable roads are a convenience. In County Alpha an employee from the transportation department would accompany the damage assessment team to provide such conveniences. Although these individuals would not necessarily assess damage, their presence was needed to allow the others on the team to complete their jobs. In the case of the spring flooding these individuals were only necessary on the initial assessment as flood waters eventually receded.

A representative from the building and code department was an essential piece in every damage assessment team in County Alpha. These personnel are trained to assess structures for their primary career. Their background in building design and coding fit the needs of the teams. One responded stated it best, "Those guys do this kind of thing every day, they are engineers." An added benefit of team members from the building and code department had some of the best knowledge of potential flooded structures as their job

during non-disaster times required them to survey most of the county and at risk structures.

The GIS department and their involvement in the damage assessment process was referred to most frequently during the interviews. In all cases, respondents described the GIS department as essential. . Flood related disasters increased the necessity and level of involvement from this department greatly. During damage assessment operations one dedicated person from the GIS department worked to develop maps. The GIS department representative was able to create maps with historical data, stream gage information, and rainfall totals to estimate where damage was most likely and to what degree the areas where damaged. The data collected through the mapping process allowed County Alpha to create preliminary lists of properties affected by flood waters. This process proved to be most effective. In the final stages of the disaster the GIS department was also able to take the data from the field to update maps.

Individuals from each of the aforementioned department contributed to the teams that performed damage assessments on behalf of County Alpha. Each individual provided their expertise in order to enhance the quality of the assessment. The efforts of these individuals was in part assisted by some non-county individuals as well.

***Non-County.*** Officials within agencies and organizations outside of the county either assisted with or performed their own damage assessment during the flood event also. Most individuals represented municipal, state and federal agencies and in one case individuals represented an NGO. Respondents explained that involvement from these outside agencies typically does take place during a disaster. The involvement was not unique to the record flooding.

Of all non-county organizations that performed damage assessments, the ARC was the only one that did not work in conjunction with the county effort. The ARC performed an assessment of community needs for the use of their organization. It was explained that in some cases the ARC will coordinate efforts with the county, in this case they did not. Respondents explained that the ARC uses its own training and forms. Special training and forms are used to serve the organization's needs. Very little information on the ARC and their process was provided by the respondents.

Municipal involvement in damage assessments was minimal in County Alpha. According to those interviewed at the county, many municipalities attempt to assist in the damage assessment process but few have the training or the resources to do so. Only in a few cases were municipalities able to perform their own damage assessments and submit them to the county with confidence. In these cases teams were composed of many of the same professionals as the county teams. Building inspectors, fire officials, water, and street department employees assisted their municipality. Municipalities have begun to take an increased role in the damage assessment and overall emergency management function within the county. County were confident that in the near future more municipalities will be trained and able to provide mutual aid to each other, reducing the strain on the county.

County Alpha needed additional resources to assist with the damage assessment process during the initial days. County Alpha exercised a mutual aid agreement with the Illinois Emergency Services Management Association (IESMA) to bring an emergency management assistance team (EMAT) to the county's aid. Respondents referenced this team multiple times during the interviews. However, they never clearly defined their

qualifications or typical professions. The presence of this team provided the county with additional manpower. It was stated that the use of the mutual aid would be less frequent in the future as municipal involvement and county trained personnel advanced.

State representatives typically assist in damage assessments when a federal disaster declaration is being attempted. In the case of the spring 2013 flooding numerous state agencies assisted counties in the assessment process. Respondents in County Alpha described the involvement of both the Illinois Department of Natural Resources (IDNR) and IEMA. The IDNR provided some insight to the county building, water and code department on what they would need to be looking for during the assessment. The IDNR's involvement with the actual field assessments was minimal. The involvement of IEMA became more intensive. For multiple days representatives from IEMA joined county officials in a door-to-door damage assessment, assisting with manpower and professional expertise. This assessment was conducted after the county had already performed their official damage assessment.

FEMA also provided expertise during the damage assessment process. Individuals specialized in multiple facets of the damage assessment process. Public information officers, individual assistance, and others assisted in areas as needed during the door-to-door damage assessments with the county.

In all, the organizations outside the county provided support in the damage assessment process. The training, experience, and overall expertise of these organizations assisted in the completion of the damage assessment process. With the help of these individuals and their agencies, County Alpha used a number of methods to collect the data needed to serve the community.



**Methods of Conducting a PDA.** The literature on damage assessments describes how damage assessments can be conducted. In County Alpha, the literature on damage assessments was accurate to a degree. Traditional door-to-door, windshield survey, aerial surveillance, and GIS are still predominant methods of data collection. Other methods such as web based crowd-sourcing, call-in systems and other technology based collection methods are also employed. Damage assessments have adapted to the hurdles presented by disasters and bureaucrats. Each method allows for data collection under different circumstances, each with consequences and benefits.

***Door-to-Door.*** Door-to-door assessments potentially provided county officials with detailed information not possibly obtained through other methods. During the door-to-door assessments county officials were able to photograph buildings and speak with residents. Being able to talk with residents and create a positive relationship with the community following the flood was one of the primary objectives during the damage assessment process for County Alpha. A door-to-door assessment allowed county employees to hear the stories from those most affected by the flood waters. With door-to-door assessments, a possibility existed that homeowners would invite the officials inside the home. Interior damage detail are not possible from any other form of assessment. Although this method allowed the county to communicate with its residents and obtain a very detailed view of the damage it was time and manpower intensive. In County Alpha the door-to-door damage assessment process took approximately one week to complete.

***Windshield tour.*** The concept of the windshield tour was not well recognized in County Alpha. Although it is known as a practice in training, the data gathered from a windshield tour would not be sufficient for their needs. As one respondent stated, “The

windshield tour is not an accepted practice in the state anymore.” As it was explained the windshield tour is typically only use to determine areas that are affected by the floods but not to actually fill out forms or to submit as damage assessment data. By driving through the community, county vehicles would be noticed which could either raise suspicions or show county involvement. For this reason a door-to-door assessment is superior as it leave room for interaction with those in the community who may be suspicious. Also GIS and aerial surveys can provide a similar level of initial assessment detail in a fraction of the time.

**GIS.** The use of GIS has been a long standing element in the operations of County Alpha. Emergency management and building and code department respondents both described the history and importance of GIS. “GIS is invaluable to us, we have used GIS since its inception.”

The application of GIS in damage assessments for County Alpha was twofold. In the initial steps of the assessment process the GIS department worked to create maps that portrayed where damage was most likely based off of historical records. County officials were able to take the maps and effectively visit each community that would have been affected by the flood waters. The May floods of 2013 caused an issues in that flood waters were hitting record levels and areas being affected may not have been flooded historically. This issues was resolved by increasing the flood elevation on the maps and generating new theoretical maps. It was even possible for the GIS department to pull addresses off of the maps and generate lists of potentially damaged structures before the assessment teams ever left the county building.

On the back end, once the data had been gathered from the field the GIS department took the information and created maps representing the new historic flood height. With this effort future assessments can hopefully pinpoint damaged structures within hours. The efforts of the GIS department were supported in part by the efforts of the aerial photography.

***Aerial Surveillance.*** In county Alpha aerial surveillance was used to determine where flooding was occurring that was not on the river systems. The use of GIS allows estimates of river levels but not of ponds or low laying areas that may also be affected by increased rainfall. Officials from County Alpha acquired the help of a county resident who owned a plane to assist with aerial surveys. From the sky, county officials were able to identify areas such as crop fields where ponding was occurring. The flight also allowed officials to take high resolution photos of the damaged areas on the river. Respondents explained that the fly over provided them with information that made them feel confident their assessment would be more accurate.

***Other.*** During the time of the interview the county had already begun to reevaluate the damage assessment process and how it would change in the future. In the past volunteers would take calls and document damage via the telephone. This was viewed by the head of the emergency management agency as an effective method but did require additional staffing in the emergency operations center. One of the new forms of data collection the county hoped to take advantage of was crowd-sourcing. Just months after the damage assessment the county had developed a web based site that could accept self-reported damages. In many ways the site asks for many of the things that would be

asked for in the field. The benefit of crowd-sourcing is the degree of information, such as GPS photos, that can be collected digitally.

Another advancement in the damage assessment process that County Alpha chose to adopt is the use of tablets and smart devices in the field. Currently damage assessment teams collect information on a form provided by the state. The county has worked with GIS to develop a mapping application that captures damage assessment data in the field via notebooks, tablets, and smart devices. This application can be updated in real time, with access to internet, providing those in the emergency operations center a real time look at what the damage assessment teams are seeing in the field. With technological advances County Alpha will be able to reduce it's time and manpower commitment during the assessment process and focus efforts elsewhere.

**Using the Data.** In many ways the use of the disaster data dictated how the damage assessment process was conducted. In County Alpha, leaders from the departments involved desired to connect to the community and gauge public needs. As well, they wanted a federal disaster declaration to obtain aid for the affected communities. Aside from the emergency management functions, data collected from the assessments was also used by the building and code department for NFIP compliance. In the broad scope of the event the data collected would also be used to update inundation maps and assist the county in the planning process for the future.

Gauging the community needs and making connections was one of the most important aspects of the assessment process in County Alpha. Respondents from the county did not believe that a federal declaration was a guarantee. Help in the recovery process was being offered by local and regional communities active in disasters (COAD)

and volunteers active in disasters (VOAD). Using the data collected in the assessment process the county would forward needs onto these organizations who would then provide assistance where possible. Due to the importance place on this aspect, door-to-door assessments where necessary. Without face to face interaction with the community it would have been difficult to carry out this task.

Acquiring a federal declaration was the main goal of the damage assessment. According to respondents, certain damage totals guarantee a federal declaration even though the federal government expresses no such equation or threshold. Getting to as many damaged properties and documenting the damage was the goal of many of those who performed the damage assessment. For others on the assessment teams, the time in the field was an opportunity to collect information for NFIP compliance.

In almost every other type of disaster, damage assessments are used solely for the community and declarations. In the case of flood related disasters, it is necessary for regulatory agencies to document damage for NFIP compliance. Respondents from the building and code department stated that it is difficult to explain the difference to the teams as they go out. Therefor NFIP compliance information is gathered in concert with the declaration data and separated out later. Information gathered in this respect allows building and code department officials to require residents to come into compliance with new standards or potentially lose their insurance. The information is shared with both the GIS department and the federal government to update records and maps.

Finally, one of the last uses for the data is the updating of maps and plans, including floodplain data. In the case of the spring 2013 floods, river levels had never been as high. Risk maps and plans needed to be readjusted in order to account for what

may be a new trend in local flooding. At the time of the interviews the county had already completed many of the changes they needed to make to their plans and were preparing for the next event.

**Experiences.** During the interview process it was made clear that many of those who were involved in the damage assessment process had worked on federally declared disasters in the past. One of the questions posed to respondents was how this particular event and the damage assessment process compared to prior disasters. Two consistent topics emerged from this discussion, the frequency of flood related events in Illinois, and the way damage assessment has changed.

It was relevant to the study to hear how respondents felt about flooding. “If there is one disaster you don’t want to deal with, it is flooding.” One respondent explained that during his tenure in emergency management, flooding was the most frequent event. “These people have been through it before, and they will go through it again.”

Respondents explained that the frequency of flooding made assessing the damage difficult at times. Some residents do not want damage recorded, as they know it will raise their insurance. In the case of this particular flood, residents were generally welcoming of assistance, possibly due to the historic nature of the flood waters.

The experiences of those who participated in past damage assessments was noteworthy as well. As one engaged in the process noted, “In the past we never had to collect this much information.” In comparison to past assessments, this one required more effort on the part of the county. As damage assessments have progressed over time they have become more detailed but the requirements and things to look for have changed as well. County officials described changing definitions, forms and requirements through

the years. Some of the changes were detailed as beneficial to the communities and in other cases the changes seem to give the respondents a sense of unnecessary bureaucracy.

**Hurdles.** Disasters such as floods create unique situations that make conducting damage assessments difficult. The respondents made it clear that requirements, definition interpretations, and bureaucracy also created challenges that impeded the damage assessment process. Below I describe the types of hurdles respondents mentioned.

Flood water created situations where some communities were cut off from the main roads. The damage assessment process could not be as accurate as possible due to a lack of access. Flood waters crested and receded more than once during the flooding event as rainfall continued. Unlike damage assessments in other disasters the flood related assessments would have worked best in waves as the flood waters receded allowing the assessor to see the damage to structures as they became evident. This hurdle was compounded by time and other constraints imposed by the state disaster declaration procedures.

As stated in the description of the event above, the governor of Illinois declared a disaster declaration one day after the flooding began. In the case of County Alpha, only a majority of the emergency management staff and resources was dedicated to the arduous task of collecting data. The process took approximately one week during an emergency time period. County officials were rushed into the damage assessment process while the flood waters were still rising and life safety was still a priority.

The personnel needed to collect information, for the state and federal agencies, burdened all departments involved in the assessment process. In the case of the

emergency management agency almost all staff were needed in the field to conduct the assessments. For the building and code department the strain was great as well. Building inspectors were taken off of their normal assignments in order to assist in the assessment effort, leaving other employees to pick up the slack. The damage assessment process was also extended when state and federal officials requested a second assessment of the damaged areas.

Historically, according to county officials, once damage assessment data is completed, state and federal governments would request an audit to verify the information. In the case of County Alpha, the state and federal governments requested that the assessment be conducted a second time. “Apparently we don’t do the PDA anymore; we did a PPDA because they came in and did the whole thing over again.” This practice created confusion and additional effort on the part of the county. The presence of state and federal officials also created challenges with how the assessment teams were categorizing damage.

A major reason for the development of the just-in-time training program was the lack of consistency from agencies during the assessment process. Regardless of prior training, many officials who went into the field with the county representatives put the same structure in different categories for damage. One respondent explained that all three levels of government, county, state, and federal, disagreed on how the damage scale was to be interpreted. For instance a federal employee might define a property as major damage where a state employee would define the property as only minor damage. The discussion created much tension and confusion in the field and slowed the process.



Finally, the format of the information sent to the state created another hurdle for the county. It was explained that the form created for the use of the state was in a format that only allowed for ten structure entries per page. As well, the form was in a format that could not be digitally modified. Although county officials were able to recreate digital databases of damaged structures and their details, the information needed to be hand copied into the state based form for submission. This process was labor intensive. One respondent described it as unnecessary and a wasteful product of bureaucracy.

**Summary.** County Alpha took advantage of best practices during the damage assessment process while also innovating ways of accurately collecting data. Innovations included the use of GIS in combination with aerial photography as well as the use of mutual aid in the PDA process. In the wake of hurdles generated by difference in definitional comprehension new training programs have been developed to make the next disaster simpler. Team composition in County Alpha served a purpose. Every department generated benefit that increased the county's ability to perform an accurate damage assessment. In the end the damage assessment process was used by the emergency management agency and other involved departments to bring aid to the community through either government aid or community volunteers.

### **Case of County Beta**

**Training.** Training brought up as much discussion in County Beta as it did in County Alpha. Beta County also received Federal, state, and county training. Much of the experiences with federal and state training resembled that of County Alpha. The main difference between the two counties came in the importance put on each level of training

and whom received the training. County Beta emphasized the need for its officials to have training tailored to suit the needs of the county. I describe these factors below.

***Federal and state.*** The federal training in County Beta consisted of both the FEMA independent study courses as well as training on how to assess structures for NFIP compliance. In contrast to County Alpha, only c officials at the highest levels of management participate in the FEMA training. Training on the NFIP however is acquired by all of those who work in the water resources department but not those in the emergency management agency. State training provided by the IEMA was similarly only received by the highest levels of emergency management officials and by the water resources department.

***County.*** Training at the county level was most important to the damage assessment team members in County Beta. Training has been developed to provide employees with the information needed to perform a very broad based damage assessment. According to an emergency management employee the training aims to get assessment team members to look at damage in broad terms rather than predefined definitions, such as those used in FEMA documentation. As it was described by an emergency management official, “We don’t want people out in the field making a decision about level of damage. We just want them to tell us what they see.” The training is accompanied by drill and exercises in hopes of honing this skills during non-disaster times.

County Beta used quite simple drills and exercises. Participants are dispatched into the field individually and told to respond to some facility. In the example used during the interview participants were dispatched to the library. Upon arrival, the participants

would be given a folder with photo graphs of damage. The damage would be described and relayed back to the emergency operations center. Drills and exercises such as this are used to remove bias in the assessment process and instill a higher level of consistency in reporting. Additionally, County Beta conducts a “just in time” training.

The “just in time” is used as another quality control method. All those responsible for conducting the damage assessment are informed of how the process is expected to occur. Officials from both the state and federal government are invited to participate. This training allows officials from all levels to come to a consensus as to what is expected. This training is a result of historical changes in the damage assessment process. One respondent explained that disasters do not occur every year, by the time a real exercise of the damage assessment function is needed things have changed. There is a strong belief that the efforts at the county level with training and exercise have had a great impact on the quality and ease of their damage assessments.

**Who Conducts the Assessments?** Representatives from within the county as well as representatives from local, state, and federal agencies participated in the damage assessment process in County Beta. Each participant played a vital role in the overall process. Damage assessments in County Beta are not conducted by a team of different departments when in the field regularly. Instead each department plays a different role in gathering the data at different points in time. During the spring 2013 flooding event the county did send teams out to assist FEMA and IEMA with their additional assessment.

**County Affiliates.** Those from the county who conduct damage assessments each play a different part in the assessment process. Rather than acting as a team in the field, the team works in a series of responsibilities. In this manner, the County works as a

cohesive unit working toward a common goal taking advantage of specialties where needed.

The county emergency management agency primarily plays a coordinating role. When a situation occurs where an event such as a flood causes damage to the residents or structures they activate. During the data collection process emergency managers coordinate which effort will be focused and where. Once the data gathering process is complete, emergency management officials forward the information to those who can potentially provide aid. In some cases the emergency management agency would use its volunteers to collect data for initial damage assessments. In this disaster the emergency management agency worked very closely with the water resources and planning departments to collect the data needed.

The planning department in County Beta was responsible for collecting damage assessment data in the field. Much like the teams in County Alpha, the planning department employees in County Beta used their experience with code enforcement and engineering knowledge to assess data. From the planning department information would be forwarded to the emergency management agency for further use. It is noteworthy that the planning department covers the areas in the county that are unincorporated. In the municipal areas the water resources department takes jurisdiction.

The role of the water resources department is three-fold. First, the water resources department has the responsibility of conducting the damage assessment in municipal areas which cannot conduct their own damage assessments. Similar to the planning department, the water resources employees are engineers by trade which fits the needs of the assessment process well. The second role the water resources department plays is that

of a regulatory nature. All damage assessment information collected is handled by the water resources department when flooding is involved as they maintain NFIP compliance. Finally, the water resources department works to monitor rivers and streams as their day to day job. Preceding a disaster the department monitors river and streamgages, rainfall totals, and tracks snowmelt. The water resources department works in conjunction with the NWS to monitor this information for the region. Using the information the water resources department is able to provide maps and estimates of where damage occurred during and after the event.

***Non-County.*** Many of the organizations involved in the damage assessment process operate outside of the county. Municipal, state, federal and other agencies assist in the damage assessment process as needed. Municipal officials who can conduct their own assessments are encouraged to assist by providing data for their locality when possible. The following agencies participated in the damage assessment process during the spring 2013 floods but are not typically involved in county affairs.

The federal and state involvement in the damage assessment process was similar to that in County Alpha. Representatives from FEMA and IEMA were joined by county emergency management, water resources, and planning employees. In the case of County Beta, water levels had not yet receded so the assessment was limited to areas where damage was clearly visible.

Civil air patrol, a division of the air force, provided assistance during the damage assessment process as well. The civil air patrol took aerial photographs enabled with GPS technology. The photographs were used to support maps and projections made by the

water resources department. The efforts of the civil air patrol were highly praised by those who were interviewed by the county.

**Methods of Conducting a PDA.** County Beta took a more remote approach to the data collection process than County Alpha by using GIS more heavily. A majority of the data was initially compiled in 2-3 days. Although windshield tours, and door-to-door assessments were used to ground truth information and provide the state and federal government with information they were not the primary methods of data collection. GIS modeling and aerial photography provided most of the damage assessment data.

**GIS.** Historical information combined with different types of modeling allowed the county to determine which homes would be affected, at levels, by the flood waters. The process was described as extremely detailed and was boasted as being 98% accurate. The ability to perform such an assessment was the product of years of data collected by the various county departments as well as information gathered from the stream gages and NWS.

The ability to create such an accurate model was facilitated by base level elevations of every structure in the flood plain. County officials had survey quality measurements for every home that could potentially be affected. Combined with information from the county taxing department addresses and parcel numbers could be assigned to each property. Finally, using best estimates of flood heights the water resources department could determine where the water was in a structure within inches. This model was able to generate over 3000 address which were potentially affected by the floods. Most of this information was generated without having to leave the county offices. One down side to this method of damage assessment is the inability to determine

if low-lying areas or ponds had caused damage outside of the river or stream systems. Many of the other structures affected by the floods were identified through other means.

***Aerial surveillance.*** The use of aerial photography was integral in the damage assessment in County Beta. Photos taken by civil air patrol allowed the different departments to both truth the maps generated from the water resources department as well as to generate information outlined by the GIS model.

***Windshield tour and door-to-door.*** County Beta still employs the traditional windshield tour and door-to-door assessment method during disasters. During this particular event there was not enough time to conduct a thorough assessment by foot. Respondents said that a door-to-door style assessment was conducted by the planning department but in many cases was not possible due to floodwaters. The manual style of damage assessment is still preferred as it gives the county employees an opportunity to interact with the public. Therefore, even if additional damage data is not required it is normal for the county to go door-to-door in affected communities to provide information on the health impacts of floodwaters.

**Using the Data.** Once the data had been collected the county used it to perform a number of functions related to obtaining aid and enforcing regulatory standards. Each respondent offered a different opinion as to what the primary use of the data would be.

Emergency management officials described the usage of the data in four ways. First, the data was used for a presidential disaster declaration. The detail of the assessment would not have changed if the potential for a declaration did not exist. The importance of federal aid made this one of the primary uses for the data. The second use would be the potential to identify the community needs in order to find alternative ways

of providing aid. This would have been in the form of COADs and VOADs similar to County Alpha. Another use of the data was for the identification of debris and potential debris collection site. Debris management is a function that is typically performed during or after the damage assessment process. Finally, data was used to update maps and impact the planning process for the county. Based on responses to the usage question from the emergency management respondents, these four categories became clear. Respondents from the water resources department provided additional uses that had not been previously mentioned.

The use of the data provided by the water resources department was in line with the emergency management department. Added responsibility in the water resources department required that the data be used for other purposes. The regulatory side of the water resources department necessitated that the data be used to bring homes into compliance for the NFIP. Additionally the water resources department was able to take the data and use it to make the forecasting model and maps more accurate.

**Experiences.** Many of those interviewed had been through several disaster declarations in the past. The experiences accumulated over those disasters detail how this particular event compares. The respondents were asked to describe their experiences with past damage assessments.

Flooding was described as the only damaging event to have occurred in the county during the tenure of those who were interviewed. Although events such as severe weather have occurred they have not caused noteworthy damage. Disaster generated challenges have consistently arisen over time but the technological advances such as GIS and tablets have made the assessment process much easier. Due to the repetitive nature of



flooding in County Beta the continued documentation of patterns have also made the process smoother.

**Hurdles.** As in County Alpha, flood waters created a situation that made aspects of the damage assessment process difficult. Particularly the lack of access to communities during the joint assessment with the state and federal agencies was troublesome. Many of the hurdles faces by County Beta were generated from civilians and bureaucracy.

In some cases the regulatory requirements of the NFIP can cause distrust in the community. Civilians can begin to think that the county officials performing damage assessment are attempting to do something nefarious such as condemn their homes or force them to leave. Two respondents described situations where interactions with the public was difficult. Although homes had been clearly damaged, victims refused to provide information to county officials. Jokingly one respondent explained that they wished a dash cam could have recorded a time they were chased away with a shotgun. Experiences like this were apparently infrequent, but enough trouble to cause some concern. Hurdles such as this make performing a damage assessment dangerous and obviously incomplete.

In the water resources department, the change in daily operations caused distress in some respondents. Disaster times warrant that employees stop their traditional jobs and take on responsibilities not typically theirs. County Beta frequently experienced flooding but in this case some workers were taken off of their normal assignments for up to two months. The back log, lack of assistance, and change in pace was difficult for some. As one respondent stated, “It is one of those things, every day you need to evaluate who is going to cover what responsibilities.”

Other hurdles related to the difficulty with the forms provided by the state and the methods of which the state accepted data. Similarly to County Alpha the forms required by the state were considered too cumbersome. The problem with the forms was circumvented by a savvy water resources employee who was able to develop a code to automatically export the data in the required format. Additionally the manner in which the state accepted the assessment data was somewhat of a hurdle. According to one respondent the state was slow to accept assessment data in a form other than a fax. In at least one case an attempt to e-mail assessment data was denied. The result was a fax of 3,500 affected properties. The run time of the fax was estimated to be about three hours.

Many of the hurdles faced by the county cannot be changed without substantial effort. The relationship with the community and trust is something that will take time to mend. Few solutions seem feasible. It will take time and persistence to change how the state requests and accepts damage assessment data. In one interview, a respondent noted that a conversation took place with a state representative on how the forms could be improved. The respondent felt that the conversation would lead to real changes and that the state would be receptive to the suggestions.

Table 5

Case	Alpha		Beta		
Training	Federal	All employees involved with DA.	Training	Federal	Only higher level officials.
	State			State	
	County	Allows for just in time training. Also asks for additional detail in the DA forms.		County	Allows for just in time training. Allows county to ask for broad descriptions of damage.
Teams	Mainly composed of engineers and building inspectors along with EM personnel.		Teams	Mainly composed of engineers and building inspectors.	
Methods	Door-to-door	Primary form of data collection.	Methods	GIS	Primary form of data collection.
	GIS	Second most discussed.		Aerial	Second most discussed.
	Aerial	Tertiary form of collection.		Door-to-door	Tertiary form of collection.
	Windshield Tour	Considered invalid.		Windshield Tour	Not highly respected in data gathering.
Uses	Guage community needs, aquire a federal disaster declaration, NFIP compliance, and future planning.		Uses	Guage community needs, acquire a federal disaster declaration, NFIP compliceance, and future planning.	

### Summary

Above is a depiction (see Table 5) of some of the basic information gathered from both counties. Each county experienced the disaster in a similar manner but their training focus, team compositions, methods, and uses all differed in some manner. Respondents from each county expressed the need to perform a damage assessment in a timely and accurate fashion. The means by which each county pursued this goal was different. In both counties the use of training in innovative ways allow those who conduct damage assessment to reaffirm their skills and become aware of agency needs. The resources and agency needs of each county determined the method of conduct for each county. In the next section the overall experiences from these two cases are discussed.

## CHAPTER V

### DISCUSSION

The study of preliminary damage assessments has provided a basics understanding of how damage assessments are conducted, the role players involved, and how accurate the resulting data can be. The conduct of preliminary damage assessments has implications for the response to and recovery from a disaster. Due to the inconsistent nature of the damage processes this study aimed to address those what factors into the processes overall. Additionally standards in the training and application of the damage assessment processes were also a point of interest.

Training related to the damage assessment process was a topic that had not been explored in past disaster research. Consistency in emergency management training has appeared as a topic of discussion in other research. It was stressed that training become more standardized in order to create national benchmarks and consistent measurements (Alexander, 2003). In this study the goal of training and its origin where explored. The respondent detail of training may also lead to significant implications.

The role players in the damage assessment process was another area in the literature that had yet to be defined. In other areas of emergency management such as search and rescue, certain departments perform the warning and evacuation function similarly across the country. In the case of damage assessments no such patterns exist yet. Identifying those involved attempted to assist in the possible development of such patterns.

Conduct of preliminary damage assessment has been described in four major categories in the literature. The windshield tour, door-to-door, aerial, and remote sensing forms of assessment are defined by the literature as commonly accepted practices (McEntire & Cope, 2004; Phillips, 2011; McEntire et al., 2012). One of the goals of the study was to identify what methods of assessment were used in during the flood event of 201 and their perceived effectiveness.

Finally, the use of the assessment data was an important question to explore as many organizations use assessment data for different purposes (Downton & Pielke, 2005). The goals of each individual organization was theorized as a potential source of inconsistency in the assessment process. This study explored the uses of the assessment data and found interesting variation of the intended use as defined by different parties.

The exploration of the damage assessment process conducted by this study hope to further the field of emergency management. The documentation of training, role players, methods, and uses of assessment data from two counties affected by historic floods aims to fill gaps and create a foundation in this sub category of response and recovery.

## **Findings**

**Training.** The training related to the damage assessment process was an important facet of this study. From the interview process it was determined that three distinct levels of training exist, federal, state, and county. Each level aims to meet certain goals for different audiences. As the training approaches the county level it becomes increasingly practical and specific. As both cases took place in the same state in the same country those levels of training were identical. At the county level training varied greatly

between the two. It was also noteworthy that in County Beta training at the state and federal levels was reserved for those who were at the higher levels of management.

Information on the federal level of training was acquired from the website that provides the training as well as responses from interviewees. Essentially the damage assessment training is offered on a web based platform which can be accessed by anyone with an internet connection. The goal of the training is to explain the process of declaring a federal disaster and to outline how state, county, and local governments can conduct their damage assessments. At no point in the training are mandates made as to how the assessment can be conducted or submitted to the federal government. According to respondents the federal training is very high level and for the most part advisory in nature. The federal training is in contrast the state preliminary damage assessment training in its practical nature.

The state training is a classroom experience with the goal of explaining how the state's damage assessment form should be filled out and submitted. The class also covers the function of debris management. The state training take place over a two day period. Essentially the state training is a means of making the state required damage assessment process less ambiguous.

At the county level training varies between cases. Both counties have established or are in the process of establishing "just in time" training. "Just in time" training is a regionally acknowledge best practice used to help all of those involved understand the expectations of the damage assessment process as it will be conducted. This type of training is a result of inconsistencies from the state and federal government. In the past damage assessment has changed numerous time with different requirements for different

declaration. The “just in time” training is also use as a refresher for county employees who may not be familiar with the processes.

County Beta also described training for its own employees. The county training’s goal is to create a situation where those conducting damage assessment log details about damage but do not personally assign damage levels. In this case County Beta uses its training as a way of creating consistency and removing bureaucratic confusion. Additionally County Beta drills and exercises the damage assessment function as a way to keep assessors current and consistent.

**Methods.** The methods used to conduct a damage assessment in both County Alpha and Beta depict a changing world. In both counties technology had impacted the method of data collection. Traditional forms of damage assessment although still employed seemed to be less impactful than those explained by the respondents.

***Door-to-door.*** Respondents from County Alpha explained that the use of door-to-door assessments was important for the connection to the community. This damage assessment method can be used as a political tool in that the county officials get a chance to meet face to face with those who need assistance. A major drawback to this method is the time required to complete a large scale assessment. In the case of both counties time was limited and the door-to-door portion of the assessment created a manpower strain. County Alpha with a larger window of time was able to make use of this assessment method and connect with the community. The first alternative to the door-to-door assessment would have been the windshield tour.

***Windshield Tour.*** The practice of the windshield tour was reserved for initial impact assessments and not for damage assessment data. Respondents from County

Alpha explained that the practice was not effective. It was also made clear that the windshield tour was not recognized by the state as an effective practice as well. In County Beta the windshield tour was used to display damage to the federal and state representatives. The use of the windshield tour was only recommended for cases where access to communities and other methods of assessment were not possible.

***Aerial Surveillance.*** Surprisingly the use of aerial surveillance was consistent in both cases. In County Alpha photos were taken by volunteer pilots accompanied by emergency management staff. In County Beta GPS enabled photos were taken by the civil air patrol. Aerial surveillance was used primarily to determine areas affected by flooding that might not otherwise be determined through modeling. Additionally it was suggested that some of the most accurate modeling could be based off of aerial surveys. In the era of technologies such as GPS and GIS the high level information that can be gathered from the sky assists in completing the overall picture.

***GIS.*** The use of GIS mapping was by far the most impactful during the assessment process. In County Beta benchmarks had been established to determine what level waters would need to reach to flood each home on the river system. This capability allowed the county to perform much of its damage assessment remotely with great accuracy. In County Alpha, GIS was used to determine where teams would perform their door-to-door assessment. Both cases noted GIS as being integral to their damage assessment. A major drawback to the remote approach came in the lack of personal interaction with the community. Where people anticipated a visit from the county they could have been disappointed. In the end both counties were able to receive federal aid because of their effort. This finding supports the literature that suggested remote sensing



and modeling capabilities would advance and become a keystone in the damage assessment (Yamazaki, 2001; Poser & Dransch, 2010).

***Other.*** Aside from the traditional methods of damage assessment a few new methods were described by respondents. These new methods employed information volunteered by those affected by the disaster through different media. In one case call-in systems were under development. In theory residents would call in and describe the damage that they incurred. The call-in system would require that a person or people man telephones to receive the calls. An alternative to the call in system was the self-reporting via the internet, also described as crowd-sourcing.

The concept of crowd-sourcing is that individuals post data to a place on the internet where it can then be aggregated and used in various manners. In County Alpha a website had been established to collect data from residents for use in the preliminary damage assessment process. Residents can submit information required by the state for a federal declaration as well as other media, such as photographs of the damage. Although this capability was not available during the spring floods, I was assured it would become a valuable asset in future disasters.

***Consequences.*** The methods chose by both counties had intended and unintended consequences. As every method had benefits and detriments in both cases the benefits suited the needs of the agencies. In count alpha the decision to perform a door-to-door assessment was based in the fact that face to face interaction with the community would result in goodwill and social capital from the community. This face to face interaction also allowed county personnel to listen to the community members and gauge their needs in a holistic manner. The drawback to this method was the intense drain on the manpower

and resources the county could have been using for other recovery activities. The consequences were enhanced by the fact that follow up assessments would also require county officials to be in the community.

In county beta, the use of GIS as the primary mode of data collection also provided both intended and unintended consequences. Using GIS allowed county officials to save time and resources while compiling and accurate damage assessment. In some cases the lack of boots on the ground lead to some community members feeling like they were not being acknowledged. Although this system was efficient in doing the job it lacked in personal touch. Each method does provide its own set of positive and negative outcomes which the counties addressed in their own way.

**Those Who Conducted Damage Assessments.** Personnel from the fire and police departments did not play a major role in the damage assessment process contrary to other studies on damage assessments (McEntire et al., 2012). Rather each county took advantage of the building, code and water resources departments to primarily conduct their assessments. The use of engineers greatly assisted the county in defining levels of damage and collecting data. Other staff such as transportation, GIS, and emergency management officials accompanied those in the field. Representatives from FEMA and IEMA were in the field for secondary damage assessments but their presence would not have been typical.

At the municipal level of government engineers and other management officials were involved in the damage assessment process. A fire chief was involved for one municipality; this person's involvement did not also mean the involvement of the local

fire department in the process. At the local level, those who conducted damage assessment were similar in profession to those at the county level.

Other agencies such as the ARC performed a damage assessment. The Arc and the county performed their assessments approximately the same time. The data collected on the part of the ARC was not used in the submittal for federal aid.

**Using the Data.** Each respondent explained the use of the data in a different way. Respondents explained the need for a federal declaration as a result of the data but explained that in most cases an event would not be declared even a state emergency. Therefore the effort of the damage assessment process is used in other ways, such as to obtain volunteer aid, update maps, assist in planning, and provide structure damage for NFIP compliance. Varied use of the data by various agencies is described as a possible reason for inaccuracy in the assessment data (Downton & Pielke, 2005). When different agencies have different forms and agendas it becomes difficult to standardize and aggregate data. In County Beta data gathered was compiled into a large database. Information was later separated out as needed for things such as a federal disaster declaration. In many ways alternative uses for the damage assessment data was viewed as positive in that the assessment would need to take place no matter the scale of the event and is not considered a waste when a federal declaration is not attained.

**Hurdles.** In both cases hurdles were experiences during the damage assessment process. Hurdles were primarily generated by exterior agents. In both cases time constraints and manpower concerns caused trouble. The use of state forms also generated much concern and confusion as there was very little consensus on how it was to be used. The repeat of the damage assessment process also generated challenges for those who

had already performed the process and were back to other duties. The disaster itself also generated hurdles. Floodwaters prevented emergency management officials from touring some neighborhoods during the assessment process.

The request made by the governor of Illinois for a federal declaration days after the flooding began to occur created a time constraint on both counties. In the case of flooding, damaged communities were inaccessible. This factor made conducting the damage assessment impossible as homes were still underwater. The rush for a damage assessment also created a manpower strain. Lifesaving efforts were still underway and county officials were undertaking new roles and responsibilities in the assessment process. In disaster literature the function of a situation where departments come together to perform a task is known as expanding structure (Dynes & Quarantelli, 1976; Quarantelli, 1994). These structures new in composition with traditional tasks. Damage assessments create these expanding structure situations. Due to the strain put on the organization to complete traditional tasks, lifesaving responsibilities and damage assessments expanding structures aim to meet the needs.

Once the counties had completed the damage assessment process they attempted to return to other disaster related duties. According to respondents county officials were asked to participate in a secondary damage assessment where state and federal officials were supposed to audit the data that had been collected. The secondary assessment was less of an audit and more of a full fledged assessment. The state and federal involvement was much greater than in the past according to respondents. Although it was meant to be helpful in nature the additional assessment was viewed as a wasteful and inconsistent with what was understood by county as a standard practice.

The damage assessment form provided by the state for use by the counties was another point of contention. The form was an ambiguous layer a bureaucracy that left many respondents frustrated. The form which is used for damage assessment asks users to input information on the affected structures. Confusion arose when FEMA and IEMA officials requested information that was not being requested on the form. Additionally both FEMA and IEMA officials differed on how damage was to be classified. Although federal training allows the state and counties to determine their own levels of damage, this was not exercised during this event. As described by a respondent from County Alpha situations arose where officials were arguing in with each other over how to categorize a structure. Issues such as this could have been addressed with some type of training. The issues also point to a lack of consistency between the three levels of government and their expectations of the damage assessment.

The floodwaters created hurdles as well. With the rapid nature of the damage assessment many communities were still underwater or roadways made them inaccessible. County officials were forced to postpone parts of the assessment in hopes of acquiring more accurate information. One county official also stated that the time flood waters were in a home affected how the home was assessed. Rapid flooding with a quick recession typically can be repaired faster than a home that has water in the living space for multiple days. This differentiation caused some trouble in the assessment of homes as well.

**Successes.** The flooding of 2013 did result in noteworthy successes as counties attempted to assess the flood impacts. GIS technology allowed counties to generate potential damage numbers in a matter of hours. “Just in time” training also played a

positive role in getting parties on the same page for the assessment process. Additionally the use of trained municipal and mutual aid partners helped to reduce the manpower burden.

The use of GIS to perform the damage assessment was considered a glowing success. In County Beta a majority of the affected structures were identified and their damage level assessed without a single boot on the ground. The efforts of County Beta prior to the flood allowed their system to fully take advantage of their GIS capability. Surveying properties and documenting flood heights overtime gave County Beta an advantage that may not be common. County Alpha was able to use GIS in a similar manner but with less confidence. Resources were being devoted to increase the GIS capability in County Alpha at the time of the interviews. GIS will apparently continue to grow as a primary source of damage assessment data in the future (Yamazaki, 2001; Eguchi et al., 2010).

Training provided a positive impact at the county level. “Just in time” training allowed county officials to discuss what would be sought after during the assessment process. After the fact it was determined that the training was based off of inaccurate information such as the difference in damage levels at the state and federal level. If such information had been accurate it is very likely that the training would have resulted in a more acceptable form for the federal and state agencies. According to county officials in County Beta, those who participated in the “just in time” training performed their assignment as initially requested. The use of such training helps to account for the gaps in time where county officials may not have performed disaster functions.

One of the major hurdles in the damage assessment process was the lack of personnel and the strain on the county employees to perform the additional functions. One of the noted success by the county respondents was the ability to call upon local and mutual aid partners for assistance. Although in some cases training and conduct on the part of the partners was inconsistent which created unnecessary trouble. The positive from this hurdle was the future expansion of the county training to the municipalities. With additional manpower to conduct the assessments less of a burden may be on the shoulders of the county.

### **Implications**

This research has provided a great deal of information on the damage assessment process overall. Much of what has been studied is consistent with what has been outlined in other damage assessment literature. These findings can assist in outlining better approaches for the damage assessment process. Details of the damage assessment process were also in some ways outside of the literature on the damage assessment process and create new questions.

Previous disaster literature has stated that the damage assessment process is performed by multiple agencies, each with a different goal (McEntire & Cope, 2004; Downton & Pielke, 2005; McEntire et al., 2012). Both counties in this study took advantage of different departments and agencies for the damage assessment process. In both cases it was discovered that there were in fact different uses for the data depending on the department. Details such as this are consistent with the literature. The exclusion or lack of coordination with voluntary agencies was also present in both counties (Downton & Pielke, 2005; McEntire et al., 2012). The ARC did complete a damage assessment in

the same region as the county governments involved yet their data was not compiled with the data collected by the county. The use of different forms and definitions may have led to the possible separation of these entities.

The variation in forms and definitions has historically been an issue in the damage assessment process (McEntire et al., 2012). This issue also arose in the flooding of 2013. Although county officials believed that the forms and training offered by the state would be consistent with what would be expected of them it was not. When Federal and state officials joined the counties on their second assessment it became clear that there was great disparity between what each level expected to take away from the assessment. Since the floods both the county and state have made efforts to bridge the gap. In the future hopefully this issue can be addressed through training and more standard operating procedures.

The methods used to conduct the damage assessment were not exactly used in the manner outlined in previous literature. The windshield tour, aerial survey, GIS and door-to-door assessment were all used in the damage assessment process. Each method provided various benefits and challenges. In the case of the windshield tour it was determined that it was not considered a valid process other than for general surveys. The door-to-door assessment served as the most beneficial method of conduct when interaction with the community was sought as a secondary product. The aerial survey was used by both counties to enhance their damage assessment scope and to validate the GIS based assessment.

During the study it was stated in County Beta that the GIS based assessment performed was approximately 98% accurate in determining which home were affected



and to what degree. This method of collecting damage assessment data has been described in theoretically in the literature. These cases provide examples where a county was able to perform a majority of the assessment from a remote location with accuracy. Perhaps it is possible that with the expanded availability of technology GIS would become the primary form of damage assessment across the country.

Other forms of damage assessment not previously outlined in the literature did exist. The concept of crowd-sourcing or self-reporting via telephone was a new method explained by respondents. Information required for a damage assessment is volunteered by community members on websites established by the county government. Information can then be compiled and used for the assessment process.

Communication, coordination and connectivity have also been a point of contention in past damage assessment literature (McEntire et al., 2012). In both cases GIS mapping was used to outline where teams would conduct the damage assessment. Additionally technology such as tablets, notebooks, and smartphones allow damage assessment teams to send real-time data to the emergency operations center reducing the amount duplicated work and increasing accuracy in the data.

### **Standardization**

It is possible to discuss the standardization that does exist in damage assessment and those which may enhance the processes overall. As it stands, information gathered from these cases and previous studies exhibit a trend in minimal standardization across and within organizations. In these study two counties of a similar region displayed differences in training, and conduct of the assessment process. In many ways the standards that do exist in regards to the damage assessment process come from the state.

The state standards only address the manner in which data is to be submitted. These standards do seem to impact the standardization of the overall process. The lack of standards between the federal, state, and county government were apparent in the respondent's discussion of the overall process. Although autonomy in the method of data collections is necessary training on industry best practices and commonly accepted definitions would benefit those involved with the damage assessment process nationwide. From this study it is clear that the lack of standardization increased the amount of effort needed to conduct the assessment, as numerous levels of bureaucracy from different government organizations did not comprehend the process in the same terms. This is an area that still needs to be addressed by future research.

### **Possible Future Research**

This study has explored the function of damage assessment. From this study it is possible to suggest future research on the subject. First, the use of training to create standards and the same processes in the assessment process can be explored further. This study found that attempts to standardize training although potentially effective have still been fruitless when faced with changing procedures and definitions. The use of GIS as a primary source of damage assessment data would also be another worthwhile study as it is an emerging technology and its benefits are not totally known. Additionally alternative methods such as crowd-sourcing and call-in centers could be explored as useful methods of collecting data. Accuracy in the damage assessment data has been explored before but based on the assumptions made in this study it is possible that the trends in damage assessment resulting in more accurate data.

The study of response and recovery could benefit from additional studies on damage assessments. The impacts of a damage assessment affect many other facets of the disaster cycle. With more knowledge in this area it is possible linkage could be made to increase the effectiveness of damage assessments and other functions such as debris removal and long term recovery.

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## APPENDICES

## Appendix A IRB Approval

### Oklahoma State University Institutional Review Board

Date: Friday, November 22, 2013  
IRB Application No AS13129  
Proposal Title: Standardization in Preliminary Damage Assessment

Reviewed and Exempt  
Processed as:

**Status Recommended by Reviewer(s): Approved Protocol Expires: 11/21/2016**

Principal  
Investigator(s):

Michael Fleming  
1553 Magnolia Dr  
Crystal lake, IL 60014

David M. Neal  
210 Murray  
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI, advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Cordell North (phone: 405-744-5700, dawnett.watkins@okstate.edu).

Sincerely,



Shelia Kennison, Chair  
Institutional Review Board

## Appendix B Consent Form

### ADULT CONSENT FORM OKLAHOMA STATE UNIVERSITY

**Title:** Standardization in Preliminary Damage Assessment

**Investigator(s):** Michael C. Fleming – Oklahoma State University Political Science Department  
Graduate Student.  
Dr. David Neal – Oklahoma State University Political Science Department

**Purpose:** The purpose of the research study is to determine if there is standardization in preliminary damage assessments performed after a disaster.

**What to Expect:** This research study is conducted via an in person interview. The interview may be recorded with your consent. Participation in this research will involve the response to four open ended questions. You may skip any questions that you do not wish to answer. It should take you about 60 minutes to complete.

**Risks:** There are no risks associated with this project which are expected to be greater than those ordinarily encountered in daily life.

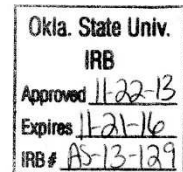
**Benefits:** The information gathered in this research will provide best practices and suggestions for the improvement of the preliminary damage assessment process.

**Compensation:** There will be no compensation for your participation in this study.

**Your Rights and Confidentiality:** Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time.

**Confidentiality:** The records of this study will be kept private. Any written results will discuss group findings and will not include information that will identify you. Research records will be stored on a password protected computer in a locked office and only researchers and individuals responsible for research oversight will have access to the records. Data will be destroyed three years after the study has been completed. Audio tapes will be transcribed and destroyed within 15 days of the interview. Direct quotes may be taken from the interview once the interview data has been de-identified. All data related to this research will be destroyed after 2 years.

**Contacts:** You may contact any of the researchers at the following addresses and phone numbers, should you desire to discuss your participation in the study and/or request information about the results of the study: Dr. David Neal, [dave.neal@okstate.edu](mailto:dave.neal@okstate.edu). Michael Fleming, 222 S Murray Hall, Dept. of Political Science, Oklahoma State University, Stillwater, OK 74078, 773 -617-1741. If you have questions about your rights as a research volunteer, you may contact Dr. Shelia Kennison, IRB Chair, 219 Cordell North, Stillwater, OK 74078, 405-744-3377 or [irb@okstate.edu](mailto:irb@okstate.edu)



**CONSENT DOCUMENTATION:**

I have been fully informed about the procedures listed here. I am aware of what I will be asked to do and of the benefits of my participation. I also understand the following statements:

I affirm that I am 18 years of age or older.

I have read and fully understand this consent form. I sign it freely and voluntarily. A copy of this form will be given to me. I hereby give permission for my participation in this study.

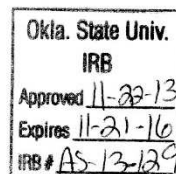
I agree that an audio recording device will be used during this interview Yes: ☐ No: ☐

Signature of Participant: \_\_\_\_\_

Date: \_\_\_\_\_

Signature of Interviewer: \_\_\_\_\_

Date: \_\_\_\_\_



## Appendix C Interview Guide

### Instrument

- What methods were/are used by the city/county to assess damages in a disaster?
- What type of training have you received in conducting preliminary damage assessments?
- Who conducts the training for preliminary damage assessments?
- What type of experience do you have in relationship to preliminary damage assessments?
- What organizations, agencies, or departments are involved in the preliminary damage assessment process?
- How does your agency use the information collected in a preliminary damage assessment?

## Appendix D

### IEMA Flood DA Form

[illegible]

**INDIVIDUAL ASSISTANCE****INITIAL DAMAGE ASSESSMENT FORM INSTRUCTIONS – For Flood Events**

Form and Instructions Revised 11/2010

**HEADER/FOOTER**

- County/City - Include the county and the city or unincorporated area where damage is being assessed.
- Date - Date of Event.
- Type of Event - Flash flood, Riverine flooding.
- Completed by - Name of the person performing damage assessment.
- Phone Number - Phone number, including area code, of person performing damage assessment.
- Page \_\_\_\_ of \_\_\_\_.
- Date(s) of Assessment Start \_\_\_\_ End \_\_\_\_.

**COLUMNS****#1 & #2 – ADDRESS**

- Indicate address number in Column #1 and street name in Column # 2. For example, the address 105 North Main Street would be recorded as follows:  
Column #1 - 105  
Column #2 - North Main Street  
The apartment number should be included after the street name if applicable.  
Recording the address number and street name in separate columns facilitates sorting the data on the spreadsheet if the forms are completed electronically.
- Use a separate line for each dwelling number and street.
- If damage to individual apartments can be determined, apartments should be listed on separate lines. If all apartments in a building have similar damage, record them as a group on the same line and indicate the number of apartments.
- If there is a business in the home, record the home and business on separate lines and note in comments.

**#3 - SF/MF/MH/B**

- Indicate if damaged dwelling is:  
SF - Single Family Home  
MF - Multi Family Structure (Apartment Building, Duplex, 2-Flat, etc.)  
MH - Mobile Home
- If damaged building is a business, indicate with B.

**#4 - OWN/RENT**

- Indicate if the occupant owns or rents the dwelling by recording O or R. If unknown, record UNK.

**#5 - DEPTH - BASEMENT**

- Record depth of water in the basement (clearly indicate feet and/or inches).
- If no water in basement, record 0.
- If no basement, record NA (Not Applicable). (The dwelling may be on a slab or in an upper apartment.)



**#6 - DEPTH – 1<sup>ST</sup> FLOOR**

- Record depth of water in the first floor of the dwelling (clearly indicate feet and/or inches).
- If no water in first floor, record 0.
- If apartment is in the basement or an upper floor, record NA.

**#7 - BASEMENT LIVING AREA - YES OR NO**

- Determine, if possible, if the basement is used as an essential living area, such as space that is used as a required (versus an optional) bedroom and record Y, N or NA.
- Family rooms **are not** considered essential living areas. A finished basement does not necessarily make it an essential living area. A basement apartment or garden apartment is considered an essential living area. If a dwelling is a split-level or tri-level design, indicate this in the Comments section.

**#8 - INS – H/R/F**

- Determine, if possible, if the occupant has Home Owners, Renters and/or Flood insurance.
- If they do not have any insurance, record N (for No).
- If they have Home Owners insurance, record H.
- If they have Renters insurance, record R.
- If they have Flood insurance, record F.
- If it can't be determined, record UNK (for Unknown).

**#9 - STRUCTURAL DAMAGE - YES OR NO**

- If there is obvious/visible structural damage to the dwelling, record Y (for Yes) and briefly describe the damage in the Comments Column. If no obvious/visible structural damage, record N (for No). Structural damage is related to the integrity of the structure. Structural damage may include collapsed basement walls and large cracks in the foundation. Structural damage does not include damage to drywall, carpet or paneling.

**#10 - COMMENTS**

- If there is structural damage, briefly describe it here. Examples of brief descriptions are: basement wall collapsed, house off foundation, large foundation cracks.
- Other types of common information to be recorded in this column using the corresponding letter are:
  - A - No one living in dwelling at time of flood
  - B - Dwelling was not a primary residence
  - C - Water in crawl space only
  - D - Damage caused by sewer back up only
  - E - No one home during damage assessment, cannot determine damage
  - F - No one home during damage assessment, information obtained by observation (waterline on house, for example) or from another source (neighbor, local official)

**DEFINITIONS**

Business – A sole proprietorship, partnership, or corporation (excludes agricultural enterprises).

Structural Damage – Damage that is related to the integrity of the structure. Structural damage may include collapsed basement walls and large cracks in the foundation. Structural damage does not include damage to drywall, carpet or paneling.

COLUMN HEADING ABBREVIATIONS

SF - Single Family	INS - Insurance
MF - Multi Family	H - Home Owners
MH - Mobile Home	R - Renters
B - Business	F - Flood

COMMENTS COLUMN KEY

A – No one living in dwelling at time of flood  
B – Dwelling was not a primary residence  
C – Water in crawl space only  
D – Damage caused by sewer back up only  
E – No one home during damage assessment, cannot determine damage  
F – No one home during damage assessment, information obtained by observation (waterline on house, for example) or from another source (neighbor, local official)

## II. Preliminary Damage Assessment Report

### **Illinois - Severe Storms, Straight-line Winds, and Flooding FEMA-4116-DR**

#### ***Declared May 10, 2013***

On May 8, 2013, Governor Pat Quinn requested a major disaster declaration due to severe storms, straight-line winds, and flooding during the period of April 16 to May 5, 2013. The Governor requested a declaration for Individual Assistance for 11 counties and Hazard Mitigation statewide. Beginning on April 29, 2013, and continuing, joint federal, state, and local government Preliminary Damage Assessments (PDAs) were conducted in the requested counties and are summarized below. PDAs estimate damages immediately after an event and are considered, along with several other factors, in determining whether a disaster is of such severity and magnitude that effective response is beyond the capabilities of the state and the affected local governments, and that Federal assistance is necessary.<sup>1</sup>

On May 10, 2013, President Obama declared that a major disaster exists in the State of Illinois. This declaration made Individual Assistance requested by the Governor available to affected individuals and households in Cook, DeKalb, DuPage, Fulton, Grundy, Kane, Kendall, Lake, LaSalle, McHenry, and Will Counties. This declaration also made Hazard Mitigation Grant Program assistance requested by the Governor available for hazard mitigation measures statewide.<sup>2</sup>

#### **Summary of Damage Assessment Information Used in Determining Whether to Declare a Major Disaster**

##### **Individual Assistance**

- Total Number of Residences Impacted:<sup>3</sup> 3,517
  - Destroyed - 41
  - Major Damage - 761
  - Minor Damage - 1,528
  - Affected - 1,187
- Percentage of insured residences:<sup>4</sup> 29%
- Percentage of low income households:<sup>5</sup> 10.7%
- Percentage of elderly households:<sup>6</sup> 12.7%
- Total Individual Assistance cost estimate: \$23,756,760

##### **Public Assistance - (*Not requested*)**

- Primary Impact: -

- Total Public Assistance cost estimate: -
- Statewide per capita impact:<sup>7</sup> -
- Statewide per capita impact indicator:<sup>8</sup> \$1.37
- Countywide per capita impact: -
- Countywide per capita impact indicator:<sup>9</sup> \$3.45

<sup>1</sup> The Preliminary Damage Assessment (PDA) process is a mechanism used to determine the impact and magnitude of damage and resulting needs of individuals, businesses, public sector, and community as a whole. Information collected is used by the State as a basis for the Governor's request for a major disaster or emergency declaration, and by the President in determining a response to the Governor's request (44 CFR § 206.33).

<sup>2</sup> When a Governor's request for major disaster assistance under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (Stafford Act) is under review, a number of primary factors are considered to determine whether assistance is warranted. These factors are outlined in FEMA's regulations (44 CFR § 206.48). The President has ultimate discretion and decision making authority to declare major disasters and emergencies under the Stafford Act (42 U.S.C. § 5170 and § 5191).

<sup>3</sup> Degree of damage to impacted residences:

- Destroyed – total loss of structure, structure is not economically feasible to repair, or complete failure to major structural components (e.g., collapse of basement walls/foundation, walls or roof);
- Major Damage – substantial failure to structural elements of residence (e.g., walls, floors, foundation), or damage that will take more than 30 days to repair;
- Minor Damage – home is damaged and uninhabitable, but may be made habitable in short period of time with repairs; and
- Affected – some damage to the structure and contents, but still habitable.

<sup>4</sup> By law, Federal disaster assistance cannot duplicate insurance coverage (44 CFR § 206.48(b)(5)).

<sup>5</sup> Special populations, such as low-income, the elderly, or the unemployed may indicate a greater need for assistance (44 CFR § 206.48(b)(3)).

<sup>6</sup> Ibid (44 CFR § 206.48(b)(3)).

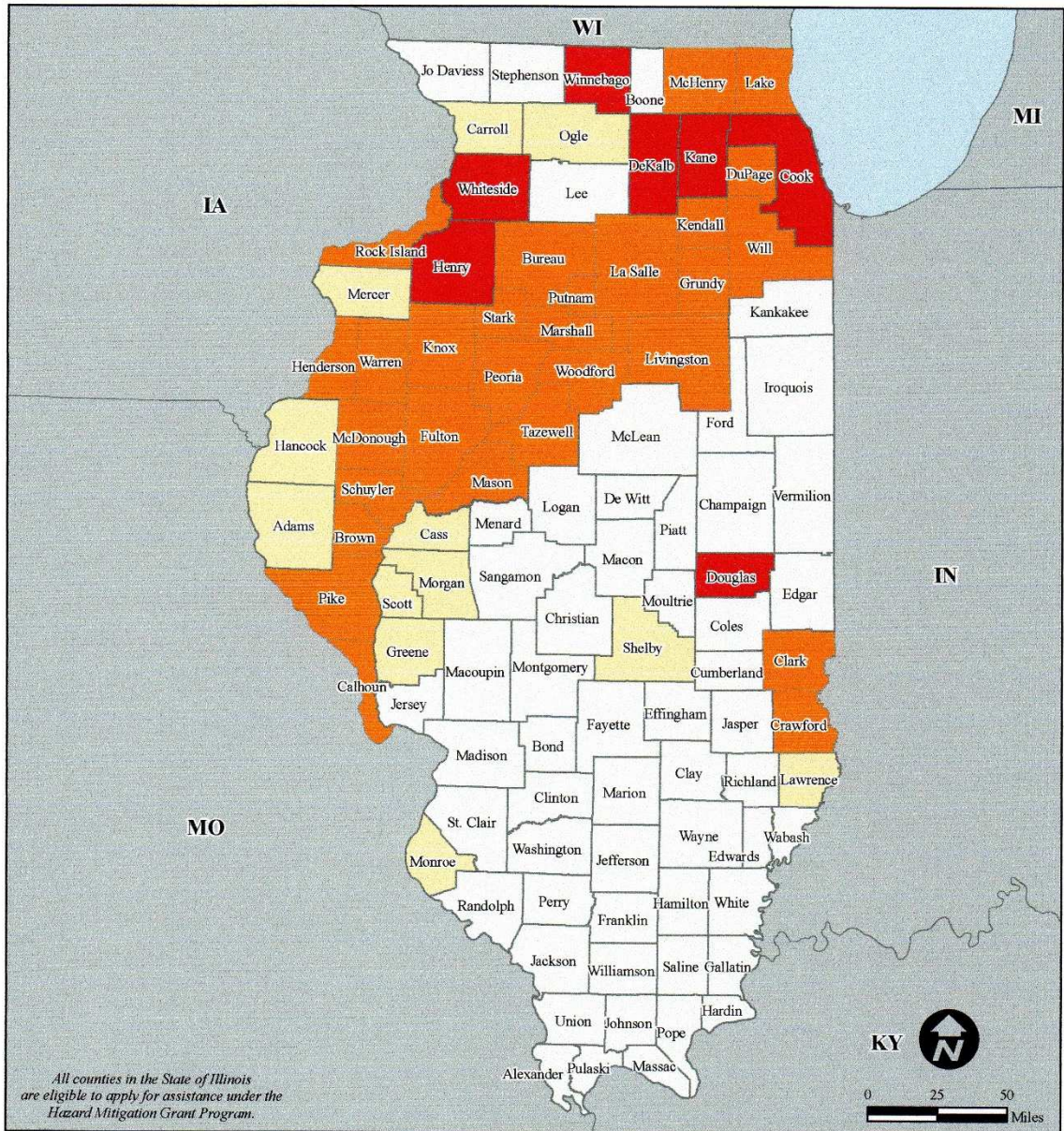
<sup>7</sup> Based on State population in the 2010 Census.

<sup>8</sup> Statewide Per Capita Impact Indicator for FY13, *Federal Register*, October 1, 2012.

<sup>9</sup> Countywide Per Capita Impact Indicator for FY13, *Federal Register*, October 1, 2012.



Appendix F  
FEMA Declaration Map  
**FEMA-4116-DR, Illinois Disaster Declaration as of 07/02/2013**



**Location Map**

**Designated Counties**

- No Designation
- Individual Assistance
- Individual Assistance and Public Assistance
- Public Assistance

**FEMA**

MS-CI-AE-EG  
Mapping and Analysis Center  
07/03/13 -- 09:27 AM EST  
Source: Disaster Federal Registry Notice  
Amendment No 6: 07/02/2013

MapID b435213602c0703130922haord

## VITA

Type Michael C. Fleming

Candidate for the Degree of

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