RESPONSE TO FLOOD HAZARDS: ASSESSING COMMUNITY FACTORS THAT AFFECT THE DECISION TO RELOCATE

By

Alex J. VanPelt

B.S., Southern Illinois University at Carbondale, 2010

A Thesis
Submitted in Partial Fulfillment of the Requirements for the
Masters of Science Degree

Department of Geography and Environmental Resources
in the Graduate School
Southern Illinois University Carbondale
May 2013

THESIS APPROVAL

RESPONSE TO FLOOD HAZARDS: ASSESSING COMMUNITY FACTORS THAT AFFECT THE DECISION TO RELOCATE

By

Alex J. VanPelt

A Thesis Submitted in Partial

Fulfillment of the Requirements

For the Degree of

Master of Science

in the field of Geography and Environmental Resources

Approved by:

Dr. Leslie Duram, Chair

Dr. Jonathan Remo

Elizabeth Ellison

Graduate School
Southern Illinois University Carbondale
March 28, 2013

AN ABSTRACT OF THE THESIS OF

Alex J. VanPelt, for the Master of Science degree in Geography and Environmental Resources, presented on March 28, 2013, at Southern Illinois University Carbondale

TITLE: RESPONSE TO FLOOD HAZARDS: ASSESSING COMMUNITY FACTORS THAT AFFECT THE DECISION TO RELOCATE

MAJOR PROFESSOR: Dr. Leslie Duram

Flooding in the United States has been increasing over the past century due to changing hydrological conditions as well as increased human manipulation of the waterways. People continue to live in these high hazard areas, even with increasing risk levels. Flood hazard mitigation has increasingly become a primary goal of floodplain managers with buyouts, insurance, and other nonstructural approaches becoming more prevalent over the past two decades. Whole town relocations have become one flood mitigation option. This study explores which community factors affect a town's decision to relocate. Three study areas in the Midwestern U.S. were analyzed: Valmeyer, IL, Rhineland, MO, and Pattonsburg, MO. Each of these three towns underwent a buyout and town relocation after the flood of 1993. Data was gathered using personal interviews with community members, specifically elected officials and relocation committee members. Analysis of interview responses identified community sense of place as the primary factor influencing relocation decisions including leadership, cost, people, and landscape. Leadership included town incorporation, relocation decision and committees, handling of legal issues, and site selection criteria. Cost involved the relocation cost, post-disaster development and tourism, and the business community of the study areas. People included the town heritage, community type, and the various community organizations.

Landscape includes the types of relocation completed, the speed of the relocation event, and the amount of pre-disaster planning. Maps created show the pre and post-relocation municipal boundary of the study sites in relation to the 500-year floodplain boundary.

ACKNOWLEDGEMENTS

A special thanks to Dr. Leslie Duram for her guidance, direction, and encouragement during this process. I feel truly bless to have worked with you throughout this. Thanks you to the citizens of Valmeyer, IL, Rhineland, MO, and Pattonsburg, MO for taking the time out of their life to talk to provide me thoughtful and sincere responses to all of my questions. A big thank you goes to my family's support and patience, without which, none of this would have been possible.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

Introduction and Research Questions

1.1 Introduction

> *"There is no disaster more devastating than a flood. With a tornado, an earthquake, or a fire, you know pretty quickly what you've lost, and what you have left, and what you need to do to get back to normal. A flood fills a house-or a town-in no time, but it takes days or weeks to empty out. In the meantime, you cling to the hope that you might preserve some of your useful goods or treasured memories. But as you wait, and wait, the hope inevitably fades. A flood saps your spirit in dribs and drabs"* (Witt and Morgan 2002).

Flooding is part of the natural hydrological cycle that occurs when precipitation intensity exceeds the carrying capacity of the soil and waterways which drain the landscape. Perceptions of what constitutes a flood vary among people living along different rivers or along the same river. These perceptions can change over decades and centuries. People's perceptions of flood hazards are important during a flood event because people base their response on their perceptions of the river process (FEMA 2003).

In the United States, floodplains constitute approximately 94 million acres of total land area with approximately 90 million acres of this land located in rural areas. These rural floodplains contain some of the most fertile agricultural land in the world, provide areas for recreation, habitat for various organisms, and contain residential and urbanized areas (Paterson and Doyle 2009). Citizens occupying these areas choose to live on the floodplain despite the inherent risk associated. From 1992-2001, flood damages constituted about 90% of all natural disaster damages in the U.S. costing approximately $55 billion in damages and some 900+ deaths (Paterson and Doyle 2009). Flood damages continue to increase and are a drain of

financial resources for all levels of government and associated land managers (Kick et al. 2011, Kousky 2011).

The Army Corps of Engineers is no longer using the term "flood control." The idea of "controlling" a flood is an idea from the past whereas the current goal is to live with the flood (Buss 2005). Current Federal floodplain management goal is one of non-structural mitigation. One of the main tools FEMA uses to achieve this goal is the voluntary buyout program which allows the Federal Government purchase properties within flood-prone areas. This property acquisition program have not been completely successful due to some households not participating in the buyout program and the limited funds the Federal Government make available for property purchases. (FEMA 2003, Buss 2005).

Despite increasing flood risk and losses very few studies have looked at communities which have participated in a voluntary buyout and relocation. Most studies focus solely on an individual's decision on whether to participate in the buyout process. This thesis seeks to determine the social, political, and economic factors that contribute to a community's decision about relocation. This study compares three towns that have undergone similar community buyout and relocation process (Valmeyer, IL; Rhineland, MO; and Pattonsburg, MO) in the Midwest. The goal of this study is to identify similarities in these communities' social, political, and economic fabrics which lead them to the decision to relocate. It is hoped this research will aid floodplain mangers and decision makers to identify community which may be willing to relocate out of flood prone areas.

1.2 Research Questions

The research questions to be addressed in this study are as follows.

1. What are the key social, political, and economic factors that contribute to each town's decisions to relocate?
2. What are community members' perceptions of the buyout and relocation process?

The main goal in answering these research questions is to increase the understanding of what factors community's view as significant to town relocation in response to a flood event. Through the analysis of these questions, this study attempts to increase the information available to policy makers, researchers, and future relocations to guide them in their academic and applied work.

CHAPTER 2

Literature Review

2.1 Floodplain Management in the U.S.

Humans have been attracted to floodplains for thousands of years due to the various advantages that these areas offer such as flat land, fertile soil, and its close proximity to water (Wohl 2000). These attributes make this land ideal for agriculture and more recently; this land within the floodplain has a lower value than the land surrounding it (due to its increased risk of disaster) making it an ideal area for development in urban areas (Tibbetts 1994; Ward 2006). Once this land is settled, there is a strong desire to protect these areas and the associated infrastructure within them using flood control structures (Buss 2005; Ward 2006; Heisel 2009).

In the United States there have been three approaches to flood management. These approaches include 1) structural flood "control", 2) insurance and landuse regulations, and 3) the non-structural mitigation era or sometimes referred to as the Era of Up or Out (FEMA, 2003; Zhu and Lund, 2009; Kick et al. 2011).

2.2 Structural Flood Control

Structural flood control is focused on changing the characteristics of the flood itself within the floodway and floodplain. This includes structures such as dams, levees, floodwalls, etc. The primary job of these structures is to keep the river flowing in its natural floodway rather than across the floodplain by preventing the overflow into the floodplain area as well as to channelize the river by training it to keep to a single channel rather than migrating across the floodplain as it did historically (Heisel 2009).

Federally supported structural control, began in during the mid 1800's and was the primary flood mitigation approach employed until the mid 1960s. This phase started in the U.S. with the development of its rivers in the mid 19th century. Prior to 1927, the levee was only flood protection tool that was funded by the Federal Government. This era in the history of U.S. floodplain management is commonly referred to as the levee only period (White and Meyers, 1993).

The discharge generated by the Great Flood of 1927 on the Lower Mississippi River exceeded the design capacity of the newly completed federal levee system which resulted in the inundation of 20,000 square miles, displaced 700,000 people and caused ~$1 billion in flood losses This great flood marked the end of the levees only policy. The following year congress pass the Flood Control Act of 1928 which provided the approval and finical means to expand structural flood control beyond levee construction to more systems base approached to structural flood control. This system based approach eventually lead to the employment of a network of flood-water-retention reservoirs and flood bypass channels to supplement the flood protection of levees and floodwalls (White and Meyers 1993).

The Flood Control Act of 1960 created the Floodplain Management Services Program, with its objective to "foster public understanding of the options for dealing with flood hazards and to promote prudent use and management of the Nation's floodplain" (USACE Flood Risk Management Authorities 2011, 1). This act provided technical assistance to communities for floodplain regulations and was the beginning of the promotion of nonstructural flood control.

2. 3 Insurance and Land-use Regulations

The second approach to flood mitigation consisted of landuse management and insurance. The implementation of these floodplain management tools began in the mid 1960s (Figure 1). At the heart of this approach is the National Flood Insurance Program (NFIP) established by Congress as part of the National Flood Insurance Act of 1968. This Act was brought about by the Task Force on Federal Flood Control Policy Report which recommended local land use recognizing flood risks (FEMA 2003; Kousky and Kunreuther 2005; Kousky 2011). This was enacted in response to a belief among insurers that providing insurance to flood prone areas was not economically feasible. The communities, in exchange for being able to purchase flood insurance were required to adopt a minimum set of policies to manage development within the floodplain (Kousky and Kunreuther 2005).

In 1974, Congress enacted the Water Resource Development Act (WRDA) which required the ACE to consider nonstructural flood control measures on an equal basis with structural measures. This Act was supplemented three years later by Executive Order 11,988 which supported the move to more nonstructural measures for all Federal agencies. This Executive Order addressed an 8 step process that agencies should perform as part of their decision making process on projects within a floodplain (NARA 1982). These were intended to reduce the extent of actions in a floodplain or acting upon a floodplain by all Federal agencies and also required Federal agencies to take steps to mitigate undesirable impacts if they could not be avoided.

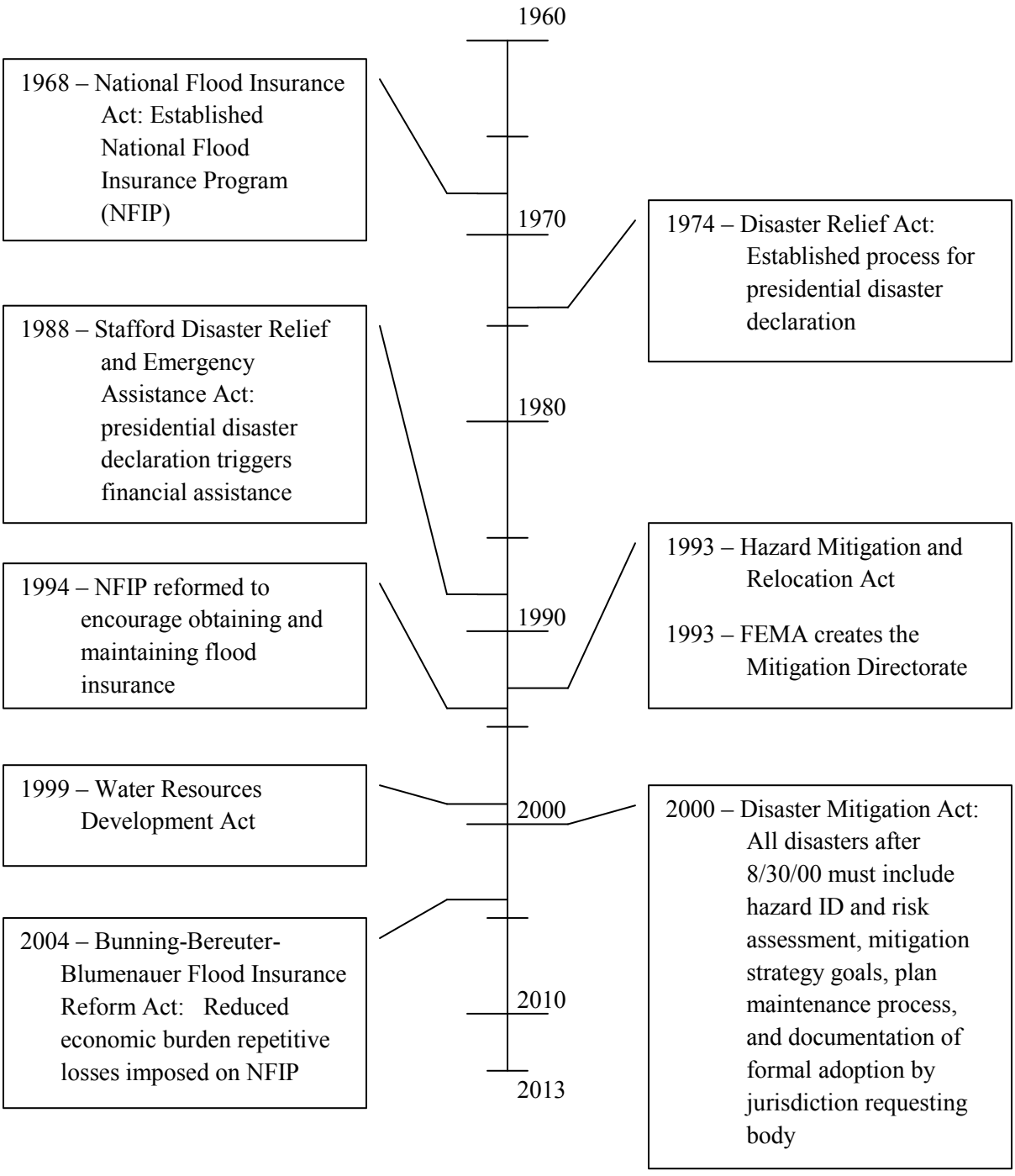


Figure 1. Timeline of Mitigation Era Floodplain Management Policy

The WRDA of 1986 and 1999 further supported the nonstructural use of floodplain protection. The WRDA of 1986 required communities to participate in and comply with NFIP before any assistance by the ACE in "construction of flood damage reduction measures" (Buss 2005). The WRDA of 1999 allowed the ACE to pursue projects that improved environmental quality along with flood damage reduction. Congress dictated that "nonstructural measures must be used to the maximum extent practicable and appropriate" (Buss 2005, 27).

2.3.1 The NFIP

The NFIP enables property owners in participating communities to purchase flood insurance protection from private insurance companies with the Federal government subsidizing a portion of the price. The NFIP currently resides under FEMA. The NFIP allows for flood insurance to be purchased anywhere within the United States but most of the active policies are located in only five states: Florida, Texas, Louisiana, California, and New Jersey. These five states alone account for about 70% of all NFIP policies (Kousky and Kunreuther 2005).

The NFIP is designed to spread the cost of flood damages over the population with the greatest risk of flooding (Patterson and Doyle 2005). The NFIP is estimated to save the federal government approximately $1 billion per year through the combination of floodplain buyouts and community regulations. This savings has also reduced the Federal Disaster Assistance spending by about $527 million annually (Kousky and Kunreuther 2005). When a community joins the NFIP, they are entering into an agreement with the Federal government stating that they will adopt and enforce floodplain management ordinances and in return the government will make flood insurance available to the community as a protection against future flood losses. The ordinances consist of land-use regulations such as no new home construction within the floodplain, subdivision regulations, building codes, etc. (Patterson and Doyle 2005). Once a

community is a member and is compliant with NFIP, homeowners have the option whether or not to purchase insurance.

The only time flood insurance is mandatory is when new homeowners are receiving a mortgage from an FDIC backed lender. This regulation was enacted as part of the Disaster Protection Act of 1973. This Act created financial penalties for noncompliant lenders and mandated that lenders purchase insurance on behalf of the borrower if the borrower failed to do so (Kousky and Kunreuther 2005; Kousky 2011). This is one of the primary ways that the U.S. government enforces the purchase of flood insurance within the floodplains. Compliance levels with the mandatory purchase requirement in the Midwest is approximately 45-50% while the compliance in the South and West closer to 80-90% (Kousky 2011).

One issue with the NFIP as it was originally constructed was having lower insurance rates for homeowners than the risk associated actually required in the area because of the insurance subsidization by the NFIP. This led to a cycle of building-flooding-rebuilding within floodplains. "If federal relief covers the cost of flood events, homeowners get the benefits of their location choice but do not have to shoulder all of the costs, which could theoretically lead to an over investment" in the floodplain (Kousky and Kunreuther 2005, 164). These issues can lead to increases in the development of floodplains which in turn can lead to increases expected losses. Future increases in losses are attributed to two factors: 1) population growth within the hazard areas, and 2) an increase in the built environment in these vulnerable areas (Hunter 2005).

2.3.2 Hazard Mitigation Grant and Pre-Disaster Mitigation Programs

There are several programs that have been instituted to help reduce flood loss risk. These programs include the HMGP and the Pre-Disaster Mitigation (PDM) program. Hazard

Mitigation Grants are given to communities that are interested in long-term mitigation measures after a disaster declaration. Activities of the HMGP include elevation of a home but focused primarily on property acquisition in flood prone areas. As a result of the HMGP, the PDM program was created in 2000 to support mitigation activities before disaster events occur (Schwartz 2005). Mitigating repetitive losses has become a high priority for FEMA. A repetitive loss is one where there are 2 or more losses of $1,000 or more in a single 10 year period (Kousky and Kunreuther 2005). Nationally, only 2% of the structures in the NFIP account for 40% of the $1 billion paid NFIP claims (Schwartz 2005,)

2.4 The Era of Up or Out

Voluntary buyouts, relocation, and the flood proofing individual structures at risk began around 1990 and came of age after the Great Midwestern Flood of 1993. These programs focus on reducing the impacts of floods by moving people and structures out of the flood-prone areas or elevating structure to above the base 100-year flood elevation (Kick et al. 2011). "FEMA's creation of the Mitigation Directorate in November 1993 represented a fundamental change in disaster and emergency management. For the first time in the history of Federal Disaster Assistance, mitigation became a cornerstone of emergency management" (FEMA 2003, 7). FEMA provides Hazard Mitigation Assistance (HMA) to state and local governments, Territories, Indian Tribal governments, and eligible private non-profit through the Hazard Mitigation Grant Program (HMGP), with the grant money going to projects such as relocation and structural elevation. These HMAs may be offered after a presidential declaration of disaster in areas of the State requested by the Governor (FEMA 2010). The HMGP is a completely voluntary buyout program for home and business owners within a community. Individuals may not apply directly to the program, but a community may apply on the individual's behalf

(Schwartz 2005). "The key purpose of the HGMP is to ensure that the opportunity to take critical mitigation measures to reduce risk of loss of life and property is not lost during the reconstruction process following a disaster" (FEMA 2010, 2).

Local communities begin by submitting an application to FEMA for HMA to conduct a buyout. The state reviews the application and prioritizes projects before forwarding the applications to FEMA. FEMA then reviews the application to ensure that the application is cost-effective, the engineering is feasible, and the plan is environmentally sound. Upon approval of the application, funding is awarded to the applicant who is then responsible for conducting the buyout and complying with program requirements, with FEMA overseeing the process. Federal Government provides 75% of the funds with the other 25% coming from the applicant (FEMA 2003). Homeowners are given fair market value for their homes and once the buyout is completed, all purchased structures will be demolished to be left as open space in perpetuity through the use of land deed restrictions (FEMA 2003).

2.4.1 Benefits of Buyouts

Research suggests that "…buyouts could be a more cost-effective mitigation solution than fixing the flood-control structures after they breach, let alone the expense to raise those structures to higher protection levels. In addition, this result underscores the potential benefits of buyouts for flood mitigation even for communities protected by levees." (Remo et al. 2011, 22). The process of offering buyouts to flood victims has been occurring since the 1970's but has become a primary focus of flood mitigation since 1993, especially helping to mitigate repetitive losses to the communities within the NFIP.

Studies have found that residents will only support land and home acquisition when: "1) they are well aware of the flood risk, 2) they believe that they will benefit personally, and 3) they

have a low attachment to the community" (FEMA 2003, 10). Other factors considered by flood victims include things such as acquisition price, severity of the flood, flood frequency in the area, the ability to find similarly priced home outside of the floodplain, and increased insurance prices if they do not mitigate (FEMA 2003; Kick et al. 2011). There were several potentially positive community benefits with completing a buyout process, for example, many citizens that were renting before the buyouts were now homeowners, people were moved out of the floodplain, and for some community members, their perception of the local government was changed for the better due to the increased involvement of community members in the buyout application process (FEMA 2003). These benefits can help to improve the standing of the community by increasing the number of homeowners outside of the floodplain as well as increase community tryst.

With these buyouts, an effort has been made in the past 20 years to help these victims relocate. Flood victims that have gone through the buyout process said that they would have been more likely to accept mitigation efforts or would have made their decision about mitigation more quickly had neighborhood buyouts been available (FEMA 2003; Kick et al 2011).

2.4.2 Uses of Buyout Purchased Land

Communities participating in a buyout are allowed to decide for themselves how best to use the acquired lands within the parameters allowed by FEMA. In many cases, once the buyout is completed, the land purchases are designed to augment local park systems while also functioning as open spaces or flood plain use. Once land is purchased via a buyout, it is required to remain open space with no enclosed structures except public restrooms on the premises in perpetuity (FEMA 2002; FEMA 2003). The community is responsible for any future

maintenance of the purchased sites and must coordinate with FEMA on any future land-use issues.

Due to the fact that the Mississippi River and its tributaries have been extensively modified, another possible scenario is to restore the damage done to the floodplains by restoring them back to their natural ecological conditions. The state of Missouri alone has lost approximately 87% of its 4.8 million acres of wetlands along its major rivers (Heisel 2009). This use would allow for increased wildlife and wetland habitat for many species of fish and birds that depend on access to nutrients supplied by the floodplains as well as many threatened or endangered species. A side benefit to this ecosystem restoration is the addition water storage of flood events by the wetlands and floodplains (Buss 2005; Heisel 2009; Fahlund 2009; FEMA 2010). This restoration is a viable option for land managers because of the Clean Water Act and Executive Order 11,988 which charge the ACE responsible for implementing wetland protection (Heisel 2009). Other post-buyout land used include site stabilization by vegetation, campgrounds, boat ramps, ball fields, recreational courts, golf courses, and bike and walking paths.

2.4.3 Challenges with Buyouts

There have been five primary issues identified in the buyout and relocation process: 1) perceptions of risk, 2) neighborhood attachment, 3) communication, 4) trust, and 5) timing (FEMA 2003; Hunter 2005; Kick et al. 2011). The meaning of risk varies depending on the individual. For buyout staff, risk is viewed as the probability of future flooding and the damages associated with that risk. The meaning of risk for community members was quite different, ranging from the possibility of losing their 'safe place' to call home as well as losing their social and financial stability (FEMA 2003). People's awareness to risk varies depending on their

socio-economic factors prior to the flood event and the length of time they have resided in the area (FEMA 2003; Kick et al. 2011)

People's neighborhood attachment varies depending on a variety of factors such as age, home ownership, willingness to relocate, and whether or not they had a mortgage (FEMA 2003; Kick et al. 2011). Older community members that have paid off their mortgages or that were landlords are less likely to accept mitigation efforts (FEMA 2003; Hunter 2005). "Changing physical locations can disrupt [routine] patterns of behavior and communication, while adversely affecting the very basis for individual identity" (Kick et at. 2011, 6). "People were hesitant to leave their property not only because it was worth money, but also because they had a certain comfort level and degree of knowledge about where they lived (FEMA 2003, 26). One solution that has been proposed in specific cases was for city and state officials to relocate neighborhoods as a whole or relocate neighbors close to one another to keep some community ties in place (FEMA 2003; Kick et al. 2011). Many residents stated that "…the most difficult aspect of their relocation was feeling as if they were not a part of the neighborhood, and lacked the sense of home they felt before" (FEMA 2003, 45).

Effective communication can be a major help to the relocation process while ineffective communication can be a major hindrance. Studies have shown when communication between flood victims and local or state officials is low, that the buyout process took longer, leading to resentment and misunderstanding among the people involved (FEMA 2003; Kick et al. 2011). Locals were generally frustrated with the buyout process due to the fact that to get information from FEMA, they had to go through the state first. This slowed down the process and added the potential of miscommunication issues. There was also a consensus among the victims that there was no strong sense of direction in the process. Most of their lessons learned were through trial

and error (FEMA 2003). Trust with the officials helped with the communication aspects but there has been general mistrust found in many study areas. People participating in the buyout said that in general they felt coerced into participating or that there was a sense that the local or state governments did not have the residents' best interests at heart. Effective communication can either enhance or destroy the trust the victims feel in the buyout staff (FEMA, 2003).

Residents did not understand the amount of time involved with the buyout process. Several factors affect the length of time including: "…political structures and bureaucracy; the quality of existing relationships among key players and flood residents; organizational capacity to handle emergency response; previous hazard mitigation experience; and expectations of government officials, buyout staff, and residents" (FEMA 2003, 29). Residents frustration can lead to community members not participating in the relocation process and instead either staying in their homes or simply leaving the community (FEMA 2003; Knobloch 2005). Because of the cost associated with a buyout and relocation, "…more households typically express desire to relocate…than actually do…an individual may accept a negative, yet stable, environment rather than face the stress associated with change" (Hunter 2005, 292-293).

Other issues with past buyouts include many people opting to not resettle in the same community as before the flood once the buyout is completes. This can cause a weakening of a community's sense of place as well as decrease the tax base of a community. There can also be pressure to redevelop purchased sites when there is no long term land-use plan in place.

2.4.4 Successful Relocations

Properties that are eligible for acquisition during a buyout are ones where the homeowner is willing to sell, are located in areas where they may or may not be damaged during

a flood event, all incompatible easements can be removed, and there must be no hazardous materials on site at the time of acquisition.

There have been several instances over the past 18 years of successful buyout and relocations of individual homeowners all over the country. These buyout locations include: Greenville and Kinston, NC, Grand Forks, SD, San Antonio, TX, and Cape Girardeau, MO (FEMA 2002; FEMA 2003).Cape Girardeau is an example of a local buyout and relocation in recent years. In August of 1993, the Mississippi River crested at an all time high of 48.5 feet at Cape, damaging 160 homes within the floodplain. 2 years later, these homes flooded again when the river crested at 46.7 feet (FEMA 2002). The city of Cape Girardeau and charitable non-profits, along with the Federal, State and local governments, decided to buyout many of these residents. The community residents participating in the buyout then decided to relocate to other parts of the community. The city succeeded in purchasing and removing 114 properties out of the floodplain. In 2002, the Mississippi River crested at 45.7 feet; 2.8 feet shy of its all-time record. This time though, only eight homes were damaged due to flooding (FEMA 2002). Cape Girardeau's buyout cost 2.7 million dollars with FEMA funding 41% of the project (FEMA 2002)

2.4.5 Future Directions of Floodplain Management

The current movement in floodplain management is to create resilient and sustainable communities. A resilient and sustainable community is one where permanent risk reduction measures are taken to reduce the long-term with attention to mitigating future impacts of similar events. There are several programs developed to aid in creating more resilient communities.

These programs include the Map Modernization program, Levee Analysis and Mapping Procedure (LAMP), Hazard Mitigation Plans, and Emergency Support Function #14 (ESF#14).

The Map Modernization Program (MMP) is designed to improve the accuracy of FEMA's Flood Rate Insurance Maps (FIRMs) (Schwartz 2005; Patterson and Doyle 2009; Posey and Rogers 2010). FIRMs are updated using advanced technology to determine accurate floodplain locations. These new Digital FIRMs or DFIRMs are used to set floodplain boundaries and set flood insurance rates all across the U.S.

FEMA is proposing replacing the old levee mapping technique, referred to as the without levee approach, with LAMP (FEMA 2011). Under the old levee mapping procedure, FEMA designated all areas within the floodplain as floodplains except those that were protected by accredited levees. Accredited levees had to meet the Federal standards at the 1% annual flood chance event. The LAMP procedure would investigate all floodplain areas, whether protected by levees or not, and come up with an easier method to understand an individual's level of risk associated with living on a floodplain. FEMA identifies this method as a more cost effective approach but LAMP is currently still in the proposal stage as of December 2011 (FEMA 2011).

Local Hazard Mitigation Plans are required for any community within the National Flood Insurance Program under the Disaster Mitigation Act of 2000 (Topping 2011). Each participating jurisdiction must identify relevant natural hazards, risk and vulnerabilities of the area, have actions to mitigate the identified hazards, and a strategy to implement these actions. Any community that does not have a mitigation plan is not eligible for any of FEMAs HMGP funds, which could fund any buyout or other mitigation projects.

Emergency Support Function #14 (ESF#14) allows communities to recover from disasters by providing a mechanism for coordinating Federal support. While ESF#14 is not a funding source, it supports long term recovery through planning and coordination pre and post-event (FEMA 2008). Pre-event plan includes developing plans and procedures defining agency participation and resources as well as evaluates prior ESF#14 efforts for future improvements. Post-event planning includes gathering of information to assess impacts and needs, facilitates sharing for information, provides technical assistance to support recovery planning, and coordinates the implementation of recovery planning with the appropriate Federal agencies and departments (FEMA 2008).

2.5 Sense of Place and its Effect on Mitigation Projects

It is well documented that mitigation projects, such as buyouts and relocations, are effective at reducing flood risk and creating more resilient communities. However, a person's sense of place can either 1) hinder the progress of mitigation projects or 2) be disrupted which may adversely affect people's basis for their individual identity (Kick et al. 2011). Sense of place is people's mental connection to the surrounding world. This mental connection can include perceptions, feelings, and emotions that make a place special or unique to an individual.

People make emotional attachments to their surroundings based on past experiences and emotions. "It is an integral part of all our environmental experiences and it is only because we are first in places that we can then develop abstract arguments about environment, economy, or politics" (Hanson 1997, 208). One suggested reason for why people feel a stronger connection to a particular place is because up until this century, people were limited by the distance they could travel in a day meaning areas were defined by their remoteness. This limit helped encourage local dialects, customs, and identities to form that still remain to this day (Hanson

1997). This uniqueness of places has changed several times over the past century; first with the invention of the railroad and then with the invention of the telegraph, radio, television, and the internet. Today, people prefer distinctness because it helps to form their identities and offers them a comfort level found only in a single unique place (Hanson 1997; Kick et al. 2011). To a certain extent, this is limit is still in existence today in many of the more rural areas of the U.S.

Individuals make decisions about their location based on their locations "place utility" and the level of satisfaction that the resident gets from a place (Hunter 2005). This level of satisfaction is one of the components in the decision making process of residents after a disaster. Individuals might accept a negative environment that is stable rather than deal with the stress associated with change (Hunter 2005). These satisfaction levels and residents' sense of place vary from person to person and can be difficult to quantify and include into the post-disaster planning process. For many individuals, the most difficult aspect of the buyout was feeling that they were no longer a part of the neighborhood and lacking the sense of home they had felt before (FEMA 2003).

CHAPTER 3

Methodology

3.1 Overview

The purpose of this study was to assess the various aspects that affect a community's decision about the relocation of their town. Interviews with elected officials, relocation committee members, and community members within the community was the primary method of assessment. Qualitative findings, while more detailed that quantitative, are generally more difficult to analyze due to the responses being longer and because the responses are not systematic or standardized. This type of research is done to measure the reactions of many people to a limited set of questions about their environment. This gives the researcher a very broad generalizable set of findings while also increasing the depth of understanding of the individual cases and situations being studied.

In order to develop a framework to identify communities for possible voluntary relocations, this study warranted the use of a qualitative approach to research. Qualitative research allows the researcher to "...preserve chronological flow, see precisely which events led to which consequences, and derive fruitful explanations." In this analysis, "most analysis is done with words. The words can be assembled, sub clustered, broken into semiotic segments. [The word of the interviewees] can be organized to permit the researcher to contrast, compare, analyze, and bestow patterns upon them" (Miles and Huberman 1994, 1).

3.2 Study Area

Review of the literature provided very little research that investigated the relocation process; therefore this study will provide a valuable contribution to literature on a community's decision to undertake buyout and relocation. The town study here includes Valmeyer, IL, Pattonsburg, MO, and Rhineland, MO (Figure 2). All three of these towns were severely flooded & successfully relocated within the past 20 years. Study participants were local community members and/or elected officials associated with the buyout and relocation process in these three towns.

3.2.1 Valmeyer, IL

Valmeyer is a rural incorporated town of approximately 1,200 people located in southwestern Illinois about 22 miles south of Saint Louis, MO (Figure 2). The town was originally established as a support town in mid to late 1800's for the Missouri Pacific Railroad. The railroad encouraged several businesses associated with the Mississippi River and railroad construction, along with encouraging local agriculture.

At the time of the flood, Valmeyer had approximately 900 residents. The levee north of Valmeyer overtopped August 1st, 1993, leaving the city under 16 feet of water in some areas (Subject 1 2012). Shortly after the disaster, the residents of Valmeyer decided to relocate their village onto the bluffs to the east of their town (Figure 3). The new site for Valmeyer added some 400 feet in elevation from the previous site (Subject 1 2012; Subject 2 2012; Subject 3 2012). Valmeyer was and is primarily a bedroom community for various commercial businesses in the area, primarily in Waterloo, IL and Saint Louis, MO. Valmeyer has a bluff line to the east and the Mississippi River and floodplains to the north, south, and west.

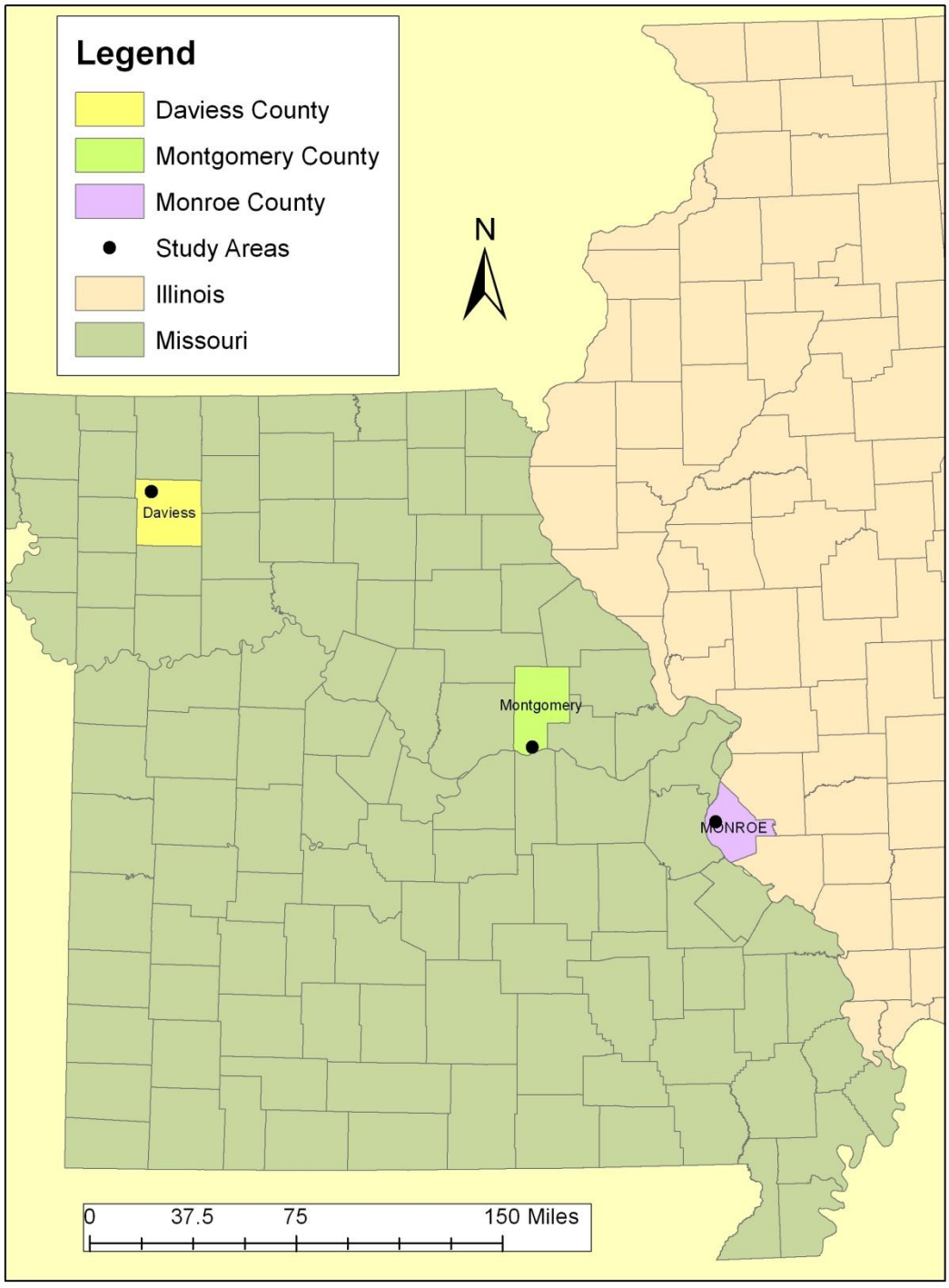


Figure 2. County Location of Study Areas

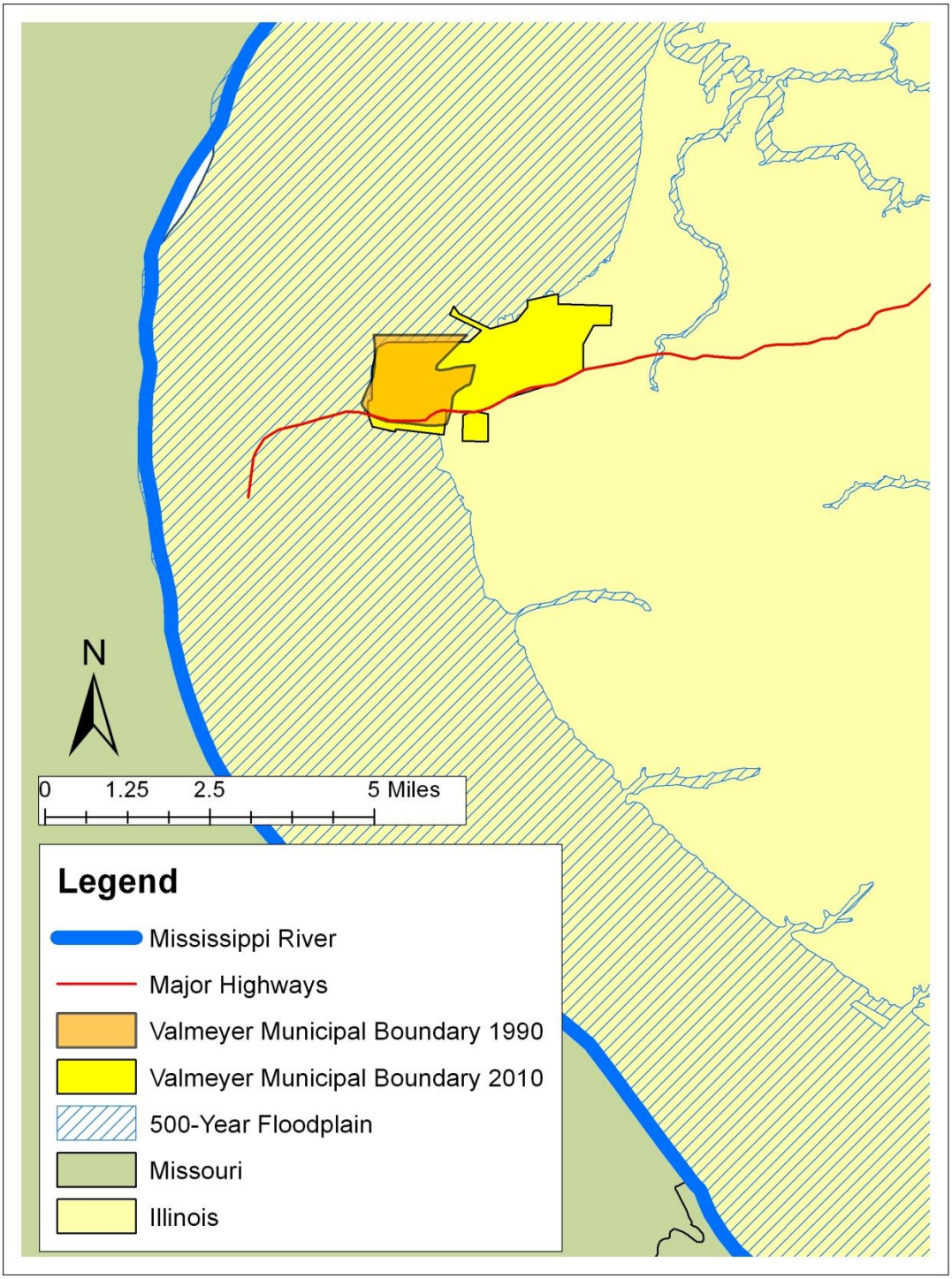


Figure 3. Valmeyer Municipal Boundary Pre and Post-Relocation

3.2.2 Rhineland, MO

Rhineland is an incorporated town of about 160 people located 75 miles west of Saint Louis, MO. in Montgomery County (Figure 2). Rhineland was established in the mid 1800's as a support community for the railroad. The railroad encouraged local agriculture in the area (Subject 4 2012; Subject 6 2012).

The town was flooded four separate times during the summer of 1993 by the Missouri River with water depths ranging from 2-6 feet (Subject 4 2012; Subject 6 2012). The residents soon decided to relocate the town 0.2 miles north onto a bluff formation (Figure 4). The new town site was 50 acres in size and provided the residents approximately 120 feet more elevation than the original town site (Subject 5 2012). Thirty-two of the fifty- two households and seventeen of the eighteen businesses physically relocated their existing structures to the new site with the other twenty households either building a new structure or purchasing a mobile home unit. A majority of Rhineland's population is either self-employed or works in various local businesses including banking, agriculture, and factory work. Rhineland has bluff lines to the north and the Mississippi River and floodplains to the south, east, and west.

3.2.3 Pattonsburg, MO

Pattonsburg is an incorporated town of approximately 350 people located 75 miles north northeast of Kansas City, MO. in Daviess County (See Figure 2). Pattonsburg was originally established in the mid 1850's as a farming settlement and the town incorporated in the mid 1870's (Subject 7 2012; Subject 8 2012). When the railroad came through the area, the town tried to lure it by offering the company $20,000 to come through the town (Witt and Morgan 2002). The railroad ended up being placed 3 miles to the south in a town called El Flats. Most

of the residents then moved to the town of El Flats and renamed it Pattonsburg (Witt and Morgan 2002).

The population at the time of the flood was approximately 400 people. Starting on July 6th, 1993, the town flooded twice in a three week period by the Grand River, a tributary of the Missouri River (Subject 7 2012; Subject 8 2012). These floods put approximately 99% of the town under 3-9 feet of water (Subject 7 2012; Subject 8 2012). After the second flood, 90% of the townspeople voted in favor of relocating the town 3 miles to the northwest (See Figure 5). The new Pattonsburg site is located along Interstate 35 and state highway 69 and gives town approximately 75 feet more elevation than the previous town site (Witt and Morgan 2002; Subject 8 2012). The original town location was surrounded by Big Creek to the east, bluffs to the north, and the Grand River to the south and west.

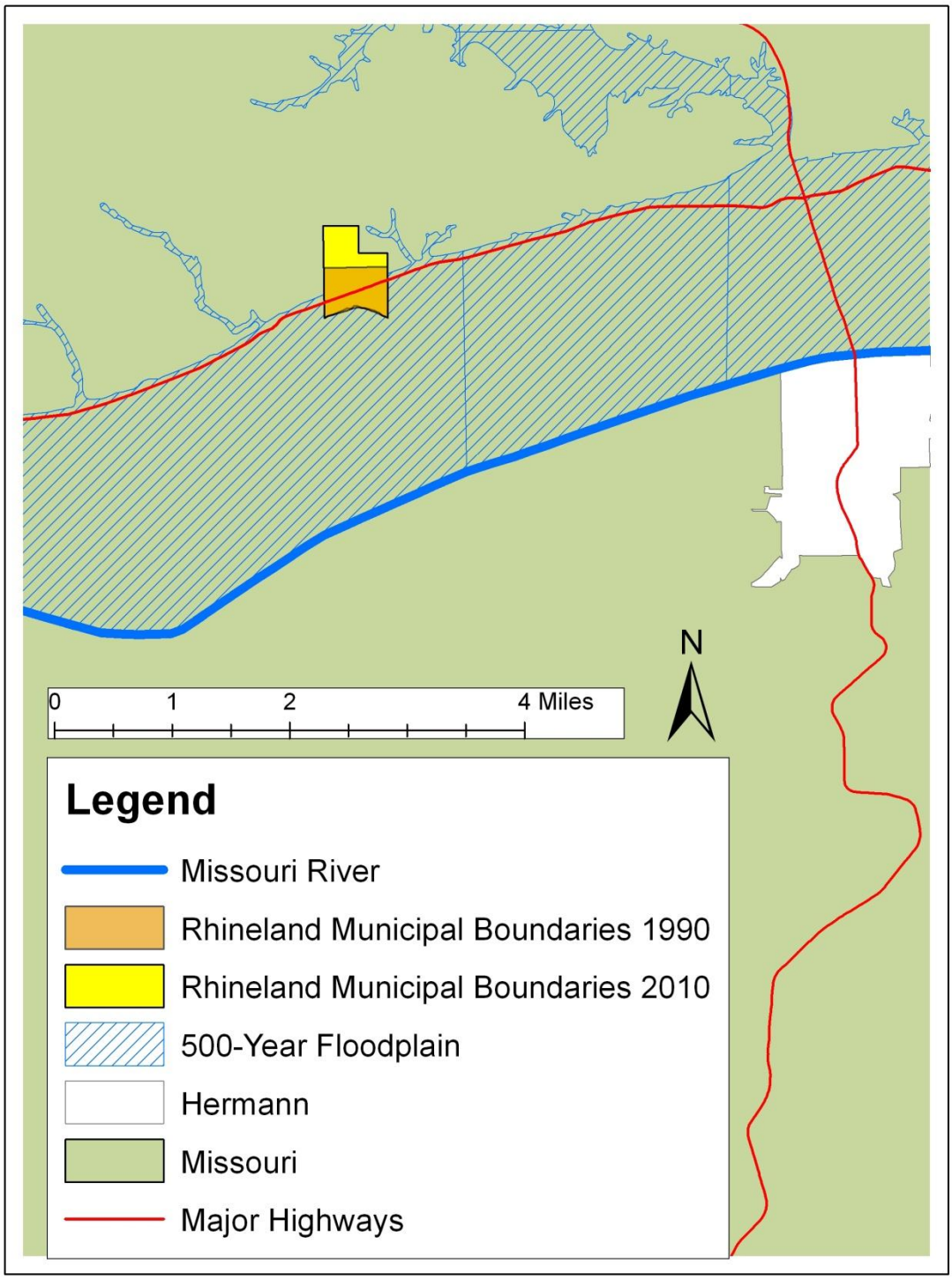


Figure 4. Rhineland Municipal Boundary Pre and Post-Relocation

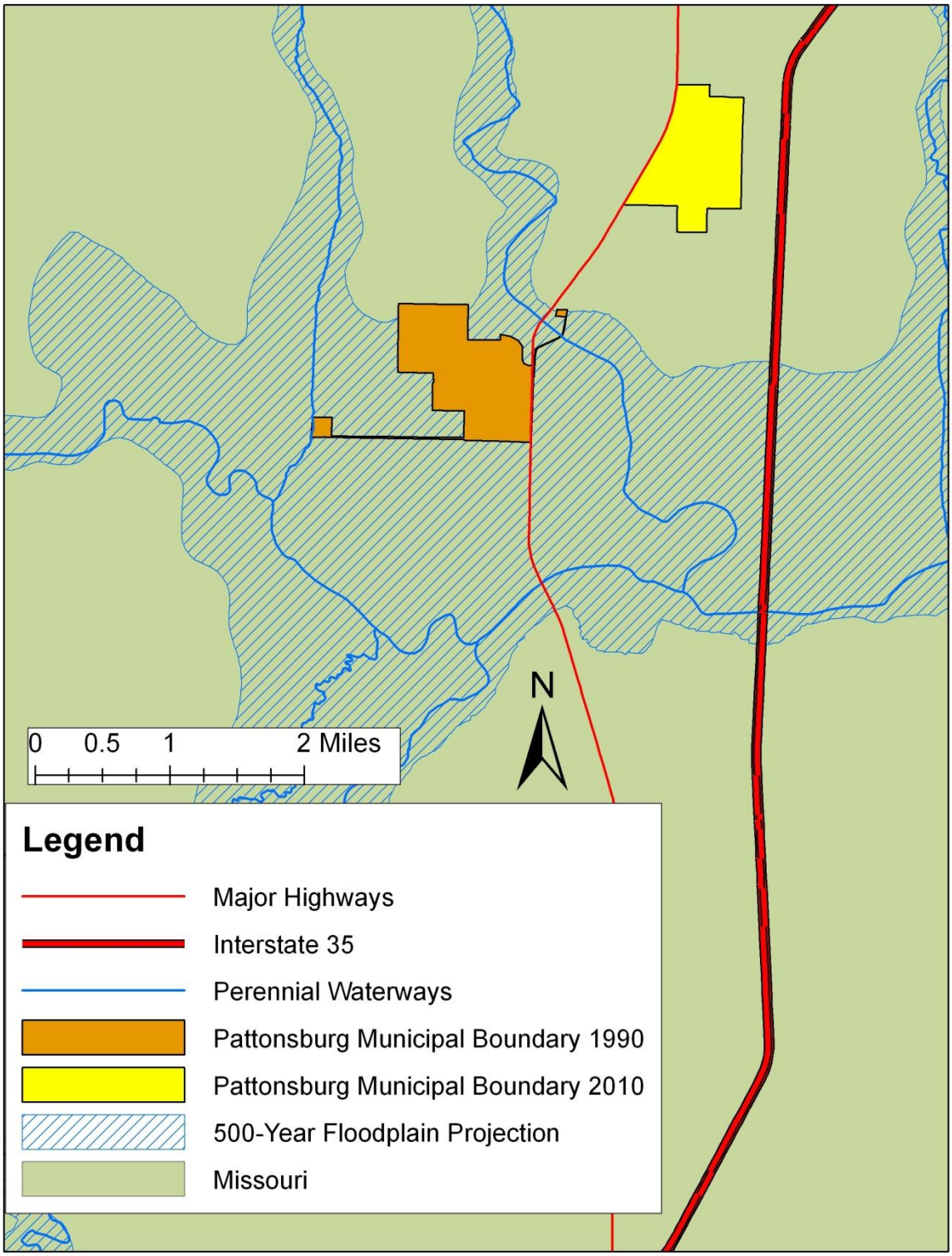


Figure 5. Pattonsburg Municipal Boundary Pre and Post-Relocation

3.3 Data Collection, Management, & Analysis

3.3.1 Interviews

The primary data collection tool used was digitally recorded personal interviews. Interviewees were participants associated with the relocation of the three towns, primarily elected city officials, community members, and relocation committee members (Table 1). Interviewees were selected using a snowball sampling approach. This type of approach uses existing study subjects to suggest future subjects among their peers and acquaintances. The advantage to using the snowball technique is the ability to include participants who the researcher would not normally be aware of. This leads to having the best experts for the sampling group (Miles and Huberman 1994).

Table 1. Interview Subjects

Town	Interview Subject #	Code Name
Valmeyer	1	Elected Official 1
	2	Civil Servant
	3	Relocation Committee Member 1
Rhineland	4	Relocation Committee Member 2
	5	Resident 1
	6	Business Owner
Pattonsburg	7	Resident 2
	8	Elected Official 2

Interviewees were asked several questions about the social structure, the political structure, and the community economics of their towns (Table 2). The interviews followed a

preplanned outline of topics in a relatively consistent fashion. The questions were designed to be open-ended and non-directive to encourage interview subjects to give their own feelings and input into the discussion.

Personal interviews were collected over the telephone using a digital voice recorder (DVR) to obtain community residents' perspectives on town relocation. Immediately following an interview, a preliminary analysis was done of interview responses to help tailor future interviews into similar directions. Prior to data analysis, all audio tapes were transcribed verbatim and coded into separate categories based on the interviewee response. Transcription occurred as soon as possible, normally within 48 hours of the interview, to help understand the intended meaning of the interviewee's responses. Once transcribed, the researcher listened to the interview repeatedly and read the transcription to get a better understanding of meaning and depth, credibility, and usability of the data. A narrative analysis technique was used to code interview responses into the overarching themes. Narrative analysis technique was chosen because it allows for recounting of the spoken viewpoints of interviewees without becoming a question and answer exchange (Riessman 1993). The themes that emerged from the coding process were used as separate headings within the study findings. The final step of this analysis involved using the emergent themes to interpret and find meaning in the data as it applied to the relocation of flooded communities.

3.3.2 Census and GIS Data

Census data was collected to provide information on the population level changes pre- and post-relocation of the towns. ArcMap 10 was used to project the old and new town locations in relation to the 500-year floodplain. Census data levels, GIS software, and GIS data sources are shown in Table 2.

Table 2. Data Sources and GIS Software

	Year	State	Level
Census Data‡	1990	IL	Municipal
		MO	Municipal
	2000	IL	Municipal
		MO	Municipal
	2010	IL	Municipal
		MO	Municipal
GIS Software	ArcMap 10		
GIS Data Sources	Illinois Natural Resources Geospatial Data Clearinghouse Missouri Spatial Data Information Service GeoCommunity GIS Data Depot		

‡ U.S. Census Bureau 2003; U.S. Census Bureau 2011; U.S. Census Bureau 2012

3.4 Sources of Uncertainty with Transcription and Coding

One issue with the analysis that bears mentioning is the possibility of errors occurring during the transcription from the DVR to text and from text into major themes. There are different levels of detail that the transcription process can be done at. To account for varying transcription detail levels, the researcher transcribed the interviews verbatim, including "…the 'uhs', 'ers', pauses, word emphases, mispronunciations, and incomplete sentences…" (Miles and Huberman 1994, 51). The researcher also read the interview transcriptions multiple times to fully understand the complexity and implications of the interviewee responses.

CHAPTER 4

Findings

Interviews generated extensive data that is useful in understanding community's decisions about relocation. The findings in this chapter are based on the interview responses of relocation participants. Analysis of the interview transcriptions revealed four key themes in interview responses: Leadership, Cost, People, and Landscape (Figure 6).

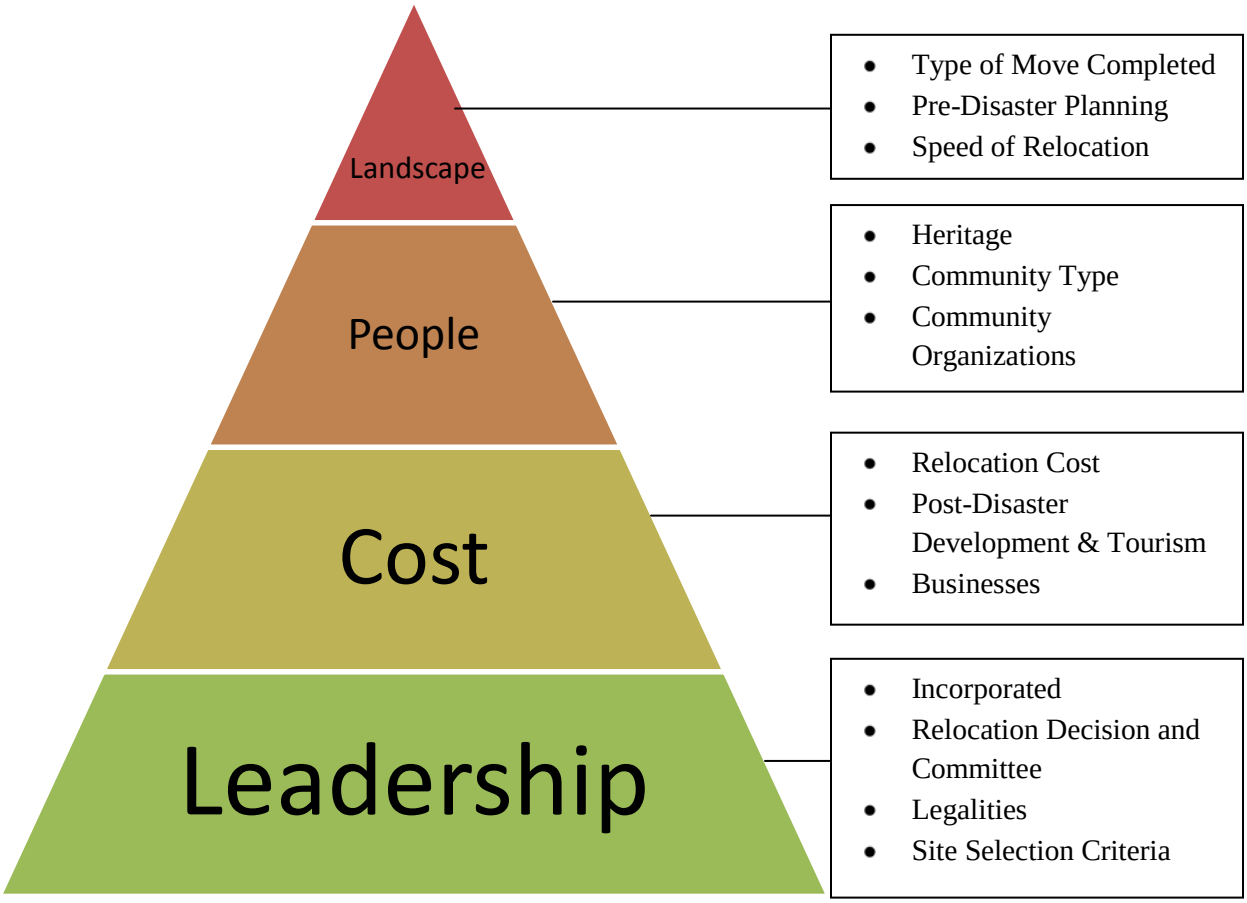


Figure 6. Importance of Factors to Community Relocation Decisions

4.1 Leadership

Finding 1. All three towns were incorporated at the time of the flood.

All three towns incorporated between the late 1870's and 1909. This meant that each of the three towns was incorporated at the time of the flood. This fact benefitted the towns in that when the flood occurred, all three towns already had a long, well established leadership system in place. This allowed the city council of each town to quickly begin dealing with the issues associated with a flood.

> *"…we had a…series of community meetings that began immediately for various aspects of the problems that we were encountering. Uh…we first had a community meeting to deal with the immediate needs of the folks and make sure that the people had a place to stay and they have food and clothes and whatever else they needed…and as all of these things started to develop, we were also able to, either by boat or by air, get in and…survey the damage to the various buildings throughout the town"* (Subject 1 2012).

Finding 2. Decision whether to relocate or not was given to the town residents.

Each town used some form of town hall meeting or survey system to find out what people wanted to do to recover from the flood. Valmeyer used the local county Extension Office to survey its citizens approximately 6 weeks after the initial flooding occurred. The Extension Office calculated the results of the survey and gave them to the town (Subject 1 2012). In Rhineland, a series of town hall meetings were held to decide upon recovery options. "…we had some big town hall meetings…and we told them what [wanted] to do…[and to find out] who was for it and who was against it" (Subject 5 2012). Residents began discussing relocation as an option 1-2 months after the initial flooding. Pattonsburg also used town hall meetings and a general consensus to decide upon town relocation. "…because of the way hazard mitigation

money runs…everything…must be voluntary" (Subject 8 2012). Subject 7 stated that relocation talks took probably a month or two to start (2012).

Finding 3. Relocation committee type and composition varies between study areas. Information dissemination was more important.

All three of the town's relocation committees were comprised either completely of city council members or had at least 1 council member on each of the various sub-committees. In Valmeyer, the city council created 7 citizen committees with each committee having at least 1 council member on it. The rest of the committee was comprised of 10 to 15 citizens of the town. The committees dealt with issues ranging from infrastructure layout and construction, the school system, to businesses and the business district. "Each of those committees was then given a list of jobs to accomplish, and…we gave them a very aggressive schedule on how quickly we wanted to them to gather the information that we needed" (Subject 1 2012). When each individual committee meet, they would also have "…people from the regional planning commission,…an architect,…an engineer,…an accountant,…and an attorney" in the room with them to help deal with any issues that might arise during the planning process (Subject 1 2012).

Rhineland went with a different approach to their relocation committee. Instead of having various citizen committees, "It was the mayor and city council [working with] Boonslick Regional Planning Commission" (Subject 4 2012). "…we didn't have, you know, 4 or 5 committees. There just the town board and the mayor and Steve Etcher [Boonslick employee]" (Subject 5 2012). The town did have residential input via town hall style meetings about relocation decisions. One committee that was at work within the town but not part of the relocation was the Unmet Needs Committee. This citizen committee worked through the

Missouri Department of Mental Health. The Unmet Needs Committee worked with agencies like the Salvation Army and they "…would go out and try to find the people…who needed help and what their needs were…[and] whether they could afford [to meet their needs] on their own or whether they needed assistance in…getting themselves back on their feet. It was as simple as buying kids pillows. There was one family that we met with…the kids didn't have pillows because they were flooded" (Subject 4 2012).

Pattonsburg's relocation committee was a hybrid of the types used by the previous two study areas. The city council completed the initial process of the relocation and "…once we got the ok to actually…move the town, then we…started forming committees and…we had…one for parks, we had a committee for…infrastructure, things like that. [We] just let everybody put their own input and we kinda all voted on…what we wanted in the community and what we didn't want, and that's kinda how we came up with what we did" (Subject 7 2012). There were 4 to 5 citizen committees formed and they all worked with the Green Hills Planning Commission and with an economic development team from Washington D.C. (Subject 8 2012).

Finding 4. Response to outside support varied depending on assistance offered.

The Governor of Missouri gave the relocation of Pattonsburg his full support during the planning process.

> *"We actually went down and set in the ante room right outside the Governor's office, he brought out his assistant and said, 'Ladies and gentlemen, this young lady stands in my shoes. This will be dealt with today.' So…the Governor took a very active role in making this happen…there were several times where things could have died out for us…if it hadn't been for the Governor and his support"* (Subject 8 2012).

Subject 8 also spoke highly of Missouri's senator, Pat Dennor, for taking the time to set down and speak with them as well as the director of FEMA, Dr. James Lee Witt, for personally asking

them "…about what was going on and what [he] could help with to make this work better" (2012).

A complaint with the help received from outside of the community by the interview subjects was that some of the expert's ideas sound better in theory than practice. Subject 8 responded,

> *"So, this whole planning process in itself was kind of nice… and we had a lot of folks between…the aspect of sustainability of the community [and] of…the energy efficiency. What was truly interesting is we had…folks from...all over the country came out here from the Department of Energy out of Washington D.C., and they came out with some ideas that make really good sense until you project them on a community*

These ideas include having smaller lot sizes for elderly citizens as well as dividing the neighborhoods for people based on family type. The thought of having smaller lots for elderly residents meant that their yards would be easier for them to maintain; however, residents felt that the lots should be the same in all cases because people do not move very often. Dividing neighborhoods based on family type was intended to keep the many elderly residents and young families together in the new location. Many residents wanted to retain their original neighbors instead.

Finding 5. All three towns used annexation to avoid potential legal issues with relocation.

All three towns chose to use annexation to integrate the new site in with the old town location. A variety of reasons were given as to why this process was chosen over simply creating a new town. The main response given was to keep the town name. These responses were discussed in depth in section 4.1. A legal issue that accompanies retaining the town name is that the towns could not "…legally be a city and be in two different spots" (Subject 2 2012).

> *"…the only way…according to the law that we could do that [retain the original name] was by having a continuous annexation or a continuous property line of the city, then we could retain the name. If we did not, we had to have a different name and so with that, we decided that if we annexed...20 feet on either side of highway 69 from the old town to the new town…that added…to our…property or the city limits. And once everything was complete up here, then we could decommission the old town and release that property back…from being annexed"* (Subject 7 2012).

The annexation process allowed all three towns to legally retain the original town name.

Along with Valmeyer's annexation of the new town location, the town was required to purchase the mineral rights below the new location along with the property. The new town is located directly over an existing quarry. "It was annexed in as a contingent…to the old [town]…that [was] why we ended up having to buy the quarry property" (Subject 3 2012).

There was a local push for town relocation after the flood for financial reasons also. Montgomery County, the county in which Rhineland is located, was"…afraid of losing their tax base…" to a town, Herman (See Figure 4), in a neighboring county which "…is relatively close to Rhineland…so [officials] were very [strongly] encouraging people to stay here in the community" (Subject 4 2012). Subject 6 responded that another reason annexation was chosen for Rhineland was that "It was pretty simple. [The new town] was right next to [the old town] and…the boundaries just kind of went back further" (2012).

The simplicity of annexation also extended to not crossing any political boundaries from the old location to the new for all three towns. Pattonsburg chose annexation because it allowed the town to keep the city's sewer and water facilities within the town.

> *"…the sewer and water treatment facilities are…adjacent to the old town. So we had to have…an easement to do the necessary plumbing to get water up here and to get sewer down there. In terms of doing that, we…picked that easement…and used that as a…annex [to keep] all [of] our sewer and water…located in the cities territory, inside city limits"* (Subject 8 2012).

Finding 6. Criteria used for site selection varied widely between study areas.

Each of the 3 towns used a unique set of criteria when deciding the location of the new town site. In Valmeyer, Subject 1 stated that,

> *"We put together a set of criteria that we felt would be necessary for a new town site. We wanted something that was first of all big enough to accommodate all the homes and businesses and the school and churches and all. We wanted something that was within the same political districts to make it as clean as a move as possible, like school district, the fire district, things like that, so we didn't cross any legal boundaries there." "We wanted something that was close enough to the original town so that the people would still have a sense that it was at least a part of the old community. We knew that if we were picking everything up and moving to a new spot, that part of that identity was definitely going to be lost, but we still wanted to keep it close enough to the old town to make it at least seem like it was uh a part of the old town. The key, the big thing that everybody talked about when we got together to discuss the initial plans, whatever you do, make sure that the thing is higher and dryer than we are right now." "We came up with about 4 or 5 sites that fit most of those criteria, and then at that point we ranked those as to best down to worst and then just started our way down the list, meeting with the people that owned that property to see if we could actually work out an arrangement where we could acquire the property. Fortunately the one that was on the top of our list was the one that we were able to make arrangement for"* (2012).

Subject 2 also stated that the first site they chose was the one they eventually relocated to (2012). Valmeyer put an informal vote out to its citizens to decide if they were to relocate or if they were to go in another direction. "…our county extension service handled that activity [voting]…we put out surveys to the residents and…they actually got those [surveys] circulated to all the folks in town and then…calculated the results and then passed them on to us" (Subject 1 2012).

In Rhineland, "…they looked at what land adjoined the current town of Rhineland that was on the hill…and it was…a farmland that…they decided that [the new site] would meet the needs of…moving…the homes and keeping [the town] intact. They could keep the town of Rhineland intact" (Subject 4 2012). Subject 5 went as far as to say that "that was the only site we really had to go to, to move the town. If not, it would prolly have stayed in the bottom where it was and there prolly wouldn't be no Rhineland today" (2012). Other sites were looked at but

"it didn't lay right [or] it was too hilly. And [the current site is] hilly but its…not as bad as going…a half mile either way" (Subject 6 2012).

Pattonsburg followed a similar path as Rhineland. "…we were trying to decide where we wanted to move the town to and…there was…an older gentleman that…had a farm that was right next to the interstate, and so we ask him if he would be interest in…selling…the property, and they said yes, and so we bought the whole farm and that's where the town we picked" (Subject 7 2012). Another reason given for the selection of the site was that at another possible site location near the interstate "…to get the amount of ground we were talking about, we would have had to deal with about 20 land owners" (Subject 7 2012). This issue of multiple land owners was an issue the city council wished to avoid. One of the stipulations that the Governor made for relocation of Pattonsburg was that "…we have a vote of the people and [he] said we had to have at least 75-80% approve of the relocation. We had 99[%]" (Subject 7 2012). FEMA also had a stipulation in that "…they would not have relocated a community unless there was…intentions for survivability and better economic possibilities" (Subject 8 2012).

Finding 7. Resident lot selection was completed fairly using a lottery system.

Each town used similar methods for selecting home locations. A lottery system was used in Valmeyer to select time slots for every household.

> *"…if you were fortunate enough to be on the top of the list after the lottery, then you were in the top picking for deciding where you were going to build. As the people picked their lots during the lottery, we put together what we called the neighbor list. And people could go up to this board and write on this list which lot they were selecting to build on. So…we had a lot of people that when they came in to select their lot when it was their turn in the lottery, they would go to that neighbor list and see where one of their old neighbors had bought a lot before them, and then they looked in the same area so they could be neighbors with that same person again"* (Subject 1 2012).

Similarly, Pattonsburg used "a double blind set up in that…nobody knew…when you drew…for your times. Everybody else, when you drew for you lots…if you decided you didn't want the lot that was here, you could pick one out somewhere else as long as it wasn't occupied. So it was about as well developed a process that way as any we could come up with" (Subject 8 2012). These processes were chosen to avoid complaints of preferential treatment in the lot selection.

4.2 Cost

Finding 8. Businesses success in relocating varied bases on assistance offered by the towns and local competition.

The interview subjects from Valmeyer and Rhineland both stated that the businesses in the town were the hardest hit by the flood and relocation process. Valmeyer "…had about 30 businesses…at the time of the flood" (Subject 1 2012). After the flood and relocation, "…we probably had 10 or 12 of those businesses that were actually able to come back and reestablish themselves" (Subject 1 2012). Subject 2 responded that "…an unfortunate part of…where we're located is not in a high traffic area so…we have a whole business district that is pretty much still empty" (2012). Similarly, in Rhineland, there were a small variety of businesses located within the town. Of these businesses only about "4 to 5…businesses moved" (Subject 4 2012). "Right now we've got the 2 elevators…the tavern, the garage…the bank, and the post office" (Subject 5 2012).

> *"…with the [grocery] store…you've got 3 of them in Herman and would it really pay to…rebuild a new store…I think that was a factor. With the TV repair shop, he was getting up to the age where…he was getting ready to retire and…his boys didn't [want] nothing to do with it so I think that was one of the factors there for why the TV shop didn't open back up"* (Subject 5 2012).

Pattonsburg faired quite differently than Valmeyer and Rhineland. Valmeyer and Rhineland zoned parts of the new town for business districts but left the construction of the new facilities up to the individual business owner. Pattonsburg, on the other hand, zoned a business district in town and then constructed 2 strip malls with 8 separate vacancies each.

> *"We had enough businesses in the old town that…wanted the economic development aspect of this, which rather than deal with zoning and who went where, who had to build and relocate and change their restaurant and move their bank and do all of this,…these strip malls are two separate sections of 8 building a piece that face each other, and those basically the city owns those and leases and rents those out to customers and then we have what's called the industrial development authority, that supervises all of that…stuff. The city owns them but there is a separate entity that…rents and repairs and does all of that"* (Subject 8 2012).

Subject 7 elaborated by saying that "…all of the businesses except [for] one made the transition from the old town to the new town" and the one that did not move was left purposefully. Residents chose to leave the MFA (Missouri Farmers Association) due to the amount of dust produced during harvest season. "…the people had always complained about the noise and the dust from…the farmers dumping their grain and stuff…so they thought [staying] would be the best thing" (2012).

Finding 9. Minimal Tourism pre- and post-flood in all study areas

Subject 2, when asked if Valmeyer had any tourism before the flood responded, "No, absolutely not" (2012). Subject 6 responded that the nearby town of "…Herman is a big tourism town" with "…3 to 4 wineries in it", but that there was no tourism in Rhineland itself (2012). Pattonsburg's tourism occurred mainly in the hunting seasons when "…a lot of people would come from…Kansas City…during deer season" but there "…weren't any big hunting lodges set up…or that kind of thing" (Subject 7 2012; Subject 8 2012). Pattonsburg actually lost some of

the local tourism they did have when I-35 was constructed in the 1980's. "…we had been on a major highway…that ran through here and…when I-35 went through, it moved all of that traffic off the edge of town and moved it basically 2.5 miles east…so basically it bypassed the town" (Subject 8 2012)

After the relocation, all three towns have done some work in attracting tourists to their new location with varying levels of success. Valmeyer developed the Salt Lick Nature Preserve which included a hiking trail that drew "…quite a few people…for that" (Subject 3 2012). "…[Rhineland] built a…baseball field or a softball field there…[in] a park and we have…had a tremendous amount of…ball being player there. Little league and also fall softball league for the older people…that's been a big…draw right there" (Subject 6 2012). Rhineland's new location also lies along the Katy Trail which "…runs through the town…it's a biking trail from…Kansas City to Saint Louis" (Subject 4 2012). Bikers coming through the town would stop to buy supplies when needed. Subject 4 also stated that "I've turned my house in to a bed and breakfast and so…has another lady. So we have B&B's here and we kind of…use the Katy Trail as primarily out target market" (2012). An extreme outdoors store has also been opened in the town since the relocation with the primary focus on the bikers traveling along the Katy Trail and toward local hunters.

Pattonsburg chose its location next to an exit off of Interstate 35 to draw travelers into the town. People traveling along the interstate can stop in the town for things such as food and gas. Pattonsburg also placed a sign on the interstate during the relocation process to draw people in that said "…newest town in America" (Subject 8 2012). Another economic boost that Pattonsburg received was that "…just shortly after the relocation project…was almost complete, we were approached by Universal Pictures to do a film in the old town and use it for a…film lot.

The movie 'Ride with the Devil' was shot in the old town. They changed…all the store fronts in the old town to where it looked like Lawrence, Kansas in the 1800's" (Subject 7 2012). Currently, Pattonsburg has "…been talking about…possibly creating a museum dedicated to the flood…we're just now getting to the construction stage of that" (Subject 7 2012).

Finding 10. Post-disaster development has varied between study areas based on local conditions.

Valmeyer turned a potential issue with the relocation into a benefit with the abandoned rock quarry. Since Valmeyer was required to purchase the mineral rights of the land they relocated to, the town has converted the quarry into "…a rock city complex which now houses…the NARA which is…the National Archives Resource Agency" and a warehouse "…for frozen foods" (Subject 3 2012). The NARA move to the complex because "…you have a constant temperature there,…cheaper rent,…and the proximity to the city [Saint Louis]" (Subject 3 2012). The warehouse for frozen foods is a distribution center for companies such as DiGiorno Pizza and Little Caesars Pizza (Subject 3 2012). The complex rents the space to another firm that then leases it to the companies. "We actually still own it, but we lease it" (Subject 3 2012).

Rhineland's development has been more focused on the community aspect rather than the economic. Only four new businesses have been opened in the time since the relocation has occurred, two bed and breakfasts, "…[an] automobile place…[and] Extreme Outdoors" (Subject 5 2012). On the other hand, there has been more development in the form of new home construction and city parks.

> *"…3 or 4 new homes have been built…here after the town has been relocated…there is…a beautiful park that is now in place where originally some of the houses sat…and actually the kids from Herman now come to Rhineland to play ball. I mean…it's lit up at night, it has a scoreboard and bleachers and…it's much nicer than the Herman…ball diamond. They done a…sand volleyball…area for the kids. The teenagers come and play…almost every*

> *Thursday night, you'll see teenagers down there playing…which has been a great addition to the community"* (Subject 4 2012).

Subject 7 said that for Pattonsburg, "there's been interest in it [economic development]…but it's just been a comedy of errors as far as…financial things goes. We had a…developer looking to…build like a shopping center close to the interstate…[until] the economy collapsed" (Subject 7 2012). "We've tried and worked and chased it, but frankly the economy the last 5-6 years has not been a real benefit to that" (Subject 8 2012).

Finding 11. Relocation cost varied between study areas based on flood severity and type of relocation completed.

Valmeyer was the most expensive move costing approximately $25 million (Subject 1 2012). This high cost was associated with the need to construct more infrastructure in the new location and the high population relative to the other study areas. Valmeyer residents were not given the option to relocate their original home structures to the new town due to their structures falling within FEMA's substantial damage category (50% or more damaged). This meant that the residents were either required to build a new home in the new location according to strict floodplain ordinances. All residents chose to relocate to the new town location or to another community. The residents were given pre-flood value for their homes in the form of a buyout any many chose to relocate to the new site.

Because so many of the residents in Rhineland simply chose to move their home rather than build new, the residents were offered $10,000 from a Federal grant to move their home. Residents who wanted to build were given pre-flood value of their home in the form of a buyout and these buyout funds were used for construction costs (Subject 4 2012). Rhineland's total cost of relocation was approximately $3 million (Subject 6 2012). This $3 million includes the

construction of infrastructure in the new location, the buyout of unmoved homes, and individual relocation assistance. Because the structures in the town did not fall into the substantial damage category, homeowners were given the option to physically relocate their homes. Subject 5, talking about the assistance they receive for the move said,

> *"You got the $10,000…given to us to move our house…[but] it cost me $15,000 to move mine. If I had to do it all over again, I wouldn't move my house…I prolly would have built…new instead of moving it because by the time you moved your old house…you prolly could have built a new one for what you stuck in your old house…I [would] just leave the house down town…because I had to borrow all this money and went so far into debt"* (2012).

This sentiment of building new rather than relocating is more prevalent today in Rhineland. According to Subject 6, many of the people feel that if given the chance to move again, they would build new rather than move (2012).

Pattonsburg's total cost of buyout and relocation was $12.8 million (Subject 8 2012). This high number was due in part because only a small portion of the buildings were physically moved with the rest of the structures being built new. Subject 8 responded that "…their operation [the government] said basically, you move a house, we'll pay you $11,000 to move it and that's it. Well, depending on how…big the house was, $11,000 was a joke. It cost $24,000 to get ours moved" (2012). Because the structures in the town did not fall into the substantial damage category, homeowners were given the option to physically relocate their homes. The homeowners that decided to rebuild were paid pre-flood value for their home in the form of a buyout and could use this money to relocate to another town or to build new in the new town location.

Subject 8 discussed some of the differences between Pattonsburg and Valmeyer when it comes to the school and other public buildings when he said,

> *"One of the interesting things we got into when we talked to the folks in Valmeyer is they were getting a brand new school that was all being taken care of, uh…when I went back and ask those questions of Missouri. Well there was 2 issues; first, we are in two separate FEMA districts, Illinois and Missouri, the other being when the governor request from FEMA emergency status, they are ask to define what they need assistance for. Illinois said they needed for public and private buildings [and] because Missouri with the Missouri River and the Mississippi River, our governor ask for…only residential. So the churches, the commercial buildings, the schools, those were not included in the relocation plans as they were in other parts of the United States. That made parts of this…entirely more difficult"* (2012).

This difference in the request for FEMA assistance meant that Valmeyer was offered Federal funding to relocate public buildings in the town such as the police/fire station and the school. Rhineland and Pattonsburg were forced to pay for these expenses themselves. This put another financial burden on these communities during relocation.

4.3 People

Finding 12. The type of the community dictates the residents' ability to cope with relocation.

Six of the 8 interviewees stated that at the time of the flood the town had developed into a "bedroom" type community. By bedroom community, they meant that a people lived in the towns but a significant portion of the population worked outside of the immediate community. Being a bedroom community allowed residents to live in temporary housing while still commuting to their jobs. Valmeyer residents generally traveled to Waterloo, IL or Saint Louis, MO for their work. Subject 3 said that "…you can almost get to Saint Louis faster than if you lived in Saint Louis. We're only 30 minutes from down town. It takes you longer than that sometimes to get from places in the city to down town" (2012). Rhineland residents traveled to Saint Louis, MO., Jefferson City, MO., or Columbia, MO for employment while Pattonsburg residents traveled to Kansas City, MO. or Bentley, MO.

The towns did have some businesses located within them such as convenience stores, grocery stores, restaurants, and farm support services. They had "…all of the businesses necessary to be able to take care of those folks [farmers] as well as the folks that lived in town" (Subject 1 2012). The types of businesses needed for agricultural support includes various farm services such as grain elevators and feed mills, as well as banking, drug stores, and grocery stores (Subject 1 2012). These businesses were able to provide support to the town to an extent but residents were still required to travel outside the community for professional services such as doctors, dentists, or hospitals. These businesses were more severely affected by the flood because unlike the town residents, they were often unable to open for business during the relocation.

Finding 13. Keeping community organizations together during flood and relocation can help tie communities together during transition.

All of the interview subjects from Valmeyer and Pattonsburg said that keeping the community organizations together during the flood and relocation was important during the relocation process. Keeping the organizations together gave people a sense of normalcy and kept community ties intact. Valmeyer and Pattonsburg both had schools, K-12, directly within their communities while Rhineland did not. Rhineland's school system is in Herman, MO. which is located approximately 5 miles east southeast of Rhineland. The Herman school system was not affected by the 1993 flood (Subject 5 2012; Subject 6 2012). Valmeyer and Pattonsburg's schools were both inundated during the flooding (Subject 1 2012; Subject 8 2012). Both towns kept their schools together during the flood and relocation process by using temporary buildings as facilities. "One of the main problems we had was that this all occurred about 3 weeks before school was supposed to start" (Subject 1 2012). "We're like 10 miles from waterloo…and the

fairground is to the east, directly east of Waterloo towards Valmeyer. They set up those portable buildings; you know those trailer type buildings…at the fairgrounds and that is where the kids went to school" (Subject 3 2012). In Pattonsburg, the school started 10 days late and "…they…brought in…doublewide mobile homes and basically…had classes…right there where it [original school] was at while they cleaned up the old building" (Subject 7 2012). "…the problem was that the government was not going to pay to move the school or and government buildings or any of the churches…and so the people had to vote to build the new school in the new town. And fortunately for us there was a fire at the school, which destroyed about half of it and then that wound up funding about half of it and the local community paid for the other half" (Subject 7 2012).

All of the interview subjects from Valmeyer and Pattonsburg said that keeping the schools together helped tie the community together during the flood and relocation. Subject 8 went as far as to say that "…when everything else was in the air, the community and the kids needed to be as stable and as solid as we could be so…we continued to have school operated right where we're at. Run the same busses…had the crew come in that cleaned up and reworked the school and go all of that taken care of" (2012).

Each town's school district had sports teams associated with them and all were kept together during the flood and relocation along with the schools. During this time, the student athletes had to,

> *"...beg and borrow any facilities for extracurricular activities, and what they wound up doing was they would have to use the unused time at neighboring schools. So many times they would go in at 4 of 5 o'clock in the morning to use the gym for basketball practice at a neighboring school so they were then out of the way when those kids showed up for their own school. And then same thing with playing the games, they...would have to take odd days and hours whenever*

> *the facilities were not being used as the other schools;…we do have to say that the other surrounding districts were very generous in allowing us to use their facilities for everything…from sporting events to…the drama and things, musical events, things like that. Whatever normally would have taken place in the school setting, that was all done at neighboring school districts"* (Subject 1 2012).

All three of the towns had at least one church located within them and all of the churches continued to meet in either the original location or in temporary facilities during the flood and relocation process. The temporary facilities ranged from high schools, neighboring community church buildings, a VFW meeting hall, and a nursing home. "…if they could get to church you went to church" (Subject 5 2012). "It helped maintain…a routine for the people and it was…consistent. It was something that they could consistently do. It was part of their routine, and I think it mentally helped them as well" (Subject 4 2012). "It didn't do anything but help…you've gotta have the church and…you know, it's a Catholic Church and they're gunna…have mass come hell or high water" (Subject 6 2012). "I think if we hadn't talked about doing those things [keeping churches and schools together], the relocation probably wouldn't have happened" (Subject 8 2012).

The towns had very few community organizations outside of school and church groups. Valmeyer had only an American Legion. Subject 3 said that "…the legion has a smaller venue. It used to have a big hall that we used to have dances in, but…they just have a…small meeting area" (2012). Rhineland also had an American Legion and a 4-H group at the time of the flooding. This Legion meets today but "…they don't have no hall or nothing, they just meet at a local tavern in the back" (Subject 5 2012). Talking about the community groups, "…They might have rescheduled just a few meetings but they went on…same way with the 4-H and things like that. They might have had to back off for a few meetings, but they all came around again" (Subject 6 2012). Pattonsburg had a Lions Club at the time of the flood that continues to meet.

"The Lions Club…now meets in…one of the buildings in…the new town. But they still own the property in the old town and they have an annual…festival down there like a tractor pull and different event s like that" (Subject 7 2012).

Finding 14. Town heritage retention was important to residents during relocation.

Annexation of the new town location was used in all 3 cases. One of the reasons given for this decision was a desire to retain the original town's name. "…the people thought that if we moved the town, we wanna keep the name" (Subject 7 2012). Subject 1 explained that "…we felt that the best way for our residents to feel that they were still living in the same community was to do an annexation of the new area to the original area" (2012). Subject 5 also commented that, "We just wanted to keep the old town original the way it was, or try to keep it original…as much as possible with everybody living there" (2012).

The cost of the relocation was deeper that just the price of a new home or the cost of moving the existing home to the new location. "What we tried to do was facilitate [neighborhood relocations] as much as possible…but we couldn't do it cart blanch" (Subject 1 2012). Subjects 4 and 5 both stated that they felt that the neighbors and neighborhoods are not as close as they once were. "We're not as tight knit of a community as we used to be I don't think. I don't think we see each other just because of the structure of …the lay of the land. It is a little more open spaced and so I think we're not as tight as neighbors as we…were before the flood" (Subject 4 2012).

Subject 4 and 5 elaborated on the reluctance of some of the community members to move.

> *"I was younger at the time , and so there were a lot of older women in the area that had lived in Rhineland all their lives and, you know, we [younger community members] were all excited about moving our home and excited about a fresh start and our houses were never going to be flooded again. And one of the ladies said to me, she was an older woman, she said 'You know, you see this as a good thing and it's kind of a sad day for us because we're watching the town we've known all our lives…disappear'"* (Subject 4 2012).

> *"When the water does get up and gets up to the levee, I'm happy I'm up here but things was just so much easier down town. Everything was flat…[and] you could walk to it easy and was within a block or two. Up here…all the houses are up on the hill and all the businesses are down along the…main highway, you know. So you really could walk to it but you got the hills and everything to go up and down"* (Subject 5 2012).

In Pattonsburg, one of the churches and a few homeowners decided they did not want to move to the new location. "…it was a…really old…majestic building…[and] it just got water in the basement. It did not get any in the main part of the church and they felt that…the cost to move the building was too great…so they stayed where they were at" (Subject 7 2012). "…we had some people that stayed in the old town…because of obligations…or history…or fondness for that area, or for the fact that it had been a family residence for years" (Subject 8 2012). These decisions not to relocate imply that people valued their community ties and history in the area more that the economic factors associated with relocation.

Subject 8 thought that the people of Pattonsburg would choose to leave a local mill in the old town location but stated that there was "…those that wanted it relocated" to the new town. "…I really was surprised that that was one of the things that those folks wanted relocated to the community" (Subject 8 2012). The towns decision to relocate a noisy mill into the new community shows that people residents wanted to keep as much of their community intact during relocation, even though it would be viewed as a burden from outside of the community

Finding 15. Age of the relocation committee members changed the committees ability to deal with issues associated with relocation.

Subject 8, talking about the age of the relocation committee,

> *.""...to me the interesting part was…I was the oldest member on the council and they [citizens] would come up and somebody would say we need to do this, and we would have all of the people say, 'We can't do this, we can't do this' and I was fortunate enough to work with the 5 younger guys and they all said, 'hey, we'll give it a try'...some of these younger guys who stepped up to the plate and did a superb job…with what we had to do and how we had to get the nuts and bolts worked out"* (2012).

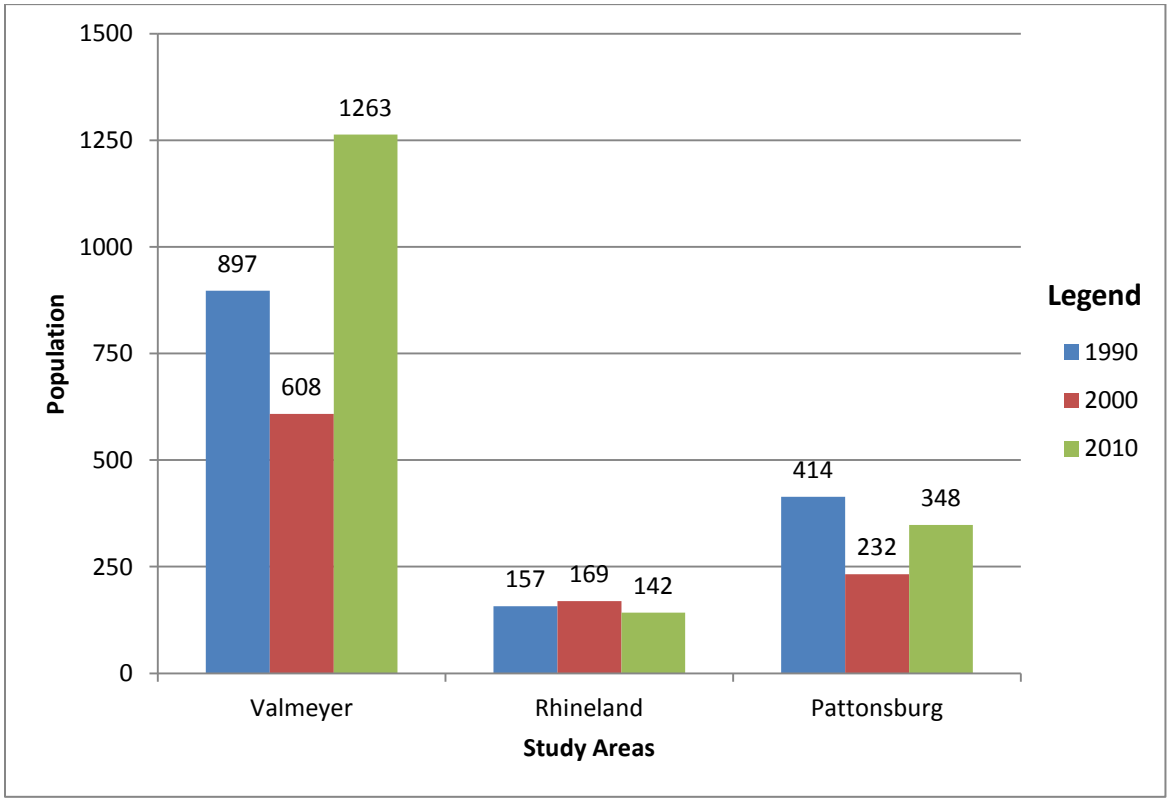
Subject 8 felt that having a younger relocation committee allowed the town to attempt the relocation with more enthusiasm. "...the fact that these were guys were all young and thinking, we'll probably make this work" was one of the reasons why the town was successful in relocating (Subject 8, 2012). Relocation committee members in other towns were also young according to the interview subjects, generally in their thirty's or forty's. Older town residents were less optimistic about successfully completing a relocation.

4.4 Landscape

Finding 16. Population levels after relocation varied depending on economic opportunities offered.

Valmeyer and Pattonsburg both had a significant drop off in population between 1990 and 2000 (See Figure 7). Subject 3 said that the population of Valmeyer "…was 900 and then after I guess the majority had built up here on high ground, it was at like 650. Our population now is over 1200" (2012). Pattonsburg also had a significant drop in population levels between 1990 and 2000. Subject 6 stated that there were "…just shy of 400…" people in the town while Subject 7 responded that there was "…roughly about 600…" people living in the immediate area

at the time of the flood (2012). "...after the flood there was probably…350 maybe that…actually stayed in the community…" (Subject 7 2012). Both Valmeyer and Pattonsburg have increased their population levels since completing their relocation. From 2000 until 2010, Valmeyer has increased their population 108.7 % while Pattonsburg has increased their total population by 50%. Rhineland on the other hand stayed relatively unchanged in terms of population from pre to post flood locations. The population actually increased in Rhineland from 1990 to 2000 by 7.6% but then decreased from 2000 until 2010 by -16% (U.S. Census Bureau 2012).



‡ U.S. Census Bureau 2003; U.S. Census Bureau 2011; U.S. Census Bureau 2012

Figure 7. Town Population Changes over Time

3 of the 6 interview subjects in Valmeyer and Pattonsburg directly attribute their town's population growth after the flood to the businesses in the town after relocation. Valmeyer

attracted businesses to its Rock City Complex where as Pattonsburg retained 17 of their original 18 businesses and located their new site next to the interstate giving the town continuous revenue source into the area.

Finding 17. Relocation discussion began very quickly, one to two months, but completing the relocation took two to three years.

Each of the three towns began discussing relocation ideas relatively quickly after the flood. Subjects 3, 4, 6, and 7 all stated that the discussion about relocating occurred immediately, within 1-2 months, after the initial flood event. "…the first reaction was to try and clean up the mess and get people back;...that kind of quieted down and …then the talk of, you know, we need to do something about this. We can't just continue to keep fighting these floods" (Subject 7 2012). Subject 3 said that this quick reaction time "…was due to the mayor we had" (2012).

> *"…it was very soon [after the flood] that he [city council president] came up with this plan and decided that we needed to get rolling quite as soon as possible, otherwise everybody was going to move in different direction and move somewhere else, so…if we didn't want to lose our …people of the town that...we had to show some hope and get rolling on…the idea ASAP. And then it was pretty shortly thereafter that…we start with the plans*" (Subject 2 2012)

All of the interview subjects responded that the move took, on average, 2-3 years from the time of the initial flood event to complete. Subjects 1 and 2 said the residents of Valmeyer moved into the new town location from April of '95 through December of '96. Subject 1 said that the town "…kind of staged…the construction and completion of the utilities throughout the site" to somewhat systematically control the move (2012). Subject 2 stated that theirs was the 2nd house completed in the new location and they moved in August of '95. Subjects 4 and 5, both residents of Rhineland, said they moved their homes in late '94 and did not move into the

new site until late ’95 (2012). Subject 6 explained that many residents that physically moved their existing home took the time to refurbish it and upgrade parts such as their electrical and plumbing. “…we did a lot…of work that…prolly wasn’t necessary but while we was at it, we done some more work to it” (2012). In Pattonsburg, residents moved into the new town from late ’94 until late ’98.

> *“…the ones that…were building new houses…they moved up here a little quicker. …ones that…decided that we can completely gut our old house and [refurbished] it as it set rather than tearing it down, so we just picked up and moved it to the new community. That took a little while longer because we only had like 2 crews that were moving houses, and we had to wait a bit…because there was a couple of bridges between the old town and the new town that were not safe to move a house over, so they had to be completely redone.”* (Subject 7 2012).

Another issue with moving the homes was that “…contractors in the area knew that we were all desperate for foundations and electrical and phone and some people took advantage of homeowners in that process” (Subject 4 2012). Subject 8 said that his home was one of the last in Pattonsburg to move “…strictly because of…the sewer and water and streets and those kinds of construction things” (Subject 8 2012).

Finding 18. Type of relocation completed varied in response to the severity of the flooding and the length of time required before physical relocations could begin.

The type of relocations completed by the towns varied. For example, Subject 1 stated that all relocating within Valmeyer was primarily new construction for its citizens and business community. This was due in part to the severity of the flooding, but also due to the distance from the original location to the new and the change in elevation. The new town site is approximately 1 mile east of the original location and is 400 feet higher. This rapid elevation change over such a short distance can make physically moving structures expensive.

A portion of the homes were physically moved in both Rhineland and Pattonsburg. In Rhineland, 32 of the 52 homes physically moved to the new site. "They could move their homes and be financially…better off than trying to start from scratch" (Subject 4 2012). Physically moving homes was chosen by many due to the close proximity of the new town location. Residents only had to move their homes 0.2 miles north compared to over 1.0 mile for Valmeyer. In Pattonsburg, some of the homes were built faster than the infrastructure was being installed. "[The town] didn't even have streets…all completely blocked out when they moved that house up here" (Subject 7 2012). One reason given for why many residents chose to build rather than physically move their home was due to the need to upgrade several bridges between the old and new sites even though there was only about 75 feet in elevation change.

The business community is where the town's relocation drastically differed. Valmeyer's businesses that relocated to the new town chose to build new facilities. Rhineland's businesses decided not to move to the new location. Instead the businesses moved to the base of the bluff near the old site outside of the floodplain (Cummings 1999; Subject 4 2012). In Pattonsburg however, the town developed a strip mall to encourage the businesses from the old town to relocate in or near the new site.

> *"We had enough businesses in the old town that…wanted the economic development aspect of this, which rather than deal with zoning and who went where, who had to build and relocate and change their restaurant and move their bank and do all of this…these strip malls are two separate sections of 8 building[s] a piece that face each other, and…basically the city owns those and leases and rents those out to customers and then we have what's called the industrial development authority, that supervises all of that… stuff like that. Takes care of all of that and has its own separate board" "How this works, the city owns them but there is a separate entity that…rents and repairs and does all of that"* (Subject 8 2012).

Finding 18. There was little to no pre-disaster planning completed for the study areas.

Interview subjects 1, 6, and 7 all expressed disappointment in the amount of pre-flood planning that was done and was available to them. Subject 1 stated that, "…we had…a bare bones disaster plan that had been in place for years and years….so whatever we had, had not had any polishing…was pretty much useless by the time the flood rolled in" for Valmeyer (2012). Subject 7 of Pattonsburg echoed Subject 1's thoughts saying, "…there was no disaster planning whatsoever in this county outside…a small book…in case something was to happen but no one had actually done anything as far as…dealing with a disaster of this type" (2012). Rhineland was in a little different position at the time of the flood. Subject 6 stated that there was little to no planning done for this type of disaster but that, "…we were in the process of getting a sewer system through the Boonslick Regional Planning Commission and they pretty well…took over…they done the planning and helped us do the planning" (2012). This meant that there had been some cost estimates already completed for the town's infrastructure at the time of the flood. Subject 8 also expressed disappointment in pre-flood planning and post-flood help saying, "My one real comment that should be made to someone is that FEMA should not be a political party location. All of those people changed every time the administration changes and then you have the people there who have no real disaster background" (2012).

CHAPTER 5

Discussion, Recommendations, and Conclusion

5.1 Discussion

This paper presented the findings from research on community decisions about relocation. The findings were based on the key themes found within the interview responses. These findings provide insight into community member's perceptions of the relocation and buyout process, as well as the key community factors that affect a town's decision about relocation. Each individual involved in the relocation process has their own unique sense of place. These sense of place ideas combine to form a community sense of place that the individuals become emotionally attached to. The following discussion summarizes the four sense of place factors (Figure 5) and their importance to the town's decision about relocation.

5.1.1 Leadership

Strong leadership helps keep citizens focused on and committed to the relocation during the lengthy planning and Federal administrative process. All three of the towns were already incorporated with a mayor and city council at the time of the flood event. This meant that they had leadership organization already in place. Having the leadership already in place allowed all three towns to begin dealing with the issues that arise during a flood event. Leadership was able, via town hall meetings, to begin collecting and disseminating information in dealing with immediate solutions to the flood as well as to discover what the citizens wished to do to recover long-term (Subject 1 2012; Subject 6 2012). This allowed the leadership to quickly begin the relocation process in terms of starting the applications for funds to conduct the buyout. Because

relocating a town is a long process, averaging 2 to 3 years for completion, having strong leadership can also help to keep citizens actively involved within the process which can be a difficult task because of the time frame.

Quickly bringing in outside experts into the relocation planning process was done in all three locations. By doing so, it allowed the relocation committees in each town make accurate plans and projections about costs estimates associated with the relocation, structure of legal matters, accurate planning of critical infrastructure for the new town, and accurate financial record keeping. Having these experts in the room with the planning committees allows for quick resolution of technical issues and helped to avoid potential pitfalls. Working with the local planning commission in the individual county also helps to bring more local expertise into the planning process.

Other political leadership was sought out that greatly assisted with the speed of the relocation. The President of the U.S. and various departments within Federal Government ordered FEMA and the State to work together to speed up Valmeyer's relocation process (Subject 8 2012). The director of FEMA and the Governor of Missouri both fully supported the Pattonsburg relocation (Subject 8 2012). This suggests that receiving outside support from the Federal and State Governments can greatly aid the relocation process as well as speed the mitigation funding approval.

There were varying levels of involvement of the residents by the relocation committees during the relocation process. This suggests that direct involvement of the residents is not essential to relocation but can play an important role. What is more important is the transfer of information about the relocation between the leadership and the residents. All three locations used community meetings to give and receive information from its citizens early in the process.

Rhineland used only this process throughout its relocation while Valmeyer and Pattonsburg went on to directly involve their citizens in the planning. Beyond just receiving input from the residents, these citizen committees and town hall meetings also served a secondary purpose in information dissemination. By directly involving citizens in the relocation planning to such a large degree, more information was shared with the citizens of the community. This allowed people to better understand the relocation process and to have stronger inputs from a larger portion of the citizens. Because Rhineland did not have citizen committees in their relocation process, a different strategy for dissemination of information was used. A local restaurant/tavern was used as a meeting place by the citizens to swap information as well as a board being put up by the city council updating residents on what was happening in the relocation process.

Relocation is a very long and trying process for a community, generally averaging two to three years for completion. In addition to this long timeframe, many residents harbor a somewhat cynical view of the government and government assistance. One interview subject stated that because this is such a long and slow process, it is easy for the residents to feel like they are just spinning their wheels (Subject 7 2012). By involving the citizen's during relocation planning and its execution, community leaders can help to keep up residence morale and increase their patience levels during the relocation process.

5.1.2 Cost of the Move

According to FEMA's National Disaster Recovery Framework, it is not more cost effective to physically relocate a structure. "...FEMA encourages communities to opt for the...acquisition and structure removal model" when conducting a buyout (FEMA 2010). These processes are encouraged because they are considerably less expensive to implement. FEMA

uses a benefit-cost analysis (BCA) tool to conduct BCAs for mitigation plans on multiple structures from a variety of hazards.

The monetary cost of relocation, as it was perceived by the residents, suggested that it was cheaper to physically relocate a structure than to construct a new one. This was seen most strongly in Rhineland where 32 of the 52 homeowners decided to physically relocate their homes to the new town site. "They could move their homes and be financially...better off than trying to start from scratch" (Subject 4 2012). Residents that chose a physical relocation were offered $10,000 - $15,000 in assistance for their relocation. Actual cost of physical relocation was between $15,000 - $40,000, depending on the side and age of the home. These additional costs were paid by the individual homeowner. Many of these homeowners were also deciding to perform enhancements to their homes during the relocation process. The fact that residents were willing to pay these higher costs out of pocket as well as improving their homes suggests that the way residents perceive the cost of relocating is affected by the individual's sense of place.

All three study areas were bedroom communities at the time of the flood. This allowed the towns to better handle the relocation process due to the flood not interfering with the lively hood of a majority of the residents. The residents who worked outside of the towns were able to move into temporary housing while still traveling outside of the community to their jobs. Because these residents' jobs were located in neighboring communities that were not affected by the flood, they were financially able to wait until the new town was completed before relocating.

The opposite was true of the business owners. The local business owners lost their livelihood during the long buyout and relocation process. Most of these businesses were forced either to move their business to a neighboring town, to close their business permanently, or to

wait the 2 to 3 years until the new town was completed when a permanent relocation could occur. This long timeframe is a primary factor in many businesses decisions to not relocate to the new town location. The businesses that did not relocate either moved to neighboring communities or closed down permanently.

Rhineland and Valmeyer both had to compete with towns nearby, five to seven miles, which offered similar services as the businesses that were located in the towns during the relocation process. Pattonsburg on the other hand had no large towns nearby to compete with its businesses. The nearest town to Pattonsburg is Bethany which is located 20 miles north of the original location. This distance from competition reduced financial pressure on the business owners because they knew they would have the same customer base if they relocated. Pattonsburg as a town also took a strong, proactive role in helping to reduce the financial burden of the relocation for the businesses. This was done by constructing new facilities for the relocating businesses. By not having to build their own facility and having little to no competition for their services in the immediate area, more of the businesses could afford to complete the relocation to the new site. The fact that Pattonsburg was able to relocate more of its businesses compared to Valmeyer and Rhineland implies that the levels of competing businesses locally and the amount of assistance received by the business community during relocation plays an important role in individual businesses' ability to relocate.

Assistance offers to the business community need to be made early in the relocation process. Previous studies on individuals' decision about relocation have shown that time is a major factor in the "success" of relocation as a mitigation effort (FEMA 2003). Adopting a similar strategy as Pattonsburg to assist the business community is unlikely to be successful in Valmeyer and Rhineland for several reasons. In this study, the citizens have become accustomed

to traveling outside of their community for service industries such as grocery stores, beauty salon and barbers, electronics, auto repair, and medical supplies such as drug stores since relocation completion. Because of this familiarity, it is unlikely that enough of the residents would begin supporting new businesses to financially support them into the foreseeable future. Another issue with adopting this strategy is that some of the businesses lost in Rhineland and Valmeyer are not well suited for using generalized constructed facilities. These would be businesses such as mushroom farming, feed mills, and grain elevators that require specialized equipment and facilities for their services.

The move of specific businesses from one town to another, in response to the flood, is also problematic with adopting this strategy at such a late point in time. The grocery store from Valmeyer for example has been located in another local town for over 19 years and would be very unlikely to relocate again into a new facility within Valmeyer. There is also the issue of the business owners that completely shut down. These residents quickly moved into another profession and are unlikely to make the switch back to their original professions either from lack of desire or due to familiarity in their new routine.

Further commercial and community development of the new town sites has been slow to develop after initial construction in all three study areas. This suggests that development beyond just the initial construction phase of the relocation is difficult to encourage. One interview subject went as far as to say that encouraging development in their town has been "…a comedy of errors" (Subject 7 2012). Valmeyer has taken the greatest advantage of its situation in that the town was able to develop the Rock City Complex in the mine under the town attracting several businesses from Saint Louis, MO into the community. Valmeyer also used this close proximity to Saint Louis and the cool temperatures associated with the quarry to attract storage and food

distribution businesses to the complex. Unfortunately, many of the businesses offered in the community before the flood have not been able to reestablish themselves in the new community.

Rhineland and Pattonsburg have attracted two and one new businesses into the towns respectively. Rhineland's development after completing the relocation was primarily new homes and community parks. Construction of new baseball fields and a sand volleyball court have been the primary type of development in the town. Rhineland does have three new businesses in the area but two of the three were Bed and Breakfasts opened by residents already living in the community. This low amount of commercial development

Community development has been the primary type of development in Pattonsburg since the relocation. Pattonsburg took advantage of their local conditions when picking a new site by selecting one near the interstate during initial relocation planning. This gave the town a long-term, sustainable revenue source. Pattonsburg also made the largest commitment its business community by offering assistance to its businesses in relocating to the new town. These decisions provided Pattonsburg with the greatest chance at long term viability as a town of the three study areas. Since the completing the relocation however, there has been new homes built but no new businesses have opened in the town. Pattonsburg's use of the old town as a film lot after relocating was a creative use of the original town location but unfortunately not one that has become a long term use.

Providing economic opportunities for residence can greatly increase a community's ability to retain its citizens during relocation as well as draw new families into the community afterwards. One interview subject in Valmeyer thought that having the rock city complex as a

local job opportunity, along with the school system, has helped to encourage an increase in the town population since 2000 (Subject 3, 2012).

5.1. 3 People

Floods can be an extremely disruptive event for a community. By keeping community organizations together during the flood and relocation process, it helps residents retain their sense of place in the community and offers stability in a time of social instability. Keeping schools together can tie various residents and neighborhoods together and gives people a common bond during the relocation. As one interview subject explained, the kids especially needed to be stable during this process since they have little to no control over what is occurring to them at the time of the flood and relocation (Subject 8 2012). The interview subjects recommended keeping the temporary school as close to the original location as possible and to keep the same services available during the relocation. This gives the students a sense of belonging to the same school during the transition from the old location to the new. Keeping extracurricular activities such as sporting events and clubs together can also help to build upon these community ties.

The school relocation process varied between the communities due to the absence of a school system in Rhineland and due to the study areas being in different states and FEMA districts. This implies that how the school relocation is dealt with is less important than simply keeping the school together during relocation. The emotional ties of the parents to the school system and to the other children of the community can help communities keep residents committed to relocating during the two to three years it takes to complete the process.

Parents feel very strongly about their children's education and the school system they attend which can partially to explain why the Valmeyer and Pattonsburg schools were able to relocate. Keeping these strong school systems intact has also helped to grow a community after completing the relocation. One subject from both Valmeyer and Pattonsburg directly attributed their community's population growth to the strength and quality of their school system since the relocation (Subject 3 2012; Subject 7 2012).

Religious groups are another important organization to residents' sense of place during the flood and relocation process. Having a weekly meeting of the churches for service or mass kept a routine together for people which were similar to what they experienced before the flood. One interview subject said that keeping the church services the same mentally helped people cope with the disaster and the recovery (Subject 4 2012). Another subject stated that if the churches and schools had not been kept together during the flood and relocation process, they did not think that the town would have relocated. They felt that the residents would have either moved away or rebuilt in the original location (Subject 8, 2012). Keeping the churches functioning in these study areas kept community members' ties to the community intact during the relocation process.

Other community groups were less significant to the interview subjects themselves but still important for various sections of the community. Groups such as an American Legion, Lions Club, or 4-H can help connect various residents together that do not normally come into contact with one another and to keep the communities sense of place intact.

The town name was an important part of the residents' heritage and sense of place in the study areas. Retaining the original town name helped people to believe that they are living in the

same community after the relocation was completed. A town cannot legally exist in two separate locations at the same time so. By annexing the new site and having a continuous city property line from the old location to the new, all three communities were able to transfer their original name to the new location.

People make relocation decisions based on both economic costs and emotional costs of involvement. People losing their homes during the relocation process as well as the loss of emotional ties to various aspects of the community is another cost associated with buyouts and relocation. Many of the residents that resisted the relocation or buyout offers in these towns did so, not because it did not make economic sense, but because they viewed the sentimental value of their home and community to be greater than the economic value of risk reduction. Other sense of place attachments associated with relocation is people's refusal to relocate because of history attachment to the neighborhood or structure. This place attachment can be seen in the community of Pattonsburg's decision to relocate a local mill to the new location. This mill was considered noise some before the flood, but the residents choose to relocate it anyway because it was considered to be a part of the community (Subject 8 2012).

These emotional costs and sentimental values need to be accounted for when planning a relocation. Several steps were taken by these communities to account for these costs such as allowing citizens to pick their neighbors and neighborhoods in the town lot selection process. Residents who were selected early in the lottery system to choose their new home sites were able to choose where they wanted to live. Residents later in the selection process were able to see where other people would be living and to choose their neighbors. Other steps included keeping various community organizations together during the flood and relocation, keeping as many of the original businesses within the town during the relocation, as well as the voluntary nature of

the buyout and relocation program itself. Future relocations should consider other ideas such offering greater assistance to the business community and entire neighborhood relocation to increase the town's solidarity and make the transition more effective

5.1.4 Landscape

Tourism in these locations was essentially nonexistent before the flood occurred. This became an area of focus during the relocation planning process. All three towns made at least one decision aimed toward increasing potential tourism during the relocation. Valmeyer developed the Salt Lick Nature Preserve near the community. The preserve included a trail system that attracts locals for hiking opportunities. Rhineland relocated along the Katy trail which brings in bicyclists to the towns outdoors shop and bed& breakfasts. Pattonsburg relocated near the interstate exit, bringing people into the community looking for gas and food. Pattonsburg is also in the discussion phase of developing a museum about the 1993 flood to attract people into the area.

Interview subjects from all three towns were dissatisfied with pre-flood disaster planning. In all three cases, the planning was either outdated or hadn't been done at all. One subject called their village and county disaster plan "…pretty much useless" (Subject 1, 2012). This suggests that adequate planning had not been performed and is one potential area for future research. Since these relocations have occurred, there have been many changes to the disaster mitigation planning processes. Prior to 2000, counties were only required to have a response plans in place in case of a disaster. These plans generally did not address community recovery after a disaster nor did they address potential mitigation opportunities to lessen the impacts of future disasters. With the implementation of the Pre-Disaster Mitigation (PDM) of 2000, counties and

communities were now required to develop a pre-disaster mitigation plan to identify hazards which could befall their community and develop mitigation projects to ameliorate the impact of these hazards. The development of a PDM plan provides communities the opportunity to pre-identify and plan mitigation efforts before a flood event.

5.2 Future Recommendations

Seven future recommendations are given for future potential relocation sites, the relocation process, and future research into factors assessing community decisions about relocation are shown in Table 3.

Table 3. Future Recommendations

Recommendation 1: Streamline Process
Streamline relocation process to encourage participation by communities
Recommendation 2: Federal Funding for Public Buildings
Offer monetary assistance to public community buildings
Recommendation 3: Timeframe
Future relocations begin assessing options as soon as possible
Recommendation 4: Future Economic Stability
Encourage economic sustainability of a community during relocation process
Recommendation 5: Physical Relocations
Encourage physical relocation of communities over individual buyouts
Recommendation 6: Prevent Future Floodplain Development
Prevent new development projects within a floodplain
Recommendation 7: Future Research
More research is needed in community relocation

5.2.1 Recommendation 1: Streamline Process

The relocation process as a whole needs to be streamlined. There are too many actors in the process that are currently required to give approval before action can be taken. A reduction in the number of actors or a formal, systematic process needs to be developed in order for this hazard mitigation technique to be viable into the future. A single entity needs to be in charge of future relocation processes both to speed up the process as well as ensure that all Federal regulations are abided by. There have been many changes in the buyout and relocation approval process since the 1993 flood. Any community within the NFIP is required to have a mitigation plan in place. Participating communities must identify relevant hazards and have a strategy in place to mitigate identified hazards. Any community that does not have a mitigation plan in place is not eligible for mitigation grants.

Another potential outcome of streamlining the process could be less associated monetary waste. Much of the mitigation work is hampered by the conflict between the short-term and long-term goals of the assistance programs. Initial assistance is given to get people "back on their feet". Citizens use this monetary assistance to repair their damaged homes and then are more reluctant to accept long-term assistance in the form of buyout or relocation when the time comes. This reluctance is due to the long time period required to complete the buyout process as well as residents sense of place returning to normal with the repair of their home.

5.2.2 Recommendation 2: Federal Funding for Public Buildings

State and Federal relocation assistance money needs to be made available to all public buildings within the towns, regardless of the request for assistance submitted by the Governor. Interview subjects from Missouri responded that the town was required to relocate their public

buildings without assistance. Not providing monetary assistance to relocate community schools or public buildings becomes a major financial burden on communities. These places are community staples as well as places of employment within the community.

5.2.3 Recommendation 3: Timeframe

Future sites for possible relocation should begin assessing their options as quickly as possible. The towns that were able to complete the relocation were the ones that decided how they were going to handle the relocation process the fastest. A fourth town (Grafton, IL) was scheduled for relocation along with Valmeyer, Rhineland, and Pattonsburg. This town did not complete its relocation because most of its residents moved to other communities before the process could be completed (FEMA 1999). This is currently being implemented through the Pre-Disaster Mitigation planning at larger scales such as the State and County levels as well as for larger Urban areas; however, implementation at the town level in rural areas is still lacking. Quickly developing cost estimates and designing possible site locations allows the application for HMGP funds to occur sooner. Under taking such planning also shows the citizens of the community their possible options for relocation, gives them evidence of progress with the relocation process, and increases their trust in leadership.

5.2.4 Recommendation 4: Future Economic Stability

Decisions to allow future relocation communities to become economically self-sustaining after the relocation are an important part of the planning process. The relocation process needs to lower the risk of the hazard as well as increase the community's economic viability. The planning process can be an enormous benefit to a community's future and should be addressed as such by the relocating communities. The planning process should account for ways to retain the

business community in the new location, ways to attract new businesses into the community, and ways to increase tourism in the town.

5.2.5 Recommendation 5: Physical Relocations

Physical relocations should be considered, whenever possible, in instances where residents are resistant to the idea of accepting a buyout. Many residents chose to physically relocate their homes to the new town location rather than build new because of their place attachment to it. By allowing these residents to retain their original home in the new location managers can remove one of the sense of place barriers associated with relocation. By removing this barrier, managers can increase the participation of residents in the buyout and relocation process which reduces the risk of future flood disasters.

5.2.6 Recommendation 6: Prevent Future Floodplain Development

Large-scale, new development within floodplains throughout the U.S. is a continuing issue. Loopholes in the NFIP that allow for a communities removal from the program such as the certification of levees are being addressed through the NFIP's Map Modernization process. However, enforcement of the building restrictions associated with the NFIP is weak or nonexistent in many states allowing for continued development. There is also low participation in the NFIP by eligible properties; less than half of eligible properties are currently enrolled in the program (Michel-Kerjan and Kunreuther 2011). Flood mitigation efforts will never be successful without better consideration of hazards and limiting future floodplain development.

5.2.7 Recommendation 7: Future Research

Further research of this sort into community decisions about relocation should focus on similarities in the social and environmental factors of these communities. It should also focus on the level of disaster planning at the county and municipality level to increase their individual preparedness for a disaster and to give the relocation committees as guiding framework to work with. Better ways to use the current technological capabilities of State and local partners of the NFIP need to be developed as well as consistent data collection and analysis methods. This will allow for better projections of future losses which help to increase the level of disaster mitigation planning.

5.3 Conclusions

After examining the given responses of the interview subjects, it becomes clear that town relocation is a viable, long-term option for flood hazard mitigation in the U.S. It accomplishes its goals of reducing the overall risk of flood damaged without destroying a community as a whole. Because physical structure relocation can often be a more cost effective option that simply offering a buyout to homeowners, this process can be a long-term solution to flood hazards.

All respondents in this study stated that they would gladly accept a relocation as long as their community stays intact. Keeping a community intact is more than simply keeping the town's population together. Residents' sense of place is not tied to any single factor in the community. It is comprised of a series of factors and experiences that all work together to connect them to the community. The more ties residents have to the community during this transition period, the more committed they were to completing the relocation. With better

streamlining of the relocation process and more consideration of a community's sense of place, town relocation could become a much quicker and more cost efficient response to flood disasters in the future.

REFERENCES

Adger, W. Neil and Jon Barnett. 2009. Four reasons for concern about adaption to climate change. Environment and Planning. 41:2800-2805

Black, Harvey. 2008. Unnatural Disaster: Human Factors in the Mississippi Floods. Environmental Health perspectives. 118(9): 390-394

Botzen, W.J.W., and J.C.J.M. van den Bergh. 2008. "Insurance Against Climate Change and Flooding in the Netherlands: Present, Future, and comparison with Other Countries." *Risk Analysis*. 28(2): 413-426.

Buss, Larry. 2005. Nonstructural Flood Damage Reduction Within the U.S. Army Corps of Engineers. Journal of Contemporary Water Research and Education. 130: 26-30.

Changnon, Stanley. 2005. The 1993 Flood's Aftermath: Risks, Root Causes, and Lessons for the Future. Journal of Contemporary Water Research & Education. 130: 70-74.

Cummings, Jeanne. "Swept Away: How Rhineland, MO., Saved Itself, but Lost S Sense of community." *The Wall Street Journal*, July 15, 1999. http://search.proquest.com/docview/398834476?accountid=13864 (accessed August 30, 2012).

DiCicco-Bloom, Barbra, and Benjamin F. Crabtree. 2004. "The Qualitative Research Interview." *Medical Education*. 40: 314-321.

Douglas, James L. 2004. Objective guidance of Floodplain Use. Gilbert F. White National Flood Policy Forum. Association of State Floodplain Managers. 43-45

Fahlund, Andrew. 2009. U.S. Flood Policy: Some Recommendations. Finding the Balance between Floods, Flood Protection, and River Navigation. Center for Environmental Sciences at Saint Louis University.

Federal Emergency Management Agency. 1999. "FEMA Buyout Program Well Underway in Flood-Damaged Midwest." Accessed January 13, 2013. http://www.fema.gov/NWZ94/press056.hem.

Federal Emergency Management Agency (FEMA), State of Missouri Emergency Management Agency. 2002. Success Stories from the Missouri Buyout Program. Washington DC: Government Printing Office.

Federal Emergency Management Agency (FEMA), National Science Foundation. 2003. Implementing Floodplain Land Acquisition Programs in Urban Localities. The Center for Urban & Regional Studies, University of North Carolina at Chapel Hill.

Federal Emergency Management Agency (FEMA). 2008. Emergency Support Function #14 – Long-term Community Recovery Annex. Available from http://www.fema.gov/pdf/emergency/nrf/nrf-esf-14.pdf (Accessed on March 30, 2013)

Federal Emergency Management Agency (FEMA). 2010. Hazard Mitigation Assistance Unified Guidance. Washington DC: Government Printing Office

Federal Emergency Management Agency. 2011. "Analysis and Mapping Procedures for Non-Accredited Levees." Available from http://www.fema.gov/plan/prevent/fhm/rm_main.shtm. (Accessed March 30, 2013)

Federal Emergency Management Agency. 2012. Use of HAZUS-Multi Hazard to Support Long-Term Community Recovery and Mitigation (ESF #14). Available from http://www.fema.gov/pdf/plan/prevent/hazus/haz_esf14_handout.pdf (Accessed April 1, 2013)

Federal Emergency Management Agency. 2012. "Hazard Mitigation Planning Overview." Available from http://www.fema.gov/hazard-mitigation-planning-overview (Accessed April 1, 2013)

Federal Emergency Management Agency Map Service Center. 2013. "Definitions of FEMA Flood Zone Designations ." https://msc.fema.gov/webapp/wcs/stores/servlet/info?storeId=10001&catalogId=10001&langId=-1&content=floodZones&title=FEMA%20Flood%20Zone%20Designations. (Accessed April 2, 2013)

Heisel, Edward J. 2009. River Restoration for Wildlife and Flood Reduction. Finding the Balance between Floods, Flood Damages, and River Navigation. Center for Environmental Sciences at Saint Louis University,

Hipple, James D., Barry Drazkowski, and Patrick M. Thorsell. 2005. Development in the Upper Mississippi Basin: 10 years after the Great Flood of 1993. Landscape and Urban Planning. 72: 313-323.

Hunter, Lori M. 2005. Migration and Environmental Hazards. Population and Environment. 26(4): 273-302

Intergovernmental Panel on Climate Change (IPCC). 2007. Synthesis Report. Fourth Assessment Report. Valencia, Spain.

Jackson, Cherry. 2004. The Enhanced Benefits Accrued from Incentive-based Planning Versus Regulatory Planning. Gilbert F. White National Flood Policy Forum. Association of State Floodplain Managers. 137-138

Kates, Rovert W., William R. Travis, and Thomas J. Wilbanks. 2012. "Transformational adaptations when incremental adaptations to climate change are insufficient". Proceedings of the National Academy of Sciences of the United States of America.

Kick, Edwards, James Fraser, Gregory Fulkerson, Laura McKinney, and Daniel De Vries. 2011. Repetitive flood victims and acceptance of FEMA mitigation offers: an analysis with community-system policy implications. Disasters. 35(3): 510-539

Knobloch, Dennis. 2005. Moving a Community in the Aftermath of the Great 1993 Midwest Flood. Journal of Contemporary Water Research and Education. 130: 41-45

Kousky, Carolyn. 2011. Understanding the Demand for Flood Insurance. Natural Hazards Review. 96-110

Kousky, Carolyn and Howard Kunreuther. 2005. Improving Flood Insurance and Flood-Risk Management: Insights from St. Louis, Missouri. Natural Hazards Review. 11(4): 162-172

Lulloff, allen. 2004. Are We Really Mapping/Managing the 1% Chance Floodplain. Gilbert F. White National Flood Policy Forum. Association of State Floodplain Managers. 77-79

Mattingly, Rosanna L., Edwin E. Herricks, and Douglas M. Johnston. 1993. "Channelization and Levee Construction in Illinois: Review and Implications for Management." *Environmental Management*. 17(6): 781-795.

Miles, Matthew B. and Michael Huberman. 1994. Qualitative Data Analysis. Thousand Oaks, California: SAGE Publications Inc.

Missouri Department of Transportation. 2012. "Missouri's Interstate System: Yesterday, Today, and Tomorrow." http://www.modot.org/interstate/MissourisInterstateHistory.htm (accessed March 8, 2013).

Moye, Michael. 2004. Lenders and the 100-year Base Flood. Gilbert F. White National Flood Policy Forum. Association of State Floodplain Managers. 137-138

National Research Council (2010) America's Climate Choices: Adapting to the Impacts of Climate Change (National Academies, Washington, DC).

National Wildlife Federation. 1998. "Higher Ground: A Report on Voluntary Property Buyouts in the Nation's Floodplains." http://www.mitigationleadership.com/hrmlf/pdf/Higher_Ground_Report_Voluntary_Property_Buyouts_National_Floodplains.pdf. (Accessed April 2, 2013)

Patterson, Lauren A. and Martin W. Doyle. 2009. Assessing Effectiveness of National Flood Policy Through Spatiotemporal Monitoring of Socioeconomic Exposure. Journal of American Water Resource Association. 45(1):237-252.

Patton, Michael Quinn. *Qualitative Research & Evaluation Methods*. Saint Paul, MN : SAGE Publishing, 2001.

Petts, G.E. and C. Amoros. 1996. Fluvial Hydrosystems. London, UK: Chapman & Hall

Pinter, Nicholas. 2005. One Step Forward, Two Steps Back on U.S. Floodplains. Science. 308: 207-208

Pinter, N. , A.A. Jemberie, J Remo, R.A. Heine , and B.S. Ickes. 2008. "Flood trends and river engineering on the Mississippi River system, USA." *Geophysical Research Letters*. 35(23): 1-5.

Posey, John and William H. Rogers. 2010. The Impact of Special Flood Hazard Area Designation of Residential Property Values. Public Works Management & Policy. 15(2): 81-90

Remo, JWF, N Pinter, and R Heine. "The use of retro- and senario-modeling to assess effects of 100 years of river engineering and land0cover change on Middle and Lower Mississippi River flood stages." *Journal of Hydrology*. 376. (2009): 403-416.

Remo, Jonathan, Megan Carlson, and Nicholas Pinter. 2011. Hydraulic and flood-loss modeling of levee, floodplain, and river management strategies, Middle Mississippi River, USA. Natural Hazards Review. 59: 1-25

Riggs, Russell W. 2004. Issues and Perspectives on Floodplain Management. Gilbert F. White National Flood Policy Forum. Association of State Floodplain Managers. 124-127

Schoof , J.T., S.C. Pryor, and J. Suprenant. 2010. "Development of daily precipitation projections for the United States base on probabilistic downscaling." *Journal of Geophysical Research*. 115: 1-13.

Schneider, Philip J., and Barbra A. Schauer. 2006. "HAZUS - Its Development and Its Future." *Natural Hazards Review*. 40-44.

Schwartz, Norbert. 2005. "FEMA and Mitigation: Ten Years After the 1993 Midwest Flood." *Journal of Contempoarry Water Reshearch and Education*. 130. 36-40.

Segal, Daniel L, Andrea June, Meghan A. Marty. Diagnostic Interviewing: Fourth Edition. New York: Springer-Verlag New York, LLC, 2009.

Sherbini, A. de, M. Castro, F. Gemenne, M.M. Cernea, S. Adamo, P.M. Fearnside, G. Krieger, and S. Lahmani, A. Oliver-Smith, A. Pankhurst, T. Scudder, B. Singer, Y. Tan, G. Wannier, P. Boncour, and C. Ehrhart, G. Hugo, B. Pandey, and G. Shi. 2011. "Preparing for Resettlement Associated with Climate Change." *Science*. 334: 456-457.

Southern Illinois University at Carbondale (SIUC). 2011. Strategic Vision for the Olive Branch Area Relocation Imitative. Alexander County, Illinois. 1-8.

Stewart, Kevin. 2004. A Perspective on Floodplain Management Practices from the Hydrologic Warning Community. Gilbert F. White National Flood Policy Forum. Association of State Floodplain Managers. 77-79

Subject 1. Interviewed by author, August 8, 2012.

Subject t 2. Interviewed by author, September 20, 2012.

Subject 3. Interviewed by author, September 11, 2012.

Subject 4. Interviewed by author, October 24, 2012.

Subject t 5. Interviewed by author, November 8, 2012.

Subject 6. Interviewed by author, November 8, 2012.

Subject 7. Interviewed by author, October 15, 2012.

Subject 8. Interviewed by author, October 15, 2012.

Taylor, George (editor). 2005. Integrating Quantitative and Qualitative Methods in Research. University Press of America

Tibbetts, John. 1994. "Waterproofing the Midwest." *Planning.* 60(4): 8-12.

Topping, Kenneth. 2011. "Strengthening resilience through mitigation planning." *Natural Hazards Observer*. 36(2): 1, 12-18.

United States Army Corps of Engineers (ACE). 1995. Floodplain Planning and Management for Extreme Floods. Alexandra, U.S.A: Institute for Water Resources.

United States Army Corps of Engineers Institute for Water Resources, "USACE Flood Risk Management Authorities." Last modified November 2011. Accessed December 11, 2012. http://www.nfrmp.us/faqUSACEFRMA.cfm

U.S. Census Bureau. 2003. "Missouri: 2000 Population and Housing Unit Counts." Available from http://www.census.gov/prod/cen2000/phc-3-27.pdf (accessed on 3/6/2013)

U.S. Census Bureau. 2011. "2010 Census Population Compared to 2000: Illinois' Municipalities/CPDs" Available from http://www2.illinois.gov/census/Documents/2010%20Data/2000%202010_IL%20Places%20by%20County.pdf (accessed on 3/6/2013)

U.S. Census Bureau. 2012. "Download Center." Available from http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml (accessed on 1/17/13)

Ward, Richard. 2006. Floodplain Development – Learning from the Great Flood of 1993. Real Estate Issues. 31(3): 17-20.

White, Gilbert F. 1945. Human Adjustments to Floods: A Geographical Approach to the Flood Problem in the United States. Chicago, IL: University of Chicago

White, Gilbert F., and Mary Fran Myers. 1993. "The Challenge of the Mississippi Flood." *Environment*. 35(10): 6-9,25-35.

Witt, James Lee, and James Morgan. 2002. *Stronger in the Broken Places*. New York: Times Books.

Wohl, Ellen E. (editor). 2000. Inland Flood Hazards. Cambridge University Press

Zhu, T., and J.R. Lund. 2009. Up or Out? – Economic-engineering theory of flood heightened setback. Journal of Water Resource Planning Managers. March/April. 90-95

APPENDICES

APPENDEX A: INTERVIEW QUESTION GUIDE

Interview Guide

Name of Interviewee:_____

Town:_____

1. Heritage
    a. History of the Community?
    b. How old?
2. Self Serving v. Bedroom Community
    a. How do community members make a living?
    b. Where do they work if Bedroom?
3. Number of Businesses before the flood
    a. What types of businesses?
4. Local Tourism Before Flood
    a. Outdoor Recreation?
    b. Unique features?
5. Unincorporated v. Incorporated
    a. Leadership types?
6. Types of Relocation Committees
    a. Did the town have a committee?
    b. How was it organized?
        i. Single Committee?
        ii. Multiple Committee with separate focus'
    c. What criteria used to select new site?
7. Local Disaster Planning Intensity
    a. Was there anything from the township/county/state for the flood and/or relocation?
8. Speed of Relocation
    a. First completed structure?
    b. Last completed structure?
    c. When moved personally?
9. Separate Town v. Annex of New Area
    a. How was this decision made?
        i. Why?
10. Number of Businesses that Completed Relocation
    a. What types?
    b. What businesses were lost in the move?
        i. Why?
    c. What businesses were able to relocate?
        i. Why?
    d. Was any assistance offered by the town?
11. Community Organizations

a. Schools
    i. How many?
    ii. Types?
    iii. Met during relocation process?
b. Churches
    i. How many?
    ii. Met during relocation process?
c. Community Groups (Knights of Columbus, Elks, Moose, American Legion, etc.)
    i. How many?
    ii. Types?
    iii. Met during relocation process?
d. Sports Teams (School and Legion)
    i. How many?
    ii. Types?
    iii. Met during relocation process?
e. Do you feel that keeping the churches, schools, and community groups together helped/hindered the relocation process?
    i. Why?

12. Potential for Development
    a. Any new development of the town since relocation?
        i. What types?
        ii. Why was it attracted to the area?
13. Local Tourism after Flood
    a. Has town done anything to encourage tourism?
    b. Specifics to the town?
14. Other
    a. Is there an aspect that you felt was a big success or that benefited the town greatly?
    b. What aspects hindered the towns relocation?

Notes

APPENDEX B: INTERVIEW COVER STATEMENT

My name is Alex VanPelt and I am a graduate student at Southern Illinois University-Carbondale.

I am asking you to participate in my research study. This is a study of the Olive Branch, IL; Valmeyer, IL; Pattonsburg, MO; and Rhineland, MO communities and their relocation process, with the purpose of finding out what social, political, and environmental factors contribute to or hinders the decision about relocation.

Participation is voluntary and if you choose to participate in the study, it will take approximately 60 minutes of your time. You will be interviewed for 60 minutes and the interview will be audio recorded, transcribed and stored for 90 days in a locked file cabinet. Afterward, all the audio recorded material will be destroyed.

All your responses will be kept confidential and only those directly involved with this project will have access to the data.

If you have any questions about the study, please contact me or my advisor Dr. Leslie Duram.

(Alex VanPelt, Telephone: 618 534 7815; email: avanpelt@siu.edu)(Dr. Leslie Duram,

Telephone: 618 453 6084; email: duram@siu.edu)

I _____have read the information above and any questions I asked have been answered to my satisfaction. I agree to participate in this activity and know my responses will be tape recorded. I understand a copy of this form will be made available to me for the relevant information and phone numbers.

"I agree _____ I disagree _____to have my responses recorded on audio tape."

"I agree_____ I disagree _____ that Alex VanPelt may quote me in his paper"

Participant signature Date

Thank you for taking the time to assist me in this research.

This project has been reviewed and approved by the SIUC Human Subjects Committee. Questions concerning your rights as a participant in this research may be addressed to the Committee Chairperson, Office of Sponsored Projects Administration, SIUC, Carbondale, IL 62901-4709. Phone (618) 453 4533. Email:siuhsc@siu.edu.