ABSTRACT


This study is about the spread of ideas over time. By considering the choices and conditions that influence policy decisions, this research examines the process of adoption through the lens of flood mitigation policy between 1968 and 2008. Using diffusion theory and data on the 50 American states, this study addresses a gap in the diffusion of policy innovations theory and contributes to the hazards literature concerned with mitigation. This study reframes diffusion theory in a way that assumes multiple policy ideas exist simultaneously for decision makers to consider. Furthermore, incorporating aspects of agenda setting literature allows for a more thorough understanding of the innovation decision. Key findings support the following: (1) this study upholds the classic diffusion model and contributes to the literature that considers diffusion as a process where factors can contribute to a favorable climate for state policy adoption; (2) provides evidence of the influence of chronic focusing events on state policy adoption; (3) includes hazard mitigation to the idea that disasters are inherently political.
Floods, Hazard Mitigation and Policy Diffusion: Testing the Influences on State Policy Adoption 1968-2008

by
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CHAPTER ONE: INTRODUCTION

This dissertation is about the spread of ideas over time. By considering the choices and conditions that influence policy decisions, this research examines the process of policy adoption through the lens of flood mitigation policy between 1968 and 2008. Using diffusion theory and data on the 50 American states, this study addresses a gap in the diffusion of policy innovations theory and contributes to the hazards literature concerned with flood mitigation. This introductory chapter is divided into three main sections: an overview of policy innovations theory, a brief overview of flood mitigation in the context of the hazards and disaster literature, and a discussion of the flood mitigation policy innovations that are the focus of this study—building code mandates, comprehensive planning mandates, and land acquisition.

Classic diffusion models have been critiqued as being overly concerned with the rate of policy adoption rather than the process by which policy ideas (or innovations) are discovered, considered, and ultimately adopted or rejected. I reframe diffusion theory in a way that assumes multiple policy ideas exist simultaneously for decision makers to consider. Furthermore, incorporating aspects of agenda setting literature allows for a more thorough understanding of the innovation decision. Expanding the definition of adoption is important because it may suggest a more robust dependent variable for diffusion theory.

While flood mitigation policies have been studied extensively and hazards and disaster scholars have contributed to what we know about the efficacy of mitigation techniques, most research has either examined one particular technique—for example, land
use planning—or compared the use of a mitigation technique in a handful of states. Little has been done to address why a state or group of states favors one particular mitigation policy above another. This gap can be attributed to the fragmented nature of hazards and disaster research that is inherently multidisciplinary. Furthermore, little has been done to determine whether influences on the decision to adopt a mitigation policy innovation vary among different policy innovations. This is important because it focuses on the role states play in flood hazard mitigation. Assessing the cumulative role of states—as policy innovators in an intergovernmental system—may lead to a better understanding of the way in which states may propel, contribute to, or deter the spread of mitigation innovations.

Overall natural disasters play a unique role in the policy process. When cast as focusing events, natural disasters often draw sharp media attention and particularly to property damage and casualties. Images of disaster damage can be pervasive in the aftermath of a flood. The symbolism stemming from a flood can have a powerful influence on the policy process.

This study relies on publicly available, secondary data for analysis. While secondary data sources often use different operational definitions that do not neatly fit within theoretical constructs of theory, diffusion theory scholars have used such secondary data as standard practice as demonstrated in the works of Walker (1969), Gray (1974), Berry and Berry (1990; 1992), Allen, Pettus, and Haider-Markel (2004), Daley and Garand (2005) and Karch (2007). This has proved sufficient in the literature for the variables in this study to be grounded in the theoretical constructs of diffusion theory. There is no suitable, comprehensive dataset for state level data on measuring policy decisions and their correlates,
including data on flood mitigation policy decisions. Because of this, the data for this study are assembled from a variety of sources. In fact, this dissertation creates a baseline dataset for inquiries into state adoption of flood mitigation policies. For the dependent variables that measure a state’s adoption decision data have been collected from the official legislative record, the *Book of States* (1968-2008) and legislative data from the National Association of State Floodplain Managers (NASFPM), the Insurance Institute for Business and Home Safety (IBHS) and the International Code Commission (ICC). Data sources for independent variables were collected from the *Book of States* (1968-2008), The Spatial Hazard Events and Losses Database for the United States (1968-2008), *The Federal Register*, the Congressional Record, The US Census Bureau, and a measure of state political ideology calculated by Berry, Fording, Ringquist, Hanson, and Klarner (2008).

Recently, scholars have broadened the application of diffusion theory to test hypotheses related to comparative policy adoption (Karch 2007), a more fully articulated way of assessing regional and national influence on policy adoption (Daley 2007), and the incorporation of other theories of the policy process into diffusion (Mintrom 1997, Mintrom and Vergari 1998). Using diffusion of policy innovations as an organizing framework, this study poses the following questions:

- What are the correlates of adoption of comprehensive planning mandates as a flood mitigation policy?
- What are the correlates of adoption of stricter building codes as a flood mitigation policy?
• What are the correlates of adoption of land acquisition policies as a flood mitigation policy?

• Which correlates are common to all three flood mitigation policies and which are unique?

• When models for the diffusion of comprehensive planning mandates, stricter building codes, and land acquisition are compared, are there similarities or differences in the patterns and underlying causes of state policy adoption?

• What are the intergovernmental influences on each policy innovation?

• Do recent disasters lead states to adopt flood mitigation policies? If so, is the positive relationship between recent floods and flood mitigation policy adoption consistent across all the policy innovations examined in this study?

Policy Ideas and Influences on Innovation

Policies represent ideas that are solutions to public problems (Kingdon 2003; Stone 1988). Policy ideas emerge and are introduced into the public debate, are considered, and are subsequently adopted or rejected. For a policy idea to be considered, it must possess some degree of acceptability with policy makers and the general public. For example, ideally the best way to completely mitigate flood hazards is to permanently remove people and property out of floodplains and away from shorelines. This would be unacceptable as a policy innovation for a number of reasons including the cost associated with complete
mitigation, the political unpopularity of such a policy, and the implications for private property rights (Prater and Lindell 2000).

When public problems are chronic in nature—whether it is homelessness, urban sprawl, environmental protection, education, or flood mitigation—policy makers often employ several ideas over a period of time to solve the problem. Chronic policy problems are relevant to this study for two reasons, one practical and one theoretical. First, floods are ongoing events and policies to mitigate floods have changed over time—from structural to non-structural mitigation. Second, diffusion has been used extensively to predict adoption but it suggests little about what else is being considered during the process of adoption. One way to address this gap is to examine how different policy innovations addressing the same policy problem diffuse over time. This is consistent with Stone’s (1988, 262) analogy of policy being akin to an “endless game of Monopoly.” Through this analogy Stone (1988, 262) suggests that where “the process of choosing and implementing the means of policy is political and continuous…. The actions we commonly call ‘new policies’ are really somebody’s next move, and in politics, as in a good game, nobody’s move completely determines anybody else’s future.”

I focus on three different so-called “policy ideas” that address the problem of flood mitigation: flood-specific building code amendments, land use planning mandates, and land acquisition in flood-prone areas. Using different policy ideas to solve the same policy problem implies that policy makers have a number of different policy ideas or solutions to choose from to address a single policy problem. While these three policy ideas use different approaches—regulation of development and construction, risk avoidance and elimination, or
incentives and disincentives for safe development—all are devised to lessen the effects of flood on life and property.

Floods are one of the most common natural hazards in the United States. They account for 80 percent of all the disasters receiving a Presidential Disaster Declaration (Godschalk et al. 1995). In 2008 of the 75 major disaster declarations, 70 percent were for flooding caused by severe storms (DHS 2009, 26).

The broader policy environment influences the feasibility of adopting a policy idea, or innovation. This broader policy environment contains two sets of influences, those internal to a state and influences external to a state. Internal influences include political and institutional factors, economic conditions, and socio-demographic conditions. External factors that influence adoption include the actions of neighboring or regional states, the decisions of the federal government, and flooding events.

In terms of political and institutional factors, classic diffusion studies have examined public opinion, specifically political ideology, and hypothesized that ideologically liberal states tend to adopt certain policy innovations that conservative states reject (Berry and Berry 1992; Daley and Garand 2005; Allen, Pettus and Haider-Markel 2004). For example in the case of tax policy, Berry and Berry (1992) found that more liberal states would adopt new income taxes because ideologically liberal states would have more spending programs, rendering new tax revenue necessary. Political institutions also play an important role in the diffusion process and these institutions can create a favorable climate for adoption (Berry and Berry 1992). Finally, diffusion studies have considered the influence of elections on the
process of state policy adoption (Mintrom and Vergari 1998; Mintrom 1997; Walker 1969; Gray 1974; Berry and Berry 1992).

State financial health is sometimes used as a proxy for economic stability and is positively associated with policy adoption. Often state financial health is assessed using state GDP, a state’s manufacturing outputs (Walker 1969; Allen, Pettus, and Haider-Markel 2004; Daley and Garand 2005) or state budget performance (Berry and Berry 1992). The underlying rationale is that the better the financial health of a state, the more likely it will be to adopt a policy innovation. This study relies on state GDP as a proxy for financial health for two reasons. First, not all states have equivalent manufacturing bases. Second, state budget shortfalls may conflate state government fiscal health with overall state fiscal health.

Finally, with respect to socio-demographic characteristics, high levels of personal wealth in a state have been positively associated with the diffusion of policy innovations (Walker 1969; Gray 1974; Berry and Berry 1992; Mooney 2001; Daley and Garand 2005).

External influences include policy decisions by neighboring states, policy decisions by the federal government, and by the disasters themselves. While flood mitigation policies are intergovernmental in nature, the transfer of policies and ideas are murky at best. Specifically, reasons for the transfer of flood mitigation policies from state-to-state, from state to federal government or from the federal government to state governments remain unclear. The federal government has been an actor in flood mitigation policy under a patchwork of pre- and post-disaster mitigation legislation including the Robert T. Stafford Act, as amended by Disaster Mitigation Act of 2000, the Post-Katrina Emergency Reform Act (PKEMRA), and the National Flood Insurance Act of 1968.
In the context of diffusion studies, we know that when states face a lack of leadership or clear information from the federal government, they will act independently to address a particular policy problem. In this instance, states are motivated to adopt by the desire to have a competitive edge over neighboring states, to avoid being at a disadvantage to neighboring states, or in response to public opinion (Berry and Berry 1999). But while states have indeed acted independently of the federal government to adopt policies to mitigate natural hazards, adoption has been uneven and the types of policies have varied from state-to-state (May and Deyle 1998). This variation has been attributed to a state’s commitment and capacity to mitigate hazards (Godschalk et al. 1995). Obviously, risks also vary state-to-state because of differences in geography and topography—North Carolina, Missouri, and Arizona have different flood risks. While Godschalk and May and Deyle’s research has explained the reasons underlying the unevenness of state-level mitigation policy adoption, it has not fully examined the reasons why states choose to adopt one type of mitigation policy instead of another. In addition it has not considered how recent flooding disasters might affect state-level policy adoption. This is relevant to research on hazards and disasters because it opens an avenue of study that focuses on states as policy leaders in hazard mitigation rather than the federal government. States do not adopt mitigation policies in a vacuum and this dissertation accounts for the federal government to play an influential role but not the primary role in mitigation policies.
Overview of Flood Mitigation, Hazards, and Disasters

Risk, Hazards, Disasters, and Mitigation

It is important to distinguish among the terms hazard, risk and disaster. I adopt the definitions employed by Haddow, Bullock and Coppola (2008, 27) who adopt the National Governors Association’s definitions for hazard, risk, and disaster: hazard as “a source of danger that may or may not lead to an emergency or disaster and is named after the emergency/disaster that could be so precipitated;” risk is defined as “susceptibility to death, injury, damage deconstruction, disruption, stoppage, and so forth;” and disaster as “an event that demands substantial crisis response requiring the use of government powers and resources beyond the scope of one line agency or service.”

When a flood hazard and risk of flooding are both present, it suggests that there is a possibility that a community will be susceptible to injury, the loss of life, property, or disruption in daily services and activities as a result of the flood hazard. However, it is possible for hazards to exist with no or very minimal risk to life and property. If a river routinely floods but there are no injuries, deaths, disruptions or property damage, it poses no real risk to human settlements. Managing hazards by minimizing risk is the goal of mitigation. Gilbert White (1945), and others (Burby et al. 1999; Birkland et al. 2003) have long argued land use practices and planning are usually more effective long-term mitigation techniques than building dams and levees to make flood-prone areas habitable. This idea is now central to modern hazard mitigation practices, but the extent and rate of adoption of these kinds of policies by the states is highly variable (Godschalk et al. 1999; May and Deyle 1998).
In the most general sense, there are four key components of emergency management: mitigation, preparation, response and recovery. These four components have been conceived in terms of pre-disaster activities in the mitigation and preparedness stages that are passive in nature and in the after-impact stages of the cycle that include response and recovery that are reactive in nature (Lindell and Perry 2000). The idea that mitigation, preparation, response, and recovery occur in an ordered, cyclical way is unrealistic. However, it is useful to consider these activities as interrelated and to some extent, mutually reinforcing.

Structural mitigation policy innovations include building dams, levees, floodwalls, floodgates and other constructed elements to control or divert the flow of floodwaters. The primary approach in structural mitigation has been to control the flow of water in flood-prone areas by using levees and other engineered systems. While this action has prevented significant losses in flood damage, it has also encouraged development in hazardous areas with sometimes catastrophic effects on cities like New Orleans and broader environmental concerns associated with floodplain management (Birkland et al. 2003).

Non-structural mitigation policies include insurance requirements, comprehensive land use planning mandates, hazard mitigation planning requirements, hazard-sensitive building codes, land acquisition and relocation, and wetland reclamation and protection. Rather than engineer structures to control floodwaters, states can adopt policies that work with the environment, minimize damage to naturally occurring flood control measures, and do not create a false sense of security about flood risks while making catastrophic disasters more likely. The most common non-structural hazard mitigation policy innovations adopted by states include: regulation of development in hazardous areas; requirements for local
governments to enforce hazard-specific portions of the state building code; comprehensive planning mandates; policies supporting land acquisition in hazard-prone areas; and public infrastructure investment decisions (May and Deyle 1998).

Floods

In the Eastern United States and along the Gulf Coast hurricanes and tropical storms are the most common cause of floods. In the western United States most floods are caused by snowmelt and rainstorms (USGS 2006). Between 1964 and 2007, there were 1,500 Presidential Disaster Declarations, of which 605 were floods accounting for 40% of all the major disaster declarations during the 43-year period. Between 2000 and 2007 there were 377 Presidential Disaster Declarations, 62 disaster declarations were for floods, or 16% of all the declarations. Floods were second only to severe storms during that time and represented 50% of all the Presidential Disaster Declarations. In many instances, severe storms and flooding were both listed as the cause of the disaster. However these figures tend to obscure the scope and magnitude of the flooding hazard in the United States. The increase of flood damage costs over time is more revealing. In terms of dollar value of flood damage, “…1960s floods caused $41.69 million dollars of damage a year. By the 1990s, average annual property damage from flooding increased to $378.12 million dollars a year (in 1960 dollars)” (Brody et al. 2007, 330).

The intergovernmental nature of disaster management means that local governments are initially responsible for the response to the disaster. If their resources and capabilities are overwhelmed then they turn to state government for assistance. If the scope and magnitude is large enough to overwhelm the state government’s resources and capabilities, then the
governor requests assistance from FEMA through the presidential disaster declaration process. The majority of disasters that occur in the United States are not big enough to register federal attention meaning that individuals, businesses, and local and state governments bear the cost to recover from disaster (Burby et al. 1999).

Floods in particular can be highly localized events. On average, the USGS estimates that floods cost $6 billion in damage and cause 14 deaths per year; major floods like the 1993 Midwest floods and the flooding that resulted from Hurricane Katrina caused $20 billion and $200 billion in damage respectively (USGS 2006).

**Flood Mitigation Policy Innovations**

This subsection discusses the three flood mitigation policy innovations that this study examines. They include building codes, comprehensive land use planning mandates, and land acquisition.

**Building Codes for Flood Hazard Mitigation**

In general, building codes have evolved from a disparate, fragmented set of construction standards that varied widely from one community to another to a uniform, national building code that local communities can adopt, in whole or in part, at their discretion. Adoption of building code standards is the responsibility of state legislatures and the majority of states’ building codes are based on three standard model codes that incorporate regional differences (Haddow, Bullock and Coppola 2008). While this is true, it is an oversimplification of the nature of building codes and how they are created and adopted.
In general, building codes are the tools that state and local government use to regulate
the safe construction of residential and commercial structures. Building codes tend to be
prescriptive, meaning that they set specific standards to achieve the goal of building safety
(Dhering 2006). But this prescriptive nature means that modern building codes have become
very complex, including sub-codes for the structural, fire, enclosure, interior environment,
and materials construction standards (Listokin and Hattis 2004). The complexity of
structural systems has caused states to jettison writing and updating their own individual
building codes and instead adopt model building codes—with or without adding state-
specific amendments (Listokin and Hattis 2004). However, not all communities in all states
are required to adopt the same provisions of the model building code and construction
standards can vary significantly between residential and commercial construction. Often
commercial structures have stricter building requirements than residences.

The first model building code emerged in 1927 and was called the Uniform Building
Code (UBC). The UBC remained the standard building code until 2000 when the
International Building Code (IBC) replaced it. The UBC was created by the insurance
industry and the IBC was created and sanctioned by the International Code Council (ICC), a
group of separate regional building code organizations. The ICC regularly updates the
building code and makes amendments to the code.

States have the authority to adopt model building codes and all 50 states have adopted
the IBC code (International Code Council 2010). This is not particularly innovative, nor does
it suggest that states are choosing to adopt the model building code by choice. It merely
suggests that states have adopted model building codes as a part of a trend towards national
standardization of construction standards. However, this does not mean that states cannot or do not adopt specialized amendments to the model code to suit local conditions. Local political subdivisions such as counties and municipalities may adopt additional amendments.

For example, states will adopt stricter building codes to mitigate the effects of a natural hazard. Florida and North Carolina have done just that by beefing up building code amendments to mitigate the effects of floods and hurricanes (Birkland 2006). State mandates for stricter building codes in California reduced potential property loss during the Northridge Earthquake (1994) however, local implementation and enforcement of the mandated codes varied by community (Burby, French, and Nelson 1998; May and Birkland 1994).

These brief examples suggest that states can and will innovate beyond simply rubber-stamping the model building code of the day. However, the influence of the federal government and its policy preferences also affect the adoption of flood-specific or hazards-based building code amendments. The National Flood Insurance Program (NFIP) requires participating counties to adopt minimum standards for building elevations in flood-prone areas and if there are substantial improvements to existing structures, they are required to meet new elevation standards (Dhering 2006). Failure to comply with the standards can result in property owners in these communities paying higher flood insurance premiums, or not being able to get flood insurance at all. In this way, the federal government indirectly through a system of positive and negative inducements influences state decisions to adopt flood or hazard-specific building code amendments.
Comprehensive Land Use Planning Mandates

State legislatures have the ability to allow or to mandate local jurisdictions to include natural hazard mitigation into their comprehensive plans or develop a stand-alone natural hazard mitigation plan. These mandates are designed to limit development in hazard-prone areas by doing the following: (1) outright prohibition of development in hazardous areas; (2) limiting the population density in hazardous areas through zoning and provide incentives for high density development in less hazardous areas; (3) reducing property taxes in hazardous areas that are devoted to open space; and (4) transferring development rights on parcels in hazardous areas (Burby and Dalton 1994). Overall, land use planning requirements have been found to be an effective non-structural mitigation tool because they channel growth away from flood-prone areas (Brody et al. 2007). However, not all states require local governments to engage in comprehensive land use planning. In states such as North Carolina, the state requires hazardous areas, particularly coastal areas, to engage in hazard-specific land use planning in addition to standard land use planning. But in states such as New York, there is no requirement for local land use planning and if communities decide not to plan, the existing land use patterns form the overall plan.

Stand-alone mitigation plans have been found to have a net positive effect on reducing exposure to flood hazards. However, sometimes mitigation plans can be poorly designed and in communities that have stand alone mitigation plans, they do not incorporate natural hazards into their comprehensive land use plans (Godschalk et al. 1999; Burby et al. 1999; Burby et al. 1997; Burby et al. 1998; Olshanksy 2001). Indeed, property damage caused by floods and the increasing cost of floods over time is attributed to traditional causes
such as population growth and increased precipitation in addition to the ramifications of planning and development decisions (Brody et al. 2007). However, in states that mandate local land use plans, local governments that might not otherwise have a land use plan on the books are compelled to adopt one. These mandates can help communities overcome resistance to hazard mitigation that stems from pro-growth political interests or community affluence but the overall quality of the plans suggests that the net result might be one of rote compliance (Berke et al. 1996). However, political tensions emerge because mitigation land use planning may reduce the availability of desirable and attractive parcels of land that would otherwise be ripe for local economic development.

The role of the federal government’s influence and policy preferences on state policy decisions for comprehensive planning mandates is somewhat similar to its influence on building codes. Under the Disaster Mitigation Act of 2000 (DMA), states were required to include hazards for local land use planning as a condition of receiving disaster recovery assistance. However, there is evidence that suggests states were mandating land use planning requirements long before the US Congress adopted the DMA. In 1985, Florida adopted the Growth Management Act, requiring local governments to include hurricane and flood mitigation tools into their comprehensive plans (Deyle, Chapin, and Baker 2008). In 1986, in the case of seismic safety, the State of California adopted earthquake-specific land use planning and development requirements to be included in local governments’ comprehensive plans in response to the 1971 San Fernando Earthquake (Olshansky 2001).
Land Acquisition for Flood-Prone Areas

Land acquisition and relocation policies are designed to physically move people and property out of flood-prone areas, including wetlands and flood plains that usually have been subjected to repetitive flooding. Acquisition and relocation policy emerged in the 1970s when the state of Florida adopted the Environmental and Land and Water Management Act in 1972 and has been on the forefront of land acquisition and relocation policies (Godschalk et al. 1999). Land acquisition and relocation allow areas that are subject to severe flooding a permanent way to mitigate floods. Land acquisition tends to be compatible with other non-structural mitigation techniques like floodplain conservation (Godschalk et al. 2000). However, land acquisition and relocation policies can be difficult to implement for two reasons: one, because of landowner resistance or reluctance to be relocated; and two, complex funding sources to purchase the land (Godschalk et al. 2000; Burby and Kaiser 1986). In spite of these challenges, land acquisition and relocation policies have been found to be very effective, particularly for communities that have high levels of development already in a floodplain or for communities that have few alternative sites for development outside of a floodplain (Burby and French 1981).

Until the mid-1990s, land acquisition and relocation policies had been the domain of state and local governments, but in 1995 Congress amended the Stafford Act (PL 100-707) to provide disaster mitigation assistance to states. This program came to be known as the Hazard Mitigation Grant Program (HMGP) and it included, among other mitigation techniques, federal funding for states and communities to purchase flood-prone land to mitigate the effects of floods and relocate people and property outside of floodplains. The
HMGP was created in response to the devastating 1993 Midwest Floods. The 1993 Midwest Flood affected nearly every state in the Midwest resulting in $15 billion in damage and 50 deaths, but Iowa, Kansas, Minnesota, Missouri, and Nebraska bore the brunt of the flooding (Sylves 2007). A significant shortcoming of the HMGP, however, is that the program provided funding after a disaster for mitigation, not before disaster when it might do the most good. Significant policy changes have occurred since the adoption of the Stafford Act, most notably the adoption of the Disaster Mitigation Act of 2000 (DMA). Under the DMA, the HMGP was continued and supplemented and a new pre-disaster mitigation was also created. However, executive branch requests and congressional appropriations for these programs have lagged far behind the demand for mitigation assistance, and less money and effort are being devoted to mitigation programs now that were expended in the 1990s.

In 1995, 22 states had adopted land acquisition and relocation policies, 13 of the states set aside state funds specifically for the purpose of acquiring flood-prone land for mitigation, and the other nine states assisted local governments in securing federal HMGP funding for post-disaster mitigation (Godschalk et al 1999). State level adoption of land acquisition and relocation policies and federal policy priorities for mitigation, particularly land acquisition and relocation, suggest that there may be different underlying causes leading certain states to adopt their own acquisition and relocation policies while others chose to rely solely on federal resources to acquire flood-prone land.

**Conclusion and a Look Ahead**

This dissertation is about the spread of ideas. Using diffusion theory as an organizing framework, this dissertation examines the process of state policy adoption through the lens of
flood mitigation policies between 1968 and 2008. This chapter provided a brief overview of policy innovations theory, reviewed flood mitigation in the context of hazards and disaster literature, and identified the flood mitigation policy innovations that are the focus of this study—building code mandates, comprehensive planning mandates, and land acquisition.

There are three main contributions of this research to the study of public policy and hazards and disasters. First, I reframe diffusion theory in a way that assumes multiple, potentially competing policy ideas exist simultaneously for decision makers to consider. Second, this dissertation addresses why a state or group of states favors one particular mitigation policy above another. This is important because it focuses on the role states play in flood hazard mitigation. Assessing the cumulative role of states over time—as policy innovators in an intergovernmental system—may lead to a better understanding of the way in which states may propel, contribute to, or deter the spread of mitigation innovations. Third, this dissertation establishes baseline data for state policy adoption of flood mitigation policy innovations. Prior to this study, there has been no suitable, comprehensive dataset for state level data on measuring policy decisions and their correlates. Because of this, the data for this study is assembled from a variety of sources in a manner that is consistent with the literature on diffusion theory.

In Chapter 2, I present my theory for how policy ideas are considered and selected, discuss the influences on the innovation process and present my hypotheses for testing the conditions under which policy ideas are considered and adopted. In Chapter 3, I describe the statistical technique and model I used for analysis, define the variables, identify sources of
data, and describe how I collected data. In Chapter 4, I analyze my results and in Chapter 5, I present my findings and conclusions.
CHAPTER TWO: POLICY INNOVATIONS, POLICY ADOPTION AND FLOOD MITIGATION

This chapter is organized into two main sections. The first section discusses diffusion of policy innovations theory, frames policy innovations as policy ideas, and presents a theory of the process of policy change and innovation. Using diffusion of innovations as a theoretical underpinning, I define policy adoption and the innovation decision for flood hazard mitigation policy innovations for the American states. I discuss the factors that predict state policy adoption, specifically the classic diffusion factors dealing with internal and external influences. These influences are grounded in the diffusion of policy innovations framework and are informed by literature addressing mitigation policies in general and flood mitigation policies specifically.

Diffusion of Policy Innovations and the Innovation Decision

The purpose of this section is to present a theory of influences on the innovation decision-making process. As such, it reframes policy innovations as policy ideas. Then it provides a brief overview of the diffusion of innovations theory and presents a theory of the innovation decision and its role in the diffusion process.

Policy Innovations and Policy Ideas

Policy innovations essentially are new ideas for policy change. These new ideas do not emerge out of thin air; rather they are simply new to the state that is considering them for possible adoption. Moreover, the policy is likely not to be new at all. Kingdon (2003) argues that it may be nearly impossible to trace the origins of a truly novel idea. For theories of the policy process, particularly Kingdon’s (2003) multiple streams, this could mean that the
policy idea is seriously being considered for adoption for the first time. In the context of state policy adoption, this means that the policy idea may have been floating around the halls of the legislature for years but had never before been seriously considered for adoption. Instead, it is only when policy makers begin to take a policy idea seriously that it becomes ripe for adoption and perhaps a wider diffusion.

Diffusion scholars have made a clear and careful distinction between policy innovations and inventions. The distinction was present beginning with Walker’s (1969, 881) definition of an innovation as “a program or policy which is new to the states adopting it, no matter how old the program may be or how many other states have adopted it.” Diffusion scholars have been less concerned with the creation of new ideas, original ideas, and inventions, than they have been concerned with the adoption of the innovation.

We know from other theories and models of the policy process that policy ideas are shaped, introduced, and considered in ways that compliment and support some aspects of Rogers’s (2003) “innovation-decision” process. Theories of policy making that rely less on innovation diffusion might hypothesize that the policy that is eventually adopted depends on the right mix of timing, actors, issues, problems and solutions (Kingdon 2003). Still others might conceive of it in terms of policy change and disruptions in the powerful interests that control the policy debate (Baumgartner and Jones 1993).

In particular, policy process theories may better inform the ways in which innovators develop an opinion about the innovation and the decision to adopt or reject the innovation. First, Baumgartner and Jones’ punctuated equilibrium model (1993) distinguishes between old and new policy ideas. They reason that new ideas do not eliminate the old ideas but they
do provide new definitions of a policy problem. Furthermore, Baumgartner and Jones asserted that punctuations in the policy equilibrium shed light on different aspects of a policy problem, or expand the scope of conflict on the policy subsystem.

Similarly, Kingdon’s multiple streams model conceives of policy ideas as so-called alternatives, or a set of items different from the group of subjects or problems that are already on the policy agenda that are being seriously considered by government officials and policy insiders. This mix of old and new policy ideas is related to Baumgartner and Jones’ concept of policy images that essentially represent the public understanding of a policy problem. These policy images are important because they play a role in expanding the policy issue to a disinterested or apathetic public.

For diffusion of innovations, this notion of multiple policy ideas—both new and old—being available for consideration at any time suggests that the classical assumption about the nature of policy innovations might be short-sighted. Walker (1969) asserted that an innovation should be new to the state adopting it. However, policy innovations often times linger between being considered for placement on the agenda and actually being placed on the agenda (Mintrom 1997).

This suggests that the importance of the relative novelty of a policy innovation may be under-specified. If a policy innovation lingers in the so-called primordial soup of the policy process, it may gain traction as policy makers learn about the innovation, develop an opinion about it, and gauge public opinion on its acceptability.

Stone (1988) theorizes that five distinct yet interrelated strategies exist to shape policies. I argue that these strategies are related to the overall acceptability of a policy idea. The first
strategy is inducements—either rewards and incentives or punishments and sanctions—are used to control others (Stone 1988). The second strategy is formal rules in the form of laws and regulations and third, informal rules in the form of social norms. While these are used to shape policy any rule is most effective when it is a balance between precision and flexibility. In Stone’s definition, the fourth strategy is facts that are sources of information that are critical to sound decision-making even though they might not always be neutral. The fifth way that Stone defines the ways in which policies are shaped is in terms of power—battling for participation where changes in the decision-making process, and changes in the size and degree of centralization of the decision-making body can change policy outcomes.

Of particular interest in this context are inducements, either positive or negative, and formal rules and regulations. Positive inducements, such as grant funding, institutional and organizational development resources, tax breaks or other positive incentives might be used to help promote consideration of the policy idea. However negative inducements, seemingly heavy-handed regulations and outright mandates could be used in a way to make a policy idea seem less acceptable, less palatable to seriously consider for adoption.

Diffusion of Innovations Theory

Studies of the diffusion of innovation began in the 1930s, and were grounded in rural sociology where researchers sought to understand how agricultural innovations diffused among farmers (Ryan and Gross 1943). The theory of diffusion of innovations holds that innovations will diffuse, or spread among actors or organizations in a system over time. Rogers (2003, 5) defines diffusion as “the process in which an innovation is communicated through certain channels over time among members of a social system.” This definition has
been applied in policy studies to specify the social system as the American states (Walker 1969, Berry & Berry 1999, Gray 1974). Rather than question whether an innovation will spread through a system over time, diffusion has been concerned with predicting or explaining why an innovation spreads through a system over time. Because of this, diffusion tends to focus on the causal explanations for innovations that have diffused rather than innovations that do not diffuse.

Diffusion of policy innovations is concerned with predicting or explaining patterns of policy adoptions among different political jurisdictions. States are the most commonly used political jurisdictions (Walker 1969, Gray 1974, Berry and Berry 1990, Berry and Berry 1992, Daley 2005, Balla 2001), although local jurisdictions have also been studied (Mintrum 1997). The pattern of diffusion for policy innovations is characterized by an S-shaped curve where early adopters or leaders will be the first to adopt. As time passes a critical mass of states adopting a policy innovation will be reached, which is typically propelled by a rapid or increased rate of adoption. States that adopt a policy innovation after the critical mass is reached are referred to as laggards or, in the case of non-adopting holdouts.

Early work on the diffusion of policy innovations focused on developing innovation scores for states to establish their relative innovativeness (Walker 1969) and explaining variances in patterns of adoption such as the interaction between pairs of adopters and non-adopters (Gray 1974). Contemporary scholars have employed more elaborate models focusing on the various factors that predict or explain the probability or likelihood of adoption (Berry and Berry 1990, Berry and Berry 1992, Berry and Berry 1999, Balla 2001, Daley 2007, Karch 2007).
The body of diffusion literature focusing on the likelihood of adoption has generally conceived of adoption as whether or not a state has adopted the policy innovation by state legislative action in a given year. The likelihood of a state to adopt a policy innovation has been the focus of studies addressing issues such as the state lottery adoption (Berry and Berry 1990), adoption of tax innovations (Berry and Berry 1992), adoption of hazardous waste remediation programs (Daley 2007), adoption of regulations addressing health maintenance organizations (Balla 2001), education reforms (Mintrom and Vergari 1998), truth-in-sentencing laws, so-called “partial birth abortion” laws, and hate crime laws (Allen, Pettus, and Haider-Markel 2004).

The Innovation Decision

Diffusion of innovation theory has traditionally been concerned with the rate at which a new idea, or innovation is adopted. This has led to an underdeveloped dependent variable for policy diffusion studies. I address the problem of an underspecified dependent variable by focusing on the “innovation decision” rather than the rate of adoption. Rogers (2003) defines the “innovation decision” as the way in which a person or organization moves from initial knowledge of an innovation, to developing an opinion of the innovation, deciding whether to adopt or reject the innovation, and implementing the innovation.

Research investigating the “innovation-decision” process has developed two approaches called variance studies and process studies. The timing of events in the innovation-decision process and the use of quantitative or qualitative research methods distinguish variance studies from process studies. Rogers (2003, 196) defines variance studies as:
A type of data gathering and analysis that consists of determining the covariances (or correlations) among a set of variables, but not in their time order. Such variance research usually is conducted using qualitative research methods, which measure variables by assigning numerical values to behaviors.

In the context of public policy adoption, early variance studies focused on either the rate at which a policy innovation diffuses among states or the underlying political and socioeconomic differences that cause some states to adopt earlier than others; or, even why some states fail to adopt certain innovations at all. However, the use of Event History Analysis (EHA) provided a solution to this either/or problem by integrating what the literature refers to as internal and external determinants models (Gray 1994; Berry and Berry 1999). While the advent of EHA was a significant development in scholarship, it still neglects to incorporate aspects of the broader innovation-decision processes such as the timing of when and why new policy ideas are considered. Rogers (2005, 196) defines process studies as:

A type of data gathering and analysis that seeks to determine the sequence of a set of events over time. Usually such process research is conducted using qualitative research methods that seek to gain insight and understanding of human behavior.

While the diffusion framework was extensively used to determine the overall rate at which policy innovations are adopted across the states (Walker 1969), and the underlying
causes for the policy adoptions (Berry and Berry 1992, 1999), it has been criticized for being overly concerned with variance in adoption rather than the process of adoption (Gray 1994).

I adopt Gray’s (1994) critique that to broaden diffusion theory, particularly the innovation-decision process research needs to incorporate elements of the policy process, such as windows of opportunity, policy entrepreneurship, and other elements of the agenda-setting literature (Kingdon 2003). Scholarship on the role policy entrepreneurs play in the diffusion process for school choice reforms (Mintrom 1997; Mintrom and Vergari 1997) suggests that incorporating aspects of agenda setting may be fertile ground to develop diffusion theory.

I address the underdeveloped concept of the innovation-decision process by focusing on the policy innovations framed as policy ideas. Specifically, I study the variations in flood mitigation policy innovations that states choose to adopt. For example, is there an underlying reason to explain why some states choose to mitigate floods by restricting development in hazardous areas rather than adopting comprehensive planning mandates? While any one of these policies would mitigate floods, they do so in different ways that are accompanied by different politics (Lowi 1964, Wilson 1973), thereby influencing outcomes.

Influences on Diffusion

Internal Determinants of State Policy Adoption

Classic diffusion studies have examined public opinion, specifically political ideology, and hypothesized that ideologically liberal states tend to adopt certain policy innovations that conservative states do not (Berry and Berry 1992; Daley and Garand 2005;
Empirical support for the influence of political ideology on adoption have been mixed. This difference has been attributed to how liberal and conservative ideologies view the role of government intervention in solving public problems. For example in the case of tax policy, Berry and Berry (1992) hypothesized that more liberal states would adopt new taxes because ideologically liberal states would have more spending programs, rendering new tax revenue necessary. But they found that political ideology does not influence states to adopt any tax innovation with one exception: state ideology influenced the adoption of income taxes (Berry and Berry 1992).

Similarly, Allen, Pettus and Haider-Markel (2004) hypothesized that ideologically liberal states would be more likely to adopt hate crime legislation because conservative states traditionally oppose such laws particularly laws based on sexual orientation. They found, however, that for truth-in-sentencing, so-called partial birth abortion, and hate legislation that ideology did not significantly influence state policy adoption. Daley and Garand (2005) hypothesized that ideology would be an important factor influencing adoption but found that citizen ideology, in particular, states with liberal citizens had no effect on the adoption of hazardous waste policy. These findings support Karch’s (2007) suggestion that “While it is important not to overestimate the influence of political ideology on the enactment process… Political ideology seems to affect the general contours within which public policy is made, but it does not force officials to comply with specific demands or give them a strict regimen to follow… It is not, however a sufficient explanation of policy adoption” (49-50).

In spite of these mixed findings, political ideology is likely to be relevant in the mitigation case, where property rights often play a large part. I anticipate that political
ideology may not be significant for every type of mitigation innovation. For example, mitigating flood hazards by regulating development of land that is in flood-prone areas, wetlands or along the coast in the way that Delaware, Florida, Michigan, New York, North Carolina, and Wisconsin have imposes direct government intervention into private property rights (May and Deyle 1998, 70). Mitigation policies such as comprehensive land use planning may be more likely to be influenced by political ideology than other mitigation policies such as stricter building codes. For example, in Florida following Hurricane Andrew (1992) the state legislature adopted a very strong comprehensive planning mandate and a strict building code to mitigate the effects of wind and flood damage from hurricanes. Outside of south Florida, there were strong economic interests in other parts of the state, particularly the panhandle that opposed the new standard building code because it would increase construction costs in areas that were falsely assumed to be safe from hurricanes (Birkland 2006, 144). Thus:

H1: The more ideologically liberal a state, the more likely it will be to adopt a flood mitigation policy.

Political institutions also play an important role in the diffusion process and these institutions can create a favorable climate for adoption (Berry and Berry 1992). These political institutions are the degree to which a state government is unified along party lines and the proximity of an election year. A unified government, with single party control of the legislative and executive branches of state government increases the likelihood of adoption (Berry and Berry 1992). A more current example of the influence of unified government is
adoption of the controversial 2010 Affordable Care Act in March 2010 when a single political party controlled the presidency, the House and the Senate.

The rationale behind this hypothesis is that when a single party controls the legislative and executive branches of government, then there will be fewer institutional obstacles to prevent or stall adoption. However, the findings on the effect of a unified government have been mixed. Berry and Berry (1992) found that states with unified executive and legislative branches were more likely to adopt tax policies but this changed over time and was highly contextual to the point where their findings would not support the unified government hypothesis. Daley and Garand found, “Political and policy variables, such as party control of state institutions… [does] not substantially and directly affect state environmental policymaking; surprisingly in states with Democratic control of the state legislature and governor’s office, liberal citizens, and a pattern of stringent environmental policies in other environmental areas are no more or less likely to adopt strong hazardous waste policies” (2005, 636). In the cases of truth-in-sentencing, partial birth abortion, and hate crime legislation, a unified government also had no significant effect on state policy adoption (Allen, Pettus, and Haider-Markel 2004).

Berry and Berry suggest that the effect of a unified government may be more indirect on diffusion—or at least the convergence of favorable political and economic conditions that might serve as the right mix to create a legislative climate favorable for adoption (1992). Disasters are inherently political phenomena, in terms of the responsiveness of elected officials, the allocation and distribution of disaster recovery resources, and the perceived
effectiveness of governmental response to disaster (Platt 1999). Thus, it seems relevant to consider the influence of political institutions on flood mitigation policy adoption. Thus:

H2: If there is single party control of a state legislature and the governor’s house, the sooner it will be to adopt a flood mitigation policy.

However, the effects of a unified government might be too subtle to influence policy diffusion. While single party control of the legislature and governor’s house may not directly affect policy adoption, a divided government may serve as an obstacle for adoption—or perhaps lead to non-adoption. This exemplifies the phenomenon of “hold outs” or “non-adopters.” These “hold outs” are states that forego adopting a policy that other states in the region have adopted (Ingle, Cohen-Vogel, and Hughes 2007). A divided government might be one possible explanation for delayed adoption or non-adoption.

Finally, diffusion studies have considered the influence of elections on the process of state policy adoption (Mintrom and Vergari 1998; Mintrom 1997; Walker 1969; Gray 1974; Berry and Berry 1992). The extent to which parties compete for the governor’s house (Walker 1969) or the margin of victory in a gubernatorial election (Gray 1974) have been used to assess electoral competition. Gray (1974) suggested that electoral competition might be more relevant for predicting early adopters of policy innovations.

As scholars have refined and developed diffusion theory, they began to examine if the proximity of elections had an effect on state policy adoption. “[S]tates with four-year gubernatorial election cycles are most likely to adopt a new tax in the year after an election, less likely to adopt a tax in the second and third years after an election, and least likely to adopt in an election year” (Berry and Berry 1992, 729). Diffusion was expanded to consider
the legislative agenda and in off years for legislative elections a policy innovation is likely to be considered for the legislative agenda but the same innovation is less likely to be placed on the legislative agenda during an election year (Mintrom and Vergari 1998). This is consistent with Mintrom’s (1997) earlier finding that policy innovations are less likely to be considered during a statehouse election year. Thus:

H3: Flood mitigation policy innovations are less likely to be adopted during gubernatorial election years.

H4: Flood mitigation policy innovations are less likely to be adopted during statehouse election years.

A state’s resources, including state financial health, personal wealth, and socio-demographic characteristics are important elements for predicting policy adoption. State financial health is sometimes used as a proxy for economic stability and is positively associated with policy adoption. Often state financial health is assessed using state GDP, a state’s manufacturing outputs (Walker 1969; Allen, Pettus, and Haider-Markel 2004; Daley and Garand 2005) or state budget performance (Berry and Berry 1992). The underlying rationale is that the better the financial health of a state the more likely it will be to adopt a policy innovation. This study relies on state GDP as a proxy for financial health for two reasons. First, not all states have equivalent manufacturing bases. Second, state budget shortfalls may conflate state government fiscal health with overall state fiscal health.
Classic diffusion theory suggests that the more fiscally healthy a state is, the more likely it will be to innovate. I anticipate that this will also be true for flood hazard mitigation policies. Thus:

H5: The better the fiscal health of a state, the earlier it will adopt a flood mitigation policy.

In general, high levels of personal wealth in a state have been positively associated with the diffusion of policy innovations (Walker 1969; Gray 1974; Berry and Berry 1992; Mooney 2001; Daley and Garand 2005). In the case of hazardous waste cleanup, Daley and Garand (2005, 634) found that wealthier states are more likely to have resources to pursue clean up and “[R]eal per capita income suggests that states with more economic resources at their disposal are more likely to develop stronger policies to address hazardous waste sites.”

This proposition of diffusion theory is inconsistent with findings in the hazards literature dealing with vulnerability. The trend in the United States reflects a population that is increasingly susceptible to natural hazards, particularly coastal hazards (Cutter and Emrich 2006). Vulnerable populations tend to feel the brunt of the impact of a disaster because of social vulnerability, which is a function of demographic characteristics, social inequities, access to health care, and connections to community support (Cutter and Emrich 2006).

For wealthier states, it is likely that they would have more resources to devote to mitigating flood hazards. Thus:

H6: The more personal wealth there is in a state, the more likely it will adopt a flood mitigation policy.
A higher degree of legislative professionalism is another resource for adoption, because the extent to which legislative staffs are subject area specialists and trained analysts is associated with a state’s motivation to adopt a policy innovation (Walker 1969). But recent findings about the relationship between a professional legislature and policy adoption have been mixed, suggesting that this proposition may not support or directly lead to state level policy adoption; instead it indicates the “background conditions” for state policy makers and policy making (Karch 2007). I anticipate that legislative professionalism will influence state adoption of flood mitigation policy innovations in a way that is consistent with Karch’s analysis: legislative professionalism sets the context for adoption rather than being a leading indicator of adoption. In the context of flood mitigation policy adoption, states with more professional legislatures may be more likely to adopt because they have the institutional capacity to innovate. This means that the more time lawmakers spend in session and whether they are reasonably compensated, the more professional the legislature. From the existing literature we can derive the hypothesis:

H7: The more professional the legislature, the more likely a state will be to adopt a flood hazard mitigation policy.

External Influences

Classic diffusion models account for regional and national influences on policy adoption and I incorporate these influences into my study. At the broadest level, these regional and national influences are external to the state considering a policy innovation. This means that unlike political ideology, party control of a legislature, or legislative professionalism the regional influence occurs exogenously to a state.
The following sections discuss the theoretical underpinnings for regional and national influence on state policy adoption and present hypotheses grounded in diffusion of innovations theory for testing. However, it is necessary to acknowledge that in the hazards and disaster literature—particularly in the context of flood mitigation—the distinction between the influence of state policy making and federal policymaking is not always clear.

Regional Influence

Regional influence is characterized by the assumption that “states are influenced primarily by those states that are geographically proximate” (Berry and Berry 1999, 175). However, the influence of neighboring states adopting an innovation may not be the same over time and the extent to which the influence of neighbors adopting may be limited. Mooney (2001) suggests that regional influence may be important during the early stages of diffusion when policy innovations are new and little information is available to decision makers but over time as the policy innovations are implemented, the regional influence will lessen.

The influence of neighboring states on policy adoption has been measured either using count data (the number of neighboring states that adopted in the previous year) or using the percentage of neighboring states that adopted in the previous year but there is no significant difference in the statistical models (Berry and Berry 1990). This is important because states like Washington, which only borders Idaho and Oregon, will theoretically be similarly influenced by its neighbors in the same manner that a state situated like Illinois, which borders Wisconsin, Iowa, Missouri, Kentucky, and Indiana.
For flood mitigation polices, there are two concerns about regional influence. First, floodplains rarely fall neatly into political jurisdictions. The 1993 Midwest Flood affected nearly every state in the Midwest resulting in $15 billion in damage and 50 deaths, but Iowa, Kansas, Minnesota, Missouri, and Nebraska bore the brunt of the flooding (Sylves 2007). It seems likely that states in a certain geographic area would adopt some flood mitigation policy. Whether they adopt the same mitigation policy innovation in the same time period remains an open question that this study will address.

Furthermore, the presence of Emergency Assistance Compacts (EMAC) suggests some degree of cooperation and collaboration among states for emergency preparedness. The EMAC is a system of mutual aid agreements between states to provide assistance in the event of a catastrophic disaster that overwhelms the effected state’s ability to respond (Bea 2007). EMAC is a relatively recent development that was adopted for national use by Congress in 1996 and is administered by the National Emergency Managers Association, a professional membership group for emergency managers (Waugh and Streib 2006). All states participate in the EMAC. Similar mutual aid agreements existed to ensure civil defense since the 1950s (Bea 2007). This might suggest that regional influence may change over time, becoming more influential in predicting adoption after 1996.

Although EMAC deals almost exclusively with disaster preparedness and response rather than mitigation, it suggests that states may innovate based on collaboration and cooperation. This is inconsistent with Berry and Berry’s (1999) classic diffusion hypotheses that states will innovate based on competition with other states. However, the elements of the disaster cycle—mitigation, preparedness, response, and recovery—are not completely
separate from each other. This means that the steps states take to share information and communicate effectively to prepare for a disaster may be similar for information sharing for mitigation.

Finally, the relative importance of regional influence on state policy innovation might be based on the interaction among states following a recent flood. There is sufficient evidence from the hazards literature to suggest that regional influence may play a role in policy adoption due to the nature of floods that transcends political jurisdictions and the evidence that states are influenced by each other—at least with respect to disaster preparedness and response. Therefore:

H8: The greater the number of a state’s neighbors that have adopted a flood mitigation policy innovation in the prior year of measurement, the more likely the state is to adopt the same policy innovation.

National Influence

In terms of policy diffusion theory, indicators of national intervention or influence that have been used in diffusion studies include financial incentives to adopt a policy (Allen, Pettus and Haider-Markel 2004), federal agency spending per state (Daley 2007), national legislation regarding a policy (Karch 2007), and presidential statements indicating policy preferences (Karch 2007). Much of the scholarship on the influence of the national government has been concerned with direct or indirect action and the clarity of national policy preferences.

For natural hazard mitigation policy and flood mitigation policies specifically, the influence of the federal government has shifted over time. Traditionally flood mitigation had
been the purview of local and state governments, but gradually the federal government has taken on more of a policy leadership role. This shift is consistent with trends in intergovernmental relations in other policy areas. Beginning in the 1970s and 1980s coercive federalism replaced more cooperative practices as the federal government assumed an active position in policy leadership that superseded the authority of state and local governments through mandates or financial incentives (Kincaid 1990).

Despite the federal government’s changing role in flood mitigation policy, its influence has been exerted primarily through legislation and funding to states. The federal government influences flood hazard mitigation policies through two major pieces of legislation: The National Flood Insurance Act of 1968 and its associated amendments, and the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Stafford Act) and its subsequent amendments. These two enactments are important because they are evidence of the federal government’s involvement in flood mitigation policy and the shifting and sometimes conflicting nature of the federal government’s influence on flood mitigation policies. Furthermore, both pieces of legislation and their associated amendments provide the vehicle for the federal government to influence states by providing mitigation funding.

In 1968, Congress passed the National Flood Insurance Act of 1968 (NFIA), which established the National Flood Insurance Program (NFIP). The NFIP initially provided flood insurance to property owners whose homes were located in flood plains—but insurance was contingent upon local governments creating flood maps and adopting land use controls (PL 90-448). The intent of the NFIP was to reduce potential flood losses by requiring local
governments to impose construction standards, undertake structural mitigation projects like
dams and levees and limit development in floodplains (Burby 2006).

Over time, the NFIA was amended twice more: in 1973 by The Flood Disaster Protection
Act (PL 93-234), making flood insurance mandatory for all federally-backed mortgages and
in 1994 with the adoption of The National Flood Insurance Reform Act (PL 103-325)
creating a National Flood Mitigation Fund that provided grant funding to states for the
“demolition or relocation of structures, elevation and flood-proofing, acquisition of
floodplain properties, ‘minor physical mitigation efforts,’ beach nourishment, and state
provision of technical assistance to localities” (Godschalk et al. 1999, 55). The 1973 and
1994 amendments to the NFIA were important because they added real consequences for
state and local noncompliance or nonparticipation in the NFIP.

In spite of the amendments to the NFIA, an effect of the NFIP has been to increase
vulnerability to floods by expanding land available for development (Burby 2006). Increased
vulnerability to floods has been magnified by generous federal disaster relief assistance that
creates a disincentive for communities and individuals to insure against floods before they
occur (Birkland et al. 2003).

In the years leading up to the adoption of the Stafford Act, Congress passed The Disaster
Relief Act of 1970 (PL 91-606.). The Congressional Research Service (2005) reports, this
legislation was important because it was the first time the federal government had considered
taking steps to mitigate disasters before they occurred. Prior to the Disaster Relief Act of
1970, federal mitigation polices were focused on reducing vulnerability after a disaster. The
legislation:
Addressed pre-disaster mitigation and preparedness by ordering the OEP [Office of Emergency Planning ] director to investigate additional or improved plans, procedures, and facilities…necessary to provide immediate effective action to prevent or minimize losses of publicly or privately owned property and personal injuries or deaths which could result from fires (forest and grass) earthquakes, tornadoes, freezes and frosts, tsunamis, storm surges and tides, and floods, which are or threaten to become major disasters (Bea 2007, 94-95).

More recently scholars studying intergovernmental relations have refined the concept to opportunistic federalism where “actors in the system pursue their immediate interests with little regard for the institutional or collective consequences. For example, federal mandates, policy preemptions and highly prescriptive federal grant programs tend to be driven by opportunistic policy makers who seek to achieve their own policy and political goals regardless of transitional norms of behavior or boundaries of institutional responsibility” (Conlan 2006, 667).

The Stafford Act (PL 100-707) as adopted provided mitigation assistance to states but only after a disaster had occurred, under what became the Hazard Mitigation Grant Program (HMGP). Significant policy changes have evolved since the adoption of the Stafford Act, most notably the adoption of the Disaster Mitigation Act of 2000 (DMA). The DMA repealed portions of the Stafford Act that provided funding for mitigation only after a disaster had occurred. Instead, the DMA mandated that states engage in mitigation planning with local governments as a condition of receiving disaster response and recovery assistance from
the federal government (PL 106-390). This planning had been mandated under the Stafford Act, but only at the state level for HMGP funds, and these plans had serious shortcomings (Godschalk et al. 1999).

This trend towards opportunistic federalism, particularly mandates, is problematic for state policy innovation because it suggests that states retain only the illusion of policy discretion. Indeed, the federal government mandated pre-disaster mitigation planning for all states through the use of Section 409 in plan requirements in an amendment to the Stafford Act. This was later repealed under section 322 of The Disaster Mitigation Act of 2000 (PL 106-309) but the mandates for state, local, and tribal mitigation planning as a condition of receiving disaster assistance remained. Although the threat of withholding federal disaster recovery assistance may have been hollow, the DMA also incentivized state and local participation in the program by promising an increased federal share of recovery funding for states that had active mitigation plans in place. The rationale for the legislation was to reduce the costs associated with disaster recovery by identifying natural hazards and taking steps to protect life and property before the disaster occurred (PL 106-390).

The federal government sets its priorities for disaster preparation, response, recovery, and mitigation via the Stafford Act and its amendments. Godschalk and colleagues (1999, 15) refer to it as an “intergovernmental mitigation system” where FEMA regional offices facilitate state level implementation based upon the individual state’s commitment to mitigation and its own mitigation plans, and the state then implements the plan to reduce risks. While the role of the federal government’s influence on flood mitigation policies should not be discounted, the so-called “intergovernmental mitigation system” may be more
of an ideal type. The federal government’s influence on flood hazard mitigation has been mixed at best. However, the relative influence other states have on adoption compared to the influence of the federal government on adoption remains unknown. Berry and Berry have a theoretical concern over the issues of discretion and mandates, because “in some cases, the national government can simply mandate certain activities by the states… a much more interesting theoretical process results when states retain discretion, but the national government provides incentives for the adoption of the policy by the states” (1999, 177).

Thus:

H9: A state is more likely to adopt a flood mitigation policy innovation if Congress passes a mitigation policy in the prior year of measurement.

In the case of financial incentives for states to mitigate floods, I am concerned with influence of federal funding before a flood. Under the Stafford Act the federal government provides financial incentives to mitigate after a disaster occurs through the HMGP. But this has the potential to reward states for failing to mitigate. Federal financial incentives to mitigate before a disaster through the Pre-Disaster Mitigation (PDM) program could create sufficient influence by way of seed money for states to innovate using their own discretion. Thus:

H10: A state is more likely to adopt innovative flood mitigation policy if the federal government has provided financial incentives to mitigate under the Pre-Disaster Mitigation program during the prior year of measurement.

Since September 11 and the creation of Department of Homeland Security (DHS), the federal government has assumed the lead in disaster policy generally, representing a shift
away from state and local governments. However, this shift has emphasized disaster preparedness and response at the expense of mitigation as a means of lessening the effects of disasters or reducing risks associated with natural hazards. These reforms stemming from the reaction to September 11 and subsequent political rhetoric to “do something,” caused natural disasters to become a secondary concern to terrorism at FEMA (Birkland 2004). For reasons that are unclear, the George W. Bush administration ended pre-disaster mitigation programs like Project Impact. In 2007, when Congress adopted the Post-Katrina Emergency Reform Act (PKEMRA), giving the director of FEMA authority to provide “land acquisition and relocation assistance” projects as long as the state or local government was eligible to receive assistance under the hazard mitigation grant program. Any property that was acquired would have the structure removed and remain vacant and essentially underdeveloped in perpetuity in a way that is “compatible with open space, recreational, or wetlands management practices” (PL 109-295).

The federal government’s role in and influence on flood mitigation policies is a part of an “intergovernmental mitigation system” but as I have argued, this description is more of an ideal type. The real effect of federal policies is that they either increase vulnerabilities to floods or initiate shifting or unclear policy priorities for flood mitigation.

We know that issues of high political salience at the national level have tended to influence state legislative and political agendas and “the national government is therefore an important causal mechanism during the agenda-setting stage of policy diffusion” (Karch 2007, 195). This is consistent with other findings in the diffusion literature. States will act to address a policy problem when it is clear that national government action is not imminent.
Finally, when the national government sends a mixed message to states about policy preferences—namely, response and recovery over mitigation—its influence on state policy adoption is weak (Allen, Pettus and Haider-Markel 2004). Thus:

H11: A state is more likely to adopt a flood mitigation policy innovation if mitigation is on the federal legislative agenda during the previous year.

**Focusing Events**

The development of diffusion theory in the policy sciences has narrowly concentrated on variance or the rate of diffusions and the characteristics of the states that have governed this process. This has led to an incomplete development of policy diffusion theory. Reframing diffusion as a more dynamic process of policy adoption within the context of focusing events, may allow for clarification of the policy innovation theories, particularly by considering diffusion as more of an integral part of the policy process, rather than a statistical variance.

Examining diffusion in the context of the policy agenda is one way to reframe diffusion. While Kingdon concedes that the term agenda has multiple meanings, whether it is the focus of a congressional meeting or a hidden plan of someone involved in the policy process he ultimately defines agenda as “the list of subjects or problems to which government officials, and people outside of government closely associated with those officials are paying some serious attention to at any given time” (1997, 3).
Within the agenda setting literature, diffusion theory has been included only in a marginal way that I argue, reinforces a narrow, variance-oriented development. Baumgartner and Jones conceptualize agenda setting as the inherent instability of policy monopolies that are either perpetuated by negative feedback loops or disrupted by positive feedback loops, which lead to a punctuation in the policy equilibrium, and thus result in policy change. Baumgartner and Jones theorize that policy diffusion “with its S-shaped curve is remarkably like a punctuated equilibrium model in which the system shifts rapidly from one stable point to another” (17).

Although Baumgartner and Jones recognize that it is not a certainty that all policy innovations will diffuse completely, their conceptualization of diffusion is a part of the positive feedback process where policies diffuse rapidly but once diffusion of a particular policy innovation reaches a saturation point, negative feedback occurs. This conceptualization of policy diffusion within the context of agenda setting implies that the punctuation in the policy equilibrium occurs in the middle of the diffusion process and that it will be demonstrated by a rapid increase in policy adoption. While this is certainly a valid way to consider policy diffusion within the context of agenda setting and non-incremental policy change, accepting the assumption that a punctuation in the policy equilibrium is analogous with the diffusion of policies among the American states may be inherently short-sided. Put simply, what if a punctuation in the policy equilibrium serves to disrupt the diffusion process? What would the process look like if a punctuation in the policy equilibrium had a deleterious effect on diffusion?
Baumgartner and Jones implicitly accept the pro-innovation bias prevalent in diffusion studies when they accepted the notion that a punctuation in the policy equilibrium would lead to diffusion. The pro-innovation bias in diffusion theory is “the implication that an innovation should be diffused and adopted by all members of a social system, that it should be diffused more rapidly, and that the innovation should neither be re-invented nor rejected” (Rogers 2003, 106). The concepts underpinning the pro-innovation bias are the assumed desirability of the innovation, rapid adoption, and lack of consideration for reinvention or rejection. Overlooking this bias means scholars will neglect the importance of rejecting an innovation, the importance of anti-diffusion programs (Rogers 2003).

This raises questions about how and when and to what effect punctuations in the policy equilibrium affect the diffusion process. Is it really important if a more specific form of a punctuation in the policy equilibrium, in the form of a focusing event, occurs during the diffusion process?

Kingdon’s multiple streams model of agenda setting and policy change decouples policy problems from solutions in an environment where policy entrepreneurs are able to influence policy change when focusing events open “windows of opportunity” for policy change. Focusing events, as initially defined are considered to be, “a crisis or disaster that comes along to call attention to the [policy] problem, a powerful symbol that catches on…” (2003, 97).

When considered within the context of diffusion theory, potential focusing events (Birkland 1997) are spontaneous rather than anticipated events that occur during the process in which policies diffuse or fail to diffuse among the American states. While Baumgartner
and Jones theorize that punctuations in the policy equilibrium are a result of policy diffusion, Kingdon’s model indicates that focusing events have the ability to change the existing policy agenda. In the context of diffusion of flood mitigation policies, this could mean that states that experience particularly damaging floods might be more likely to change the make up of policies on the existing policy agenda. Consistent with Kingdon, I theorize that the disaster—the focusing event—trigger diffusion but diffusion emerges out of changes in the existing policy agenda. Because of this, I assume that the mitigation innovations are already on the existing policy agenda, albeit largely on the backburner. This conceptualization is contrary to Baumagartner and Jones’ conception of diffusion occurring prior to punctuation in the policy equilibrium. This view also demonstrates the difference between the variance and process studies in diffusion discussed above. Punctuated equilibrium models inherently focus on the variance of policy diffusion and multiple streams models imply a process-oriented approach to diffusion studies.

Birkland (1997, 22) expanded the definition of focusing events to potential focusing events that are “sudden, relatively rare, can be reasonably defined as harmful or revealing the possibility of potentially greater future harms, inflicts harms or suggests potential harms that are or could be concentrated on a definable geographical area or community of interest, and that is known to policy makers and the public virtually simultaneously.” The potential harm that floods reveal may vary from state-to-state for two reasons. First, potential harm from a flood might be revealed by the experience of a recent flood. If some span of time has elapsed since a flood, a state might be less likely to adopt because of the perception that floods do not pose a serious threat to life and property. Second, the severity of a potential focusing event
might be positively associated with adoption if the damage caused by a flood (in terms of life and property). Thus:

H12: A state will be more likely to adopt a flood mitigation policy innovation if it has experienced a recent flood;

H13: A state will be more likely to adopt a flood mitigation policy innovation if it has experienced a severe flood.

Conclusion and a Look Ahead

In this chapter, I discussed the factors than predict state policy adoption, specifically the classic diffusion factors dealing with internal and external influences. These influences are grounded in the diffusion of policy innovations framework and are informed by literature addressing mitigation policies in general and flood mitigation policies specifically. While the internal characteristics of states are more straightforward, the distinction between the regional influence and national influence in the context of flood mitigation policies is less clear both because of the shifting role of the federal government and its shifting priorities.

In Chapter Three, I present my research methodology for testing my hypotheses, operationalize the variables in the model, and discuss data selection and method.
CHAPTER THREE: METHODOLOGY

The purpose of this chapter is to present the research methodology, specifically the data, method of analysis and model. It is divided into three main sections that are research design, hypotheses and model specification.

Research Design

This study examines a 40-year span of time where the data are grouped within the population of 50 states. I use a quasi-experimental research based on the population of 50 states rather than a sample. It analyzes data that is time variant—such as the variable measuring unified political control that changes based on election outcomes. The research design is both cross-sectional and longitudinal based on data described below.

The unit of analysis for this study is the policy innovation. The primary goal of this study is to determine the underlying causes that influence states to adopt a particular flood mitigation policy innovation and to determine whether there are any common correlates among the policy innovations of strict building codes, land use planning, and land acquisition. As such, focusing on the policy innovation as the level of analysis allows for comparisons between the flood mitigation policy innovations of comprehensive land use planning, flood-specific building codes, land acquisition, and public infrastructure investments.

The unit of analysis for this study is the state innovation decision. Using the state as the unit of analysis is consistent with other diffusion studies (Berry and Berry 1990). However, this study is concerned with the process by which states decide to innovate rather than the relative quickness to innovation of one state compared to another. As such, the level
of analysis is the state and the unit of analysis is the policy decision, which includes adoption or non-adoption.

Data Collection

This study relies on publicly available, secondary data for analysis. Secondary data sources often use different operational definitions that do not fit neatly within theoretical constructs but the variables for this study are grounded in the theoretical constructs of diffusion theory. Furthermore, the standard practice for policy diffusion studies has been to use secondary longitudinal data as demonstrated by the works of Walker (1969), Gray (1974), Berry and Berry (1990; 1992), Allen, Pettus, and Haider-Markel (2004), Daley and Garand (2005), and Karch (2007).

There is no suitable, comprehensive dataset for state level data on policy adoption and their correlates. Because of this, the data for this study is assembled from a variety of sources. For the dependent variable, the innovation decision for a policy in a given year between 1968 and 2008. Data is collected from the official legislative and governmental records and supplemented by the Book of States (1968-2008), with additional legislative data from the Association of State Floodplain Managers (ASFPM), the Insurance Institute for Business and Home Safety (IBHS) and the International Code Council (ICC). Data sources for independent variables are collected from the Book of States (1968-2008), The Spatial Hazard Events and Losses Database for the United States (1968-2008), The Federal Register, the Congressional Record, The US Census Bureau, and a measure of state political ideology calculated by Berry, Fording, Ringquist, Hanson, and Klarner (2008).
Data

Data Screening

First, I checked data accuracy by screening the frequencies for each variable to determine if the distributions were within normal ranges. The data was screened for skew and kurtosis. Some variables were heavily skewed. I attributed this to the dichotomous or nominal nature of some variables and changing nature of the data over time. For example, the hazards literature indicates that floods are increasingly damaging over time so the distribution of the data reflects that change (Brody et al. 2007). In spite of the presence of heavily skewed data and kurtosis in some variables, the overall shape of the data is within the acceptable range (See Table 1). Second, the data was subsequently screened for missing values by looking for any pairwise or listwise missing values in the analysis of the descriptive statistics. No values were found to be missing.

Third, I screened the independent variables for multicollinearity by examining the bivariate correlations of the independent variables. Correlations above a threshold of \( r = 0.7 \) (Tabachnik and Fidell 2001) or \( r = 0.8 \) (Garson 2012) are considered too high and indicative of possible multicollinearity among the independent variables. The correlations among the independent variables did not exceed the \( r = 0.7 \) threshold.
### Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>State GDP</td>
<td>$1,628</td>
<td>$8,270,462</td>
<td>$11,900</td>
<td>$25,750</td>
<td>17.021</td>
<td>495.991</td>
</tr>
<tr>
<td>Per Capita Income</td>
<td>$2,179</td>
<td>$56,904</td>
<td>$17,690</td>
<td>$11.110</td>
<td>.562</td>
<td>-.508</td>
</tr>
<tr>
<td>Citizen Liberalism</td>
<td>4.261</td>
<td>95.971</td>
<td>47.785</td>
<td>16.308</td>
<td>.116</td>
<td>-.265</td>
</tr>
<tr>
<td>Electoral Competition,</td>
<td>0</td>
<td>3</td>
<td>1.42</td>
<td>1.110</td>
<td>.111</td>
<td>-1.330</td>
</tr>
<tr>
<td>Gubernatorial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electoral Competition,</td>
<td>0</td>
<td>1</td>
<td>.55</td>
<td>.497</td>
<td>-.214</td>
<td>-1.956</td>
</tr>
<tr>
<td>Legislative Government</td>
<td>0</td>
<td>2</td>
<td>.54</td>
<td>.500</td>
<td>-.147</td>
<td>-1.949</td>
</tr>
<tr>
<td>Legislative Professionalism</td>
<td>.027</td>
<td>.659</td>
<td>.20683</td>
<td>.0340</td>
<td>6.153</td>
<td>80.728</td>
</tr>
<tr>
<td>Federal Mitigation Adoption</td>
<td>0</td>
<td>1</td>
<td>.29</td>
<td>.454</td>
<td>.925</td>
<td>-1.146</td>
</tr>
<tr>
<td>Congressional Mitigation Hearing</td>
<td>0</td>
<td>6</td>
<td>.64</td>
<td>1.214</td>
<td>2.553</td>
<td>7.241</td>
</tr>
<tr>
<td>Federal Mitigation Spending</td>
<td>$-9.0 Million</td>
<td>$200 Million</td>
<td>$51,600</td>
<td>$6.853 Million</td>
<td>23.049</td>
<td>652.204</td>
</tr>
<tr>
<td>Regional Influence</td>
<td>0</td>
<td>1</td>
<td>.11</td>
<td>.313</td>
<td>2.491</td>
<td>4.208</td>
</tr>
<tr>
<td>Property Damage Caused by Flood</td>
<td>$0</td>
<td>$8.0 Trillion</td>
<td>$3.84</td>
<td>$2.479 Million</td>
<td>20.081</td>
<td>539.164</td>
</tr>
<tr>
<td>Injuries</td>
<td>.00</td>
<td>6357.02</td>
<td>8.1301</td>
<td>158.09918</td>
<td>34.935</td>
<td>1328.396</td>
</tr>
<tr>
<td>Fatalities</td>
<td>.00</td>
<td>237.00</td>
<td>1.7801</td>
<td>7.80954</td>
<td>19.181</td>
<td>495.174</td>
</tr>
<tr>
<td>Time Elapsed Since Previous Flood</td>
<td>1</td>
<td>12</td>
<td>1.51</td>
<td>1.242</td>
<td>3.626</td>
<td>16.357</td>
</tr>
<tr>
<td>Coastal Hazard</td>
<td>0</td>
<td>1</td>
<td>.58</td>
<td>.494</td>
<td>-.324</td>
<td>-1.897</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>2050</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Standard error for skew = 0.054
- Standard error for kurtosis = 0.108
Validity and Reliability

Validity, or the internal logical consistency of a study, is important to social science research because it is difficult to define and measure intangible concepts like political ideology or legislative professionalism. There are two chief concerns related to validity. The first concern is construct validity, or whether the data appropriately represent the theoretical constructs underpinning a study. All of the variables used in this study are based on what has been established in the existing literature on diffusion of policy innovations and agenda setting, specifically focusing events.

The second concern is content validity or whether the data are measuring what the research claims they are measuring. Because most of my data has been gathered from sources such as the Bureau of Economic Analysis or the U.S. Census Bureau, the face validity of measures like state GDP and per capita income have already been validated. However, much of the data that has been collected, particularly data measuring the dependent variables is based on historic records. To ensure content validity, I identified policy adoptions from publications by the ASFPM (1995, 2003, 2010), the ICC (2010), and the IBHS (2009) but verified the adoptions and year of adoption by searching executive orders signed by the sitting governor and state legislative records, particularly the legislative histories. Furthermore, for any states that did not report or participate in the studies conducted by ASFPM, ICC, or IBHS I conducted an independent search of state legislative and executive records to determine whether adoption had occurred. Finally, I extended my search for any state that had adopted one innovation to determine if there was evidence of other adoptions.
The reliability of the data used in this study is important for the generalizability of its findings. One way to ensure the reliability is to choose the appropriate statistical technique that fits the theory, research problem, and the shape and distribution of the data. I have attempted to do that and my choice of analytic tool is discussed in detail in the next section.

**Statistical Procedure**

Event history analysis (EHA) is a group of statistical techniques that are the standard methodology for diffusion of innovation studies. The EHA family of methods includes three types of models: parametric models, proportional hazard models, and discrete time models. Each technique has advantages and disadvantages and selection of the appropriate technique depends on theoretical assumptions about the shape of the data distribution, assumptions about the rate for the risk of adoption, and the discrete nature of data to measure a continuous event (Box-Steffensmeier and Jones 2004). Parametric models are not applicable because the shape of the baseline hazard function, meaning that the hazard function of all predictors is unknown. However, the selection between a proportional hazard model and a discrete data model is not quite as clear.

Box-Steffensmeier and Jones (2004) argue that if the proportional hazard rate is considered a “nuisance” variable then it is preferable to use Cox regression instead of a discrete data model. However, the use of a discrete data model that incorporates a variable for time has been and continues to be the standard practice for diffusion of policy innovations studies (Beck et al. 1998). Moreover, when the data present too many ties at once, i.e., too many adoptions at one time, discrete data models are preferred. I use a discrete time model for this study because it is focused on the correlates of policy adoption rather than the rate of
adoption. The use of a discrete time model is the commonly accepted approach for studies about policy diffusion and the correlates of adoption (Berry and Berry 1990, Berry and Berry 1992, Mintrom 1997, Mintrom and Vergari 1999).

To conduct the discrete time model, I use a statistical technique in the Generalized Linear Model (GZLM) family. I model the binary dependent variables using a binomial distribution and include a log link function known as complementary log-log function to account for the probability that an adoption event will occur (Garson 2011). Furthermore, because of reliability concerns, I include a dummy time variable allowing the data to be treated as grouped duration data (Personal Communication with Beck 2011: Beck, Katz et al. 1998). Following the technique used by other diffusion scholars (Mintrom 1997, Berry and Berry 1990, 1992) I code for time period of consideration that corresponds with legislative session.

**Hypotheses**

This study contains thirteen hypotheses that are broadly separated into three theoretical constructs—resources and obstacles, external influences, and focusing events. While the hypotheses and their theoretical underpinnings were established in Chapter 2, it is appropriate to revisit them to extend the connection between theory, hypotheses, and analytic models. Table 2: Hypotheses lists the hypotheses used in this study including the anticipated direction and strength of association of each hypothesis in the model. I report significance at .001, .05 and .10 levels. I use the .05 significance level for hypothesis testing. and the .10 significance level for exploratory analysis.
### Table 2: Hypotheses

<table>
<thead>
<tr>
<th>Theoretical Construct</th>
<th>Hypothesis</th>
<th>Anticipated Direction</th>
<th>Strength of Association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources and Obstacles</td>
<td>H1: The more politically liberal the state, the more likely it will be to adopt a flood mitigation policy in a given year.</td>
<td>+</td>
<td>Strong</td>
</tr>
<tr>
<td></td>
<td>H2: If there is single party control of a state legislature and the governor’s house, the sooner it will be to adopt a flood mitigation policy.</td>
<td>+</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>H3: Flood mitigation policy innovations are less likely to be adopted in a gubernatorial election.</td>
<td>+</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>H4: Flood mitigation policy innovations are less likely to be adopted in a legislative election.</td>
<td>-</td>
<td>Weak</td>
</tr>
<tr>
<td></td>
<td>H5: The better the fiscal health of a state, the more likely it will adopt a flood mitigation policy.</td>
<td>+</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>H6: The more personal wealth there is in a state, the earlier it will adopt a flood mitigation policy.</td>
<td>+</td>
<td>Weak</td>
</tr>
<tr>
<td></td>
<td>H7: The more professional the legislature, the more likely a state will be to adopt a flood hazard mitigation policy.</td>
<td>+</td>
<td>Weak</td>
</tr>
<tr>
<td>External Influence</td>
<td>H8: The greater the number of a state’s neighbors that have adopted a flood mitigation policy innovation in the prior year of measurement, the more likely the state is to adopt the same policy innovation.</td>
<td>+</td>
<td>Strong</td>
</tr>
<tr>
<td></td>
<td>H9: A state is more likely to adopt a flood mitigation policy innovation if Congress passes a mitigation policy in the prior year of measurement.</td>
<td>+</td>
<td>Strong</td>
</tr>
<tr>
<td></td>
<td>H10: A state is more likely to adopt innovative flood mitigation policy if the federal government has provided financial incentives to mitigate under the Pre-Disaster Mitigation program during the prior year of measurement.</td>
<td>+</td>
<td>Strong</td>
</tr>
<tr>
<td></td>
<td>H11: A state is more likely to adopt a flood mitigation policy innovation if mitigation is on the federal legislative agenda during the previous year.</td>
<td>+</td>
<td>Moderate</td>
</tr>
<tr>
<td>Focusing Events</td>
<td>H12: A state will be more likely to adopt a flood mitigation policy innovation if it has experienced a recent flood.</td>
<td>+</td>
<td>Weak</td>
</tr>
<tr>
<td></td>
<td>H13: A state will be more likely to adopt a flood mitigation policy innovation if it has experienced a severe flood.</td>
<td>+</td>
<td>Strong</td>
</tr>
</tbody>
</table>
The category of resources and obstacles contain hypotheses about state political ideology, unified political control of government, electoral competition, fiscal health, personal wealth, and legislative professionalism. Based on the literature, I anticipate that political ideology, unified political control of government, gubernatorial electoral competition, fiscal health, personal wealth, and legislative professionalism will be positively associated with adoption of policy innovations; statehouse election years are likely to be negatively associated with adoption of a policy innovation. I anticipate that liberal state political ideology will be strongly associated with mitigation policy innovations because the nature of the innovations suggests a more liberal view of the role of government in addressing the loss of life and property associated with floods. Unified government, gubernatorial election years, and state fiscal health are anticipated to be moderately associated with state policy adoption.

The category of external influences contains hypotheses testing regional influence of neighboring states and influence of national government including legislative, financial, and agenda-setting variables. Based on the literature, it is anticipated that the influence of neighboring states will be positively associated with state adoption of mitigation innovations. Furthermore, consistent with the hazards and disaster literature, federal adoption of a mitigation innovation, financial incentives, and presence on the federal legislative agenda are anticipated to be positively associated with state adoption of flood mitigation policy innovations. All of the hypotheses testing the influence of external factors on state policy adoption are anticipated to be strong for two reasons. First, neighboring states are likely to have similar flood hazards because beaches, rivers, and floodplains tend not to fit neatly into
political jurisdictions. Second, much of the hazards and disaster literature assumes that the federal government takes a primary (albeit mixed and sometimes muddled) role in mitigation policy.

The third and final category of hypotheses contains constructs related to focusing events including the recentness of a flood and the damage caused by a flood. I anticipate that recent floods will have a weak and negative association with state policy adoption. Repeated chronic flooding may diminish risk perception about the severity of flood hazards, making states less likely to innovate. However, I anticipate that the more severe a recent flood, the more positively and strongly it will be associated with state policy adoption.

**Model Specification**

There are three dependent variables measuring policy adoption in a given state year, for each flood mitigation policy innovation in this study—building codes, comprehensive planning mandates, and land acquisition. The dependent variables are defined in terms of the adoption status—either by legislative adoption, executive order, or rulemaking procedure. The dependent variables are dichotomous where 0 represents nonadoption and 1 represents adoption. No evidence of policy rejection or reversal was found. Refer to Table 3 for a description of the variables, the operationalization, method of measurement, and data source for each of the dependent variables used in this study.
Table 3: Measures of Dependent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operationalization</th>
<th>Values</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning Mandates</td>
<td>The legislative status of state requirements for local government to engage in flood mitigation as a part of their comprehensive land use planning for a given state/year.</td>
<td>Dichotomous variable with 0 meaning not adopted, 1 representing legislative adoption for a given state/year.</td>
<td>Insurance Institute for Commercial and Residential Building (2009), Association of State Floodplain Managers. (1995, 2003, 2010)</td>
</tr>
</tbody>
</table>

The dependent variable measuring the state adoption of mandatory building codes from 1968 to 2008 includes fifteen states. The adopting states are California, Connecticut, Georgia, Indiana, Kentucky, Massachusetts, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Rhode Island, South Carolina, Utah, and Virginia (International Code Commission 2009). State adoptions by year and policy innovations are detailed in Table 4.

The dependent variable measuring state adoption of requirements for local governments to include hazard mitigation in their comprehensive land use planning includes eleven states. The adopting states are Arizona, California, Colorado, Connecticut, Florida, Idaho, Maryland, Montana, North Carolina, Oregon, and South Carolina (Insurance Institute

The independent variables for this study are divided into three categories: resources and obstacles, external influences, and focusing events. The operationalization and data are described below. Descriptive statistics for the independent variables can be found in Table 1. Results of bivariate analysis are reported when the covariates are found to significantly correlated at the p=.05 level and exceed the threshold of .90 for multicollinearity.
<table>
<thead>
<tr>
<th>State Building Code Adoption</th>
<th>Land Use Planning Adoption</th>
<th>Acquisition and Relocation Adoption</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Carolina</td>
<td>Idaho</td>
<td>Wisconsin</td>
</tr>
<tr>
<td>Virginia</td>
<td>Montana</td>
<td>Mississippi</td>
</tr>
<tr>
<td>New Jersey</td>
<td>Oregon</td>
<td>Florida</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>North Carolina</td>
<td>Maryland</td>
</tr>
<tr>
<td>South Carolina</td>
<td>Florida</td>
<td>Virginia</td>
</tr>
<tr>
<td>Kentucky</td>
<td>Maryland</td>
<td>Arizona</td>
</tr>
<tr>
<td>New York</td>
<td>South Carolina</td>
<td>Georgia</td>
</tr>
<tr>
<td>Florida</td>
<td>California</td>
<td>Michigan</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>Colorado</td>
<td>Colorado</td>
</tr>
<tr>
<td>California</td>
<td>Connecticut</td>
<td>Massachusetts</td>
</tr>
<tr>
<td>Indiana</td>
<td>Arizona</td>
<td>Rhode Island</td>
</tr>
<tr>
<td>Georgia</td>
<td></td>
<td>Tennessee</td>
</tr>
<tr>
<td>Connecticut</td>
<td></td>
<td>Minnesota</td>
</tr>
<tr>
<td>Oregon</td>
<td></td>
<td>Illinois</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td></td>
<td>Iowa</td>
</tr>
<tr>
<td>Utah</td>
<td></td>
<td>North Dakota</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oklahoma</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indiana</td>
</tr>
<tr>
<td></td>
<td></td>
<td>South Carolina</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alaska</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missouri</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nebraska</td>
</tr>
<tr>
<td></td>
<td></td>
<td>New Jersey</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kentucky</td>
</tr>
<tr>
<td></td>
<td></td>
<td>North Carolina</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alabama</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connecticut</td>
</tr>
</tbody>
</table>
### Table 5: Measures of Independent Variables

<table>
<thead>
<tr>
<th>Theoretical Construct</th>
<th>Variable</th>
<th>Operationalization</th>
<th>Measurement</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unified Political Control</td>
<td>States that have unified party control of governmental institutions will be more likely to adopt flood mitigation policies because there will be less opposition when the institutions of government are divided by political parties. Divided political control of the legislative and executive branches may cause a state to be less likely to adopt (either by outright rejection or consideration without adoption) a flood mitigation policy innovation.</td>
<td>Dichotomous variable 0/1 for unified control/divided government.</td>
<td>Council Of State Governments. 1968-2008. The Book of States. Lexington: Council of State Government. Data from table on legislators and their party affiliation.</td>
</tr>
</tbody>
</table>
**Table 5 Measures of Independent Variables, Continued**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operationalization</th>
<th>Measurement</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electoral Competition, Gubernatorial</td>
<td>Electoral competition is defined as the proximity in years to the next gubernatorial election.</td>
<td>Categorical variable where “0” represents an election year, “1” represents the first year after an election, “2” represents the second year after an election, and “3” represents the third year after an election.</td>
<td>Council Of State Governments. 1968-2008. The Book of States. Lexington: Council of State Government. Data from tables on general elections for statewide office by state/year.</td>
</tr>
<tr>
<td>Electoral Competition, Legislative</td>
<td>Legislative electoral competition is defined as whether or not it is a statehouse election year.</td>
<td>Dichotomous variable 0/1 for legislative election year.</td>
<td>Council Of State Governments. 1968-2008. The Book of States. Lexington: Council of State Government. Data from tables on general elections for statewide office by state/year.</td>
</tr>
</tbody>
</table>
Table 5 Measures of Independent Variables, Continued

<table>
<thead>
<tr>
<th>Variable</th>
<th>Operationalization</th>
<th>Measurement</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legislative professionalism</td>
<td>Legislative professionalism is defined as the extent to which a state has the capacity to effectively conduct legislative business. The more days a state legislature is in session, the larger the average staff size, and the higher the amount of legislative compensation, the more likely the state legislature is to be considered professional.</td>
<td>Measure based on legislator salary, staff size, and days in session by state/year. Measure to be calculated based on: Squire, Peverill 1992. Legislative professionalism and membership diversity in state legislatures. Legislative Studies Quarterly 17 (1): 69-79.</td>
<td>Council Of State Governments. 1968-2008. The Book of States. Lexington: Council of State Government. Data to calculate the measure comes from tables on average legislator salary, staff for individual legislators, and legislative sessions.</td>
</tr>
</tbody>
</table>
Table 5 Measures of Independent Variables, Continued

<table>
<thead>
<tr>
<th>External Influence</th>
<th>Regional Influence</th>
<th>Description</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The number of neighboring states in each corresponding FEMA region that adopted in the prior year of measurement.</td>
<td>Calculated by the author will measure the number of neighboring states that have adopted a flood mitigation policy in the prior year of measurement.</td>
<td>Data gathered from The Book of States, legislative records, and legislative data from the National Association of Emergency Managers.</td>
</tr>
<tr>
<td>National Influence</td>
<td>Whether or not a bill dealing with a flood mitigation policy innovation has been adopted by the US Government.</td>
<td>Dichotomous variable 0/1 for bill not passed/passed.</td>
<td>American Institutes for Research (2005)</td>
</tr>
<tr>
<td>National Influence</td>
<td>The amount of funding the federal government provides to states for pre-disaster mitigation grants and disaster mitigation grants per year.</td>
<td>Dollar value of federal government provides to states for pre-disaster mitigation funding per year per state/year in 2008 dollars for the prior two years of measurement.</td>
<td>US Census, Consolidated Federal Funds Report. Funding by state/year under the pre-disaster mitigation program, CFDA number 97.047.</td>
</tr>
<tr>
<td>National Influence</td>
<td>Whether or not a committee hearing on a flood mitigation policy innovation has been held in the US Congress for a given year.</td>
<td>Dichotomous variable 0/1 for no hearing/hearing.</td>
<td>The Library of Congress (1968-2008), Congressional Record. (1968-2008)</td>
</tr>
</tbody>
</table>
Table 5 Measures of Independent Variables, Continued

<table>
<thead>
<tr>
<th>Theoretical Construct</th>
<th>Variable</th>
<th>Operationalization</th>
<th>Measurement</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focusing Events</td>
<td>Focusing Event - Recentness</td>
<td>Time elapsed since the last flood.</td>
<td>The number of years have elapsed since the last flood has occurred in the prior state/year.</td>
<td>Hazards &amp; Vulnerability Research Institute (2010).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dollar value of property damage caused by flooding per state/year in 2008 dollars</td>
<td>Hazards &amp; Vulnerability Research Institute (2010).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number of injuries caused by a flood in a state/year.</td>
<td>Hazards &amp; Vulnerability Research Institute (2010).</td>
</tr>
<tr>
<td></td>
<td>Focusing Event - Control</td>
<td>Whether the state is subject to a coastal flooding hazard.</td>
<td>Dichotomous variable of 0/1 for the presence of a coastal flood hazard.</td>
<td>Calculated by author</td>
</tr>
</tbody>
</table>
The category of resources and obstacles contain variables of state political ideology, unified political control of government, electoral competition, fiscal health, personal wealth, and legislative professionalism. State political ideology is measured using a scale of state mass liberalism (Berry, Fording, Ringquist, Hanson, and Klarner 2008). There are no significant correlations with other covariates to report.

Unified political control of government is measured using a dichotomous variable where 0 represents unified government—regardless of political party—and 1 represents divided government, meaning that different political parties control the governor’s seat and the state legislature. Data for this variable were gathered from tables on governors and legislators from *The Book of States* (1968-2008) and hand calculated by the author. The measure for uniform control of government does not have any significant correlations to report.

Electoral competition is assessed using two different measures. Gubernatorial election year is a measure based on Berry and Berry’s coding scheme for proximity to gubernatorial election year. It is a categorical variable where 0 represents the election year, 1 represents one year after the election year, 2 represents two years from the election year and 3 represents three years from the election year. Data for gubernatorial electoral competition was gathered from *The Book of States* (1968-2008) and hand calculated by the author. Legislative electoral competition is measured using a dichotomous variable based on data from *The Book of States* (1968-2008). There are no significant results from the bivariate analysis to report.
State fiscal health is measured by state gross domestic product in constant dollars. Data for this variable were gathered from the US Bureau of Economic Analysis (1968-2008). State GDP is somewhat correlated with per capita income although that is not unexpected and the correlation is not significantly correlated at the 0.05 level.

The level of personal wealth in a state is measured using per capita income in constant dollars. Data for this variable is measured using data from the US Census Bureau (1968-2008). Personal wealth is not significantly correlated with any of the covariates. State legislative professionalism is measured using Squire’s (1992) scale of legislative professionalism and it is a function of legislator salary, staff size, and days in session by state/year. It is not significantly correlated with any of the covariates.

The category of external influences contains variables measuring regional influence of neighboring states and influence of national government including legislative, financial, and agenda-setting variables. Regional influence is a lagged variable with count data to measure the number of neighboring states in a given FEMA region to adopt a flood mitigation policy innovation in the prior year of measurement. Data for the regional influence was calculated by the author using data from FEMA and from ICC (2010), NASFM (1995, 2003, 2010), and ICRBS (2009). Regional influence is significantly correlated with the covariate for unified government but it does not meet the threshold to generate concerns about multicollinearity. Table 6 lists the states in each FEMA region.
Table 6: FEMA Regions

<table>
<thead>
<tr>
<th>FEMA Region</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont</td>
</tr>
<tr>
<td>2</td>
<td>New Jersey, New York</td>
</tr>
<tr>
<td>3</td>
<td>Delaware, Maryland, Pennsylvania, Virginia, West Virginia</td>
</tr>
<tr>
<td>4</td>
<td>Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee</td>
</tr>
<tr>
<td>5</td>
<td>Illinois, Indiana, Michigan, Ohio, Wisconsin</td>
</tr>
<tr>
<td>6</td>
<td>Arkansas, Louisiana, New Mexico, Oklahoma, Texas</td>
</tr>
<tr>
<td>7</td>
<td>Iowa, Kansas, Missouri, Nebraska</td>
</tr>
<tr>
<td>8</td>
<td>Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming</td>
</tr>
<tr>
<td>9</td>
<td>Arizona, California, Hawaii, Nevada</td>
</tr>
<tr>
<td>10</td>
<td>Alaska, Idaho, Oregon, Washington</td>
</tr>
</tbody>
</table>

Source: Federal Emergency Management Agency 2012

External influence from the national level on state policy adoption is measured using three different independent variables. The first variable measures federal legislative adoption of a flood mitigation policy in a given year. Data for the variable on federal legislative adoption was collected from the American Institutes for Research (2005). I calculated the measure as a dichotomous variable where 1 represents federal adoption of a flood mitigation policy innovation. Table 7 lists the variables for federal legislative adoption. There are no significant correlations to report for the variable measuring federal legislative action.
Table 7: Federal Legislative Adoption

<table>
<thead>
<tr>
<th>Year</th>
<th>Legislation Adopted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>The National Flood Insurance Act of 1968, Title XII of the Housing and Urban Development Act of 1968 (PL 90-448) is passed creating the National Flood Insurance Program.</td>
</tr>
<tr>
<td>1974</td>
<td>The Disaster Relief Act Amendments of 1974 (PL 93-288). Amendments are the first congressional mandate for hazard mitigation as a condition for receiving disaster assistance.</td>
</tr>
<tr>
<td>1979</td>
<td>Land acquisition program for flood-damaged properties from Section 1362 of the National Flood Insurance Act of 1968 is funded. (Carter’s Water Policy Initiative recommends funding buyout program in June 1968).</td>
</tr>
<tr>
<td>1988</td>
<td>The Robert T. Stafford Disaster Relief and Emergency Act (PL 100-707) is passed. Emphasizes acquisition or buyouts of properties, reduce risk through construction in non-hazardous areas.</td>
</tr>
<tr>
<td>1993</td>
<td>The Volker Amendment of the Hazard Mitigation and Relocation Assistance Act amending the Stafford Act to increase funding for buyouts, increases federal share from 50% to 75%.</td>
</tr>
<tr>
<td>1994</td>
<td>The Community Development and Regulatory Improvement Act (PL 103-325), the National Flood Insurance Reform Act of 1994, including the most comprehensive changes since 1973. Creates the Mitigation Assistance Program, creates the National Mitigation Fund, provides additional coverage for compliance with land use and control measures.</td>
</tr>
<tr>
<td>1999</td>
<td>The Consolidated Appropriations Act (PL 106-113) is passed, directing FEMA to study the feasibility and justification for reducing buyout assistance to property owners who choose not to buy flood insurance. Authorizes $215 million for buyout/relocation.</td>
</tr>
<tr>
<td>2000</td>
<td>The Disaster Mitigation and Cost Recovery Act (PL 106-390) amends the Stafford Act provides technical and financial assistance to state and local governments to assist in the implementation of pre-disaster hazard mitigation measures. Requires states to prepare a comprehensive state program for emergency and disaster mitigation prior to receiving funds from FEMA.</td>
</tr>
<tr>
<td>2004</td>
<td>Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (HR 235) Reauthorization of NFIP with additional funding for mitigation for severe repetitive flood loss.</td>
</tr>
<tr>
<td>2007</td>
<td>Post-Katrina Emergency Reform Act.</td>
</tr>
</tbody>
</table>

Sources: Adapted from American Institutes for Research 2005; Author

The second variable measuring federal influence on state policy adoption of a flood mitigation policy innovation is drawn from the agenda setting literature. The variable
assesses federal legislative consideration of a flood mitigation policy as a correlate of state policy adoption. The variable measures the number of hearings the US House and Senate held per year on non-structural flood mitigation policy innovations. Data were collected from *The Congressional Record* (1968-2008) for hearings and hand calculated by the author with a one-year lag. It is not significantly correlated with any of the other covariates.

The third variable measuring federal influence on state policy adoption of a flood mitigation policy innovation is measures fiscal influence. Data for the variable were gathered from the *Consolidated Federal Funds Report* (US Census Bureau 1968-2008). It includes federal spending per state/year for hazard mitigation grants in constant dollars. It is not significantly correlated with any of the other covariates.

The final category of independent variables contains measures associated with focusing events. These measures include the recentness of a flood and the severity of a flood. The recentness of a flood is measured in years since the previous flood. The variable is hand calculated by the author and the data for the variable were gathered from Spatial Hazard Events and Losses Database for the United States (1968-2008). It is significantly correlated with legislative professionalism but does not meet the threshold for concerns about multicollinearity.

There are three measures of flood severity. First, this study measures damage to property in constant dollars for damage caused by a flood (SHELDUS 1968-2008). Second, this study includes a measure of flood severity based on the number of people injured by a flood from data gathered from SHELDUS (1968-2008). Third, this study measures flood severity based on the number of people killed by each flood per year. Data for this variable is
also from the SHELDUS database (1968-2008). None of the measures of flood severity are significantly correlated with any of the other covariates in the model.

Finally, a control variable for coastal flood hazard is included to hold the effects of coastal flood hazards constant in the model.

**Conclusion and a Look Ahead**

This chapter presented the research methodology including a discussion of the data, the method of analysis and the specification of the research model. The next chapter presents the results from the data analysis.
CHAPTER FOUR: RESULTS
This chapter presents the results of the data analysis. It is divided into three sections, one on each of the hazard mitigation policy innovations included in this study. Each section analyzes goodness of fit statistics, tests of model effects, and hazard ratios for three analytical models conducted for each of the policy innovations.

Land Use Planning Model

The model for state adoption of comprehensive land use planning mandates has 1838 observations with 11 observed adoptions (0.6%) and 1838 non-adoptions. Model fit statistics reported in Table 8 indicate the Model 1, the saturated model, is not the best fit of the data. Model 3 is the best fit because of the smallest -2LL, AIC and BIC values but there are concerns that the dropping covariates for state GDP and per capita income lack a theoretical rationale. Instead, the subsequent discussion is based on Model 2 because it is the best fit for the data. The subsequent discussion is focused on the results from Model 2 of the analysis. Land use planning has historically been the purview of local and increasingly state government (May and Deyle 1998). As such it is anticipated that the presence of covariates assessing federal influence might contribute too much noise to the model and dull the effects of other covariates.
In terms of model effects, Wald Chi-Square statistics reveal that state liberalism, gubernatorial electoral competition, legislative professionalism, and flood rarity are significantly associated with adoption at the $p < .001$ level with gubernatorial electoral competition and legislative professionalism being significant at the $p < .05$ level or better, controlling for other variables in the model. Because of the low threshold of significance testing, results from this analysis must be considered with caution. Significant Wald-Chi square statistics demonstrate that effect of variables for state liberalism, gubernatorial electoral competition, legislative professionalism, and flood rarity are significantly different from zero. Wald Chi-Square statistics for each of the statistical models analyzing the land use planning innovation are listed in Table 9.
Table 9: Tests of Model Effects, Land Use Planning Adoption

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wald Chi-Square</td>
<td>Wald Chi-Square</td>
<td>Wald Chi-Square</td>
</tr>
<tr>
<td>State GDP</td>
<td>23.472</td>
<td>25.051</td>
<td>—</td>
</tr>
<tr>
<td>Per Capita Income</td>
<td>1609.098</td>
<td>2164.168</td>
<td>—</td>
</tr>
<tr>
<td>Citizen Liberalism</td>
<td>6.256***</td>
<td>5.033***</td>
<td>0.885*</td>
</tr>
<tr>
<td>Electoral Competition, Governor</td>
<td>2.656*</td>
<td>1.587*</td>
<td>0.414*</td>
</tr>
<tr>
<td>Electoral Competition, Legislative</td>
<td>17.082</td>
<td>14.531</td>
<td>5.703***</td>
</tr>
<tr>
<td>Unified Government</td>
<td>26.648</td>
<td>35.490</td>
<td>0.041*</td>
</tr>
<tr>
<td>Legislative Professionalism</td>
<td>.144*</td>
<td>0.065*</td>
<td>0.056*</td>
</tr>
<tr>
<td>Regional Influence</td>
<td>24.785</td>
<td>23.021</td>
<td>39.477</td>
</tr>
<tr>
<td>Congressional Mitigation Hearings</td>
<td>18.361</td>
<td>—</td>
<td>3.279**</td>
</tr>
<tr>
<td>Federal Legislative Adoption</td>
<td>5.459***</td>
<td>—</td>
<td>1.236*</td>
</tr>
<tr>
<td>Federal Mitigation Spending</td>
<td>11.614</td>
<td>—</td>
<td>2.522*</td>
</tr>
<tr>
<td>Flood Rarity</td>
<td>4.918***</td>
<td>4.541***</td>
<td>5.151***</td>
</tr>
<tr>
<td>Property Damage</td>
<td>5.358***</td>
<td>7.099**</td>
<td>1.939*</td>
</tr>
<tr>
<td>Injuries</td>
<td>11.990</td>
<td>18.845</td>
<td>2.770**</td>
</tr>
<tr>
<td>Fatalities</td>
<td>5.571*</td>
<td>15.854</td>
<td>0.457***</td>
</tr>
</tbody>
</table>

Notes: *** = p < .001; ** = p < .05; * = p < .10.

Odds ratios for the three analytical models are presented in Table 10. Unless otherwise noted, the results from Model 2 are discussed. Odds ratios greater than 1 indicate a positive effect on the odds ratio, or the odds that a state will adopt a policy; odds ratios less than one indicate a negative effect on the likelihood that a state will adopt.

With respect to the effects of internal influences on adoption, the odds ratios are very close to one, meaning that they have little effect on the likelihood of adoption with a few exceptions. Increasing proximity to a gubernatorial election slightly reduces the odds that a state will be likely to adopt land use planning to mitigate. Legislative electoral competition produces a similar odds ratio but it is not significant in the parameter estimates. For Model 2, States with a more professional legislature are 3.3 times more likely to adopt comprehensive
land use planning. For focusing event covariates, the more rare the flood, the odds are 0.3 more likely that a state will adopt.

**Table 10: Odds Ratios, Land Use Planning Adoption**

<table>
<thead>
<tr>
<th></th>
<th>Model 1 Exp(B)</th>
<th>Model 2 Exp(B)</th>
<th>Model 3 Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State GDP</td>
<td>1.00</td>
<td>1.00</td>
<td>—</td>
</tr>
<tr>
<td>Per Capita Income</td>
<td>1.00</td>
<td>1.00</td>
<td>—</td>
</tr>
<tr>
<td>Citizen Liberalism</td>
<td>1.017***</td>
<td>1.015***</td>
<td>.982*</td>
</tr>
<tr>
<td>Electoral Competition, Governor</td>
<td>0.820**</td>
<td>0.869*</td>
<td>.843*</td>
</tr>
<tr>
<td>Electoral Competition, Legislative</td>
<td>2.830</td>
<td>0.869</td>
<td>3.831***</td>
</tr>
<tr>
<td>Unified Government</td>
<td>3.602</td>
<td>3.764</td>
<td>0.898*</td>
</tr>
<tr>
<td>Legislative Professionalism</td>
<td>3.695*</td>
<td>3.256*</td>
<td>0.002*</td>
</tr>
<tr>
<td>Regional Influence</td>
<td>0.265</td>
<td>.298</td>
<td>0.013</td>
</tr>
<tr>
<td>Congressional Mitigation Hearings</td>
<td>.790</td>
<td>—</td>
<td>0.747***</td>
</tr>
<tr>
<td>Federal Legislative Adoption</td>
<td>1.700***</td>
<td>—</td>
<td>0.585*</td>
</tr>
<tr>
<td>Federal Mitigation Spending</td>
<td>1.000</td>
<td>—</td>
<td>1.00*</td>
</tr>
<tr>
<td>Flood Rarity</td>
<td>1.370</td>
<td>1.327***</td>
<td>10.599***</td>
</tr>
<tr>
<td>Property Damage</td>
<td>1.000***</td>
<td>1.000</td>
<td>1.00**</td>
</tr>
<tr>
<td>Injuries</td>
<td>0.985</td>
<td>.956</td>
<td>0.961**</td>
</tr>
<tr>
<td>Fatalities</td>
<td>2.156***</td>
<td>1.744</td>
<td>1.345*</td>
</tr>
</tbody>
</table>

Notes: *** = p < .001; ** = p < .05; * = p < .10.
Building Code Model

The model for state adoption of strict building codes has 1805 observations with 15 observed adoptions (0.8%) and 1790 non-adoptions. Model fit statistics reported in Table 11 indicate the saturated model is not the best fit of the data. The subsequent discussion is focused on the results from Model 1 of the analysis because of concerns that Model 2 and Model 3 may put parsimony above theoretical framework.

Table 11: Goodness of Fit Statistics, Building Code Adoption

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2LL</td>
<td>-286.460</td>
<td>-65.259</td>
<td>-78.886</td>
</tr>
<tr>
<td>AIC</td>
<td>604.920</td>
<td>148.518</td>
<td>169.819</td>
</tr>
<tr>
<td>BIC</td>
<td>692.893</td>
<td>198.003</td>
<td>202.762</td>
</tr>
</tbody>
</table>

Wald Chi-Square statistics reveal that gubernatorial electoral competition, legislative electoral competition, legislative professionalism, congressional mitigation hearings, federal mitigation spending, property damage, injuries, and fatalities are significantly associated with adoption at the p <.001 level with gubernatorial electoral competition, legislative electoral competition, Congressional mitigation hearings, federal mitigation spending, property damage, injuries, and fatalities being significant at the p<.05 level or better. Wald Chi-Square statistics for each of the statistical models analyzing strict building code adoption are listed in Table 12.
Table 12: Tests of Model Effects, Building Code Adoption

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wald Chi-Square</td>
<td>Wald Chi-Square</td>
<td>Wald Chi-Square</td>
</tr>
<tr>
<td>State GDP</td>
<td>13.085</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Per Capita Income</td>
<td>8747.994</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Citizen Liberalism</td>
<td>15.300</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Electoral Competition,</td>
<td>2.403*</td>
<td>0.401*</td>
<td>9.476***</td>
</tr>
<tr>
<td>Governor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electoral Competition,</td>
<td>1.397*</td>
<td>4.568**</td>
<td>1.160*</td>
</tr>
<tr>
<td>Legislative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unified Government</td>
<td>54.051</td>
<td>2.98**</td>
<td>0.737*</td>
</tr>
<tr>
<td>Legislative Professionalism</td>
<td>4.369*</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Regional Influence</td>
<td>29.048</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Congressional Mitigation</td>
<td>3.729**</td>
<td>4.031***</td>
<td>3.116**</td>
</tr>
<tr>
<td>Hearings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal Legislative</td>
<td>68.242</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Adoption</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal Mitigation</td>
<td>1.923*</td>
<td>0.25*</td>
<td>—</td>
</tr>
<tr>
<td>Spending</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flood Rarity</td>
<td>23.875</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Property Damage</td>
<td>0.020*</td>
<td>7.545***</td>
<td>—</td>
</tr>
<tr>
<td>Injuries</td>
<td>0.023*</td>
<td>17.022</td>
<td>—</td>
</tr>
<tr>
<td>Fatalities</td>
<td>0.188*</td>
<td>18.560</td>
<td>—</td>
</tr>
</tbody>
</table>

Notes: *** = p <.001; ** = p <.05; * = p<.10.

Odds ratios for the three analytical models are presented in Table 13. Unless otherwise noted, the results from Model 1 are discussed. Odds ratios greater than 1 indicate a positive effect on the odds ratio, or the odds that a state will adopt a policy; odds ratios less than one indicate a negative effect on the likelihood that a state will adopt.

With respect to the effects of internal influences on adoption, the odds ratios are very close to one, meaning that they have little effect on the likelihood of adoption with a few exceptions. Increasing proximity to a gubernatorial election year and a legislative election year slightly reduces the odds that a state will be likely to adopt a strict building code. States with a more professional legislature are overwhelmingly more likely to adopt but because of
the low significance level, this finding should be treated with extreme caution. The presence of flood mitigation on the congressional agenda decreases the odds that a state will be likely to adopt a strict building code. For focusing event covariates, the more fatalities caused by a flood result in a slight decrease in the odds that a state would be likely to adopt a stricter building codes.
Table 13: Odds Ratios, Building Code Adoption

<table>
<thead>
<tr>
<th></th>
<th>Model 1 Exp(B)</th>
<th>Model 2 Exp(B)</th>
<th>Model 3 Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State GDP</td>
<td>1.00</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Per Capita Income</td>
<td>0.999</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Citizen Liberalism</td>
<td>1.015</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Electoral Competition, Governor</td>
<td>0.742*</td>
<td>1.141*</td>
<td>1.115*</td>
</tr>
<tr>
<td>Electoral Competition, Legislative</td>
<td>0.883*</td>
<td>1.072**</td>
<td>1.205*</td>
</tr>
<tr>
<td>Unified Government</td>
<td>2.721</td>
<td>1.507**</td>
<td>1.132*</td>
</tr>
<tr>
<td>Legislative Professionalism</td>
<td>1108.279***</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Regional Influence</td>
<td>.364</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Congressional Mitigation Hearings</td>
<td>0.805**</td>
<td>0.808***</td>
<td>0.840**</td>
</tr>
<tr>
<td>Federal Legislative Adoption</td>
<td>3.409</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Federal Mitigation Spending</td>
<td>1.000*</td>
<td>1.00*</td>
<td>—</td>
</tr>
<tr>
<td>Flood Rarity</td>
<td>2.196</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Property Damage</td>
<td>1.000*</td>
<td>1.00***</td>
<td>—</td>
</tr>
<tr>
<td>Injuries</td>
<td>1.000*</td>
<td>1.209</td>
<td>—</td>
</tr>
<tr>
<td>Fatalities</td>
<td>0.996*</td>
<td>0.845</td>
<td>—</td>
</tr>
</tbody>
</table>

Notes: *** = p < .001; ** = p < .05; * = p < .10.

Land Acquisition and Relocation Model

The model for state adoption of land acquisition and relocation policy has 1460 observations with 28 observed adoptions (1.9%) and 1432 non-adoptions. Model fit statistics
reported in Table 14 indicate the saturated model is the best fit of the data. The subsequent discussion is focused on the results from Model 1 of the analysis.

**Table 14: Goodness of Fit Statistics, Land Acquisition and Relocation Adoption**

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2LL</td>
<td>-443.802</td>
<td>-457.617</td>
<td>-549.766</td>
</tr>
<tr>
<td>AIC</td>
<td>919.604</td>
<td>945.234</td>
<td>111.684</td>
</tr>
<tr>
<td>BIC</td>
<td>1004.183</td>
<td>1024.527</td>
<td>1172.394</td>
</tr>
</tbody>
</table>

In terms of model effects, Wald Chi-Square statistics reveal that state GDP, gubernatorial electoral competition, legislative electoral competition, regional influence, federal mitigation spending, injuries and fatalities are significantly associated with adoption at the p < .001 level with only gubernatorial electoral competition being significant at the p < .05 level or better. Because of the low threshold of significance testing, this analysis must be treated as exploratory. Significant Wald-Chi square statistics demonstrate that effect of variables for state GDP, gubernatorial electoral competition, legislative electoral competition, regional influence, federal mitigation spending, injuries and fatalities are significantly different from zero. Wald Chi-Square statistics for each of the models analyzing land acquisition and relocation are listed in Table 15.
Table 15: Tests of Model Effects, Land Acquisition and Relocation Adoption

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>State GDP</td>
<td>9.274***</td>
<td>12.996</td>
<td>20.053</td>
</tr>
<tr>
<td>Per Capita Income</td>
<td>5956.221</td>
<td>60.438</td>
<td>7714.030</td>
</tr>
<tr>
<td>Citizen Liberalism</td>
<td>55.795</td>
<td>6083.722</td>
<td>76.774</td>
</tr>
<tr>
<td>Electoral Competition, Governor</td>
<td>0.013*</td>
<td>.814*</td>
<td>—</td>
</tr>
<tr>
<td>Electoral Competition, Legislative</td>
<td>5.536***</td>
<td>9.392***</td>
<td>—</td>
</tr>
<tr>
<td>Unified Government</td>
<td>48.165</td>
<td>37.787</td>
<td>—</td>
</tr>
<tr>
<td>Legislative Professionalism</td>
<td>23.609</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Regional Influence</td>
<td>9.311***</td>
<td>6.974***</td>
<td>15.300</td>
</tr>
<tr>
<td>Congressional Mitigation Hearings</td>
<td>20.011</td>
<td>14.328</td>
<td>—</td>
</tr>
<tr>
<td>Federal Legislative Adoption</td>
<td>28.088</td>
<td>36.599</td>
<td>—</td>
</tr>
<tr>
<td>Federal Mitigation Spending</td>
<td>9.265***</td>
<td>8.460***</td>
<td>5.125***</td>
</tr>
<tr>
<td>Flood Rarity</td>
<td>23.059</td>
<td>28.981</td>
<td>30.934</td>
</tr>
<tr>
<td>Property Damage</td>
<td>32.104</td>
<td>33.580</td>
<td>26.921</td>
</tr>
<tr>
<td>Injuries</td>
<td>4.126***</td>
<td>4.821***</td>
<td>4.512***</td>
</tr>
<tr>
<td>Fatalities</td>
<td>7.934***</td>
<td>8.980***</td>
<td>9.509***</td>
</tr>
</tbody>
</table>

Notes: *** = p < .001; ** = p < .05; * = p < .10.

Odds ratios for the three analytical models are presented in Table 16. Unless otherwise noted, the results from Model 1 are discussed. Odds ratios greater than 1 indicate a positive effect on the odds ratio, or the odds that a state will adopt a policy; odds ratios less than one indicate a negative effect on the likelihood that a state will adopt.

With respect to the effects of internal influences on adoption, the odds ratios are very close to one, meaning that they have little effect on the likelihood of adoption with one exception. States with a divided government are twice as likely to adopt a land acquisition and relocation policy. For external influences, states in a region where a neighboring state has adopted are twice as likely to adopt than a state whose neighbors have not adopted. Congressional hearings appear to decrease the overall likelihood of state adoption. Measures
assessing the influence of focusing events do not substantially increase the likelihood of state adoption but deaths from a flood tend to make states somewhat less likely for adoption.

Table 16: Odds Ratios, Land Acquisition and Relocation Policy Adoption

<table>
<thead>
<tr>
<th></th>
<th>Model 1 Exp B</th>
<th>Model 2 Exp B</th>
<th>Model 3 Exp B</th>
</tr>
</thead>
<tbody>
<tr>
<td>State GDP</td>
<td>1.00***</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Per Capita Income</td>
<td>.999</td>
<td>.999</td>
<td>.999</td>
</tr>
<tr>
<td>Citizen Liberalism</td>
<td>1.027</td>
<td>1.028</td>
<td>1.029</td>
</tr>
<tr>
<td>Electoral Competition, Governor</td>
<td>1.006*</td>
<td>1.048*</td>
<td>—</td>
</tr>
<tr>
<td>Electoral Competition, Legislative</td>
<td>1.358***</td>
<td>1.480***</td>
<td>—</td>
</tr>
<tr>
<td>Unified Government</td>
<td>2.160</td>
<td>1.947</td>
<td>—</td>
</tr>
<tr>
<td>Legislative Professionalism</td>
<td>1.0346</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Regional Influence</td>
<td>2.368***</td>
<td>2.106***</td>
<td>2.966</td>
</tr>
<tr>
<td>Congressional Mitigation Hearings</td>
<td>.828</td>
<td>.852</td>
<td>—</td>
</tr>
<tr>
<td>Federal Legislative Adoption</td>
<td>2.053</td>
<td>2.251</td>
<td>—</td>
</tr>
<tr>
<td>Federal Mitigation Spending</td>
<td>1.000***</td>
<td>1.00***</td>
<td>1.00***</td>
</tr>
<tr>
<td>Flood Rarity</td>
<td>1.286</td>
<td>1.320</td>
<td>—</td>
</tr>
<tr>
<td>Property Damage</td>
<td>1.000</td>
<td>1.000</td>
<td>—</td>
</tr>
<tr>
<td>Injuries</td>
<td>1.001***</td>
<td>1.002***</td>
<td>1.329***</td>
</tr>
<tr>
<td>Fatalities</td>
<td>0.981***</td>
<td>0.979***</td>
<td>0.979***</td>
</tr>
</tbody>
</table>

Notes: *** = p < .001; ** = p < .05; * = p < .10.
**Conclusion and a Look Ahead**

This chapter presented the results from the data analysis. Statistical models were developed for state adoption of comprehensive land use planning, building codes and land acquisition. Models were fit to the data to achieve parsimony but I took caution to avoid overfitting the data without a compelling theoretical reason, particularly for comprehensive land use planning.

In the next chapter, I test the hypotheses for each of the theoretical constructs that underpin this study: resources and obstacles to adoption, external influences and focusing events. I compare the results of each model and discuss the findings. Then I discuss what the findings mean for diffusion of policy innovations theory, agenda setting theory and the field of hazards and disasters. Finally, I conclude by discussing the limitations of this study and future areas for research.
CHAPTER FIVE: FINDINGS AND CONCLUSIONS

This chapter is divided into four sections. First, I present the findings of the statistical analysis and results from the hypothesis testing. Second, I discuss and answer the overarching research questions that guided this study. Third, I discuss the limitations of this study. Fourth, I discuss the implications for this study for theory. And fifth, I discuss areas for future research.

Findings

Hypothesis testing is based on the results of full model effects previously reported in Tables 9, 12, and 15. This discussion is organized based on the theoretical constructs from diffusion of innovations that guide this study, internal influence on adoption, external influences on adoption, and the role of focusing events on adoption.

Internal Influences

In this section I discuss my findings on the internal influences on state policy adoption. Unique findings in this group of hypotheses include a pattern of political indicators that are important for flood mitigation adoption and findings on personal wealth and fiscal health that are counter to the diffusion literature.

I hypothesized that states with a more liberal political ideology would be more likely to adopt a flood mitigation policy. This hypothesis is upheld for adoption of comprehensive land use planning but not for the other mitigation policies. This mixed finding is consistent with the diffusion literature. It contributes to the underlying narrative that a liberal ideology may only be important for the adoption of some policies but not all policies (Berry and Berry
1992) and it is important for the adoption of liberal policies (Gray 2008). Comprehensive land use planning is a policy that favors a strong role for government in determining how private property can be used and developed. I did not anticipate that state adoption of strict building codes would affirm this hypothesis because of the economic concerns regarding construction and building. I anticipated that adoption of land acquisition and relocation policies would uphold this hypothesis and it did not. Political ideology is believed to generally shape the policy environment in diffusion theory (Karch 2007). Future testing would be necessary to determine what role it plays for adoption of land acquisition and relocation policy.

The presence of a unified or divided government had no influence on the likelihood that a state would adopt any of the policy innovations included in this study. This finding is consistent with recent findings in diffusion theory supporting the rationale that while a unified government might contribute to the overall policy making environment, it is not a critical element of diffusion modeling (Daley and Garand 2005). Because disasters are inherently political events (Platt 1999), I anticipated that unified government would have some effect because of political responsiveness. This means that divided government may not be a barrier to innovation. Or, more broadly it suggests that the severity of the flood hazard might cause state politicians to overcome party barriers to adopt a mitigation policy.

I found that electoral competition had a mixed influence on the adoption of comprehensive land use planning mandates, strict building codes, and land acquisition policies. This study accepts the hypothesis that gubernatorial electoral competition, i.e., the proximity to a gubernatorial election, makes a state less likely to adopt a flood mitigation
policy innovation. Furthermore, this study accepts the hypothesis that legislative electoral competition makes states less likely to adopt policies on building codes and land acquisition policy.

When put together, my findings on electoral competition and unified government tell a political story about the mitigation and why some states are more likely to innovate. States are likely to mitigate in spite of partisan divisions but not at the expense of the electoral concerns of public officials. Disasters are inherently political phenomena, in terms of the responsiveness of elected officials, the allocation and distribution of disaster recovery resources, and the perceived effectiveness of governmental response to disaster (Platt 1999). My findings further support this idea. Furthermore, my findings provide evidence that flood hazard mitigation is inherently political because of re-election and responsiveness. However, this only applies to the very limited number of states that have adopted the mitigation policy innovations in this study.

This study rejects the hypothesis that the better a state’s fiscal health, the more likely it will be to adopt any of the flood mitigation policy innovations. This is inconsistent with the diffusion of policy innovations literature that indicates that wealthier, more fiscally healthy states are more likely to adopt. Fiscal health had no effect on the likelihood that a state would adopt comprehensive land use planning mandates, strict building codes, or land acquisition and relocation policy innovations. Furthermore, this study rejects the hypothesis that states where people have a high level of personal wealth are more likely to adopt, specifically for land use planning and building code adoption. I anticipated that both of these propositions would be supported by the analysis because diffusion theory indicates that high levels of
personal wealth in a state have been positively associated with the diffusion of policy innovations (Walker 1969; Gray 1974; Berry and Berry 1992; Mooney 2001; Daley and Garand 2005).

These contrary findings are explained, to some extent, by the hazards and disaster literature. Vulnerable populations tend to feel the brunt of the impact of a disaster because of social vulnerability, which is a function of demographic characteristics, social inequities, access to health care, and connections to community support (Cutter and Emrich 2006). This means that people who have lower socioeconomic status are more likely to feel the brunt of disaster. In the context of this study, states could be less likely to adopt a flood mitigation policy because of the underlying personal wealth in a state. Simply put, wealthy people can afford to mitigate and insure their property out of their own pockets. States with lower levels of fiscal health and personal wealth would have more people that are vulnerable to disaster. Further investigation of these findings are necessary to determine whether the lack of an association between fiscal health and state adoption is unique to these policies or whether it is generalizable in a broader context.

Finally, this study has mixed findings with respect to legislative professionalism. I accept the hypothesis that states having professional legislatures are more likely to adopt building codes and land use planning mandates but reject the hypothesis for land acquisition and relocation policies. This is consistent with mixed findings in the literature about the relationship between a professional legislature and policy adoption. Mixed findings suggest that higher levels of legislative professionalism may not always support or directly lead to state level policy adoption; instead it indicates the “background conditions” for state policy
makers and policy making (Karch 2007). In the context of flood mitigation policy adoption, states with more professional legislatures may be more likely to adopt because they have the institutional capacity to innovate but it is not a consistent factor across all of the innovations in this study.
Table 17: Hypothesis Testing, Internal Influences

<table>
<thead>
<tr>
<th>Theoretical Construct</th>
<th>Hypothesis</th>
<th>Land Use Planning</th>
<th>Building Codes</th>
<th>Land Acquisition and Relocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Influences</td>
<td>H1: The more politically liberal the state, the more likely it will be to adopt a flood mitigation policy in a given year.</td>
<td>Accept</td>
<td>Reject</td>
<td>Reject</td>
</tr>
<tr>
<td></td>
<td>H2: If there is single party control of a state legislature and the governor’s house, the sooner it will be to adopt a flood mitigation policy.</td>
<td>Reject</td>
<td>Reject</td>
<td>Reject</td>
</tr>
<tr>
<td></td>
<td>H3: Flood mitigation policy innovations are less likely to be adopted in a gubernatorial election.</td>
<td>Accept</td>
<td>Accept</td>
<td>Accept</td>
</tr>
<tr>
<td></td>
<td>H4: Flood mitigation policy innovations are less likely to be adopted in a legislative election.</td>
<td>Reject</td>
<td>Accept</td>
<td>Accept</td>
</tr>
<tr>
<td></td>
<td>H5: The better the fiscal health of a state, the more likely it will adopt a flood mitigation policy.</td>
<td>Reject</td>
<td>Reject</td>
<td>Reject</td>
</tr>
<tr>
<td></td>
<td>H6: The more personal wealth there is in a state, the earlier it will adopt a flood mitigation policy.</td>
<td>Reject</td>
<td>Reject</td>
<td>Accept</td>
</tr>
<tr>
<td></td>
<td>H7: The more professional the legislature, the more likely a state will be to adopt a flood hazard mitigation policy.</td>
<td>Accept</td>
<td>Accept</td>
<td>Reject</td>
</tr>
</tbody>
</table>
External Influences
Hypotheses testing the influence of external factors on state policy adoption were included in this study. Important findings for this section include mixed and limited effects of regionalism on the diffusion process and findings that indicate a nuanced role for federal fiscal incentives in the diffusion process.

The effects of regional influence on state policy adoption of the flood hazard mitigation innovations were mixed. Regional influence had no direct effect on state adoption of comprehensive land use planning mandates and strict building code standards. However it did have a direct effect on state adoption of land acquisition and relocation policy. I anticipated that the effects of regional influence would be important indicators of state adoption because often floodplains do not fall into neat political jurisdictions. For example, the 1993 Midwest Flood affected nearly every state in the Midwest but Iowa, Kansas, Minnesota, Missouri, and Nebraska bore the brunt of the disaster (Sylves 2007). Among these states, only Iowa adopted a mitigation policy—land acquisition and relocation—following the flood. However, regionalism does seem to be important for early adoption. Mississippi’s’ adoption in 1972 appears to have influenced subsequent adoptions in neighboring states including Virginia in 1974, Florida in 1976 and Georgia and in 1977.

Classic diffusion literature indicates that adoption is directly associated with regionalism. No distinct pattern of regional influence emerges for state adoption of strict building codes. This is consistent with the diffusion literature that finds no association between regionalism and adoption (Paynter 2008). There are limited clusters of regional adoptions of comprehensive land use planning mandates: Idaho, Montana and Oregon in the
1970s and North Carolina, Florida, Maryland, and South Carolina in the 1980s and 1990s. These clusters of early adopters can be explained by the effects of a common flood hazard but the effects are still relatively limited. Another possible explanation for these mixed effects may be that regionalism is a waning effect over time (Mooney 2001). The effects of regional influence are important early in the diffusion process, particularly for clusters of neighboring states for innovations with relatively few adopters.

Hypothesis testing for national influence produced mixed results. Federal adoption of a flood mitigation policy is only directly associated with state policy adoption for comprehensive land use planning mandates. A possible explanation is that states might be more likely to innovate if there is a perception that the federal government is exerting too much influence over a traditional state matter.

Federal adoption was found not to be an indicator of state adoption of strict building codes or land acquisition and relocation policies. One possible explanation is that the federal government has historically not played a role in building codes. While federal building requirements from the National Flood Insurance Program have flowed down and been incorporated into the International Building Code, that appears to be the extent of the influence on states. Simply put: there is evidence the federal government influences what is in the building code but has no influence on whether states adopt one.

With respect to land acquisition and relocation policy, a lack of federal influence could be explained by the mixed role that it has played in mitigation overall. This study finds that land acquisition and relocation policies had been adopted by states and were well established by the time the federal government passed The Stafford Act in 1988. Subsequent
funding, defunding, refunding, repealing, and re-adoption of a land acquisition and relocation policy by the federal government in the 1990s and 2000s indicate that states took the initiative to innovate based on unclear signals from the feds. This is consistent with diffusion literature that indicates when the national government sends a mixed message to states about policy preferences its influence on state policy adoption is weak (Allen, Pettus and Haider-Markel 2004).

Federal fiscal influence, in the form of pre-disaster mitigation funding, is an indicator of adoption for comprehensive land use planning, strict building codes, and land acquisition and relocation policies. This indicates that pre-disaster mitigation funding from the federal government may trigger state innovation by providing seed money to mitigate at their own discretion. This finding is important for diffusion of policy innovations theory because it provides a more nuanced explanation for state innovation beyond the overwhelming influence of coercive federal dollars. Instead, these findings indicate that limited federal financial incentives lead states to innovate.

Hypothesis testing for the influence of mitigation on the federal legislative agenda is an indicator of state policy adoption produced mixed results. The presence of mitigation on the federal legislative agenda was not an important indicator for comprehensive land use planning and land acquisition adoption. One possible explanation is that, much like federal adoption of mitigation policies, mixed signals from the federal government reduce its influence on state adoption. This is consistent with other findings in the diffusion literature that indicate when the national government sends a mixed message to states about policy
preferences its influence on state policy adoption is weak (Allen, Pettus and Haider-Markel 2004).
### Table 18: Hypothesis Testing, External Influences

<table>
<thead>
<tr>
<th>Theoretical Construct</th>
<th>Hypothesis</th>
<th>Land Use Planning</th>
<th>Building Codes</th>
<th>Land Acquisition and Relocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Influence</td>
<td>H8: The greater the number of a state’s neighbors that have adopted a flood mitigation policy innovation in the prior year of measurement, the more likely the state is to adopt the same policy innovation.</td>
<td>Reject</td>
<td>Reject</td>
<td>Accept</td>
</tr>
<tr>
<td></td>
<td>H9: A state is more likely to adopt a flood mitigation policy innovation if Congress passes a mitigation policy in the prior year of measurement.</td>
<td>Accept</td>
<td>Reject</td>
<td>Reject</td>
</tr>
<tr>
<td></td>
<td>H10: A state is more likely to adopt innovative flood mitigation policy if the federal government has provided financial incentives to mitigate under the Pre-Disaster Mitigation program during the prior year of measurement.</td>
<td>Accept</td>
<td>Accept</td>
<td>Accept</td>
</tr>
<tr>
<td></td>
<td>H11: A state is more likely to adopt a flood mitigation policy innovation if mitigation is on the federal legislative agenda during the previous year.</td>
<td>Reject</td>
<td>Accept</td>
<td>Reject</td>
</tr>
</tbody>
</table>
**Focusing Events**

This study hypothesized that focusing events would play an influential role in the policy diffusion process. The findings about the association between recentness of a flood and likelihood of adoption are again mixed. States are more likely to innovate using comprehensive land use mandates if they have not had a recent flood. States are less likely to adopt building codes and acquisition and relocation policies if they have had a recent flood.

This pattern suggests that the power of floods as potential focusing events is stronger when floods are less rare. A chronic flood problem could lead states to change the way they require local government to manage growth and development through comprehensive land use planning. It is a chronic problem that leads to a more comprehensive (and rare) innovation to solve the problem. This supports Birkland's (1997) theory of potential focusing events play an important role in the policy process to trigger policy change. However, this study challenges the idea that focusing events are powerful because of their rarity. Rather, focusing events may be more powerful if there is an accumulation of events to reveal a policy problem. Furthermore, this finding suggests that a series of potential focusing events, in the form of chronic floods, are indicative of triggering policy change.

Consequently, the influence of the focal nature of the event and the policy had different implications on acute and chronic flood hazards. To wit, evidence from this study suggests that when in the context of a diffusion of innovations study, focusing events can lead to different motivations for state policy innovation. Potential harm from a flood might be revealed by the experience of a recent flood. If enough time has elapsed since a flood,
state might be less likely to adopt because of the perception that floods do not pose a serious threat to life and property.

A very clear pattern emerges indicating that flood severity is an indicator of state policy adoption of comprehensive land use planning mandates, strict building codes, and land acquisition and relocation policies. Findings for all of the innovations in this study support the proposition that states experiencing particularly serious, damaging floods are more likely to adopt but only marginally so. For comprehensive land use planning, fatalities are strongly associated with adoption; higher levels of property damage also contribute but do not directly indicate a likelihood of adoption. Injuries very slightly decrease the likelihood that a state will adopt comprehensive land use planning mandates. With respect to state adoption of building codes, property damage, injuries, and fatalities are all background indicators, meaning that they are important but not direct indicators of adoption. Similarly, for land acquisition, injuries and property damage are important background indicators. Fatalities are also a background indicator but, like land use planning, they very slightly decreases a state’s likelihood of adoption.

The indicators of flood severity tell a story about the role of flood damage as a contributing factor creating a favorable environment for adoption of a mitigation policy rather than a direct indicator of adoption. For diffusion theory, these findings support a growing rationale that indicators of adoption need not always be direct to contribute to a favorable environment for state policy adoption. My findings are consistent with the favorable “background conditions” rationale adoption for classic diffusion indicators such as
legislative professionalism (Karch 2007) and political indicators (Daley and Garand 2005; Allen, Pettus and Haider-Markel 2004).

For agenda setting theory, these findings uphold the proposition that harm revealed by an event is a key aspect of potential focusing events. It is not possible to determine the extent fears about future harm revealed by a flood played in this study. However, these findings invite further exploration of the role that focusing events play in the diffusion process as a catalyst to spark diffusion.

Table 19: Hypothesis Testing, Focusing Events

<table>
<thead>
<tr>
<th>Theoretical Construct</th>
<th>Hypothesis</th>
<th>Land Use Planning</th>
<th>Building Codes</th>
<th>Land Acquisition and Relocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focusing Events</td>
<td>H12: A state will be more likely to adopt a flood mitigation policy innovation if it has not experienced a recent flood.</td>
<td>Accept</td>
<td>Reject</td>
<td>Reject</td>
</tr>
<tr>
<td></td>
<td>H13: A state will be more likely to adopt a flood mitigation policy innovation if it has experienced a severe flood.</td>
<td>Accept</td>
<td>Accept</td>
<td>Accept</td>
</tr>
</tbody>
</table>

Discussion

The beginning of this study proposed using a diffusion of innovations framework and posed the following questions.

- What are the correlates of adoption of comprehensive planning mandates as a flood mitigation policy?
Based on the analysis we know that the correlates of comprehensive planning mandates on flood mitigation policy innovation are liberal political ideology, gubernatorial electoral competition, legislative professionalism, federal legislative adoption, flood rarity, and the number of fatalities from floods.

- What are the correlates of adoption of stricter building codes as a flood mitigation policy?
  - Based on the analysis the correlates of adoption of strict building code are gubernatorial electoral competition, legislative electoral competition, legislative professionalism, the presence of flood mitigation on the federal agenda, federal mitigation spending, and property damage, injuries and fatalities.

- What are the correlates of adoption of land acquisition policies as a flood mitigation policy?
  - Based on the analysis the correlates of adoption of land acquisition and relocation policies are gubernatorial electoral competition, adoption by neighboring states, federal mitigation spending, and injuries from a flood.

- Which correlates are common to all three flood mitigation policies and which are unique?
  - The correlate that is common to all three flood mitigation policies is gubernatorial electoral competition. However, some combination of the measures of flood severity (property damage, injuries, and fatalities) correlated with policy adoption.
  - Correlates that were unique to a single policy innovation are political ideology, personal wealth, and adoption by neighboring states.
• When models for the diffusion of comprehensive planning mandates, stricter building codes, and land acquisition are compared, are there similarities or differences in the patterns and underlying causes of state policy adoption?
  o The overall pattern that emerges from the analysis supports the influence of internal state characteristics and focusing events on the likelihood of state policy adoption.

• What are the intergovernmental influences on each policy innovation?
  o Findings on intergovernmental influences on policy adoption are mixed. While the influence of the federal government was associated with policy adoption, there was no consistent pattern that emerged among the policy innovations. Federal legislative adoption of a flood mitigation policy innovation was associated with state adoption of comprehensive land use planning mandates.

• Do recent disasters lead states to adopt flood mitigation policies? If so, is the positive relationship between recent floods and flood mitigation policy adoption consistent across all the policy innovations examined in this study?
  o A positive relationship between flood mitigation policies exists but the analysis suggests that the answer may not be so clear. Flooding and experience with flooding is positively associated with state policy adoption. The evidence from this study seems to suggest that when states have relatively rare floods, they are more likely to adopt a more stringent policy, like mandating local governments to address hazard mitigation in comprehensive land use planning. Recent, less rare floods that suggest a chronic problem are associated with adoption of a strict
state-wide building code and land acquisition and relocation policy. These findings suggest that the focusing events may have different focal power depending on the policy problem.

Limitations

This study is limited in three main ways. First, the data are limited in that the study relies on historical data from secondary sources of data. This is problematic for longitudinal research when the scholar has not been able to collect primary data over the course of time. Conducting research in that way would be ideal for ensuring measurement validity instead of relying on external sources.

Second, it only includes a handful of measures assessing the correlates of focusing events and their association on policy adoption. Because of this, findings related to focusing events in the diffusion of innovations process should be treated as exploratory and the basis for future research.

Third, this study is limited because it has assumed that mitigation generally takes place after a flood. It perpetuates the conventional wisdom that a disaster cycle exists and mitigation should take place following a disaster. Narrowing the focus of mitigation innovations may limit the possibility that mitigation innovations can occur at other points in time.

Implications for Theory

There are three sets implications for theory stemming from the results of this study. First for diffusion of policy innovation theory, this study largely supports the use of the
classic diffusion model, particularly on political indicators of state adoption. However, I found no evidence to support one major tenant of diffusion theory: states with more fiscal resources are more likely to adopt. This suggests that the severity of the policy problem or large groups of vulnerable populations, may trump fiscal considerations. Furthermore, other elements of the classic diffusion model seem to have waning importance as indicators of adoption. However, my finding on regionalism supports a growing body of diffusion literature where regionalism was not an important indicator of adoption. Furthermore, my findings on regionalism are somewhat frustrating considering that floodplains, rivers, and coast do not fit neatly into political jurisdictions. Further research is necessary to investigate this somewhat confounding result. Findings from this study suggest that aspects of fiscal federalism have the potential to be more nuanced than traditionally considered. The role of the federal government, at least in terms of mitigation funding was to plant the seeds of innovation. The other main implication for diffusion theory is that findings from this study support the idea that diffusion of policy innovations can be conceptualized as a broader policy process. Evidence to support this implication can be seen in my findings on background indicators that help create a favorable environment for states to adopt a policy innovation.

Second, findings from this study largely support the theory of potential focusing events and their inclusion in a diffusion of policy innovations model. While findings on focusing events were somewhat mixed, the implication for theory is clear: chronic events, in this case repetitive floods, have power to reveal harm and trigger policy change.
Third, findings from this study have implications for the field of hazards and disasters. This study provides evidence that states can and do play an important role in mitigating hazards. More importantly, when the federal government sends unclear or conflicting signals about mitigation policies, states will act to mitigate. Furthermore, my findings regarding adoption and state fiscal health add another element to the policy implications of social vulnerability. It appears that state governments are inclined to mitigate even when citizens lack a high degree of personal wealth. Finally, my results support the idea that disasters are inherently political events and extend it to include hazard mitigation as a political phenomenon. This means at the state level, hazards and disasters are important for political responsiveness as they relate to mitigation. This is a relatively new idea in the field of hazards and disasters and one I hope gains a foothold.

Future Research

The results of this study lay out four main areas for future research. First, it raises concerns about the lack of an association between regionalism and state adoption of flood mitigation policies. My concern is that there should be some association based on common sense. States in the same region are likely to have similar flood hazards and therefore be influenced positively by their neighbors. Exploring the underlying causes that limit regional influence in diffusion could be important for theory development. This includes testing different ways of measuring regionalism, including direct neighbors and participation in Emergency Management Assistance Compacts.
Second, this dissertation was focused on testing the diffusion model but there is more of the mitigation story to be told. Introducing some qualitative research, including interviews with state lawmakers will shed light on why they chose to mitigate. This could be particularly helpful for fleshing out the political context for state policy adoption.

Third, the results of this study indicate that chronic focusing events appear to play an important role in the policy process. An important next step involves articulating and defining what a chronic focusing event is and developing hypotheses for the possible influences on agenda setting and diffusion of policy innovations. Furthermore, additional research would be necessary to determine if findings about focusing events in this study are generalizable to other chronic policy problems outside of hazards and disasters.

Fourth, and finally, the next logical step in this course of study would be to include local governments as the innovators and the influence that state government has on their decision to mitigate. Extending the study to the local level and incorporating aspects of risk perception, as it relates to harm or potential harm revealed by a flood, would be one way to elaborate on the role that floods play as chronic focusing events. Extending this study to include local government would provide a way to expand upon the ideas that states are active in mitigation and that hazard mitigation is a political phenomenon.
REFERENCES


Quarantelli, Henry. 2005. *Catastrophes are different from disasters: Some implications for crisis planning and managing drawn from katrina*.


