

PUBLIC POLICY EVALUATION OF  
THE NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

By

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This dissertation is dedicated to those who gave me life, William Tevis Boulware and Helen Louise Boulware; to my soul mate who has sustained my life, Diane Marie Boulware; and to my treasured legacy, Erynn Dawn Jean Boulware, Sonja Grace Louise Boulware, and Eric William Tevis Boulware.

## ACKNOWLEDGEMENTS

Near the completion of my fifth decade on earth, I decided to pursue my life-long goal of earning a PhD. With the support of my dear wife and three children, I began a PhD program at the University of Florida in August of 2002. With great anticipation, I entered the program and knew that I wanted to do my dissertation research on a trendy/sexy topic that would make great cocktail party chat. The best laid plans...anyway, my first job in “academia” was serving as a teaching assistant for Dr. Walter A. Rosenbaum.

Dr. Rosenbaum made me an offer I could not refuse—a chance to do research on the National Flood Insurance Program (NFIP). Oh yes, trendy/sexy I said to myself at the offer—I will be the belle of the next “tinni and tappas” party! Well, six years later, I find studying the NFIP to be quite fascinating, a matter of extreme public policy importance, as well as great conversation in the cocktail crowd—who would have thought?

What I have learned is that the NFIP is an extraordinarily complex program that involves a variety of engrossing issues which deal with policy formation, implementation, issue networks, political economy, and the unintended consequences of government policies. With the realization of this wonderful opportunity to study the NFIP, I am, correspondingly, quite grateful to Dr. Rosenbaum for asking me to do this research work as well as the time he has invested and patience he has shown. Thanks also to my committee members, Dr. David M. Hedge, Dr. Michael J. Scicchitano, Dr. Beth A. Rosenson, and Dr. Ruth Steiner for their ideas, support and patience.

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## LIST OF ACRONYMS

AIR	American Institutes of Research
ASFPM	Association of State Flood Plain Managers
BFE	Base Flood Elevation
CATEX	Categorical Exclusion (from environmental review)
CAC	Community Assistance Communication
CAV	Community Assistance Visit
CBIA	Coastal Barrier Improvement Act
CBRA	Costal Barrier Resource Act
CEQ	Council on Environmental Quality
CLOMR-F	Conditional Letter of Map Revision-Fill
CRS	Community Rating System
DHS	U.S. Department of Homeland Security
EIS	Environmental Impact Statement
EA	Environmental Assessment
EHP	Environmental and Historic Procedure
EIS	Environmental Impact Statement
EO	Executive Order 11988
ESA	Endangered Species Act of 1973
EHP	Environmental and Historic Procedure
FEMA	Federal Emergency Management Agency
FIA	Federal Insurance Agency
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
HUD	U.S. Department of Housing and Urban Development

ISO	Independent Services Office
LOMR-F	Letter of Map Revision-Fill
NEPA	National Environmental Policy Act of 1970
NFIA	National Flood Insurance Act of 1968
NFIP	National Flood Insurance Program
NFIRA	National Flood Insurance Reform Act of 1994
NMFS	National Marine Fisheries Service
PEA	Programmatic Environmental Assessment
RA	Regional Administrator
REO	Regional Environmental Officer
SFHA	Special Flood Hazard Area
USFWS	United States Fish and Wildlife Service
USMFS	United States Marine Fisheries Service
WRC	U.S. Water Resources Council
WYO	“[W]rite [Y]our [O]wn” NFIP policies

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A flood insurance program is a tool that should be used expertly or not at all. Correctly applied, it could promote wise use of flood plains. Incorrectly applied, it could exacerbate the whole problem of flood losses. For the Federal Government to subsidize low premium disaster insurance or provide insurance in which premiums are not proportionate to risk would be to invite economic waste of great magnitude.

-Gilbert F. White, 1966

Most people in the United States have never heard of the National Flood Insurance Program (NFIP). This practically invisible government program is the largest national insurer of property and the third largest government-run social insurance program in the United States, surpassed only by Social Security and Medicaid.

Although the NFIP poses important empirical and conceptual issues, the program has received little attention from the political science community and social scientists in general. As an empirical matter, the NFIP's impact has been meagerly examined in the context of policy evaluation or, particularly, of policy impact assessment. Further, the implications of the NFIP as an historic experiment in political economy have been largely neglected by political scientists. The development and impact of this social insurance program has not been characterized in terms of its relevance to strategic

conceptual frameworks for policy analysis within political science, such as political development theory, policy analysis frameworks, political economy, and urban planning.

The original research in this study shows that flood insurance is important to homeowners and that as the price of insurance rises, the demand (willingness to pay) declines. Therefore, for a substantial number of homeowners, the subsidized price of NFIP insurance has been an enabler.

This dissertation suggests that there should be a review of the current public policy supporting the NFIP due to the unintended consequences of: 1) accelerated floodplain development; 2) unsatisfactory flood risk mitigation; and 3) insufficient floodplain conservation.

## CHAPTER 1 INTRODUCTION

### **Why this Dissertation Is Important as a Matter of Public Policy**

Most people in the United States have never heard of the National Flood Insurance Program (NFIP). However, this little known government program is one of the world's largest single line property insurance programs (Federal Insurance Administration, Stakeholder Report, 1996). In fact, it ranks as one of the largest government-run social insurance programs in the United States, surpassed only by Social Security and Medicaid (King, 2005). The NFIP is currently over \$19 billion in debt to the US Treasury (GAO-09-420R, 2009). There is pending Congressional legislation which will broaden the NFIP to include wind damage (Kelly, 2007)<sup>1</sup>.

Although the NFIP poses important issues, the program has received little attention from the political science community and social scientists in general. As an empirical matter, the NFIP's impact has been meagerly examined in the context of policy evaluation or, particularly, of policy impact assessment (Rosenbaum, 2005). Further, the implications of the NFIP as an historic experiment in political economy have been largely neglected by political scientists. Based on the literature review conducted for this dissertation, the development and impact of this substantial social insurance program has not been characterized in terms of its relevance to conceptual frameworks for policy analysis within political science, such as political development theory, policy analysis frameworks, political economy, and urban planning. Therefore, the focus of this dissertation is to build a research foundation with original empirical data that

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<sup>1</sup> See H.R. 3121, the Flood Insurance Reform and Modernization Act, that was passed by the House of Representatives. The current status of this legislation is discussed in Chapter 5.

characterizes the impact of the NFIP in term of its stated objectives and the potential, unintended consequences<sup>2</sup> of the program as it has evolved since its inception.

### **Background**

Federal public disaster policy has become a multi-billion dollar enterprise. From the birth of the country through 1950, disaster relief was largely a private and local government issue (Sylves, 1998). However, since the Disaster Relief Act of 1950, the federal government's responsibility and fiscal liability has steadily grown (Sylves, 1998)<sup>3</sup>. Subsequent legislation established the Federal Emergency Management Agency, and delivered the National Flood Insurance Program (NFIP). The NFIP has multiple purposes including reducing development of land vulnerable to flood plain damage, providing flood insurance, and preserving natural resources of the nation's floodplains. However, many public policies have had unintended consequences (Roots, 2004; Congressional Research Service, 2006). The NFIP may not be an exception, based on unintended consequences that were highlighted during and after the 2006 hurricane season. A study of the unintended consequences of the NFIP is important at this time as the NFIP is under review for reauthorization and is being considered for expansion to include wind coverage (Napolitano, 2009). The NFIP may have caused unintended consequences by encouraging people to live in flood prone areas subject to natural disasters, not the least of which is hurricanes (Burby, 2006).

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<sup>2</sup> The economic "law of unintended consequences" is defined as "actions of people—and especially of government—always have effects that are unanticipated or unintended" by the Concise Encyclopedia of Economics, 2009.

<sup>3</sup> The growth of the federal government's responsibility in providing disaster relief is discussed in "The Genesis of the NFIP" section of this chapter.

The federal aid channeled to the Hurricanes Katrina and Rita “relief, recovery and rebuilding” in the Gulf Coast is approximately \$110.6 billion (Department of Homeland Security Website, March 2007). The National Flood Insurance Program (NFIP), the focus of this dissertation, alone experienced from Hurricane Katrina an estimated \$16.1 billion in claims (Department of Homeland Security Website, March 2007). The Government Accountability Office (GAO) predicts that the combination of NFIP claims for Hurricanes Katrina, Rita and Wilma will be around \$23 billion (GAO Study, 2006). According to testimony given by David M. Walker, former Comptroller General of the United States,

The federal flood insurance program faces major financial difficulties and challenges as the Gulf Coast recovers. The program is essentially bankrupt...The magnitude and severity of the flood losses from Hurricanes Katrina and Rita overwhelmed the ability of the NFIP to absorb the costs of paying claims, providing an illustration of the extent to which the federal government is exposed to claims coverage in catastrophic loss years....NFIP paid an unprecedented dollar amount for a record number of claims from Hurricanes Katrina and Rita. Congress increased NFIP's borrowing authority with the U.S. Treasury from a pre-Katrina level of \$1.5 billion to about \$20.8 billion in March 2006, but FEMA will probably not be able to repay this debt on annual premium revenues of about \$2 billion. (Walker, 2006)

Even before the devastating hurricanes of 2004 and 2005, a comprehensive study supported by the National Science Foundation, the National Weather Service and the National Oceanic and Atmospheric Administration found that damage from floods was on the rise during the period between 1926 and 2000 (Pielke, 2002). One might surmise that based on climate change research and population migration towards coastal areas, flooding will continue to rise in the future. Thus, studying the public policy decisions surrounding the NFIP adds an important dimension to understanding the broader context of government's response to natural disasters.

If this were not reason enough to examine the NFIP as public policy, the House Financial Services Committee added additional reason to look at this public policy by passing the Flood Insurance Reform and Modernization Act in August of 2007. The Act, proposed by Rep. Gene Taylor (D-Miss.), adds wind coverage to the already “bankrupt” NFIP (Kelly, 2007). As will be discussed in more detail in Chapter 5, wind coverage was actually added to H.R. 3121, the Flood Insurance Reform and Modernization Act of 2007, that was passed by the House. However, the Senate version of the bill does not add wind to the NFIP. The two bills have not been reconciled. The GAO has cautioned that by adding wind coverage “the potential exists for losses to exceed expectations by a large amount...potentially adding to FEMA’s total debt...” (GAO-08-504, 2008).

### **Dissertation Objectives and Structure**

The objective of this dissertation is to characterize the implementation of the NFIP using public policies theories and tools to evaluate the NFIP’s success in meeting its stated goals. The NFIP has been implemented in a manner which has created some controversy and some literature suggests that the NFIP is not substantially achieving its strategic objectives (Rosenbaum and Boulware, 2005). In fact; the author’s initial research suggests the NFIP may have produced in many cases the opposite of its stated strategic goals. Specifically, the federal government intended the NFIP to achieve three strategic goals outlined in the National Flood Insurance Act of 1968 (NFIA) and subsequent NFIP related legislation. These goals relate to restricting the development of flood hazard areas, mitigating the loss of life and damages caused by

floods, and preserving/restoring associated natural resources (An Evaluation of the NFIP: Final Report, 2006).<sup>4</sup>

With these legislative intentions as a framework, the objectives of this dissertation are: (1) to present empirical research data to describe policy outcomes of the NFIP with respect to its goals of restricting development, improving mitigation, and conserving natural resources in floodplains; and (2) to use theory drawn from the literature on policy implementation and political economy to determine if the NFIP, as implemented, meets its stated public policy goals.

Chapter 1 recounts the evolution of public policy regarding natural disasters in the United States with emphasis on America's emergency response mechanisms and FEMA. The chapter surveys the NFIP, a specific government program which created public policy regarding flooding which is the most frequently occurring natural disaster in the United States (FEMA: Ready America, 2009). In particular, this chapter discusses the intended consequences of the NFIP and then discusses the apparent outcomes of this program. Chapter 2 presents the methodology for analyzing the data based on survey respondent groups: flood plain administrators; development interests; and homeowners. Chapter 3 analyzes frequency distribution data of these survey respondent groups and evaluates the implications of the data. Chapter 4 focuses exclusively on individual homeowner's risk perception and the potential risk response agency of the NFIP by using multivariate analysis. Chapter 5 summarizes the

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<sup>4</sup> The American Institutes for Research (AIR) documented goals for the NFIP based on FEMA, AIR, and the NFIP Steering Committee's review of the National Flood Insurance Act and subsequent NFIP related legislation.

conclusions and significant implications drawn from this data, and suggests follow-on research in this area.

### **Public Policy Regarding Natural Disasters and the NFIP**

An appropriate beginning toward an understanding of current public policy regarding the NFIP is to characterize briefly the evolving nature of public policy regarding natural disasters in general in the United States. Floods and other natural disasters occur with devastating impact on individuals and families, local community infrastructure and business establishments, as well as on regional, national and international economies. Between 1989 and 1995, the results of research indicated that major natural catastrophes in the United States averaged 35 per year and resulted in total insured losses of \$75 billion (Jones, 1999). To update this research, statistics from the FEMA website were used to determine that from 1996 through 2008 there were an average of 56 major disaster declarations and flooding was the number one cause.

### **The Political Development of America's Emergency Response Mechanisms**

When a natural disaster occurs, few people stop to ask if the government should intervene. Instead, citizens tend automatically to view the situation as a serious public problem requiring immediate governmental action...This raises an interesting question: why are natural disasters perceived to be public problems? (Schneider, 1995)

Thus concludes Sandra K. Schneider, Professor of Political Science at Michigan State University and an expert concerning public natural disaster policy in her book, *Flirting with Disaster: Public Management in Crisis Situations*, which provides a useful theoretical basis for the political development of American disaster response. The quote accurately reflects prevailing public opinion. Schneider also poses a substantive question: "why are natural disasters perceived to be public problems?" As Schneider

points out, “In theory, natural disasters could be described as individual-level problems requiring private-sector solutions” (Schneider, 1995). Schneider believes that the “individual-level” view of the problem was the prevailing view in early America. How then did disaster management become a government responsibility?

The answer, suggests Schneider, involves integrating “agenda building” literature from Cobb and Elder (1983), Eyestone (1978), Kingdon (1984), as well as Baumgartner and Jones (1993) into an understanding of disaster response public policy. Cobb and Elder focused on the importance of issue definition and symbols to transform diverse needs into collective action. Cobb and Elder as well as Eyestone seek to understand the role of “triggering mechanisms” or dramatic events that impact a large number of people and the public’s perception of how important the event is. Kingdon adds the role of “political stream” where policy advocates work at pushing their policy preference during key moments when the policy window is open and their policy preference will be more likely to make it onto the public agenda. Baumgartner and Jones evaluate “policy monopolies” and the how individual members of interest groups, the bureaucracy, and political leaders frame an issue to serve their interests. Schneider condenses this literature into a premise that disaster situations

...reveal the extent to which public figures are willing and able to respond to citizens’ needs. Natural disasters also contain extremely important symbolic elements: individual people tend to view these events as...beyond their control [and] generate problems that the private sector simply cannot or will not handle. (Schneider, 1995)

These factors and perceptions caused the natural disaster problem to become part of the policy-making agenda—which resulted in legislation gradually shifting the problem from the individual to the government. The term “disaster” itself signals or symbolizes that individuals cannot handle the event and therefore, government action is

required (Brown, 1990; Rochefort and Cobb, 1994). As with other matters of public policy, this shift in responsibility occurred over time and was part of a general trend beginning with legislation “making grants and loans available to industry and public facilities that incurred disaster-related damages” (Schneider, 1995). With this larger perspective on the shifting focus of public policy in mind, the historical development of the federal government response to flood disasters can be understood as one major consequence.

### **The Evolution of FEMA**

FEMA’s current mission statement is, “To support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards” (FEMA.gov, 2009). As mentioned previously, early America’s view was that disaster relief was an individual problem (Schneider, 1995). However, the Congressional Act of 1803 began the initial relatively small step to make the issue of disasters more of a collective problem (Anderson, 2002). FEMA’s website refers to this relatively obscure act as the first trace of the federal government’s involvement with disasters and the historical beginning of FEMA (FEMA.gov 2009). “This act, generally considered the first piece of disaster legislation, provided assistance to a New Hampshire town following an extensive fire. In the century that followed, ad hoc legislation was passed more than 100 times in response to hurricanes, earthquakes, floods and other natural disasters” (Anderson, 2002). Ad hoc legislation in this context refers to the government responding to individual events versus a blanket responsibility for disaster relief that US citizens expect today (Anderson, 2002).

Another aspect of collective action in response to disaster relief was in government sponsored financial support following a disaster. The Reconstruction Finance Corporation was originally started under the Hoover administration to help the ailing banking industry but was adopted by the New Deal program and given the authority by the federal government to make disaster loans after disasters in the 1930s (Sprinkel, 1952). The Bureau of Public Roads provided funding for highways and bridges damaged by natural disaster and the Army Corps of Engineers were given power through the Flood Control Act of 1944 to implement flood control projects.

More recent disasters requiring federal response such as Hurricane Carla (1962), the Alaskan Earthquake (1964), Hurricane Betsy (1965), Hurricane Camille (1969), the San Fernando Earthquake (1971) and Hurricane Agnes (1972) all drew significant federal assistance (Anderson, 2002). These events lead to more legislation such as the Disaster Relief Act (1974) and the National Flood Insurance Act (1986) which provided piecemeal federal programs to respond to major emergencies that overwhelmed state and local resources. Ultimately, “more than 100 federal agencies were tasked with some aspect of responding to disasters, hazards and emergencies” (Anderson, 2002).

Although state and local governments welcomed federal dollars, negotiating the myriad of federal programs and agencies with which they had to deal was often daunting (Anderson, 2002). The National Governor’s Association acted as a catalyst to encourage the federal government to centralize relief efforts. As a response, President Jimmy Carter established FEMA by Executive Order in 1979 (Anderson, 2002).<sup>5</sup> One of

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<sup>5</sup> For more detailed review of the literature on the evolution of FEMA, see Appendix G.

FEMA's most important responsibilities and largest outlays is the NFIP (FEMA.gov, 2009; USAspending.gov, 2009.)

### **The Genesis of the NFIP**

The Flood Control Act of 1936 represents the federal government's first attempts to manage flood disasters. It focused on building national structural flood projects, such as re-routing rivers, building dams, and constructing sea-walls (Pasterick, 1998). Most large cities are located on or near water. So, it is not surprising that flooding is the single most expensive category of disaster managed by FEMA (U.S. House of Representative Hearings, 1998). Experts identify two main approaches to containing the cost of flood damage. The first is to construct flood control works to keep floodwaters away from properties. The second is to restrict construction through land-use regulations (Pasterick, 1998). The federal government has instituted programs that have focused on both of these methods.

FEMA provides a rationale for the NFIP on its website. According to FEMA, the NFIP was established by Congress because the national response to flood disasters was piecemeal and generally limited to constructing dams, levees, sea-walls, etc (FEMA.gov 2009). The NFIP was created to provide a government sponsored and coordinated response to reduce future flood damage and to provide flood insurance to those in flood prone areas (FEMA.gov, 2009).

The U.S. Congress established the NFIP with the passage of the National Flood Insurance Act of 1968 (NFIA of 1968). The scope of the NFIP was significantly increased with the passage of the Flood Disaster Protection Act of 1973; its aim was "To expand the national flood insurance program by substantially increasing limits of coverage and total amount of insurance authorized to be outstanding and by requiring

known flood-prone communities to participate in the program, and for other purposes” (FDIC Website, 2009). This act “made the purchase of flood insurance mandatory for the protection of property located in Special Flood Hazard Areas” (SFHA)<sup>6</sup>.

Subsequently, the National Flood Insurance Reform Act of 1994 “resulted in major changes to the National Flood Insurance Program (NFIP)... It provides tools to make the NFIP more effective in achieving its goals of reducing the risk of flood damage to properties and reducing Federal expenditures for uninsured properties that are damaged by floods” (FEMA website, 2007).

The NFIP enables property owners to purchase flood insurance protection. Prior to the NFIP, private insurance companies were unwilling to provide policies covering structures for which the flood risk was unknown. The risk was unknown because there were no detailed maps to show the elevation and hydrological characteristics of property. The cost of obtaining the studies to develop the maps was considered prohibitive by the private insurance industry. Therefore, the federal government accepted the responsibility to develop Flood Insurance Rate Maps (FIRMs) (Pasterick, 1998). The FIRM could then be used as a basis for establishing insurance rate structures and allowing communities to make informed land-use decisions.

Communities are also subject to a Community Rating System (CRS) that evaluates how well they are complying with NFIP guidelines (Pasterick, 1998).

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<sup>6</sup> FEMA defines a SFHA as “The land area covered by the floodwaters of the base flood is the Special Flood Hazard Area (SFHA) on NFIP maps. The SFHA is the area where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The SFHA includes Zones A, AO, AH, A1-30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO, V1-30, VE, and V”. See FEMA website <http://www.fema.gov/plan/prevent/floodplain/nfipkeywords/sfha.shtm>.

The Community Rating System (CRS), created in 1990, is a voluntary program encouraging communities to enact additional measures to reduce flood risk and to protect floodplains beyond the minimum criteria for community enrollment in the NFIP. Floodplain conservation is among the CRS objectives (FEMA NFIP CRS Website, 2009). In 1994, the CRS was modified by an additional goal “to encourage adoption of more effective measures that protect natural and beneficial floodplain functions” [Pub. L. 103-325, Sec. 541 (b)]. To achieve this goal, FEMA is allowed to credit communities for activities that protect natural and beneficial floodplain functions (CRS Coordinator’s Manual: FEMA, 2002).

Any NFIP community may join the CRS, provided the community is in full compliance with NFIP eligibility requirements and makes a commitment to perform a minimum amount of additional floodplain management activities. NFIP premiums in a CRS community are discounted according to the number and type of additional CRS floodplain regulations the community adopts. CRS communities account for more than two-thirds of NFIP policies in force and CRS communities can be found in virtually all the nation’s major urban areas, making the CRS an important consideration when assessing the environmental impact of the NFIP. However, CRS communities are also geographically concentrated in a few areas. These incentives were intended to create the critical mass in communities to adopt floodplain protection and management practices that protect natural and beneficial functions far more than would have been the case were there no NFIP. As will be discussed in more detail later, when a community participates in the CRS program, all residents of the community are guaranteed NFIP flood insurance—independent of their property’s risk level.

Like many well intended programs in government or private industry, there are the intended consequences and the less than desirable unintended consequences of policy making. The following sections review the literature that describes the NFIP's documented intended consequences, the initial literature that points to unintended consequences, and the research in this dissertation to empirically evaluate the NFIP's intended consequences versus unintended consequences.

### **The NFIP: Intended Versus Unintended Consequences**

The NFIP addresses an area of natural disaster—flooding—for which the federal government has taken almost complete responsibility, a responsibility which includes mitigation as well as insurance against flood losses. Since this study concerns how well the NFIP is meeting its strategic policy objectives—which include restricting development of flood prone areas, mitigating loss of life and damages caused by floods, and preserving as well as restoring the natural resources of floodplains—it is helpful to begin to contrast, briefly, NFIP's statutory objectives with impacts so often the opposite of intentions.

#### **The Intended Consequences of the NFIP**

Through the NFIP, the federal government intended to achieve strategic goals outlined in the National Flood Insurance Act of 1968 (NFIA) and subsequent NFIP related legislation. In 2006, FEMA formed an NFIP Working Group to evaluate the NFIP and produce a final report regarding the status of the program (An Evaluation of the NFIP: Final Report, 2006). This report, along with the language of the NFIA enacting legislation, supports these three NFIP goals.

1. **Development:** Restrict the development of land which is exposed to flood damage and guide development of future construction, where practicable, away from locations which are threatened by flood hazards.

2. **Mitigation:** Reduce the loss of life, the disruption, and the damages caused by floods.
3. **Conservation:** Preserve and restore the natural resources of the Nation's floodplains.

From the inception of the NFIP, considerable debate has persisted regarding the actual outcomes of the program, and particularly concerning the extent to which the NFIP has achieved its major strategic goals.

### **The Unintended Consequences of the NFIP**

An initial literature search suggests that the NFIP may have had several apparent outcomes inconsistent with the NFIP's stated strategic goals:

1. **Accelerated floodplain development:** Development appears to have accelerated in flood prone areas in recent decades. Further, literature suggests that the NFIP has sometimes enabled development and, in doing so, creates a "moral hazard" or "perverse incentive" to encourage development in flood prone areas.
2. **Unsatisfactory flood risk mitigation:** Property owners, who want to live near water, have taken advantage of the government-backed flood insurance policies that private insurance companies were unwilling to assume. NFIP policies have steadily increased. NFIP claims, due to flood damage, have steadily increased since the NFIP's inception. One might argue that the risk of a structure being in a flood may have increased, not lessened, due to the NFIP.
3. **Insufficient floodplain conservation:** Floodplain conservation has not become a priority in the implementation of the NFIP and, in fact, the pace of development in environmentally sensitive floodplain and coastal areas quickened. The NFIP has done little to preserve or restore the natural resources of the nation's floodplains.

The following sections review the literature on each one of these suggested unintended consequences of the NFIP and become the basis for the empirical research offered by this dissertation to add to the body of knowledge regarding the NFIP's intended versus unintended consequences.

## **Accelerated floodplain development**

Some critics have referred to the NFIP as “The Granddaddy Coastal Development Subsidy” (Millemann, 1993). Prior to the 1960s, development in flood prone areas was, with a few exceptions, rather limited—especially in coastal erosion zones--because insurers would not underwrite the policies that would encourage development (Millemann, 1993). Cordes and Yezer, in one of the few existing empirical NFIP studies, determined that the NFIP actually stimulated beachfront development by as much as 50% (Cordes and Yezer, 1998). The implication of this study is that the NFIP, contrary to its legislatively prescribed intent, has more often been an enabler of development rather than a deterrent. A General Accounting Office study also found that the NFIP, although not the principal reason, did offer an added incentive for development (GAO, 1982). The above studies looked at coastal floodplain areas in general and posited the relationship between government programs such as the NFIP and development.

A former mayor of South Padre Island, Texas, offered this cogent observation of the impact of the NFIP: “Insurance makes all the difference in the world in a place this prone to hurricane damage [South Padre Island, Texas]. The boom began in 1971 when we started getting mortgage money. And when you get that, you get development” (quoted by Crane Miller, in Hearings on H.R. 5981, p.99, as cited by Siffin, 1981).

Other federal government structural flood mitigation projects, such as levees, were also intended to decrease flood disasters. However, they may have further encouraged individuals to build in flood zones, by creating a perception that the flood controls would supplement the NFIP in making their property safe. One study estimated that “in the

absence of insurance and other programs to reduce flood risk, development density would be about 25% lower in areas vulnerable to storm waivers (i.e., V Zones ) than in areas less susceptible to damage from coastal flooding” (Heinz Center, 2000).

The flooding in New Orleans after Katrina also becomes relevant. With the steady growth of NFIP policies covering properties in extensive flood zones, critics believe the NFIP has had a similar, if unintended, consequence in not mitigating flood risk prior to Hurricane Katrina (Burby, 2006).

The post-NFIP household growth rate in flood hazard areas is estimated at 40% across the country (Sarhou, Gulf Restoration Network, 2002). Another telling statistic is that 25% of all land conversions from rural to urban/suburban occurred since the mid-1980s. Further, over 50% of the United States population now lives in coastal counties and, closer to home, 80% of the total population of Florida lives within 10 miles of the coast (Beach, Oceans Commission, 2002).

### **Unsatisfactory flood risk mitigation**

Prior to the NFIP, private insurance companies were unwilling to provide policies covering structures for which the flood risk was unknown. The risk was unknown because no detailed maps showed the elevation and hydrological characteristics of flood-prone property. The cost of obtaining the studies to develop the maps was considered prohibitive by the private insurance industry—creating what economists often describe as an “incomplete market.” Therefore, the federal government accepted the responsibility to develop Flood Insurance Rate Maps (FIRMs) (Pasterick, 1998) as an essential prerequisite for a national flood insurance program.

Properties that were constructed prior to the creation of FIRMs are known as “pre-FIRM.” FEMA defines pre-FIRM on its website:

Pre-FIRM buildings are those built before the effective date of the first Flood Insurance Rate Map (FIRM) for a community. This means they were built before detailed flood hazard data and flood elevations were provided to the community and usually before the community enacted comprehensive regulations on floodplain regulation. Pre-FIRM buildings can be insured using "subsidized" rates. These rates are designed to help people afford flood insurance even though their buildings were not built with flood protection in mind. (FEMA Keywords, 2009)

These properties were intentionally given a lower premium rate in the NFIP than they might otherwise receive as an incentive to take out NFIP insurance and these properties continue to receive federally subsidized insurance rates through the NFIP. Although the number of insured pre-FIRM structures may have remained the same over the years, the total number of NFIP flood insurance policies has increased dramatically. Pre-FIRM subsidized insurance policies represented, until recently, approximately 35% of all policies in 1997 (Pasterick, 1998). The pre-FIRM structures receive a government subsidy amounting to approximately 38% of the "full-risk premium" (Pasterick, 1998). Thus, per Pasterick's research, as of the late 1990s, homeowners paid 38% less for their premiums than was actuarially sound. More recent research discussed in Chapter 5 indicates that actuarially sound rates may be as much as 80% higher than current NFIP premiums. This known subsidy was planned as an incentive for homeowners to take out NFIP policies. The subsidy was never eliminated. Many subsidized pre-FIRM properties are also "repetitive loss" properties which have a disproportionate percentage of the NFIP loss claims. According to Congressional testimony by Robert Shea, the Acting Administrator for the Federal Insurance Mitigation Administration, "repetitive loss" properties (properties which have multiple flood claims) are a subset of pre-FIRM policies and therefore, subsidized (Shea, 2001). Shea stated that the total number of these pre-FIRM policies was approximately 1.2M (Shea, 2001). By all accounts, the

federal government was highly successful at increasing community membership in the NFIP. Detailed statistics from the FEMA website, appearing in the following section, indicate that there has been a steady growth in the program since 1978.

The problem with subsidizing repetitive loss properties is that these properties also represent a disproportionate number of claims for the NFIP. FEMA actually breaks down the repetitive loss properties category into a subcategory of “severe repetitive loss” properties. The concentration of severe repetitive loss properties insured by the NFIP is approximately 8,237 and “was impacted repeatedly during the 2004 and 2005 Hurricane Seasons” (FEMA Online Library, 2009).

Beginning in the 1970s, the NFIP’s overall emphasis became community participation in the NFIP, not cost control, thereby greatly increasing the NFIP’s insured properties and liability exposure. Shea’s testimony included an explanation of the agreement sought between the federal government and local communities. If local communities adopted and enforced building and development standards in their high-risk flood plains, the federal government agreed:

In exchange for this commitment from communities,... to make flood insurance, which the private insurance sector does not provide, available to all property owners in these communities, no matter where they are located and how serious their risk. Furthermore, the government agrees to provide this insurance to high-risk properties built before NFIP standards were in place, i.e., pre-FIRM properties, for a premium that does not fully reflect the true risk to which these properties are exposed. (Shea, 2001)

Much of the current literature concerning the NFIP focuses on the extraordinary losses suffered by the NFIP from Hurricane Katrina and her sisters; but even before these catalytic events, researchers were beginning to count the cost of the NFIP. In addition to the normal appropriations to operate the NFIP, the program losses from 1993 through 1996 amounted to over \$3.4 billion. The losses for 1997 and 1998

amounted to approximately \$1 billion each year (Pasterick, 1998). Taxpayers absorbed these losses through supplemental bills passed yearly by Congress.

Even before the 2004-2006 Hurricane Season, the total indemnification distributed by the NFIP for flood loss from 1978 through 2002 was \$11,555,943,833 (FEMA website, 2003). The implication of these losses, increasingly suggested by NFIP critics, is that the NFIP in fact encouraged this escalating liability payment development in flood zone areas by aggressively providing or guaranteeing the availability of flood insurance (Siffin, 1981; Millemann 1993; Bovard, 1998; Browne and Hoyt, 2000; Moss, 2002; Black, 2005; Conrad et al, 1998).

### **Insufficient floodplain conservation**

If the NFIP has in fact encouraged development in flood zone areas, then it has also encouraged development close to rivers and lakes, upon wetlands and coastal areas—all of which are environmentally sensitive. The National Environmental Policy Act (NEPA) of 1969 essentially states that all federal agencies must evaluate the environmental impact of their programs and avoid, when possible, adverse environmental impacts. Many believe that the NFIP directly conflicts with the intent of this act (Galloway, 1994; David, 1999). In addition to NEPA, Executive Order (EO) 11988, “Floodplain Management,” (1977) creates an additional mandate for federal agencies specifically to promote floodplain conservation, which also seems inconsistent with the NFIP’s actual impacts.

NEPA requires all federal agencies, including FEMA, to administer any government funded program, such as the NFIP, to “attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.” NEPA also requires the preparation of an

Environmental Impact Statement for any activity “significantly affecting the quality of the human environment.” EO 11988 adds further, more explicit environmental responsibilities by requiring FEMA “to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modifications of floodplain development wherever there is a practicable alternative”... as well as to provide leadership “to restore and preserve the natural and beneficial values served by floodplains” (EO 11988 Section 1, 1978). The NFIP has been the subject of litigation due to its perceived negative impact on environmentally sensitive areas and wildlife.

### **Litigation involving the NFIP and the Endangered Species Act (ESA)<sup>7</sup>**

Section 7(a)(2) of the ESA requires that all federal agencies consult with the U.S. Fish and Wildlife Service (FWS) to assure that agency actions “are not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species.” Three lawsuits have been initiated in federal courts asserting that the NFIP has caused or facilitated development threatening endangered species or their habit and that FEMA is required by Section 7(a)(2) of the ESA to consult with the FWS in these situations.

**Florida Key Deer v. Stickney (1994):** Monroe County, Florida, includes the Florida Keys. Monroe County and the incorporated communities in the county have participated in the NFIP since the early 1970’s. Big Pine Key and adjacent No-Name Key in Monroe County, the principal habitats of the endangered Florida Key Deer, are inhabited by approximately two-thirds of the remaining Key Deer population. Current federal land holdings in these areas were insufficient to assure the continued survival of

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<sup>7</sup> See Rosenbaum and Boulware 2006

the Key Deer and the USFWS was competing with private developers to acquire additional land judged essential to Key Deer recovery. The USFWS had determined that the greater the scale and pace of private development on these lands, the less likely the Key Deer population would recover.

The federal district court determined that the NFIP was related to development of the remaining unprotected Key Deer habitat in several ways. First, FEMA had broad discretion to issue regulations implementing the NFIP and was therefore subject to the consultation requirements of the ESA. Additionally, the court cited evidence that the NFIP affected the rate of development on the unprotected Key Deer habitat. This evidence included:

- An August 24, 1984 statement by the Associate Solicitor of the United States Department of Interior noting that the implicit approval of construction or acquisition and the issuance of flood insurance to make available needed financing for such projects clearly involves actions subject to the consultation requirements of ESA Section 7(a)(2) and “but for” the all pervasive activities of FEMA, development in flood plains would probably not take place;
- Correspondence to FEMA from the USFWS in August, 1989, stating its belief that FEMA’s insurance in Monroe County encouraged development that would have been “much less attractive” without such insurance;
- Testimony by USFWS staff in August 1989 to a Congressional subcommittee on the effects of the availability of federal flood insurance in promoting new development. The USFWS cited its survey of 186 units of the Coastal Barrier Resource System, where NFIP insurance may not be issued, to demonstrate that in the absence of NFIP insurance no substantial new development had occurred; (Hearing on H.R. 2840, 1989)
- A letter from USFWS Director John Turner FIA Administrator C. M. Schauerte in December 1990 reaffirming the USFWS beliefs that “experience with the Coastal Barrier Resources System (System) shows the importance of flood insurance for development.

The federal District Court ruled in 1994 that the NFIP encouraged the development of endangered species habitat and ordered FEMA work with the USFWS to address the issue.

In 1997, FWS issued a Biological Opinion on Key Deer and other listed species in Monroe County. This opinion concluded that the administration of the NFIP in Monroe County would affect protected species in the County and issued a Reasonable and Prudent Alternative (RPA) to avoid the likelihood of the NFIP jeopardizing the continued existence of species. The RPA specified that FEMA would require Monroe County to refer all development proposals that could impact listed species to FWS for review under the ESA. This was done under 44 CFR 60.3(a)(2) of the NFIP Regulations that require communities to assure that floodplain permit applicants obtain other necessary federal and state permits prior to issuing a floodplain permit. If the proposed development will not adversely affect a species, the county can issue the building permit. If it could adversely affect a species, FWS works with the applicant to ensure that the development complies with the ESA.

On November 27, 2002, FWS issued a letter reopening formal Section 7 consultation and indicating that FWS would proceed to update the 1997 opinion due to new information on the status and distribution of species and non-completion of a habitat conservation plan by Monroe County. The Opinion was updated with FEMA input and finalized in April 2003. The 2003 opinion placed no additional requirements on FEMA other than to continue to implement the RPA.

On Dec. 16, 2002, a hearing was held on a motion previously filed by environmental groups to challenge the sufficiency of the 1997 biological opinion in

Monroe County. This was later followed by a second amended complaint under the ESA filed by the National Wildlife Federation, et al, challenging the sufficiency of the 2003 amended Biological Opinion and the RPA. On March 29, 2005, the Court issued an Order ruling the Service and FEMA violated the Act and the Administrative Procedure Act (APA) (79 Stat. 404; 5 U.S.C. 500 et seq.). The Court's March 2005 Order criticized the 2003 RPAs for (1) relying on voluntary measures and (2) not protecting against habitat loss and fragmentation or otherwise accounting for the cumulative effects of the permitted projects.

On September 9, 2005, the Court also granted the plaintiff's motion for an injunction against FEMA issuing flood insurance on any new residential or commercial developments in suitable habitats of federally listed species in Monroe County, Florida. The Court also ordered the Service to submit a new Biological Opinion (BO) within nine months from the September 9, 2005, date. FEMA closely coordinated with the U.S. Fish and Wildlife Service (Service) in completing a new BO on FEMA's implementation of the NFIP in Monroe County, FL and its effects on federally listed endangered species. After getting a 60-day extension of the deadline, the Service submitted the BO on FEMA's implementation of the NFIP in Monroe County, Florida and its effects on eighteen federally listed threatened or endangered species on August 9, 2006. The issues raised by the Court in March of 2005 were addressed as follows: First, FEMA has more clearly described the steps that will be taken if the RPA is not followed. Second, the revised RPA will result in a review process that will allow the Service to consider the cumulative impacts of a series of permit proposals at clear points in time,

rather than on a piecemeal basis. FEMA is in the process of working with the Service in implementing the August 9, 2006 BO.

**Forest Guardians, Southwest Environmental Center, and Sierra Club v.**

**FEMA (2001):** In 2001, New Mexico environmental organizations sued FEMA in federal District Court alleging that FEMA was jeopardizing thirteen listed endangered species by providing flood insurance for 35 communities developing within the Rio Grande and San Juan River floodplains. The plaintiffs requested the court to order FEMA to prepare both an environmental impact statement and an assessment as required by NEPA and to consult with the USFWS under ESA Section 7(a)(2). In February 2002, FEMA agreed to consult with the USFWS on the effects of the NFIP by submitting a Biological Assessment to the USFWS in April.

In May 2002, FEMA provided the USFWS with a its Biological Assessment of the NFIP impact on the Rio Grande and San Juan River floodplains. The assessment determined that “the implementation of the NFIP in New Mexico has not adversely affected the 13 listed species and that the Program is not likely to affect listed species and their habitat” (FEMA, *Biological Assessment*, 2002).

No further litigation has been initiated in response to FEMA’s environmental assessment. Discussion with staff of the Southwest Environmental Center, one of the two plaintiffs in the initial suit, indicates no further litigation concerning the biological assessment is currently anticipated.

National Wildlife Federation and Public Employees for Environmental Responsibility v. FEMA and National Association of Home Builders (2003): In 2003, the National Wildlife Federation and Public Employees for Environmental Responsibility

initiated a lawsuit against FEMA, alleging that FEMA had violated Section 7(a)(2) of the ESA by not consulting with the National Marine Fisheries Service (NMFS) on the impact of the NFIP on the Puget Sound Chinook salmon, listed as a threatened species by the NMFS since 1999. Every community within the range of the salmon is enrolled in the NFIP and is required to adopt floodplain development standards consistent with FEMA's regulatory minimums. Since that time, FEMA had provided over 2600 new flood insurance policies for floodplain structures in these communities.

The plaintiffs contended that FEMA's implementation of NFIP regulations constituted a "discretionary" agency action requiring ESA consultation because some regulations encouraged development in the floodplain habitat of the salmon. At issue were elements of NFIP mapping regulations, its community floodplain management requirements and the CRS.

The federal district court ruled in November 2004 that FEMA's implementation of the regulations at issue constituted a discretionary and continuing action subject to ESA review. Additionally, the court held that "FEMA's passage of minimum eligibility criteria, the mapping of floodplains, and the implementation of the CRS have ongoing effects extended beyond their mere approval" that could affect Chinook salmon habitat. The court ordered FEMA to consult with the NMFS on aspects of the mapping program, the criteria for community eligibility, and the CRS

In support of its opinion that NFIP regulations may have a negative impact upon floodplain ecology and, specifically, upon Chinook salmon habitat, the presiding judge cited evidence that he considered sufficient to indicate that such an impact might exist:

- The U.S. Department of the Interior’s “official policy determination” in 1984 that floodplain development “would probably not take place” were it not for the activities of FEMA;
- The expert opinion of Alan Wald, a floodplain manager from the Washington Department of Fish and Wildlife, that filling of floodplains, such as that conditionally permitted by NFIP regulations, can result in destruction of wetland with a negative impact on species habitat;
- Another opinion by Alan Wald that the CRS encourages some activities that are harmful to salmon, such as the removal of large woody debris from rivers;
- Letters to FEMA from the NMFS and the Washington Department of Ecology stating that implementation of the NFIP may be affecting salmon listed under the ESA;
- Sworn statements by defendant-intervenors, experts in the construction and real estate business, indicating that the restriction of flood insurance would “effectively shut down” development and real estate transactions in Puget Sound;
- A biological opinion between FEMA and the U.S. Fish and Wildlife Service over implementation of the NFIP in Monroe County, Florida, finding that FEMA’s activities were “jeopardizing” several listed species.

FEMA has contested these assertions. However, FEMA has initiated consultation with NMFS on those NFIP regulations at issue, in accordance with the judge’s order. This order did not affect the sale of insurance itself, which the court ruled was non-discretionary. FEMA also agreed to expand the consultation to include all of the 16 salmonids within the state of Washington. That Biological Assessment is not yet available.

### **NFIP may sometimes facilitate development of endangered species habitats**

In one of the three cases reviewed, the court found evidence it considered sufficient to demonstrate that NFIP insurance was associated with adverse impacts on endangered Key Deer in Monroe County, Florida. In other litigation, FEMA’s Biological Assessment indicated no adverse impact upon endangered species on New Mexico, Rio Grande and San Juan River’s floodplains and no Biological Assessment has yet

been completed concerning NFIP impact on endangered Chinook habitat in Washington State. In each case, however, the court considered that evidence of a *possible* adverse impact upon endangered species sufficient to require that FEMA consult with the appropriate agencies under terms of Section 7(a)(2) of the ESA. There have been other Notices of Intent to Sue under ESA where FEMA has determined that there is no impact and either responded as such or did not respond (San Pedro River, AZ; Verde River, AZ; and Santa Clara River, CA) where no litigation has resulted. There is also one situation where FEMA is in informal consultation with FWS and has set up a permit referral system similar to Monroe County, FL. The issue is still very much unresolved.

No research evidence is available to characterize the extent to which the NFIP enhances the protection of endangered species or their habitat. Nor does substantial evidence exist about the extent to which NFIP-related development may become an ESA issue. Given the NFIP's association with floodplain development and the adverse environmental consequences that sometimes arise for endangered species from urban growth, a national investigation concerning the NFIP's potential impact on ESA-protected species would seem desirable.

Several other conclusions are relevant to this litigation. First, whether the NFIP significantly drives development and whether that development may adversely affect endangered species habit are two distinct, if related issues. Evidence exists that the NFIP facilitates development but that development may not necessarily affect endangered species. Moreover, in cases where such development does affect endangered species and can be associated with the availability of NFIP insurance,

action might be taken through FEMA's NFIP regulations, or its CRS standards, to mitigate that impact.

With the growth of the environmental movement, the NFIP's potential role as an enabler of development in floodplains has assumed increasing political and economic importance as an ecological issue. The NFIP's apparent association with accelerated floodplain development is ironic because among the initial NFIP supporters were many environmentalists and advocacy organizations encouraged by NFIP's enabling legislation. For example, Section 1301 of the enabling legislation required the NFIP to "restrict the development of land which is exposed to flood damage" and "guide development of future construction, where practicable, away from locations which are threatened by flood hazards" (FEMA Report, 1979). The legislation also required in Section 1302(c) that the goals of the NFIP should be linked to the 1979 report, "A Unified National Program for Floodplain Management" (FEMA Report, 1979). The Unified National Program for Floodplain Management declared the following goals regarding federal floodplain management: (1) to reduce the loss of life, the disruption, and the damages caused by floods; and (2) to preserve and restore the natural resources of the Nation's floodplains (also see Rosenbaum and Boulware, 2006). Follow-on legislation and other federal mandates such as The National Flood Insurance Reform Act (1994) also articulated an NFIP objective to promote "the protection of natural and beneficial floodplain functions."

Another area of unintended consequences caused by the NFIP is the potential for the NFIP to impact the flood risk tolerance of homeowners as interest in well as development. Specifically, the question being asked is: "Does the availability of flood

insurance, through the NFIP, decrease the perception of risk and make risk more tolerable?”

### **The Impact of the NFIP on Risk Perception and Response**

The research on the NFIP’s developmental impacts has been inconclusive concerning the importance of the NFIP compared to other influences driving development, such as property characteristics and financial considerations. The research asserts that the NFIP creates a “moral hazard.” The research also implies that the NFIP may mediate risk tolerance through its influence on risk perception and response among property owners and development interests.

Chapter 4 will amplify the discussion from Chapter 1 regarding the impact of the NFIP in term of its stated objectives and the realities of the unintended consequences of the program as it has evolved since its inception. Specifically, Chapter 4 will characterize and clarify empirically the role of the NFIP with respect to flood hazard perception and response through a survey of property owners’ responses to the NFIP’s availability.

Chapter 4 reviews the pertinent literature relating to risk perception and risk response related to hazard insurance. The review begins with literature characterizing the general nature of hazard risk and moves to a more specific understanding of risk and risk response as it relates to flood hazard.<sup>8</sup> Next, the NFIP’s role as an agency of risk tolerance will be explored through the relevant literature and through an analysis of individual level data collected during the course of this dissertation.<sup>9</sup> Chapter 4 will also

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<sup>8</sup> The selected literature is more focused on risk as it pertains to hazard versus risk in other areas such as environmental or health.

<sup>9</sup> The source of this individual level data is discussed in detail in Chapter 2, Methodology, The Survey Database.

have a section with hypotheses driven by the literature and a results and analysis section.

Continuing the theme of unintended consequences, it is also essential to view the NFIP through the perspective of relevant literature on political development to clarify why and how the NFIP, as a public policy strategy, evolved into the largest insurer of property in the United States and the potential unintended consequences of these policies.

### **Public Policy Frameworks: The NFIP as Political Development and Its Unintended Consequences as Public Policy**

The evolution of FEMA and the growth of government's responsibility regarding disaster relief are consistent with a larger body of literature suggesting that the early American individualistic view of responsibility, liberty and freedom have evolved. Eric Foner notes that the Colonial-era notion of liberty and freedom referred to individual rights and protections from government (of course these liberties and rights were focused on male property owners of relative privilege). Foner highlights the Progressive Era reforms during which liberty and freedom were redefined to include government regulations on behavior to provide for food safety, child labor protections, limitations on political party machines and corporate barons—making the government a protector of liberty and freedom (Foner, 1999).

Skowronek believed that the early American government did not envision a large administrative state. However, due the rapid growth in economic development, in the form of industrialization, the government was forced to expand its national administrative capacities (Skowronek, 1997). Skowronek feels that the impact of “crisis, class conflict, and complexity” together provides the impetus for the growing American

state-building (Skowronek, 1997). Arthur M. Schlesinger, Jr.'s *Age of Roosevelt* series, written in the 1950's, details the failure of unregulated capitalism and the struggle to expand the role of government during economic and social turmoil (Schlesinger, 1958).<sup>10</sup> One of the author's themes is that it was difficult for Roosevelt, even in difficult times, to overcome the strong individualistic view held by the "Old Order" (Schlesinger, 1958). These authors attempt to explain the evolution of an "individualist view" to the "collective action" view held by many Americans today.

Today, surveys of the American electorate suggest that government is trying to do too much, but the same surveys point out that no one wants their food to be less safe, drugs to be less safe, air travel to be less safe, workplaces to be less safe, etc. (Kettle and Fesler, 2009) A number of theories provide an explanation of why political development has lead to the federal government's deep involvement in natural disasters and, thus, can clarify the NFIP's significance in the broader evolution of public disaster management. Four theoretical, varied, developmental perspectives can account for the government's role in disaster management: agenda building, rent-seeking, market failure, and the value of communal action to solve community problems.

### **The NFIP and Political Development**

As discussed earlier, Schneider's research into natural disasters utilizes "agenda building" theory and effectively integrates concepts from Cobb and Elder (1983), Eyestone (1978), Kingdon (1984), as well as Baumgartner and Jones (1993). As with other matters of public policy, this shift in responsibility occurred over time and was part

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<sup>10</sup> These were contentious times in American political development. Roosevelt vetoed 635 bills and was overridden 9 times (<http://www.presidency.ucsb.edu/data/vetoes.php>, The American Presidency Project, 2009)

of a general trend of expanding national government policy agendas in which the federal government was “assuming more responsibility for a wide variety of domestic policy concern. As part of this general trend, specific legislation was passed making grants and loans available to industry and public facilities that incurred disaster-related damages” (Schneider, 1995). Along with the notion of agenda building, rent-seeking activity (e.g. lobbying those who control the agenda) is a probable second rationale.

The literature on natural disasters utilizes agenda building theory, but does not refer specifically to rent-seeking activity. One common definition for the term rent-seeking is “lobbying the government for tax, spending or regulatory policies that benefit the lobbyists at the expense of taxpayers or consumers or some other rivals” (Economist.com, February 2009)<sup>11</sup>. According to a Congressional Joint Economic Committee Report, rent-seeking starts “with economic intervention by government biased toward special interests” (Joint Economic Committee Report, 1996). When bureaucrats and politicians reward particular special interests with favored treatment or burden their competitors with restrictions, they create what economists call “rents.” (For original usage of the term “rent-seeking” also see Krueger, 1974.) However, one can assume that publics with concentrated interests would be politically active and gain disproportionate political influence in this area while the diffused majority pays little attention to the issue (concept in Weimer and Vining, 1999). In this case, those constituents who are more likely to be affected by a natural disaster or who are in a position to make money from insuring those constituents have a motivation to organize and seek preferential treatment. Individual preferences also played a role because

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<sup>11</sup> For an interesting analysis of the role of congressional travel (especially privately sponsored travel) and interest group activity, see Beth A. Rosenson, 2009)

individuals wanted to “consume” an appealing view of water from their home, but did not take into account the risk associated if the perspective became an up front and personal view of a flooded home. Therefore, one might assume it natural for such individuals to participate in rent-seeking activity—a subsidy to pay for the risk of enjoying or “consuming” a water front view.

The literature in American political development also seems to largely neglect rent-seeking by the insurance industry as it relates to natural disasters, but the literature does note that there are government-backed insurance programs that provide a fee to private insurance companies who write a policy that is backed by the NFIP (KRC Research & Consulting, 1995). In effect, the insurance company receives revenue but does not assume any risk. This would seem like a considerable incentive to the insurance industry to keep this subsidized program in effect and growing.

A third theoretical perspective in which analysts might interpret the NFIP’s role in American political development involves the concept of market failure or incomplete natural disaster insurance markets. Natural disasters pose a problem for the market. Natural disasters fall into the category of “uncertainty” (unknown probabilities) compared to “risk” (known probabilities). Uncertainty was particularly true in the case of flood insurance. Prior to the 1970s, Flood Insurance Rate Maps (FIRMs), as previously noted, were unavailable for most of the country and therefore, private insurance companies did not have a basis to determine actuarial risk and premiums. Due to the large upfront investment in developing these maps with unknown returns on the investment for any one insurance company, the market failed to produce the maps. The market also failed to provide private flood insurance for those in flood zone areas due to

adverse selection (those who have the greatest risk of loss seek to buy insurance) and moral hazard (people who have insurance are more willing to take risks) problems that were perceived by the commercial insurance industry. All of these factors lead to a lack of privately available flood insurance as a “reduction of individual risk through pooling” (Weimer and Vining, 1999). Although incomplete insurance markets for flood damage did exist in the 1960’s and 1970’s, experts now believe that this situation has changed and actuarial information is now available to private insurance companies (D.R. Anderson, 2000). The terms “adverse selection” and “moral hazard” will be discussed in depth later in this paper.

A fourth public policy theoretical perspective that should be considered is found in Deborah Stone’s *Policy Paradox*. Stone asserts that a collective response by the government in providing insurance against natural disasters can be explained for reasons of security and equity (Stone, 2002). Stone considers natural disasters a threat to security and “communal provisions for security may be the most important force holding communities together” (Stone, 2002). She also notes the development of the policy principle that “personal welfare is not separable from collective welfare” and therefore, it is a matter of fairness that the state take action to help those in need after a natural disaster (Stone, 2002). Whatever the causes, the government’s role in satisfying needs after a natural disaster has a long history in the United States. While the Federal Emergency Management Agency (FEMA) is a contemporary institutional example of government’s coordinated response to disasters, the roots of government intervention date back more than 100 years.

The political development of FEMA is consistent with the overall trend begun in the Progressive Era. This trend continued through the New Deal, the Great Society, and the legislation passed in the 1970's that established independent federal agencies such as the Environmental Protection Agency and the Occupational Safety and Health Administration. This trend toward Executive Branch disaster management—including powerful independent agencies created by executive order rather than legislative act—continues from the Progressive Era until today. Although there are obvious societal advantages to this mode of disaster response, there are also disadvantages.

Theorists interested in societal responses to disasters have found that “the organizational part of the disaster subculture weakens the individual sector of the flood subculture in that there is growing disinterest in disaster preparedness by potential victims” (Quarantelli, 1978). In the context of Quarantelli's book, this notion is meant to imply that the more the government does, the less the individual feels responsible to do for themselves.

Each of the political development eras and its subsequent programs offered substantially more attractive benefits to the American society. However, the positive impact of these reforms and initiatives is less clear due to the unintended consequences. The basis of dialogue is to understand the careful balance between the government supporting a collective or public good and the individual's responsibility to contribute to that good. In economic theory, individuals are motivated by a number of self-interests; one potent self-interest is monetary gain. Therefore, the challenge is to create government programs for the collective good while avoiding a government program which favors organized particular interests. Often an unintended consequence

of the government action is the favoring of focused interests over the public interest. Identifying the unintended consequences of government programs does not imply that all government programs, or their unintended consequence, are bad. It does mean that the unintended consequences of government activity should be studied and evaluated as a routine matter of public policy evaluation.

### **The Unintended Consequences of Public Policies**

Citizens often look to government to provide important services and solve difficult problems—health care, public safety, public schools, national defense, world peace, safe roads and bridges, poverty, justice, economic growth and prosperity, and ethical government. The public often asks government to produce what the free market cannot or will not provide. In economic terms, we expect government to act when there is a “market failure.” A market failure is often described in economic terms as a situation in which “Decentralized behavior does not lead to Pareto efficiency” (Weimer and Vining, 1999). A more simplistic definition of a market failure is “a situation in which a market left on its own fails to allocate resources efficiently” (Mankiw, 2004). The problem is that sometimes well-intentioned government policies that seek to correct market failures have significant unintended consequences.

There is rich literature about the unintended consequences of public policies. Political economy texts refer to this phenomena as “government failures”—a government analogy to a “market failure” (Weimer and Vining, 1999). One of the best frameworks for evaluating the implementation of government programs to solve market failures was written by Charles Wolf in a Rand report. Wolf’s research preceded the use of the term “government failure.” Instead, Wolf referred to the phenomena of unintended government programs as “nonmarket failures.” Wolf observes that there are

occasions when “Non-market remedies for market failures may themselves fail”—resulting in “behavior and outcomes that diverge substantially from what is socially preferable” (Wolf, 1979). Some applications of this concept can be understood in terms of social welfare programs (Murray, 1995; Gottschalk 1989), health care policies (Johnson, 2000), education (Chubb and Moe, 1990), campaign finance reforms (Fiorina, 1980; Garrett and Smith 2004), government regulation (Buchanan, Tollison, and Tullock, 1980; Stigler, 1971), Progressive Era reforms (Hofstadter, 1955; Fiorina 1980; Link 1983) and ethics laws on legislative recruitment (Rosenson, 2006).

A particularly pertinent observation regarding the unintended consequences of government funded-flood control programs is offered in a National Science Foundation study which concluded that “the flood control works projects protect existing development, but encourage new development, thereby increasing the property at risk” (Kaiser, et al: 1987).

Although a number of these references indicate the negative impacts of the unintended consequences of government action, it should be noted that unintended consequences are not always undesirable, simply unintended. As Rosenson’s research points out, ethics laws governing those who run for public office have value “in terms of setting clear standards of conduct and helping to prevent potential conflicts of interest.” However, ethics laws (especially financial disclosure) resulted in “fewer candidates and lower competition in state legislative primaries”—an unintended consequence of the ethics laws. Since it is difficult to know who is deciding not to run for public office, the unintended consequences could be good or bad. If the potential candidate drops out due to conflict of interests reasons, the unintended consequence could be good. If a

well-qualified candidate decides not to run simply because he/she would like financial affairs to be private, the unintended consequence could be bad. The point is that there is an impact and a cost to unintended consequences.

An important rationale for understanding the unintended consequences of government policies may be found in the earlier discussion of “rent seeking”—the ability of concentrated or organized interests to seek government preferences at the expense of diffused or disorganized interests. As stated earlier, a more formal definition of rent seeking is “lobbying the government for tax, spending or regulatory policies that benefit the lobbyists at the expense of taxpayers or consumers or some other rivals” (Economist.com, May 2009). Essentially, those with a known self-interest tend to find it worth their while to spend time and resources to participate or support activities that further their policy positions on government action. It is not too surprising that the National Association of Realtors (realtor.org, 2007), the National Association of Professional Insurance Agents (pianet.com, July 31, 2007), the National Association of Mutual Insurance Companies (namic.org, 2006), the National Association of Home Builders (Pressly, 2006), and the Mortgage Bankers Association (Lowrie, 2006) are currently lobbying Congress to continue funding the NFIP (pianet.com, 2007).

As one might expect, the organized interests identified above all have an economic interest in furthering development in the floodplain. Private insurance companies actually write the homeowner’s flood insurance policy along with the homeowner’s normal policy through a NFIP program known as Write Your Own (WYO). Not well advertised outside organized interest circles is that the private insurance companies which collect the premiums are entitled to 31.8% of the annual premium in

the form of a commission. The private insurance company sends the balance of the premium (68.2%) to FEMA along with 100% of the liability. In the case of a claim, the WYO companies receive 3.3% of the value of the amount of that claim for servicing the flood loss (Financial Assistance/Subsidy Arrangement, October 1, 2005). Therefore, there is no incentive for insurance companies to control costs. In fact, the higher the claim, the larger the insurance company's service fee—all paid for by the government.

### **Public Policy Frameworks: The NFIP as Political Economy**

Two major themes emerge from the initial research regarding the NFIP: 1) an ongoing controversy regarding the NFIP's ability to achieve critical strategic objectives; 2) a dearth of empirical research that adds clarity to this controversy. These are issues with significant public policy consequences. The NFIP also has a wide-ranging impact on communities across the United States and represents a significant financial liability to the United States Treasury.

According to FEMA, in 2007, over twenty thousand communities were participating in the NFIP. A "community" may represent an entire county or a municipal government. These twenty thousand communities represent the vast majority of the highest-risk flood prone areas of the United States. As Figure 1-1 below shows, the NFIP insures a growing number of assets—totaling in excess of \$1.1 billion in assets by 2007. Figure 1-2 also shows that the NFIP continues to underwrite a growing number of policies—totaling over 5.6 million policies by 2007. Along with the increased liability has come an increase in loss dollars paid and policy premiums collected (Figures 1-3 and 1-4). Figures 1 through 4 were taken directly from FEMA's statistical analysis provided on the web at: <http://www.fema.gov/business/nfip/statistics/cy2007lsdl.shtm>.

Unfortunately, as will be presented in more detail later in this section, the NFIP's policy premiums do not cover all the costs of the loss dollars paid or the cost to run the NFIP program. Therefore, the NFIP is subsidized by the U.S. Treasury/tax payer. According to the Congressional Budget Office, the debt to the U.S. Treasury is \$17.5 billion with a growing backlog of unpaid claims (Congressional Budget Office, 2007).

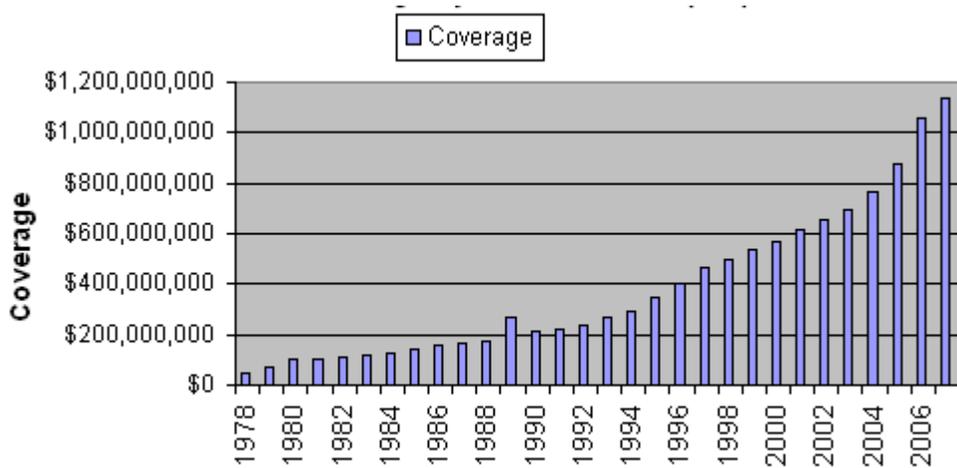


Figure 1-1. Total Coverage by Calendar Year. 1978 through December 2007

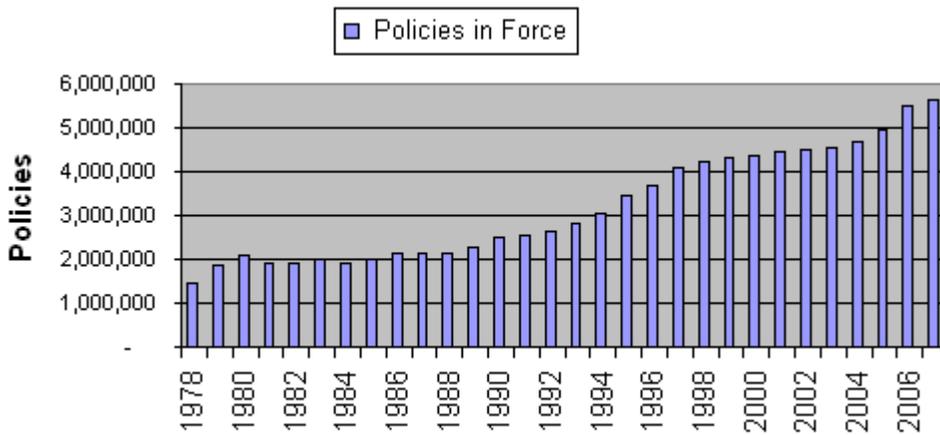


Figure 1-2. Total Policies in Force by Calendar Year. 1978 through December 2007

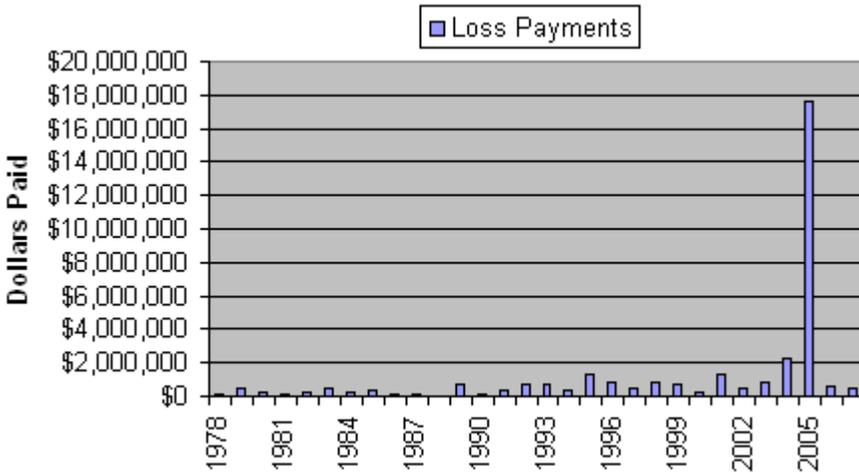


Figure 1-3. Loss Dollars Paid by Calendar Year. 1978 through December 2007

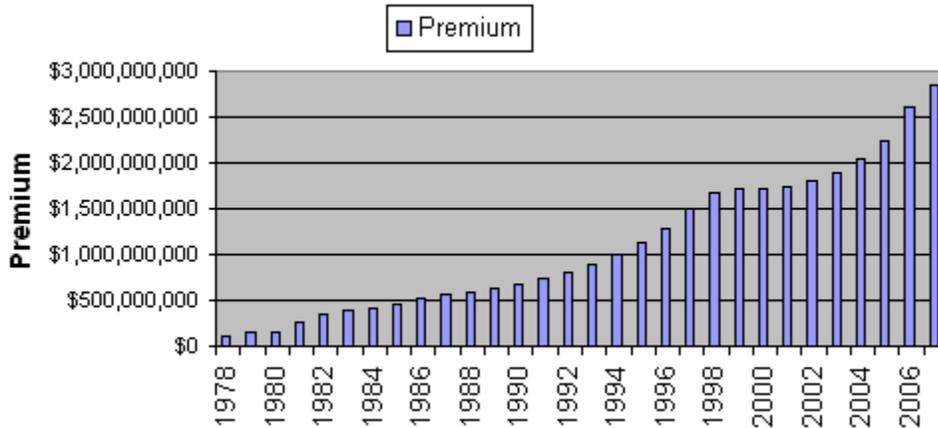


Figure 1-4. Total Premium by Calendar Year. 1978 through December 2007

As Figure 1-3 indicates, there appears to be an upward trend in loss dollars paid, especially since 1990. Hurricanes Katrina, Rita and Wilma point to how vulnerable NFIP-insured property is to heightened hurricane activity. This trend may also be an indication of the increased development that has occurred in coastal areas, especially along the Gulf of Mexico. One implication of this research is that this development could have been at least, in part, facilitated by the availability of subsidized NFIP-provided insurance. Another implication is that the NFIP's financial problems are not

getting smaller but in fact are growing as the NFIP insures properties subject to the economic realities of “adverse selection,” “moral hazard,” and “subsidy.”

### **The NFIP and the Problem of “Adverse Selection”**

A stated goal of the federal government is to create incentives for communities to participate in the NFIP by offering government-backed and often subsidized insurance. A problem is that, by definition, the people most likely to seek NFIP insurance are more likely to have their property flooded, resulting in a flood loss and a claim. This phenomenon is known in the insurance market as “adverse selection” (Mankiw, 2004). The concept of adverse selection assumes that under conditions of asymmetrical information (i.e., those who know they are at greater risk will seek insurance at greater rates than those with less risk), those at greatest risk will seek flood insurance and others with moderate or low risk will avoid the cost of flood insurance—thus, creating an ever smaller group of highly vulnerable policies. Another way of looking at the idea of adverse selection is that insurance buyers have more accurate estimates of their probability of loss than the insurance company has (Rothschild and Stiglitz, 1976). If only high risk insurance buyers want insurance, then there is an adverse selection problem for the one who offers the insurance. Solvency of any insurance-based program involves pooling the risk of a large number of policy holders—some with high risk, some with moderate risk, and some with low risk. If the insurance market is not properly constructed, one ends up with a pool of policy holders dominated by high risk clients.

Studies by Burby and French found that the NFIP has become a public policy that in fact creates an “adverse selection” insurance market because communities experiencing the greatest growth in floodplain areas have often been the first to join the

program (Burby and French, 1981). Therefore, consistent with this concept of adverse selection, the federal government has been highly successful at increasing the membership in floodplain areas by recruiting numerous flood-prone communities.

### **The NFIP and the Problem of “Moral Hazard”**

Another political economy concept that appears to characterize the NFIP is “moral hazard” (also known as “perverse incentive” in some texts). The term ‘moral hazard’ was coined in 1963 by Nobel Prize winner Kenneth Arrow. A moral hazard is described as a situation whereby a government program or regulation provides an incentive to take risky action (Arrow, 1963; Staten and Umbeck, 1983; Baker, 1996). In more directly insurance-related literature, a moral hazard refers to “the reduced incentive that insurees have to prevent compensable losses” (Weimer and Vining 1999). It appears that the NFIP creates such a moral hazard, since its policies are often viewed by NFIP sellers and homeowners as subsidized by the government. Thus, as critics assert, the NFIP provides an incentive to live in a flood-prone area where there is more risk of hazard because that risk is subsidized. That is, since the government assumes part of the cost associated with the risk of living in a floodplain, more people are willing to live in flood-prone areas. The link between the NFIP and the concept of moral hazard did not seem to appear in political economy literature prior to the year 2000; subsequently, an explicit link between the concept of moral hazard and the NFIP appears in the Congressional Joint Economic Committee Research Report #109-29 written in 2006:

The NFIP creates two moral hazard problems. After the NFIP, some people bought homes or located businesses in flood-prone neighborhoods, knowing that the NFIP would indemnify a significant portion of their flood-related losses. The NFIP also discourages some policyholders from undertaking measures to mitigate flood risks. (Joint Economic Committee, 2006)

Key to this assertion is the manner in which the NFIP subsidy is created and implemented.

### **The NFIP and the Problem of Public Subsidy**

It is almost axiomatic in U.S. politics that once a government benefit is granted, it is very difficult to take the benefit away—or to even make what would seem to be a common sense modification. In February 2001, Congress rejected the Bush Administration’s proposal that “sought to eliminate insurance coverage for the reconstruction of buildings subject to repetitive flooding, an initiative similar to one proposed toward the end of the Clinton Administration” (Bea, 2002). “Repetitive loss” has been a major NFIP issue since the policy’s inception. According to FEMA, a “repetitive loss property” is one that meets one of the following criteria since 1978:

- a) Four or more paid flood losses of more than \$1,000 each; or
- b) Two paid flood losses within a 10-year period that, in the aggregate, equal or exceed the current value of the insured property; or
- c) Three or more paid losses that, in the aggregate, equal or exceed the current value of the insured property.  
(<http://www.fema.gov/faq/faqDetails.do?action=Init&faqId=1163> )

Repetitive loss properties represent a substantial risk for the NFIP as they accounted for 25% of all claims and 40% of all payments from 1978 to 1995 (D.R. Anderson, 2000). Also, 90% of repetitive loss properties are also pre-FIRM properties eligible for subsidized premium (D.R. Anderson, 2000). One would suspect that without the availability of federally underwritten insurance, private companies would not want to expose themselves to that kind of repetitive loss, would cancel the policy, and people would not continue to live in these high risk structures.

Another, subtler subsidy embedded in the NFIP is the method by which risk, and therefore actuarial premiums, are calculated. FEMA bases its premium structure on “historical average loss year” versus the “full-risk” approach that would also account for “catastrophic loss year.” This difference is explained in FEMA’s 2002 annual “Actuarial Rate Review.” In this document, the idea of raising premiums to full-risk, that would include catastrophic contingency, would raise pre-FIRM subsidized rates two and a half times their current premiums and the overall premium rate would raise by 50-70% (Hayes, 2002). The difference between what policyholders currently pay for “historical average loss year” versus the “catastrophic loss year” is paid for by supplemental appropriations by Congress at the time of the catastrophe in contrast to collecting premiums in advance and banking those premiums to make payouts during catastrophic flooding events. Therefore, the average taxpayer bears the cost of the catastrophic loss year rather than the policyholder. More directly stated, because the premiums charged to the policy holder do not include the true costs, which include the potential for catastrophic loss years, the cost of the catastrophic loss is paid out of the US Treasury, not through the collection of premiums from policy holders.

More clear quantification of the subsidized nature of the NFIP comes from the fact that the NFIP is “recapitalized” or given “loan forgiveness” by Congress. The latest attempt to shift the NFIP’s outstanding debt to the US Treasury can be found in a Congressional Budget Office Cost Estimate for the Flood Insurance Reform and Modernization Act of 2007. The cost estimate supporting the Act requests that the current \$17.5 billion debt, which is unlikely to be repaid, be forgiven. The bill also authorizes an additional \$2.4 billion for FEMA’s flood mapping program, \$190 million for

the repetitive flood loss mitigation program, and \$1.6 billion to support “state-sponsored mediation programs” (CBO Cost Estimate, 2007).

One might argue that a taxpayer assuming this subsidy leads to a question of equity. Is it “fair” that the average taxpayer bears the burden of paying for those who, by choice, want to enjoy the view or easy access to water? In addition to the economic equity issue implied by this premium calculus, the development in flood plains, enabled by the NFIP, is a major concern to environmentalists because it harms the environment and also allows for the hidden costs associated with the externality of pollution.

If the NFIP is, in fact, facilitating harm to the environment, the hidden costs associated with this negative externality are surely distorted by myopic views and the social rate of time preference (concept in Weimer and Vining, 1999). During a 2003 visit to FEMA headquarters in Washington DC to collect data for this dissertation, four senior leaders of the NFIP program were interviewed. This group of civil servants had been with the program for 20 to 30 years. They were obviously proponents of the program and its many successes. However, they stressed that the NFIP was not established as an environmental program. In fact, it was unclear who in the NFIP program was responsible for environmental policy and ensuring that the NFIP was in compliance with the NEPA, the Environmental Protection Agency’s (EPA) laws and regulations, and specifically Executive Order (EO) 11988. Even more to the point, the staff interviewed could not identify who in the NFIP office was responsible for insuring the proper application of Executive Order 11988 which specifically calls for government organizations such as FEMA to provide for floodplain protection and conservation.

## Price Elasticity of Demand as It Relates to the NFIP

Another important economic concept that applies to the issue of government providing subsidized flood insurance is the price elasticity of demand. This economic concept applies because if the government subsidizes a good or service, economic theory suggests that consumers will demand more of the good or service (in this case, subsidized flood insurance). Elasticity measures the change in demand relative to a determinant—in this case “price.” Therefore, the price elasticity of demand measures how much the quantity of goods demanded changes relative to the change in price of those goods. The price elasticity of demand is computed as the percentage change in the quantity demanded divided by the percentage change in price (Mankiw, 2004). Mathematically, the basic formula for computing the price elasticity of demand is:

$$\text{Price elasticity of demand} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

Applying this economic concept involves answering these questions relative to the NFIP:

- If the price of NFIP insurance is in fact subsidized, what would happen if the price of flood insurance increased?
- If the price of flood insurance increased, would current (and new potential policy holders) respond to the price increase by decreasing demand?

The answers depend on the elasticity of demand for flood insurance. There are a variety of demand curves that can be computed using this formula. Perfectly inelastic demand means that the quantity demanded does not respond to price changes. This is illustrated graphically in Figure 1-5, where the demand curve is vertical and the price elasticity of demand is computed as zero. This case would arise when the good is a

necessity and there are no close substitutes, a narrowly defined market, and a relatively short time horizon. Gasoline is the classic example of this type of good.

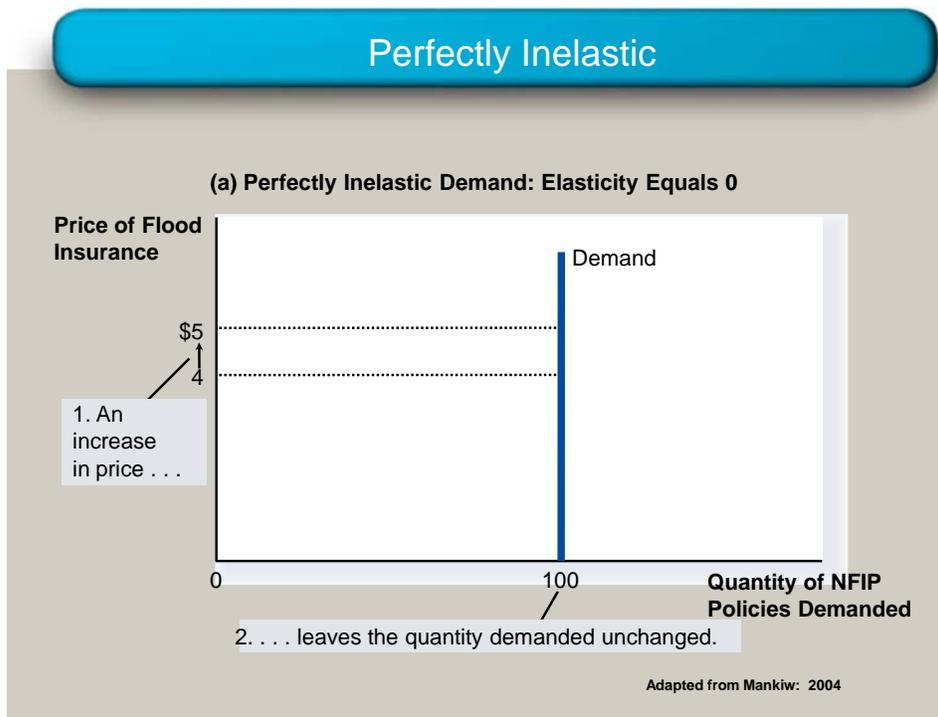


Figure 1-5. Price Elasticity of Demand, Perfectly Inelastic

Inelastic demand means that the quantity demanded decreases but at a rate yielding a value of less than 1, i.e. the percentage of decreased demand is less than the percent decrease in price. As Figure 1-6 shows, the resulting curve is fairly steep.

In contrast, elastic demand implies that the quantity demanded decreases significantly with an increase in price, at a rate greater than 1—the percentage of decrease demand is greater than the percent increase in price. As Figure 1-7 shows, the resulting curve is relatively flat.

Perfectly elastic demand would mean that small changes in price result in significant changes in quantity demanded—people want as much as they can get under a certain price. Over a certain price, the quantity demand is zero. Graphically, as

## Inelastic Demand

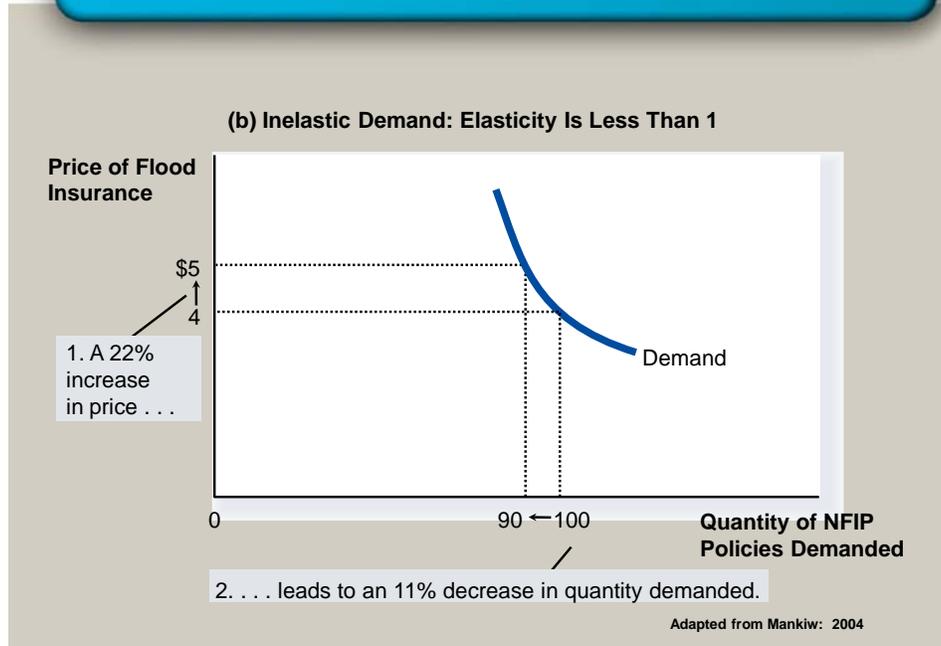


Figure 1-6: The Price Elasticity of Demand, Inelastic Demand

## Elastic Demand

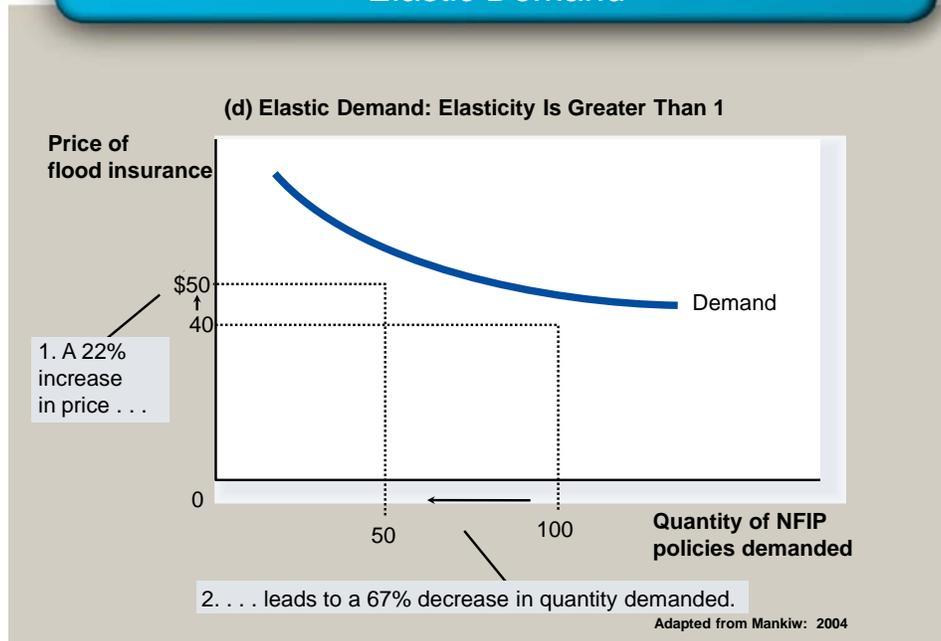


Figure 1-7: Price Elasticity of Demand, Elastic Demand

shown in Figure 1-8, the demand curve is horizontal and the price elasticity of demand computed approaches infinity.

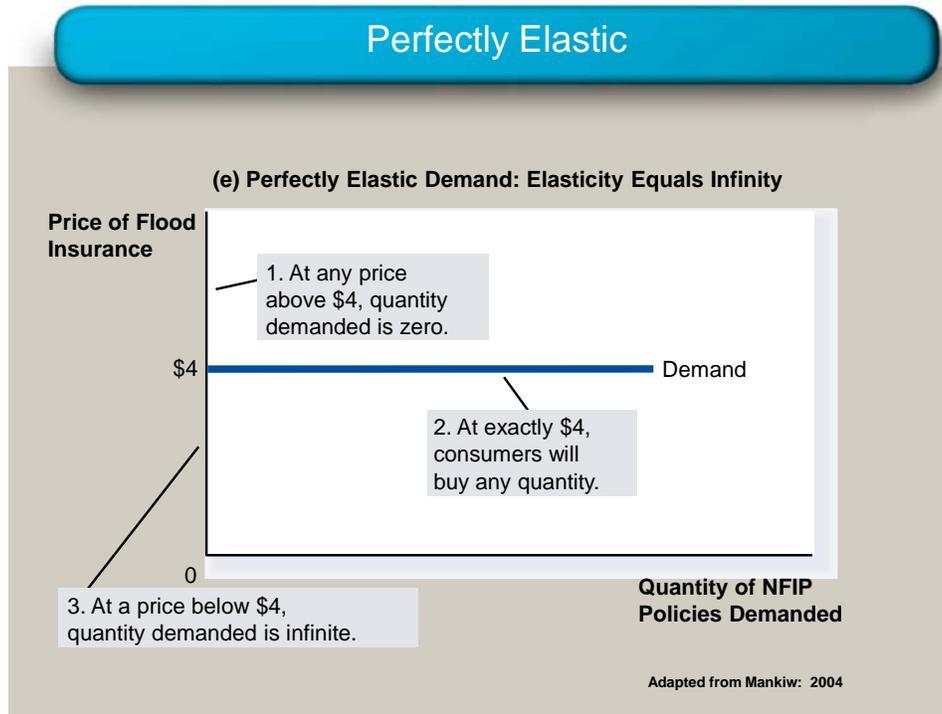


Figure 1-8: Price Elasticity of Demand, Perfectly Elastic

The point of this discussion is that survey groups in this study are asked about their perceptions of the willingness of NFIP policy holders to pay more for their flood insurance. If the survey groups answer that people are not willing, or able, to pay higher premiums, this would indicate that the demand for flood insurance is in fact sensitive to the price for the flood insurance. Therefore, as the price of insurance rises, the demand for flood insurance decreases. This situation would lend credence to the argument that the NFIP, an often-cited subsidized commodity, might be encouraging more people to live in the floodplains than would be the case if they were to pay the full economic cost of such a decision.

In the Methodology chapter, the hypothesis that flood insurance elasticity of demand is elastic and (greater than 1) and therefore, the demand for flood insurance would decrease if the price of flood insurance increases is discussed in greater detail. The corollary hypothesis, if less flood insurance were demanded, then the rate of development in flood zones may decrease is also offered in detail.

Another aspect of this dissertation is to better understand the intersection of public policy and public administration with urban planning. An important and often overlooked aspect of political science (especially in the sub-field of public policy and administration) is urban planning.

### **Public Policy Frameworks: The NFIP and Urban Planning**

Another set of policies that comes from urban planning literature that could affect development in floodplains are referred to collectively as “Smart Growth.” The question is, “do Smart Growth policies impact floodplain development?” Smart Growth is a current phrase focused on public policies regarding land use in urban and suburban centers. Although there are many facets to the term “Smart Growth”, the thrust is to try and minimize or counter urban sprawl. Regina Gray, U.S. Department of Housing and Urban Development provides these three defining characteristics of Smart Growth: (1) they generally encourage compact designs and high-density development; (2) they typically place strict limitations on building projects in sprawling communities; and (3) they usually involve comprehensive approaches to land use planning decisions (Gray, 2007).

Although Smart Growth planning initiatives do not directly address floodplain management, many Smart Growth advocates include the idea of “preserving open spaces” and “protecting critically designated environmental spaces” (Gray, 2007). This

was particularly true for wetland and coastal areas in Florida (American Planning Association, 2002). As noted above, preserving open spaces and encouraging conservation are also goals of the NFIP. In theory, the NFIP Community Rating System specifically attempts to reward communities for enacting ordinances for this purpose by various forms of premium rate reductions for community NFIP policyholders. So, a logical question is, “are there any differences in floodplain management in states that have strong Smart Growth policies in place versus those that do not?”

The research for this dissertation looked at six states—these six states cover the range of Smart Growth policies. Florida and Oregon have relatively strong statewide planning mandates. North Carolina has a strong mandate focused on coastal areas (all of the communities included in this study of North Carolina were coastal). Illinois, Texas and Arizona have relatively weak statewide planning policies (Gray, 2007). As will be discussed in the Methodology chapter, floodplain managers were asked specific questions regarding the NFIP’s impact on preserving open spaces as well as protecting the environment. Due to the agreement made with government officials that were interviewed, no particular response was to be associated with a particular official, therefore a more precise evaluation of smart growth policies is not possible in this paper.

### **What This Research Adds to the Existing Body of Knowledge**

Up to now, the NFIP has been largely ignored by political science. Existing research does not yet provide a comprehensive, empirically based, policy evaluation of the developmental impacts of the NFIP in the context of its implementation goals. Therefore, this research intends to provide an empirical policy evaluation for a substantive policy usually not studied in this manner by political scientists. Existing

research has not used the public policy literature on political economy theories, as a context in which to understand NFIP policy outcomes. In particular, political economy concepts such as “adverse selection” and “moral hazard” are essential to understand this aspect of implementation of the NFIP.

### **Conclusion**

This study, and the data base upon which it draws from the broader NFIP evaluation, can be especially significant to understanding the policy impact of a major federal disaster program for which community impact, including its environmental consequences, have not been carefully researched despite its fiscal implications. The author is indebted to Dr. Rosenbaum for allowing this opportunity to study and learn about the NFIP as well as a variety of environmental policy matters.

This quote from by Congressman Earl Blumenauer, Oregon (D) from congressional testimony from 1999 discussing the reauthorization of the NFIP might help the reader to understand the complexity of the politics involved with the NFIP:

My concern is that the Federal Government does people no favors by encouraging them to live in areas where God has shown that he doesn't want them to live...By encouraging people to live in harm's way, we encourage natural disasters. It is one of the reasons why disaster relief payments have increased 550 percent in the course of the last ten years. There is a reason why these events occur, and by our using the flood insurance program to subsidize people to live in these areas, we continue a pattern that is also environmentally unsound. And we are doing the individuals no favors. (Blumenauer, 1999)

These words spoken by Congressman Blumenauer were offered **not to kill the NFIP but to reauthorize the program with additional funds** to support mitigation costs associated with repetitive loss properties. Unfortunately, the major hurricanes that

followed this time period did not distinguish between repetitive loss properties and other properties built in and around the floodplains.<sup>12</sup>

Those who do formal research and develop theories about societal responses to disasters have found that “the organizational part of the disaster subculture weakens the individual sector of the flood subculture in that there is growing disinterest in disaster preparedness by potential victims” (Quarantelli, 1978). In the context of Quarantelli’s book, this means that the more the government does, the less the individual feels responsible. This should be an important consideration in studying public policy—particularly focusing on the good intentions of government programs which may also have unintended consequences.

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<sup>12</sup> As this dissertation goes to print, the NFIP still (as a matter of public policy) subsidizes repetitive loss properties and may be encouraging more people to live in SFHAs.

## CHAPTER 2 METHODOLOGY: LINKING THE NFIP'S STRATEGIC GOALS AND OUTCOME MEASURES

Floods are 'acts of God,' but flood losses are largely acts of man.

-Gilbert F. White, 1945

Gilbert F. White, often referred to as the "Father of Floodplain Management," was the leading American environmental geographer of the 20<sup>th</sup> Century and the principle author of the National Flood Insurance Act (NFIA) of 1968. He insisted that the NFIP contain Section 1302 of the NFIA which linked the NFIP to an anticipated national floodplain management plan. In 1979, a federal interdepartmental committee, of which White was a member, created *The United National Program for Floodplain Management* to accomplish the goal of Section 1302 by declaring that floodplain management should reduce loss of life and damage caused by floods and added an important environmental commission "to preserve and restore the natural resources of the nation's floodplains" (FEMA, 1979).

### **The NFIP's Intended Consequences**

The federal government intended to achieve a number of strategic goals through the NFIP as outlined in several government documents that also broadened the NFIP's floodplain management responsibilities. The National Environmental Policy Act of 1970 (NEPA) required all federal agencies, such as FEMA, to conduct Environmental Impact Statements (EIS) and to "attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences" (NEPA, 1977) when implementing programs such as the NFIP. The 1977 Executive Order 11988, "Floodplain Management" required FEMA "to avoid to the extent possible the long and short term adverse impacts associated with the occupancy

and modifications of floodplain development wherever there is a practical alternative” and “to minimize the impacts and restore and preserve the floodplain...” (42 FR 26971, 3 CFR, 1977 Comp).

FEMA summarized in House Document 465, “A Unified National Program for Managing Flood Losses,” written in 1979, the “primary purposes” of the National Flood Insurance Act (NFIA) of 1968. These purposes were: to (1) “provide flood insurance”; (2) “reduce future flood damages through better floodplain management”; and (3) “reduce federal expenditures for disaster assistance associated with floods” (NFIP Program Description, 2002). Appendix A provides a complete summary of the NFIA objectives. Section 1301 of the NFIA includes phrases such as:

“restrict the development of land which is exposed to flood damage”

“guide development of future construction...threatened by flood hazards,”

“discouraging unwise occupancy of flood prone areas”

These mandates, along with their analysis in the An Evaluation of the NFIP: Final Report (discussed in Chapter 1) can be summarized in these categories:

1. **Development:** Restrict the development of land which is exposed to flood damage and guide development of future construction, where practicable, away from locations which are threatened by flood hazards.
2. **Mitigation:** Reduce the loss of life, the disruption, and the damages caused by floods.
3. **Conservation:** Preserve and restore the natural resources of the nation’s floodplains.

### **The NFIP’s Unintended Consequences**

As the previous chapter noted, there has been considerable debate since the inception of the NFIP regarding the actual outcomes of the program, and particularly concerning the extent to which the NFIP has achieved its major strategic goals. Among

the numerous NFIP studies are several major national commissions' reports, few of which are empirical, suggesting the NFIP may promote development through the availability of flood insurance (John, 2005; Heinz Center, 2000; Pew Oceans Commission, 2003; Millemann, 1993). The initial literature search for this proposal, more specifically, repeatedly suggests that the NFIP has had several documented outcomes inconsistent with the NFIP's stated strategic goals:

1. **Accelerated floodplain development:** Development appears to have accelerated in flood prone areas in recent decades. Further, evidence suggests that the NFIP has sometimes enabled development and, in doing so, creates a "moral hazard" or "perverse incentive" to encourage development in flood prone areas.
2. **Unsatisfactory flood risk mitigation:** Property owners, who want to live near water, have taken advantage of the government-backed flood insurance policies that private insurance companies were unwilling to assume. NFIP policies have steadily increased and NFIP claims have steadily increased since the NFIP's inception due to flood damage. Many commentators have suggested that the risk of a structure being in a flood has increased, not mitigated, due to the NFIP.
3. **Insufficient floodplain conservation:** Floodplain conservation has not become a priority in the implementation of the NFIP and, in fact, the pace of development in environmentally sensitive floodplain and coastal areas quickened. The NFIP has done little to preserve or restore the natural resources of the nation's floodplains.

This inconsistency between intended and unintended consequences of the NFIP results in a situation earlier referred to as "moral hazard" or "perverse incentives" (see Chapter 1 for a more detailed explanation of these concepts). "Moral hazard" is the term most often used in insurance-oriented literature while "perverse incentive" is more common to political economy. The terms are virtually interchangeable within the context of this dissertation.

### **Characterizing the NFIP's Unintended Consequences**

Two sources of information have been particularly significant in supporting the characterization of the NFIP as creating the unintended consequence of perverse

incentives. First is the research of Professor Raymond Burby who coined the term “Safe Development” (Burby, 2006). Second is an original survey database produced during research conducted by Dr. Walter Rosenbaum and the author of this study for FEMA. This dissertation will utilize a FEMA database developed by Dr. Rosenbaum, the author, and the Florida Research Survey Center for FEMA. The original FEMA database will be amplified with additional statistical research and conceptual interpretations drawn from the literature on political economy. The FEMA database will be described in detail later in this chapter.

### **Safe Development**

Raymond Burby, Professor of City and Regional Planning at the University of North Carolina, Chapel Hill, added a new dimension to how one might view programs like the NFIP. Burby evaluated the social/psychological impact of the government’s role in encouraging development in hazardous areas. Burby uses the term “Safe Development” and postulates two “safe development paradoxes”—one at the federal level and a second at the local level (Burby: 2006):

The safe development paradox is that in trying to make hazardous areas safer the federal government has in fact substantially increased the potential for catastrophic property damages and economic loss. The local government paradox is that while their citizens bear the brunt of human suffering and financial loss in disasters, local officials pay insufficient attention to policies to limit vulnerability.

The implication is that if the government provides safe building codes, subsidized flood insurance, and relief if a disaster does occur, the public will conclude that it must be safe to live in a flood prone area. For example, Hurricane Beulah destroyed much of South Padre Island in 1967; but by 1978, with the aid of the subsidized NFIP, two

thousand permanent residents had returned with a total insured property value of \$464 million (Miller, 1981).

Through federal government policies, like the NFIP, the development in hazard prone areas becomes perceived “safe” or “normal” by potential inhabitants. The NFIP provides benefits (e.g. subsidies) directly to the policy holder (i.e. home owner) and essentially bypasses state and local officials. The “safe development” and “local government” paradoxes also influence the premises for land development among developers, builders and homeowners by “normalizing” the idea of living in a floodplain. The mindset might be characterized as, “If the federal government is enabling me to do something, it must be OK.” For example, when community floodplain administrators were interviewed for this research regarding the relative importance of the availability of flood insurance, they indicated that the question was in many ways moot or inconsequential—everyone involved in the development process knows that the government provides flood insurance: “that’s the standard,” “that’s a given” and “that’s normal” (Rosenbaum and Boulware Community Floodplain Administrator Interviews, 2003).

### **The Original Survey Research**

Previous studies have generally promoted the presumption that a major NFIP perverse incentive is to enable development near water and therefore, within flood prone areas (Heinz Commission, 2000; Pew Oceans Commission, 2003). However, there is continuing controversy over the reliability of these studies and the lack of comprehensive empirical data—especially information derived from community-based and policyholder information. In an effort to clarify the NFIP’s role in enabling development near water and the potential impact on the environment, FEMA was

commissioned by Congress to research this topic. One prime contractor for organizing a number of studies regarding the NFIP was the American Institutes for Research (AIR). AIR hired a number of subcontractors to perform studies, including one conducted by Dr. Rosenbaum and the author of this dissertation.

The empirical data in this dissertation examines community and policyholder data obtained through survey research contracted by FEMA through the AIR. In 2002, FEMA contracted with a variety of organizations to do an evaluation of the NFIP. A significant portion of the work was contracted to a not-for-profit organization, AIR. In turn, AIR awarded a contract for one study, "NFIP: Developmental and Environmental Impacts," to Dr. Walter A. Rosenbaum, the Florida Research Center, and the author. The impetus for the study was concern voiced by various environmental groups and the Environmental Protection Agency (EPA) regarding the NFIP's potentially negative impact on environmentally sensitive floodplain areas. An important element of this study was to evaluate the NFIP's compliance with Executive Order (EO) 11988, the National Environmental Policy Act of 1969 (NEPA) and the Endangered Species Act (ESA) of 1973. As discussed in Chapter 1 and earlier in this chapter, EO 11988, NEPA and the ESA all place mandates on the NFIP program to restrict development in flood plain areas and to preserve and restore the natural resources of the nation's floodplains.

The study director for the environmental and developmental impacts of the NFIP was Dr. Walter A. Rosenbaum and the author was Assistant Study Director. The author's responsibilities included a literature search and assistance in the design, testing and administration of the survey research component of the project. This dissertation utilizes some of the original research data collected for this comprehensive

study. However, the research in this dissertation does not replicate the FEMA study nor was it commissioned by FEMA.

### The Survey Database

The survey information is drawn from two databases: individuals important in the development of specific NFIP communities (referred to collectively as “development interests”) and a national sample of homeowners. Development interests at the community level included those who design, build, finance, promote floodplain development and manage floodplain regulations. This group specifically includes insurance agents, realtors, financial lenders, property developers and, as were mentioned, floodplain administrators. The homeowner category encompasses NFIP policyholders and non-policyholders from across the nation, including those living in a Special Flood Hazard Area (SFHA) and in a community near a SFHA. FEMA defines a SFHA as:

The land area covered by the floodwaters of the base flood is the Special Flood Hazard Area (SFHA) on NFIP maps. The SFHA is the area where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The SFHA includes Zones A, AO, AH, A1-30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO, V1-30, VE, and V. (FEMA SFHA Definition, 2009)

Table 2-1 identifies the respondent groups and the total number of respondents for each group:

Table 2-1. Pool of Survey Participants by Respondent Group

*Administrators	*Developers	*Insurers	*Lenders	*Realtors	**Homeowners
17	25	31	78	37	2003

\*These 5 respondent groups are also referred to as “community respondents involved with development”

\*\*Homeowners will be further broken down by “policyholders” and “non-policyholders” as well as “In SFHA” or “Out SFHA”

Note: Due to the sequencing of questions in the survey, the total frequency (f) of responses may not add up to the total number of potential survey participants. Some questions were only asked as follow-on questions to other questions—thus, not all respondents had the opportunity to respond to all questions.

## **Development interests: state selection**

States selected in the community survey were chosen by criteria that prior research suggests may be related, singly or in combination, to variability in the onset and magnitude of development and the environmental consequences of development in flood hazard areas:

- Regionally distributed among the Northwest, Southeast, Southwest, Midwest and Mid-Atlantic areas;
- Inclusive of coastal and riverine states;
- Among the highest third of states in total population growth between 1990-2000;
- Among the highest third of states in total number of NFIP policy holders.

States ranked nationally among the upper third in population growth between 1990 – 2000 were selected (with the exception of Illinois) because the development of floodplains appears to be most intensive within these states and, consequently, the magnitude and character of such environmental transformation most apparent. Illinois is added to assure at least one Midwestern state is included in the survey. All states are among the top third nationally in the total number of policyholders to assure the survey is conducted where large numbers of policyholders exist. The six states selected by these criteria were Arizona, Florida, Illinois, North Carolina, South Carolina, and Texas.

Particular care was given to the selection of states because regions differ in a number of pertinent variables. For example, regions differ in the extent to which their political cultures encourage aggressive local governmental planning for floodplain conservation. Also, significant regional differences exist in the rate of population growth and the increase of NFIP policyholders between 1990 and 2000 that may, in turn, imply important variability in regional economic, political or geographic contexts for floodplain

management. All Midwestern states in this survey, for instance, are among the lowest third of all states in population growth during this decade. The Southeastern and Northwestern states are in the upper third of national population growth during 1990-2000, and the Mid-Atlantic states generally rank in the middle-third among state growth rates during this period. Since research also suggests that coastal and riverine states may differ significantly in developmental impacts upon floodplains, the six-state survey includes two riverine states (Arizona and Illinois) and four coastal states (South Carolina, Texas, Florida, and North Carolina).

### **Development interests: community selection within states**

The selection of communities was based on those communities within a state ranking among the top one-third in developmental pressure during the 1990-2000 time period. In general, the communities that were selected also met the additional criteria: 1) they were among the top 5% of total policy holders in their respective states; and 2) they were among the highest in percentage of post-FIRM policies.

Three communities were selected for study within each state. Within each state, communities were ranked according to the total number of NFIP policies in community SFHAs, then rank-ordered by the percent of post-FIRM contracts. In the NFIP, a community can constitute an entire county. The highest-scoring three communities in each state were then designated for interviews. These communities were surveyed:

- Arizona: Scottsdale, Mohave County, Maricopa County
- Florida: Pembroke Pines, Davie, Palm Beach County
- Illinois: St. Clair, Fox Lake, Round Lake
- North Carolina: Sunset Beach, Ocean Isle Beach, Kill Devil Hills
- Texas: Corpus Christi, League City, Hildago County
- South Carolina: Beaufort City, Mt. Pleasant, Hilton Head Island

## **Development interests: respondent selection within communities**

Survey research was conducted among respondents strategic in understanding the relationship between perceptions of flood hazard, flood insurance availability and development in NFIP communities. The survey was conducted among individuals likely to have a significant influence on community floodplain development, or to be well informed about floodplain management in the communities to be studied. These individuals were identified as developers, mortgage lenders, development underwriters, real estate brokers, insurance agents and floodplain administrators. The sampling frame was composed of various businesses in the research communities or, in the case of floodplain administrators, from local government officials.

Budget constraints precluded a large, statistically valid random sample of these respondents, but interviews with a smaller number of randomly selected individuals in each group provided valuable interpretations of factors affecting floodplain development in specific communities that could not be obtained from policyholders themselves. Individuals chosen for these interviews were selected randomly from appropriate community professional and business association rosters.

Individual respondents in the communities, such as realtors, developers, insurers, and lenders were randomly selected from local phone listings. Floodplain administrators were not randomly selected since they were the designated floodplain administrators of the communities selected for this study. The survey protocols address specific issues identified by FEMA:

1. What kind(s) of risk, or other factors, are considered when decisions are made to buy/build in a floodplain?

2. To what extent, and in what manner, do individuals in or near SFHAs consider flood hazard an important consideration when making decisions about buying/building within a SFHA?
3. Do individuals contemplating buying/building in or near a SFHA consider flood insurance necessary for floodplain occupancy?
4. How important is the availability of flood insurance relative to the other factors in the decision to develop an area?
5. What is the relation between people's perceptions about development in flood-prone areas and their actions and behaviors?
6. In what way(s) does the availability of flood insurance influence decisions about buying, building, or financing development in a SFHA? Would the lack of insurance serve as a deterrent to buy, build, or develop in a SFHA?
7. To what extent is development on community floodplains attributable to a growth in seasonal residents or to year-round residents moving into the community to provide services and infrastructure for an expanding population?
8. Is there development in the CBRS and if there is, what is causing the development?

The Florida Research Center (FSRS) was contracted by AIR to assist in the development of survey instruments and to conduct surveys in selected communities throughout the United States. The surveys were conducted telephonically. All surveys were conducted by FSRS with the exception of the community flood plain administrators. The community flood plain administrators were interviewed telephonically by the report's director and assistant director. Additional detail of how communities were selected for survey may be found in Appendix B.

### **Homeowner survey dataset**

The national homeowner survey attempts for the first time to account accurately for flood zone status among homeowners, including NFIP policyholders, in describing perceptions about flood risk and flood insurance. Few single data sources were

available for this critical piece of information. Thus, the sample is drawn from two sources.

The first is a database, constituting communities located in a SFHA, developed by the RAND Corporation as part of the NFIP evaluation concerning market penetration rates. This dataset provides information on a respondent's flood zone, which provides an objective measure of flood risk that would not be available for non-policyholders through other means. This dataset was merged with several variables including policyholder status (i.e., whether or not the homeowner has an NFIP policy). This market penetration dataset was used for all strata where a sufficient number of potential respondents were found to conduct a survey.

The Market Penetration database was developed in three stages. In the first stage, a stratified cluster sample of 100 communities was created from the approximately 19,200 NFIP communities. Clustering was necessary so that there were a reasonably small number of communities for flood determination agents to visit, draw parcels and make flood zone determinations for the study, as discussed later. From these 100 communities, a random sample of parcels was drawn in the second stage to form a database of 27,667 properties. These parcels were matched with tax identification number of FEMA's BureauNet database of policyholders. They also were assessed by a determination company for their flood zone and distance from any change in NFIP regulatory flood zone, as determined by the determination companies. From this set of properties, a stratified random sample of NFIP non-policyholders was drawn for interviews.

The characteristics of properties were selected for stratification based on the results of the literature review and focus groups that suggested the importance of policyholder status, location of the community on a coast versus inland, housing occupancy type, and flood zone as primary determinants of risk perceptions. To simplify the stratification, the strata only considered two characteristics: policyholder versus non-policyholder. Similarly, for location of the community, the strata are a coastal community versus an inland community. Additional detail of how homeowners were selected for survey may be found in Appendix C.

### **The survey instruments**

The survey instruments were extensively reviewed by expert personnel at the University of Florida, Florida Survey Research Center (UF FSRC), and NFIP staff members. These instruments were then submitted for review to the University of Florida Institutional Review Board (UFIRB) as well as the United States Office of Management and Budget (OMB). The UF FSRC made the UFIRB submission and the OMB submission was made by FEMA. The UF IRB and OMB approved the survey instruments before the study began.

The survey instruments for policy holders, floodplain administrators/managers and developers are contained in Appendix D. Because the interviews with floodplain managers and administrators of floodplain programs were considered especially vital to understanding the program, these were personally conducted by the study director, Dr. Rosenbaum, and the author.

These surveys were all pre-tested with a limited respondent group and then results were evaluated for reliability and validity. The results of the various surveys described above are the basis for the quantitative analysis that will be included in the dissertation.

## **Floodplain Administrators: Hypotheses and Indicators**

Floodplain administrators from the high-growth communities were interviewed about the NFIP's local consequences. High-growth communities were chosen because they are commonly assumed in the relevant literature to portray the NFIP's most identifiable consequences and to characterize the role that NFIP availability plays among other drivers of development.

As part of the original research conducted for this dissertation, the floodplain administrators were surveyed personally or by phone. As previously noted, these were floodplain administrators in communities that experienced significant developmental pressure since 1995 and have a large number of NFIP policies (information is based on a FEMA database). A FEMA database with the number of policy holders for each year from 1990 through 2000 was used to determine which communities had the greatest development pressure in flood prone areas. As discussed above, communities considered as candidates for study had to meet two criteria: 1) be in the top 5% of the state's total policy holders; and 2) be among the top 5% of state communities in percentage of post-FIRM policies. Because of their professional responsibilities and experience, community floodplain administrators are likely have an informed and contemporary understanding of the NFIP and the role the NFIP plays in development in their communities. Therefore, these respondents were asked a unique set of questions directly evaluating the NFIP's developmental and environmental impact on their community's floodplain.

The following survey questions were used as indicators of how well the NFIP was accomplishing its intended goals in these communities. The indicators are categorized by the intended goals the NFIP was supposed to achieve. Since development and

mitigation are closely tied, these two goals are grouped together for the purposes of displaying the hypothesis and indicator. Note that the coded terms such as “enabled development” were assigned by the author. All questionnaires are available in Appendix D.

### Development and Mitigation Indicators

Hypothesis	Indicator
Hypothesis 1: The NFIP has enabled or encouraged development in flood zones.	<p>“Taking all your knowledge of the NFIP insurance program into consideration, do you believe that the availability of NFIP flood insurance has enabled or encouraged development in flood zone areas that otherwise might not have occurred?” [YNDR]</p> <p>(Coded as “enabled development”)</p>
Hypothesis 2: The NFIP has increased the pace of development in flood zones.	<p>“Taking all of your knowledge of the NFIP insurance program into consideration, do you believe that the availability of NFIP flood insurance has increased the rate or pace of development in flood zone areas?” [YNDR]</p> <p>(Coded as “increased development”)</p>
Hypothesis 3: The NFIP has not guided residential development away from locations threatened by flood hazard.	<p>“Using a scale from 1 to 5, where 1 is ‘very unsuccessful’ and 5 is ‘very successful,’ please tell me how successful you think the National Flood Insurance Program has been in accomplishing the following: guiding residential development away from locations that are threatened by flood hazards.” [1-5, DR]</p> <p>(Coded as “guided residential development”)</p>

<p>Hypothesis 4: The NFIP has not guided business development away from locations threatened by flood hazard.</p>	<p>“Using a scale from 1 to 5, where 1 is ‘very unsuccessful’ and 5 is ‘very successful,’ please tell me how successful you think the National Flood Insurance Program has been in accomplishing the following: guiding business development away from locations that are threatened by flood hazards.” [1-5, DR]</p> <p>(Coded as “guided business development”)</p>
<p>Hypothesis 5: There has been new development in the floodplains.</p>	<p>“Using a scale from 1 to 5, where 1 is ‘very little’ and 5 is ‘very much,’ please estimate how much new development has occurred in your community's floodplain in the past three years.” [1-5, DR]</p> <p>(Coded as “new development”)</p>

**Conservation Indicators**

<p>Hypothesis 6: The NFIP has not preserved open spaces.</p>	<p>“Using a scale from 1 to 5, where 1 is ‘very unsuccessful’ and 5 is ‘very successful,’ please tell me how successful you think the National Flood Insurance Program has been in accomplishing the following: preserving open spaces in your community.” [1-5, DR]</p> <p>(Coded as “preserve open spaces”)</p>
<p>Hypothesis 7: The NFIP has not protected water quality.</p>	<p>“Using a scale from 1 to 5, where 1 is ‘very unsuccessful’ and 5 is ‘very successful,’ please tell me how successful you think the National Flood Insurance Program has been in accomplishing the following: protecting water quality in your community.” [1-5, DR]</p> <p>(Coded as “protected water quality”)</p>

<p>Hypothesis 8: The NFIP has not controlled soil erosion and sedimentation.</p>	<p>“Using a scale from 1 to 5, where 1 is ‘very unsuccessful’ and 5 is ‘very successful,’ please tell me how successful you think the National Flood Insurance Program has been in accomplishing the following: controlling soil erosion and sedimentation in your community.” [1-5, DR]  (Coded as “controlled soil erosion”)</p>
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**Development Interests: Development and Mitigation Hypotheses and Indicators**

Some survey questions were asked of all development interest groups. The purpose of these questions is to characterize the perception of flood risk in the community, the amount of development occurring despite the risk, and the willingness of homeowners to pay more for flood insurance. When possible, the questions were aggregated to create a comprehensive view held by respondent floodplain administrators, developers, insurers, lenders, and realtors. In some cases, the development interested responses can be compared to the response of the homeowners. As with the floodplain administrators, the survey questions were used as indicators of how well the NFIP was accomplishing its intended goals. The indicators are categorized by the intended goals of the NFIP. Since development and mitigation are closely tied, these two goals are grouped together for the purposes of displaying the hypothesis and indicator. The coded terms, such as “perception of risk,” were assigned by the author.

Hypothesis	Indicator
<p>Hypothesis 9: There will not be any significant difference between development interests' perception of the likelihood of flooding in their community in the next 10 years.</p>	<p>“Please consider the likelihood of some part of your community flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will ‘not happen at all’ and 5 is flooding will ‘definitely happen,’ how would you characterize the likelihood of flooding in your community?”</p> <p>(Coded as “perception of risk”)</p>
<p>Hypothesis 10: There will not be any significant difference between development interests' perception of homeowners perceived flood risk.</p>	<p>“Using the same scale, please tell me how you think the residents of your community would characterize the risk from flooding when considering buying or building on property in your community's flood plain.”</p> <p>(Coded as “perception of homeowner risk”)</p>
<p>Hypothesis 11: Availability of flood insurance will be an important consideration in a person's decision to purchase or develop in the flood plain.</p>	<p>“Could you please tell me what factors influence a person's decision to purchase or develop property in your community's flood plain?”</p> <p>(Coded as “development factors”)</p>
<p>Hypothesis 12: There will not be any significant difference between development interests' perception of the importance of flood insurance in deciding to do business in the floodplain.</p>	<p>(LENDERS) “Suppose that federal flood insurance is NOT available for a property located in the flood plain that you or your company is considering for a mortgage, would you still underwrite a mortgage for the property if federal flood insurance were not available?”</p> <p>(DEVELOPERS) “Suppose that federal flood insurance is NOT available for a property located in the flood plain that you or your company is considering for purchase or development, would you still purchase or develop the</p>

	<p>property if federal flood insurance were not available?”          (REALTORS) “Suppose that federal flood insurance is NOT available for a property located in the flood plain that a client is considering for purchase through you or your agency, would you still recommend that a client purchase the property if federal flood insurance were not available?”          [1-5, DR]</p> <p>(Coded as “insurance important”)</p>
<p>Hypothesis 13: As the price of flood insurance increases, less people will be perceived as wanting to buy flood insurance.</p>	<p>“Suppose that federal flood insurance was not available, but flood insurance was still required for federally backed mortgages, and property owners had to consider purchasing commercial insurance, what percentage of the property owners do you think would be willing to pay 10%, 25%, 35%, 50% or 100% more for flood insurance?”</p> <p>(Coded as “how much more”)</p>

Development interests such as realtors, developers, lenders, and insurers were not considered to be focused on “conservation” issues, so they were not asked conservation-related questions.

### **Homeowners Survey: Hypotheses and Indicators**

The goal of the Homeowners Survey was to assess the individual homeowner’s perception of flood risk, identify the behavior associated with that risk, and then evaluate the impact when the homeowner was asked if he/she/they would pay more than the current rate for flood insurance. The latter question is particularly strategic since it directly addresses the dissertation premises that “homeowners would be less likely to

obtain flood insurance if they were forced to pay actuarial rates for flood insurance.” If homeowners were in fact sensitive to the cost of flood insurance (i.e. less likely to buy flood insurance if it was more expensive), but were required to have flood insurance as a requirement for their federally backed mortgages, then, perhaps there would be less development in flood prone areas.

### **Classification of Homeowners**

The respondent pool was divided into four groups:

- NFIP policyholders residing in a special flood hazard area (SFHA)
- Non-policyholders residing in a SFHA
- NFIP policyholders residing near but not in a SFHA
- Non-policy-holders residing near but not in a SFHA.

The original database for the random selection of homeowners was developed by the RAND Corporation as part of an NFIP evaluation of market penetration rates. This dataset provides information on homeowners’ property location—living in a SFHA or outside a SFHA. The Market Penetration database was developed in stages. In the first stage, a stratified cluster sample of 100 communities was created from the approximately 19,200 NFIP communities. From these 100 communities, a random sample of parcels was drawn in the second stage to form a database of 27,667 properties. These parcels were matched with tax identification number of FEMA’s BureauNet database of policyholders. They also were assessed by a determination company for their flood zone and distance from any change in NFIP regulatory flood zone, as determined by the determination companies. From this set of properties, a stratified random sample of NFIP non-policyholders was drawn for interviews.

The characteristics of properties were selected for stratification based on the results of the literature review and focus groups that suggested the importance of

policyholder status, location of the community on a coast versus inland, housing occupancy type, and flood zone as primary determinants of risk perceptions. To simplify the stratification, we restricted each characteristic to two strata. For policyholder status, the two strata are simply policyholders and non-policyholders. Similarly, for location of the community, the two strata are “coastal community” versus “riverine community.” The phone survey for homeowners was conducted by the University of Florida’s survey research center (Rosenbaum and Boulware, 2006).

As with the floodplain administrator and development indicators, the following survey questions were used as indicators of how well the NFIP was accomplishing its intended goals. The indicators are categorized by the goals the NFIP was intended to achieve. Since development and mitigation are closely tied, these two goals are grouped together for the purposes of displaying the hypothesis and indicator. Note that the coded terms such as “homeowner perception of risk” were assigned by the author.

### **Development and Mitigation Indicators**

In this section, the focus is homeowner survey questions which try to explain homeowner perceptions and behavior as it relates to flood risk, flood plain developments, and the impact of higher insurance rates on development in the flood prone areas.

### **Homeowners’ perceptions of flood risk**

Many of the questions asked of homeowners focused on the perceptions of flood risk. The perception of risk appeared to be an appropriate place to begin to understand the demand for flood insurance. These questions were asked of policy holders in special flood hazard areas (SFHAs) as well as those near to SFHAs. The following is a

set of hypotheses and indicators (survey questions) dealing with homeowners perception of flood risk.

Hypothesis	Indicator
Hypothesis 14: There will be a significant difference between respondent groups: policyholders living in a SFHA will perceive more flood risk.	“Is this residence in a neighborhood where a flood could happen?”  (Coded as “homeowner perception of risk”)
Hypothesis 15: There will be a significant difference between respondent groups: policyholders living in a SFHA will perceive more likelihood of flood damage.	“Consider the probability that a flood will cause damage to your home. Using a percentage, please estimate the probability that your home, or the building you live in, will suffer at least moderate damage from a flood within the next 10 years.”  (Coded as “homeowner perception of damage”)
Hypothesis 16: There will be a significant difference between respondent groups: policyholders living in a SFHA will think it is more important to have flood insurance.	“Using a scale from 1 to 5, where 1 is ‘not important’ and 5 is ‘very important’ please tell me how important you think it is for you to have insurance that covers your home in the event of a flood.”  (Coded as “homeowner flood insurance important”)

### **Homeowners’ perceptions and behavior about floodplain development**

The intent of the previous homeowner questions was to evaluate the level of perceived flood risk among homeowners. The following questions/indicators measure the behavior of homeowners based on their perceptions of risk (i.e., do they actually purchase flood insurance and would they be willing to carry flood insurance if they were not required).

Hypothesis	Indicator
Hypothesis 17: The percentage of people who have flood insurance will mirror those who perceive a risk of flooding.	<p>“Do you have insurance that would cover losses to your home in the event of a flood?” [YNDR]</p> <p>(Coded as “homeowner have insurance”)</p>
Hypothesis 18: The percentage of people who would still have flood insurance will mirror those who perceive a risk of flooding.	<p>“If you were not required to have flood insurance as a condition of your mortgage, would you still carry a flood insurance policy on your home?”</p> <p>(Coded as “homeowner still carry flood insurance”)</p>
Hypothesis 19: Homeowners would not have purchased, built or stayed in a flood prone area without flood insurance.	<p>“Suppose that flood insurance had not been available for your property or that you could not purchase the insurance. Would you still have purchased, built, or stayed at this location?”</p> <p>Coded as “homeowner live in flood prone area without insurance”</p>

**Homeowners’ perceptions about the impact of higher insurance rates on development in flood prone areas**

FEMA officials have consistently stated during interviews with the author that cost is not a very important factor in determining if people will buy flood insurance. FEMA’s implicit argument is that the NFIP is not an enabler of development by offering inexpensive flood insurance. This dissertation proposes an alternative view. Essentially, FEMA’s assertion implies that the cost of flood insurance is, in economic terms, “inelastic”—as the price of flood insurance goes up, potential consumers will not decrease their willingness to purchase flood insurance. This dissertation challenges FEMA’s assumption, proposes alternatively that the demand for flood insurance is in

fact “elastic”—as the price of flood insurance goes up, potential consumers will be less inclined to obtain (or “consume”) flood insurance.

If the NFIP provides insurance that the commercial markets will not provide or if NFIP insurance is cheaper than commercial markets provide, the NFIP can be characterized as an enabler, or at least a facilitator of development, in the sense that it makes available at a more attractive price than the commercial market a commodity usually considered necessary for residential and commercial property sales. This is particularly true for those wishing to live in a SFHA who might decide otherwise if their flood premiums were to increase to commercial, actuarially based, rates.

Hypothesis	Indicator
Hypothesis 20: As the price of flood insurance increases, less people will be willing to buy flood insurance.	<p>“Suppose that federal flood insurance was not available, but still required for federally backed mortgages, and property owners had to consider purchasing commercial insurance, what percentage of the property owners do you think would be willing to pay 10%, 25%, 35%, 50% or 100% more for flood insurance?”</p> <p>(Coded as “homeowner how much more”)</p>

Homeowners were not considered to be focused on “conservation” issues, so they were not asked conservation indicators.

### **Conclusion**

In reviewing this methodology, the question of burden of proof comes to mind. Is the assumption that the NFIP is meeting its goals, and therefore, research must demonstrate that it is not? Or, is there a burden on the part of the NFIP to show that the

survey indicators support the notion that the NFIP is fulfilling its goals? And what should be the standard of evidence—preponderance of the evidence or proof beyond a reasonable doubt? These standards are important because in this researcher’s opinion, studies in political science rarely provide “scientific” and “irrefutable” evidence.

The position of this author is that the burden of proof lies with the NFIP program to prove it is meeting its goal and the standard of evidence is preponderance of the evidence. One might suggest that a program which is \$20 billion in debt should have some burden to prove.

In the next chapter, Results and Analysis will illuminate the research data associated with this dissertation. Each hypothesis will be tested based on the indicators and the results will be explained and evaluated to see if they make sense based on a common sense review of the results.

## CHAPTER 3 RESULTS AND ANALYSIS: LINKING NFIP STRATEGIC GOALS TO IMPACT INDICATORS

The broad problem of flood-loss reduction is that the rate at which flood losses are being eliminated by construction of engineering or land-treatment works is of about the same magnitude as the rate at which new property is being subjected to damage...The construction of new flood-protection works frequently has been the signal for accelerated movement into the floodplain.

-Gilbert F. White, 1960

### **NFIP's Intended and Unintended Consequences**

The major premise of this dissertation is that the NFIP is failing to achieve its major goals and that, as a result, it has created significant, contradictory, and unintended consequences. These NFIP primary goals include:

1. **Development:** Restrict the development of land which is exposed to flood damage and guide development of future construction, where practicable, away from locations which are threatened by flood hazards.
2. **Mitigation:** Reduce the loss of life, the disruption, and the damages caused by floods.
3. **Conservation:** Preserve and restore the natural resources of the Nation's floodplains.

Each will be evaluated in terms of the survey research indicators from the survey data collected.

In contradiction to its major objectives, the NFIP has outcomes that are in fact inconsistent with the NFIP's strategic goals. The unintended consequences include:

1. **Accelerated floodplain development:** Development appears to have accelerated in flood prone areas in recent decades. Further, evidence suggests that the NFIP has sometimes enabled development and, in doing so, creates a "moral hazard" or "perverse incentive" to encourage development in flood prone areas.

2. **Unsatisfactory flood risk mitigation:** Property owners, who want to live near water, have taken advantage of the government-backed flood insurance policies that private insurance companies were unwilling to assume. NFIP policies have steadily increased and NFIP claims have steadily increased, since the NFIP's inception, due to flood damage. Many commentators have suggested that the risk of a structure being in a flood has increased, not mitigated, due to the NFIP.
3. **Insufficient floodplain conservation:** Floodplain conservation has not become a priority in the implementation of the NFIP and, in fact, the pace of development in environmentally sensitive floodplain and coastal areas quickened. The NFIP has done little to preserve or restore the natural resources of the nation's floodplains.

To briefly review the survey databases, they were drawn from two sources: interviews with individuals important in the development of specific NFIP communities (referred to collectively as "development interests") and a national sample of homeowners. Development interests at the community level included those who design, build, finance, or promote floodplain development and manage floodplain regulations. This group specifically includes insurance agents, realtors, financial lenders, property developers and floodplain managers. The homeowner category includes NFIP policyholders and non-policyholders as well as those living in a special flood hazard area (SFHA) and those who live in a community near a SFHA.

In this chapter, the hypotheses, the appropriate indicator(s), the data results and analyses will in turn be presented, leading to a discussion concerning the extent to which the data support the original hypotheses. The discussion begins with the floodplain administrators, then addresses the broader group of development interests and concludes with the homeowner survey data.

It is important to note again, that the floodplain administrator surveys were not drawn from a national random sample. As a group, they are representative of both riverine and coastal areas as well as representative of various regions of the country.

What the floodplain administrators all had in common was that their communities all experienced high levels of developmental pressure.

### **Floodplain Administrators and the NFIP's Impact**

As discussed in Chapter 2, the floodplain administrators are government employees who are dedicated to management of their community's floodplain. As a group, floodplain administrators are in a unique position to evaluate the NFIP's impact. Floodplain administrators do not have an economic incentive for encouraging development. If anything, they may be blamed for mismanagement if major damage is done to structures built in the floodplain. Floodplain administrators were selected from 17 communities in six states:

- Beaufort City, Mt. Pleasant, Hilton Head Island
- Arizona: Scottsdale, Mohave County, Maricopa County
- Florida: Pembroke Pines, Davie, Palm Beach County
- Illinois: St. Clair, Fox Lake, Round Lake
- North Carolina: Sunset Beach, Ocean Isle Beach, Kill Devil Hills
- Texas: Corpus Christi, League City, Hildago County, South Carolina

This narrative follows the format discussed in Chapter 2, with the indicators categorized by the intended goals the NFIP was supposed to achieve. Since development and mitigation are closely tied, these two goals are aggregated for the purposes of displaying hypotheses and indicators. The coded terms such as “enabled development” were assigned by the author.

### **Development and Mitigation Indicators**

The interviews with flood plain administrators were the only personal contact the author had with respondents. All the other interviews were conducted via the phone by the Florida Survey Research Center. The five indicators used in this research from the flood plain administrators were derived from phone and personal interviews and drew

upon the administrator’s first-hand knowledge of the NFIP’s development/mitigation impacts in their community. The collective impression gained from flood administrators was that they viewed the NFIP rather non-judgmentally (i.e. as a group, no one seemed predisposed to think that the NFIP was good public policy or bad public policy—it just was the public policy). Among this group, environmental protection was not their top mission priority—it is not that they didn’t care about the environment, but it wasn’t the focus of their job. The policies and practices molded by the NFIP existed long before most of the administrators had assumed their position. The number of flood administrators interviewed was relatively small but still representative of high growth communities across the nation.

**Floodplain administrator response indicator #1**

Hypothesis	Indicator
Hypothesis 1: The NFIP has enabled or encouraged development in flood zones.	<p>“Taking all your knowledge of the NFIP insurance program into consideration, do you believe that the availability of NFIP flood insurance has enabled or encouraged development in flood zone areas that otherwise might not have occurred?” [YNDR]</p> <p>(Coded as “enabled development”)</p>

Table 3-1. Floodplain Administrators: Enabled Development

Response	Frequency	% (N=17)
Yes	10	58.8%
No	7	41.2%
Don’t Know	0	0.0%
Refuse	0	0.0%

This one parsimonious indicator is quite revealing. Almost 60% of the floodplain administrators interviewed felt that the NFIP was an enabler of development. If the

NFIP was meeting its goals of restricting development in flood prone areas, one might expect a nearly unanimous “no” response to this indicator, rather than the substantial consensus favoring “yes.” If the NFIP is in fact satisfying the strategic goal to restrict the development of land exposed to flood damage and guide development of future construction away from locations which are threatened by flood hazards, it is not apparent from this indicator.

**Floodplain administrator response indicator #2**

Hypothesis	Indicator
Hypothesis 2: The NFIP has increased the pace of development in flood zones.	<p>“Taking all of your knowledge of the NFIP insurance program into consideration, do you believe that the availability of NFIP flood insurance has increased the rate or pace of development in flood zone areas?” [YNDR]</p> <p>(Coded as “increased development”)</p>

Table 3-2. Floodplain Administrators: Increase Development

Response	Frequency (N=17)	%
Yes	8	47.1%
No	8	47.1%
Don't Know	1	5.9%
Refuse	0	0.0%

This indicator takes a slightly different approach on the NFIP’s impact on development—suggesting that the NFIP has increased the rate or pace of development in flood zones. Again, if the NFIP were fulfilling the goal of steering development away from flood zones, one might expect a substantial consensus among the administrator’s responses. Coupling the floodplain administrators’ responses to “enabled development” and “increased development” strengthens the hypothesis that the NFIP has not restricted the land in the survey flood prone areas.

### Floodplain administrator response indicator #3

Hypothesis	Indicator
Hypothesis 3: The NFIP has not guided residential development away from locations threatened by flood hazard.	<p>“Using a scale from 1 to 5, where 1 is ‘very unsuccessful’ and 5 is ‘very successful,’ please tell me how successful you think the National Flood Insurance Program has been in accomplishing guiding residential development away from locations that are threatened by flood hazards?”</p> <p>[1-5, DR]</p> <p>(Coded as “guided residential development”)</p>

Table 3-3. Floodplain Administrators: Guided Residential Development

Response	Frequency (N=17)	%
Very unsuccessful	7	41.2%
2	3	17.7%
3	6	35.3%
4	1	5.9%
Very successful	0	0.0%
Don't Know	0	0.0%
Refused	0	0.0%

Table 3-3a. Guided Residential Development: Aggregated

Response	Frequency (N=17)	%
1= Very unsuccessful & 2	10	58.8%
2=3	6	35.3%
3=4 & Very successful	1	5.9%
Don't know	0	0.0%
Refuse	0	0.0%

The response to this indicator seems quite clear: nearly 60% of the responses did not think that the NFIP guided residential development away from locations that are threatened by flood hazards.

#### Floodplain administrator response indicator #4

Hypothesis	Indicator
Hypothesis 4: The NFIP has not guided business development away from locations threatened by flood hazard.	<p>“Using a scale from 1 to 5, where 1 is ‘very unsuccessful’ and 5 is ‘very successful,’ please tell me how successful you think the National Flood Insurance Program has been in accomplishing guiding business development away from locations that are threatened by flood hazards?”</p> <p>[1-5, DR]</p> <p>(Coded as “guided business development”)</p>

Table 3-4. Floodplain Administrators: Guided Business Development

Response	Frequency (N=17)	%
Very unsuccessful	7	41.2%
2	1	5.9%
3	5	29.4%
4	1	5.9%
Very successful	1	5.9%
Don't Know	2	11.8%
Refused	0	0.0%

Table 3-4a. Guided Business Development: Aggregated

Response	Frequency (N=17)	%
1= Very unsuccessful & 2	8	47.1%
2=3	5	29.4%
3=4 & Very successful	2	11.8%
Don't know	2	11.8%
Refuse	0	0.0%

In the case of business development, only 12% of floodplain administrators thought that the NFIP was quite successful at guiding development away from flood hazards.

## Floodplain administrator response indicator #5

Hypothesis	Indicator
Hypothesis 5: There has been new development in the floodplains.	<p>“Using a scale from 1 to 5, where 1 is ‘very little’ and 5 is ‘very much,’ please estimate how much new development has occurred in your community's floodplain in the past three years.” [1-5, DR]</p> <p>(Coded as “new development”)</p>

Table 3-5. Floodplain Administrators: New Development

Response	Frequency (N=17)	%
Very little	2	11.8%
2	1	5.9%
3	2	11.8%
4	1	5.9%
Very much	10	58.8%
Don't Know	1	5.9%
Refused	0	0.0%

Table 3-5a. New Development: Aggregated

Response	Frequency (N=17)	%
1= Very little & 2	3	17.7%
2=3	2	11.8%
3=4 & Very much	11	64.7%
Don't know	1	5.9%
Refuse	0	0.0%

Almost 65% of floodplain administrators felt that there was a lot of new development occurring in their community.

### Conservation Indicators

Along with development and mitigation questions, floodplain managers were also asked a series of questions regarding the NFIP's role in environmental conservation. These questions were specifically worded to match with the intended environmental goals of *The United National Program for Floodplain Management*.

## Floodplain administrator response indicator #6

Hypothesis 6: The NFIP has not preserved open spaces.	<p>“Using a scale from 1 to 5, where 1 is ‘very unsuccessful’ and 5 is ‘very successful,’ please tell me how successful you think the National Flood Insurance Program has been in accomplishing the following: preserving open spaces in your community.” [1-5, DR]</p> <p>(Coded as “preserve open spaces”)</p>
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Table 3-6. Floodplain Administrators: Preserve Open Spaces

Response	Frequency (N=17)	%
Very unsuccessful	5	29.4%
2	3	17.7%
3	4	23.5%
4	2	11.8%
Very successful	3	17.7%
Don't Know	0	0.0%
Refused	0	0.0%

Table 3-6a. Preserve Open Spaces: Aggregated

Response	Frequency (N=17)	%
1= Very unsuccessful & 2	8	47.1%
2=3	4	23.5%
3=4 & Very successful	5	29.4%
Don't know	0	0.0%
Refuse	0	0.0%

Nearly 30% of floodplain administrators thought that the NFIP was very unsuccessful at preserving open spaces and 47% of floodplain administrators responded with very unsuccessful or unsuccessful. Only 30% thought the NFIP was very successful or nearly very successful.

### Floodplain administrator response indicator #7

<p>Hypothesis 7: The NFIP has not protected water quality.</p>	<p>“Using a scale from 1 to 5, where 1 is ‘very unsuccessful’ and 5 is ‘very successful,’ please tell me how successful you think the National Flood Insurance Program has been in accomplishing the following: protecting water quality in your community.” [1-5, DR]</p> <p>(Coded as “protected water quality”)</p>
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Table 3-7. Floodplain Administrators: Protected Water Quality

Response	Frequency (N=17)	%
Very unsuccessful	5	29.4%
2	3	17.7%
3	2	11.8%
4	3	17.7%
Very successful	1	5.9%
Don't Know	3	17.7%
Refused	0	0.0%

Table 3-7a. Protected Water Quality: Aggregated

Response	Frequency (N=17)	%
1= Very unsuccessful & 2	8	47.1%
2=3	2	11.8%
3=4 & Very successful	4	23.5%
Don't know	3	17.7%
Refuse	0	0.0%

Floodplain administrators tended to also think that the NFIP was not very successful at protecting water quality. Responses 1 and 2 combined for 47% of the responses.

### Floodplain administrator response indicator #8

Hypothesis	Indicator
Hypothesis 8: The NFIP has not controlled soil erosion and sedimentation.	<p>“Using a scale from 1 to 5, where 1 is ‘very unsuccessful’ and 5 is ‘very successful,’ please tell me how successful you think the National Flood Insurance Program has been in accomplishing controlling soil erosion and sedimentation in your community.” [1-5, DR]</p> <p>(Coded as “controlled soil erosion”)</p>

Table 3-8. Floodplain Administrators: Controlled Soil Erosion

Response	Frequency (N=17)	%
Very unsuccessful	6	35.3%
2	2	11.8%
3	6	35.3%
4	2	11.8%
Very successful	0	0.0%
Don't Know	1	5.9%
Refused	0	0.0%

Table 3-8a. Controlled Soil Erosion: Aggregated

Response	Frequency (N=17)	%
1= Very unsuccessful & 2	8	47.1%
2=3	6	35.3%
3=4 & Very successful	2	11.8%
Don't know	1	5.9%
Refuse	0	0.0%

The distribution of the responses again seems to favor the idea is that the NFIP has not done a very convincing job of controlling soil erosion.

### Floodplain Administrators: Summary

After reviewing the floodplain administrator responses, it seems clear that a majority of floodplain administrators surveyed felt that the NFIP was an enabler of development, did not guide development away from flood hazard areas, and was not very successful at succeeding in supporting a number of key environmental indicators

(e.g. preserving open spaces, improving water quality, and controlling soil erosion). No indicator characterized the NFIP as even closely meeting its goals. Every indicator supported the associated hypothesis—and each of the hypotheses proposed that the NFIP was in fact not meeting its goals.

### **Aggregated Development Interests and NFIP Impact**

Some survey questions were asked of all Development Interest Groups. The intent of these questions is to characterize the perception of flood risk in the community, the amount of development occurring despite the risk, and the willingness of homeowners to pay more for flood insurance. When possible, the questions were aggregated to create a comprehensive view held by respondent floodplain administrators, developers, insurers, lenders, and realtors.

Since development and mitigation are closely tied, these two goals are grouped together for the purposes of displaying the hypothesis and indicator. Development interests such as realtors, developers, lenders and insurers were not considered to be focused on “conservation” issues, so they were not asked conservation indicators. The coded terms such as “perception of risk” were assigned by the author.

### **Development and Mitigation Indicators**

This section discusses the development interests’ perceptions of flood risk, how development interests believe homeowners perceive flood risk, what factors influence development, the role that the availability of NFIP insurance plays in development decisions, and the willingness of homeowners to pay higher flood insurance premiums.

## Development interests response indicator #9

Hypothesis	Indicator
Hypothesis 9: There will not be any significant difference between development interests' perception of the likelihood of flooding in their community in the next 10 years.	<p>“Please consider the likelihood of some part of your community flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will ‘not happen at all’ and 5 is flooding will ‘definitely happen’, how would you characterize the likelihood of flooding in your community?”</p> <p>(Coded as “DI: perception of risk”)</p>

Table 3-9. Development Interests: Perception of Risk

Response	Admini- strators % N=17	Developers % N=25	Insurers % N=31	Lenders % N=78	Realtors % N=37	Aggregated by group % N=188
Not happen at all & 2	35.3%	20.0%	35.5%	24.4%	29.7%	27.7%
3	29.4%	20.0%	16.1%	21.8%	21.6%	21.3%
4 & Definitely Happen	35.3%	56.0%	48.4%	53.9%	46.0%	50.0%
Don't Know	0.0%	4.0%	0.0%	0.0%	2.7%	1.1%

A Chi-Square test was run on the data for Table 3-9. The resultant Chi-Square of 0.7475 indicates that there is no significant difference between the various development groups regarding their perception of the likelihood of flooding in their community in the next 10 years. This indicator (#9) and the following indicator (#10) asked of development interests, concern the perception of risk associated with buying or building near a floodplain and the role that flood insurance plays in mitigating that perceived risk. The surveys asked several questions related to these perceptions. Tables 3-9 and 3-10 compare how community developers and floodplain administrators perceived these risks with how they believed residents of their community would perceive the same risks. These responses suggest that the community developers and administrators

shared a greater sensitivity to flood risk than they believed would be found generally within their communities. While 50% of the aggregated group thought a flood to be relatively likely in the next 10 years, they speculated that only 22.9% of residents would perceive the same likelihood of flood risk.

**Development interests response indicator #10**

Hypothesis	Indicator
Hypothesis 10: There will not be any significant difference between development interests' perception of homeowners perceived flood risk.	<p>“Using the same scale, please tell me how you think the residents of your community would characterize the risk from flooding when considering buying or building on property in your community's floodplain.”</p> <p>(Coded as “perception of homeowner risk”)</p>

**Table 3-10. Development Interests: Perception of Homeowner Risk**

Response	Administrators % N=17	Developers % N=25	Insurers % N=31	Lenders % N=78	Realtors % N=37	Aggregated by group % N=188
Not happen at all & 2	70.6%	28.0%	54.8%	46.2%	18.9%	42.0%
3	23.5%	40.0%	16.1%	28.2%	46.0%	30.9%
4 & Definitely Happen	5.9%	20.0%	25.8%	23.1%	29.7%	22.9%
Don't Know	0.0%	12.0%	3.2%	2.6%	5.4%	4.3%

A Chi-Square test was run on the data for Table 3-10. The resultant Chi-Square of 0.0156 indicates that there is a significant difference between the various development groups regarding their perception of how homeowners characterize the risk of flooding. In particular, flood plain administrators and insurers were more likely to respond that homeowners would not perceive flood risk. The development interests' perception of how the homeowner perceived risk was almost a mirror image of how development interests perceived risk themselves in Table 3-9. Only 22.9% of the aggregated development interest group thought that homeowners would think that a flood was likely

in some part of their community. However, the aggregated development group believed that 42% of homeowners would characterize the risk of flooding as not very likely to happen. The implication is that development interests believe that there is a higher degree of flood risk than homeowners perceive. One explanation for this difference of risk perception is that the development interests were looking at the community-wide likelihood of flood risk while the individual homeowner was looking at their particular risk of flood. However, during the interviews with floodplain administrators, many believed that homeowners incorrectly assessed their risk of flooding—believing that flooding would not happen to their home.

### Development interests response indicator #11

Hypothesis	Indicator
Hypothesis 11: Availability of flood insurance will be an important consideration in a person's decision to purchase or develop in the flood plain.	<p>“Could you please tell me what factors influence a person's decision to purchase or develop property in your community's floodplain?”</p> <p>(Coded as “development factors”)</p>

Table 3-11 Development Interests: Development Factors

Response	Administrators %(N=17)	Developers %(N=25)	Insurers %(N=31)	Lenders %(N=78)	Realtors % (N=37)	Aggregated by group %(N=188)
Availability of Flood Insurance	41.1%	64.0%	22.6%	46.2%	73.0%	49.5%
Characteristics of the property	100.0%	16.0%	58.1%	41.0%	62.2%	50.0%
Financial considerations	70.6%	48.0%	22.6%	33.3%	27.0%	35.6%
Flood Risk	23.5%	24.0%	9.7%	26.9%	5.4%	21.3%
Proximity to shopping, schools, employment	47.0%	4.0%	0.0%	17.9%	8.1%	15.4%
Proximity to friends/relatives	35.3%	0.0%	0.0%	9.0%	NA	8.6%
The surrounding area	52.9%	8.0%	22.6%	20.5	27.0%	23.4%
Availability of homes or land**	N/A	8.0%	22.6%	6.4%	5.4%	10.6%
Cost of flood insurance**	N/A	0.0%	3.2%	10.3%	0.0%	3.4%
Other	5.9%	32.0%	12.9%	46.2%	37.8%	34.0%
Don't Know	5.9%	8.0%	6.5%	3.8%	0.0%	3.7%
Refused	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

This survey question is also derived from the early discussion with FEMA personnel who felt that the availability of flood insurance was relatively unimportant to a homeowner's decision to build in a flood-prone area when compared to other factors such as the characteristics of the property, expected financial returns, etc. FEMA's argument was that people would buy waterfront property with or without flood insurance; therefore, NFIP insurance was not an enabler of development. However, the responses from development interests indicate that the availability of flood insurance is one of the most important factors.

Table 3-11 indicates that community developers and floodplain administrators perceived the "availability of flood insurance" to be one of the two most significant factors in these decisions, virtually equal to "characteristics of a property" as the most important influence on decisions to purchase or develop in a floodplain.

It should be noted that during interviews with floodplain administrators, some stated that the availability of flood insurance was not a key factor in deciding to build in the floodplain because everyone knows that flood insurance is available through the NFIP—and therefore, not a factor. These floodplain administrators' logic reinforces Burby's notion discussed in Chapter 1 that the idea of building in a flood zone is "normalized", i.e. potential home buyers/builders don't need to concern themselves with the availability of flood insurance—it is normal to be guaranteed flood insurance through the government. Development interests did not think that the cost of flood insurance was an important factor. This could be due to the fact that flood insurance was considered "affordable" or "reasonable" as it was subsidized by the NFIP.

## Development interests response indicator #12

<p>Hypothesis 12: There will not be any significant difference between development interests' perception of the importance of flood insurance in deciding to do business in the floodplain.</p>	<p>(LENDERS) "Suppose that federal flood insurance is NOT available for a property located in the flood plain that you or your company is considering for a mortgage. Would you still underwrite a mortgage for the property if federal flood insurance were not available?"</p> <p>(DEVELOPERS) "Suppose that federal flood insurance is NOT available for a property located in the flood plain that you or your company is considering for purchase or development. Would you still purchase or develop the property if federal flood insurance were not available?"</p> <p>(REALTORS) "Suppose that federal flood insurance is NOT available for a property located in the flood plain that a client is considering for purchase through you or your agency. Would you still recommend that a client purchase the property if federal flood insurance were not available?"</p> <p>[1-5, DR]</p> <p>(Coded as "insurance important")</p>
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**Table 3-12. Development Interests: Insurance Important**

Response	Administrators %(N=0)	Developers %(N=25)	Insurers %(N=)	Lenders %(N=78)	Realtors % (N=37)	Aggregated by group %(N=140)
Yes	NA	16.0%	NA	7.7%	10.8%	10.0%
No	NA	76.0%	NA	80.8%	78.4%	79.3%
Don't Know	NA	8.0%	NA	11.5%	10.8%	10.7%
Refused	NA	0.0%	NA	0.0%	0.0%	0.0%

Note: Floodplain administrators and insurers were not asked this question in the survey as their responses would not make sense based on the wording of the question.

A Chi-Square test was run on the data for Table 3-12. The resultant Chi-Square of 0.8050 indicates that there is no significant difference between the various development groups regarding their perception of the important to lenders, developers and realtors in

deciding to do business in the floodplain. This indicator alone demonstrates the importance of the NFIP in business decisions involving development in the floodplain. Based on this one indicator, if NFIP insurance were not available, 76% of developers would not develop land in the floodplain, 80.8% of lenders would not provide mortgages to a property in the floodplain, and 78.4% of realtors would not recommend purchasing property in a floodplain. Of the 140 development interest respondents surveyed, nearly 80% would have difficulty conducting business in a floodplain without the benefit of the NFIP. This one indicator makes a very strong case for viewing the NFIP as an enabler of development in the floodplain.

Development interests response indicator #13

Hypothesis	Indicator
<p>Hypothesis 13: As the price of flood insurance increases, less people will be perceived as wanting to buy flood insurance.</p>	<p>“Suppose that federal flood insurance was not available, but flood insurance was still required for federally backed mortgages, and property owners had to consider purchasing commercial insurance. What percentage of the property owners do you think would be willing to pay 10%, 25%, 35%, 50% or 100% more for flood insurance?”</p> <p>(Coded as “how much more”)</p>

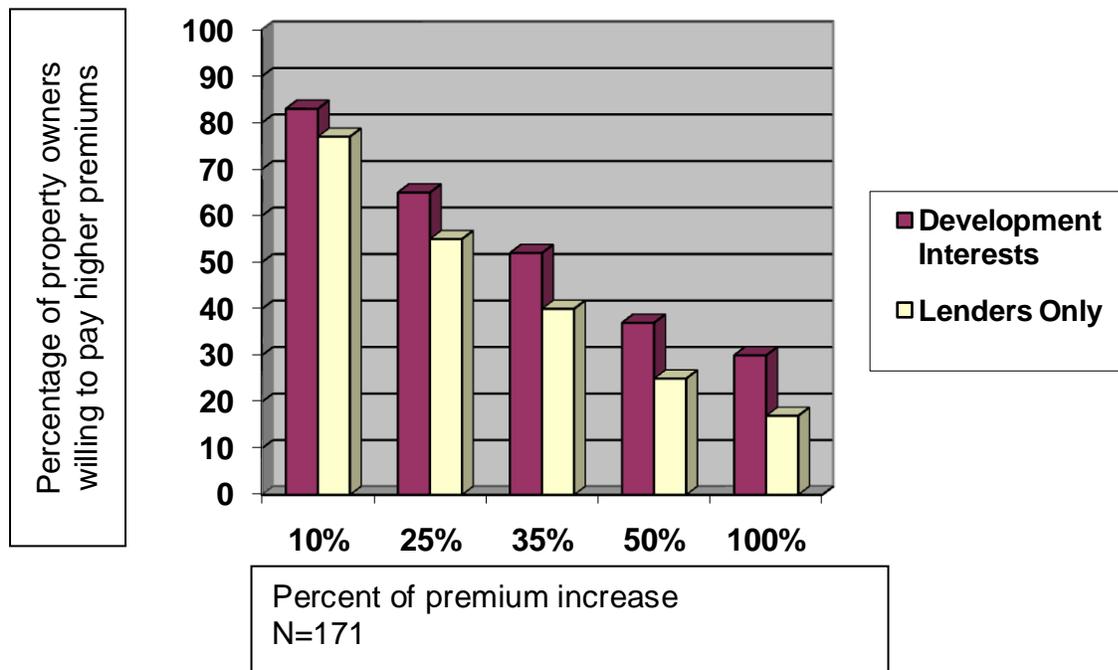


Figure 3-1. Development Interests: How Much More

Again, this indicator focuses on a specific argument put forth by advocates of the NFIP that the cost of the insurance is not a key factor in property purchases; people who want to live on water will pay whatever is necessary. Table 3-12 indicates that those closest to development decisions believe that availability of flood insurance is important to the decision to purchase or develop property. Figure 3-1 graphs the responses by development interests regarding the price elasticity of demand or willingness of homeowners to pay more in response to a potential price increase in flood insurance. The results of the question indicate that as the price for flood insurance increases, the predicted demand for the insurance is presumed to decrease.

As discussed in Chapter 1, this is a fundamental economic concept apparently not previously applied to the NFIP. One interpretation of this data is that federally subsidized flood insurance may be an enabler to development in SFHAs. This interpretation is supported by the notion that if federally backed mortgages were

required to have flood insurance but the flood insurance costs more, less people would be willing to live in SFHAs because they would either be unable or unwilling to pay more for the flood insurance. One should note that the respondent group “Lenders” was most likely to view flood insurance as fairly elastic—specifically, as the cost of flood insurance rose, the demand for flood insurance would drop. Lenders were selected to graph separately as they might be in the best position to judge the financial constraints of borrowers.

Although not a perfect method of calculating price elasticity, the data collected from the survey indicates that if the price of NFIP premiums rose 25%, the aggregate group of development interests believed that 34.6% of homeowners would not be willing (or perhaps able) to pay more. Referencing the formula from Chapter 1, price elasticity is computed by dividing the percentage change in quantity demanded by the percentage change in price. Therefore, a measure of price elasticity in this case is:  $34.6/25=1.38$ . If the price increased by 50%, the price elasticity would be  $62.8/50=1.26$ . Since the price elasticity of demand is greater than 1, the price of NFIP premiums would be considered elastic in this range of price increases.

### **Aggregated Development Interest: Summary**

After reviewing the development interests’ responses, it seems clear that a majority of the respondents surveyed felt that the NFIP was an enabler of development, and did not guide development away from flood hazard areas. No indicator characterized the NFIP as even closely meeting its goals. Every indicator supported the associated hypothesis—and each of the hypotheses proposed that the NFIP was in fact not meeting its goals.

## Homeowners Survey and NFIP Impact

A total of 2003 homeowners were surveyed via phone as part of this research. A stratified random sample was developed to survey homeowners in the following categories:

- NFIP policyholders residing in a special flood hazard area (SFHA)
- Non-policyholders residing in a SFHA
- NFIP policyholders residing near but not in a SFHA
- Non-policy-holders residing near but not in a SFHA.

A total of seven questions were used to create hypotheses and indicators to determine if the NFIP was satisfying its strategic goals of restricting development in flood prone areas and mitigating by reducing the potential loss from flood damage. Homeowners were not considered to be focused on “conservation” issues, so they were not asked questions used as conservation indicators. The coded terms such as “homeowner perception of risk” were assigned by the author.

### Development and Mitigation Indicators

In this section, homeowner survey data will be displayed and analyzed as it relates to perceptions of risk, perception of damage, homeowner behavior (i.e., deciding to have or forgo flood insurance), and willingness to pay more for actuarially sound flood insurance.

#### Homeowner’s response indicator #14

Hypothesis	Indicator
Hypothesis 14: There will be a significant difference between respondent groups: policyholders living in a SFHA will perceive more flood risk.	“Is this residence in a neighborhood where a flood could happen?”  (Coded as “homeowner perception of risk”)

Table 3-13. Homeowners: Homeowner Perception of Risk

Response	Policyholders In SFHA		Policyholders Out SFHA		Non-policyholders In SFHA		Non- policyholders Out SFHA	
	f(N=483)	%	f(N=214)	%	f(N=112)	%	f(N=35)	%
Yes	277	57.4%	115	53.7%	81	55.5%	15	28.3%
No	186	38.5%	86	40.2%	59	40.4%	34	64.2%
Don't Know	20	4.1%	13	6.1%	6	4.1%	4	7.6%
Refused	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Note: Due to the sequencing of questions, the total frequency (f) of responses may not add up to the total number of potential survey participants. Some questions were only asked as follow-on question to other questions—thus, not all respondents had the opportunity to respond to all questions.

A Chi-Square test was run on the data for Table 3-13. The resultant Chi-Square of 0.0081 indicates that there is a significant difference between the respondent groups (policyholders versus non-policy holders and those living in versus those living near a SFHA) regarding their perception flood risk. The proportional results of indicator #14 are displayed in Table 3-13. In general, NFIP policy holders recognized the potential for flood risk in their neighborhood at a higher rate than non-policy holders. Policyholders living in a SFHA have the highest percentage of respondents who perceive risk at nearly 57.4%. Non-policyholders living near but not in a SFHA perceive the least amount of risk at just over 28%. When comparing the homeowners perception of risk with the perception of risk with development interests (see Tables 3-10 and 3-11), homeowners appear to be more likely to perceive risk than development interests give them credit for.

However, Table 3-14 below suggests that residents perceive a much lower risk of flood damage to their particular home. As might be expected, those without flood insurance and living outside of the SFHA perceived the least amount of flood risk.

**Homeowners response indicator #15.**

<p>Hypothesis 15: There will be a significant difference between respondent groups: policyholders living in a SFHA will perceive more likelihood of flood damage.</p>	<p>“Consider the probability that a flood will cause damage to your home. Using a percentage, please estimate the probability that your home, or the building you live in, will suffer at least moderate damage from a flood within the next 10 years.”</p>
	<p>(Coded as “homeowner perception of damage”</p>

Table 3-14. Homeowners: Homeowner Perception of Damage

Response	Policyholders In SFHA		Policyholders Out SFHA		Non-policyholders In SFHA		Non-policyholders Out SFHA	
	f(N=185)	%	f(N=92)	%	f(N=62)	%	f (N=14)	%
0-25	100	54.1%	52	56.5%	34	54.8	9	64.3%
26-50	42	22.7%	25	27.2%	14	22.6	2	14.3%
51-75	8	4.3%	3	3.3%	5	8.1%	1	7.1%
76-100	25	15.0%	10	10.9%	6	9.7%	2	14.3%
Don't Know	10	5.4%	2	2.2%	3	4.8%	0	0.0%
Refused	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Note: Due to the sequencing of questions, the total frequency (*f*) of responses may not add up to the total number of potential survey participants. Some questions were only asked as follow-on question to other questions—thus, not all respondents had the opportunity to respond to all questions.

A Chi-Square test was run on the data for Table 3-14. The resultant Chi-Square of 0.8952 indicates that there is no significant difference between the various homeowner groups regarding their perception of damage to their residence in the next 10 years. In general, the majority of homeowners did not perceive even a moderate likelihood of damage to their particular property within the next 10 years.

## Homeowner’s response indicator #16

<p>Hypothesis 16: There will be a significant difference between respondent groups: policyholders living in a SFHA will think it is more important to have flood insurance.</p>	<p>“Using a scale from 1 to 5, where 1 is not important and 5 is very important please tell me how important you think it is for you to have insurance that covers your home in the event of a flood.”</p> <p>(Coded as “homeowner flood insurance important”</p>
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Table 3-15. Homeowners: Homeowner Flood Insurance Important

Response	Policyholders In SFHA		Policyholders Out SFHA		Non-policyholders In SFHA		Non-policyholders Out SFHA	
	f(N=483)	%	f(N=214)	%	f(N=143)	%	f(N=52)	%
not important & 2	104	21.5%	22	10.3%	38	27.6%	26	50.0%
3	38	7.9%	19	8.9%	19	13.1%	5	9.6%
4 & Very important	333	68.9%	172	80.4%	85	58.6%	19	36.5%
Don't Know	6	1.2%	1	0.5%	1	0.7%	2	3.8%
Refused	2	0.4%	0	0.0%	0	0.0%	0	0.0%

Note: Due to the sequencing of questions, the total frequency (f) of responses may not add up to the total number of potential survey participants. Some questions were only asked as follow-on question to other questions—thus, not all respondents had the opportunity to respond to all questions.

A Chi-Square test was run on the data for Table 3-15. The resultant Chi-Square of <0.0001 indicates that there is a significant difference between the respondent groups (policyholders versus non-policy holders and those living in versus those living near a SFHA) regarding the importance of having flood insurance. Policyholders living in or near a SFHA had a higher likelihood of responding that flood insurance was important. Homeowner perceptions and behaviors about the importance of flood insurance are not consistent, as Table 3-15 illustrates. This table displays the response of homeowners to

a question concerning the importance of flood insurance to them. As might be expected, for example, a substantial majority of NFIP policyholders (those in response categories 4 and 5) considered flood insurance important but more than half the homeowners living in an SFHA and more than one-third of homeowners living outside an SFHA also considered flood insurance important but did not own NFIP policies. The complicated nature of risk perception and risk response will be covered in more detail in Chapter 4.

### Homeowner Behavior Regarding Floodplain Development

Tables 3-15 above concerned perceptions of flood risk by respondent groups and the importance they attributed to flood insurance in decisions to buy, build, develop, finance or insure a property in or near a SFHA. Table 3-16 below concerns behavior about flood insurance in light of how homeowners perceive flood risk.

#### Homeowner’s response indicator #17

Hypothesis	Indicator
Hypothesis 17: The percentage of people who have flood insurance will mirror those who perceive a risk of flooding.	<p>“Do you have insurance that would cover losses to your home in the event of a flood?” [YNDR]</p> <p>(Coded as “homeowner have insurance”)</p>

Table 3-16. Homeowners: Homeowner Have Insurance

Response	Policyholders In SFHA		Policyholders Out SFHA		Non- policyholders In SFHA		Non- policyholders Out SFHA	
	f(N=483)	%	f(N=214)	%	f(N=112)	%	f(N=52)	%
Yes	387	80.1%	202	94.4%	83	57.2	21	40.4%
No	81	16.8%	11	5.2%	52	35.9%	26	50.0%
Don't Know	15	3.1%	1	0.5%	9	6.2%	5	9.6%
Refused	0	0%	0	0%	1	.7%	0	0%

Note: Due to the sequencing of questions, the total frequency (f) of responses may not add up to the total number of potential survey participants. Some questions were only asked as follow-on question to other questions—thus, not all respondents had the opportunity to respond to all questions.

A Chi-Square test was run on the data for Table 3-15. The resultant Chi-Square of <0.0001 indicates that there is a significant difference between the respondent groups (policyholders versus non-policy holders and those living in versus those living near a SFHA) regarding having flood insurance. Federal law requires any person with a federally-backed mortgage to have flood insurance if their home resides in a SFHA. In practice, almost all mortgages are federally backed at this point. A significant number of homeowners appear to be confused about their flood insurance or FEMA's data base is in error. For example, 16.8% of policyholders in a SFHA and 5.2% of policyholders near a SFHA indicated that they did not have flood insurance while FEMA data indicated that they had policies. The number of people who think they have flood insurance but according to FEMA do not is even more significant. These statistics point to either the lack of precision in FEMA's database or the lack of understanding homeowner's have regarding flood insurance. Certainly, anyone who watched people being interviewed after the hurricane season of 2004 and 2005 can attest to the lack of understanding people have of their homeowner's insurance. Unfortunately, it is outside the scope of research for this paper to determine the accuracy of FEMA's database. The lack of clarity of the data makes it difficult to determine if the hypothesis is correct or not.

**Homeowners response indicator #18**

<p>Hypothesis 18: The percentage of people who would still have flood insurance will mirror those who perceive a risk of flooding.</p>	<p>“If you were not required to have flood insurance as a condition of your mortgage, would you still carry a flood insurance policy on your home?” [YNDR]  (Coded as “homeowner still carry flood insurance”)</p>
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Table 3-17. Homeowners: Homeowner Still Carry Flood Insurance

Response	Policyholders/ In SFHA		Policyholders/ Out SFHA		Non- policyholders/In SFHA		Non- policyholders/ Out SFHA	
	f(N=176)	%	f(N=25)	%	f(N=39)	%	f(N=2)	%
Yes	119	67.6%	16	64.0%	25	64.1%	1	50.0%
No	49	27.8%	8	32.0%	9	23.1%	1	50.0%
Don't Know	8	4.6%	1	4.0%	5	12.8%	0	0.0%
Refused	0	0.0%	0	0.0%	0	0.0%	0	0.0%

A Chi-Square test was run on the data for Table 3-14. The resultant Chi-Square of 0.5364 indicates that there is no significant difference between the various homeowner groups regarding their likelihood to carry flood insurance even if they were not required to as a condition of their mortgage. Therefore, the hypothesis cannot be proven with this data. However, the most striking observation from Table 3-17 is that almost 28% of current policy holders in a SFHA indicated that they would drop their flood insurance if flood insurance were not required as a condition of their mortgage.

Consistent with these findings, other studies (Dixon *et al* 2006, 25; Kriesel, Warren and Landry 2004, 413) found that only 18-22% of homeowners who were currently not subject to mandatory flood insurance purchase requirements have an active NFIP policy. A variety of reasons are plausible; for example, some owners without mortgages may feel they have sufficient resources to “self-insure” against flood damage. Overall, this data suggest that the mandatory purchase requirement for homeowners with federally backed mortgages is an important determinant of the decision to purchase flood insurance.

## Homeowners response indicator #19

<p>Hypothesis 19: Homeowners would not have purchased, built or stayed in a flood prone area without flood insurance.</p>	<p>“Suppose that flood insurance had not been available for your property or that you could not purchase the insurance. Would you still have purchased, built, or stayed at this location?” [YNDR]</p> <p>Coded as “homeowner live in flood prone area without insurance”</p>
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Table 3-18. Homeowners: Homeowner in Flood Prone Area Without Insurance

Response	Policyholders In SFHA		Policyholders Out SFHA		Non-policyholders In SFHA		Non-policyholders Out SFHA	
	f(N=363)	%	f(N=200)	%	f(N=70)	%	f(N=14)	%
Yes	244	67.2%	145	72.5%	54	77.1%	12	85.7%
No	79	21.8%	40	20.0%	10	14.3%	2	14.3%
Don't Know	38	10.5%	15	7.5%	5	7.1%	0	0.0%
Refused	2	0.6%	0	0%	1	1.4%	0	0%

Note: Due to the sequencing of questions, the total frequency (f) of responses may not add up to the total number of potential survey participants. Some questions were only asked as follow-on question to other questions—thus, not all respondents had the opportunity to respond to all questions.

A Chi-Square test was run on the data for Table 3-18. The resultant Chi-Square of 0.4535 indicates that there is no significant difference between the various homeowner groups regarding their likelihood to stay in a flood prone area without flood insurance. However, based on the response to indicator #19, there is a market for homeowners who are willing to live in a SFHA even if flood insurance was not available. However, 21.8% of policyholders and 20% of non-policy holders may not have bought/built in a SFHA. Further, this question does not take into consideration the fact that federal law would have required buyers/builders to have flood insurance if they had a federally backed mortgage. Therefore, the market for homeowners who wanted to live in a SFHA without flood insurance would be limited to those who have the resources to pay cash for their home. One suspects this would be a fairly low percentage of buyers.

## Homeowners: Impact of Higher Insurance Rates on Development in the SFHA

A number of experts who have studied the NFIP state that the NFIP is not actuarially sound for a variety of empirical reasons. Some argue that these omissions lead to NFIP premiums lower than comparable commercial insurance. However, this study does consider the potential impact the NFIP might have in community development if the NFIP rates are not actuarially sound. Specifically, this study proposes one method for determining the price elasticity of flood insurance—in effect, asking if less people would consume flood insurance if it cost more? If fewer people could afford to pay higher flood insurance premiums, or were unwilling to pay higher flood insurance premiums, there might be less development in flood prone areas. Some argue that individuals building in SFHAs have the economic resources, and the will to pay, significantly higher rates to live in desirable SFHAs. Community respondents involved with development and homeowners were both asked several questions concerning the willingness of property owners to pay higher premiums.

### Homeowners response indicator #20

Hypothesis	Indicator
Hypothesis 20: As the price of flood insurance increases, less people will be willing to buy flood insurance.	“Suppose that federal flood insurance was not available, but still required for federally backed mortgages, and property owners had to consider purchasing commercial insurance. What percentage of the property owners do you think would be willing to pay 10%, 25%, 35%, 50% or 100% more for flood insurance?”  (Coded as “homeowner how much more”)

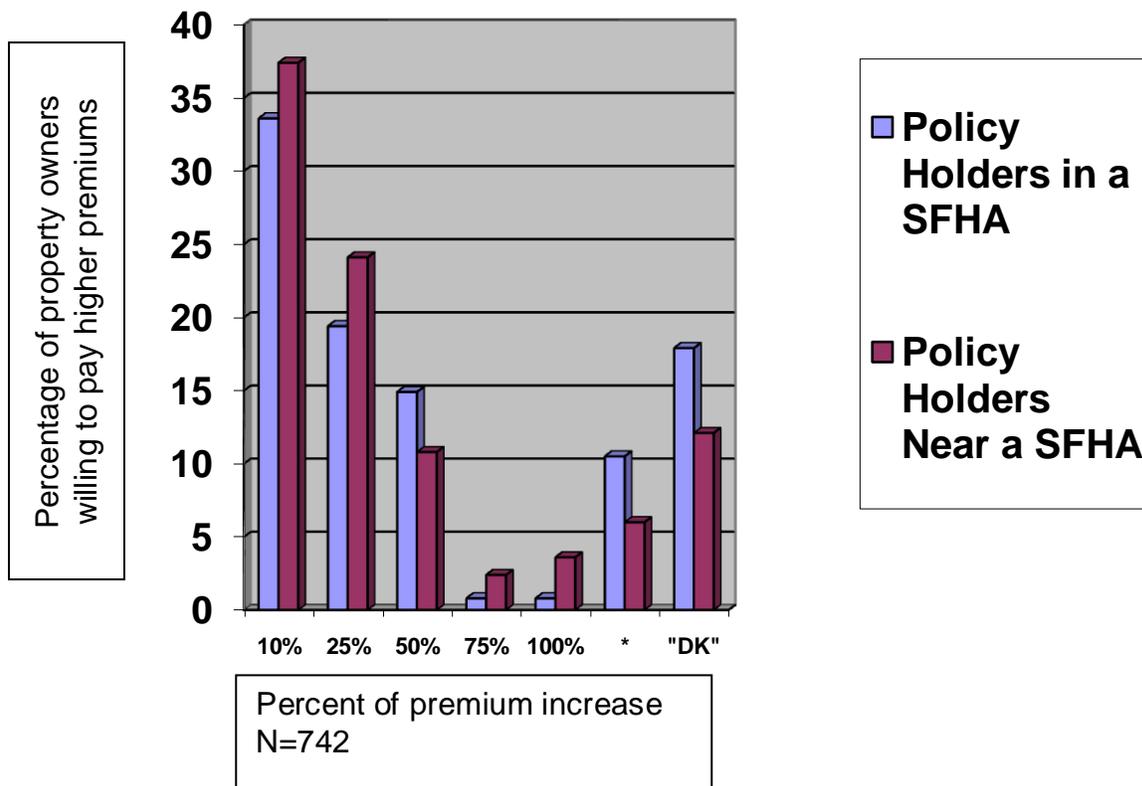


Figure 3-2. Homeowners: Homeowner How Much More

Notes: \* This response stands for "Whatever it costs." DK stands for "Don't Know"

As discussed in detail in Chapter 1, there is strong evidence to suggest that the NFIP insurance rates are not actuarially sound. This is because the rates do not fully account for the cost of subsidized pre-FIRM structures, the cost of reinsurance for catastrophic losses, failing to use the realistic 500-year floodplain actuarial algorithms, and continued availability of NFIP insurance for repetitive loss properties.

Therefore, the willingness of policyholders to pay more for flood insurance is of critical importance. One might argue that, if large numbers of policy holders are not willing or able to pay more, then the lack of subsidized NFIP insurance may lead to less development in the floodplain.

When policyholders were asked if they were willing to pay more for commercial insurance, 54.9% of policyholders in a SFHA responded that they would be willing to pay higher premiums for commercial insurance if federal insurance were not available. 27% responded that they were not willing to pay any more for flood insurance and 18% did not know if they were willing to pay more. Among the 54.9% that said they would be willing to pay more, 35.3% were willing to pay up to 10% higher premiums; 18.5% were willing to pay up to 25% higher premiums; and 16% were willing to pay up to 50% higher premiums. Only 10.1% were willing to pay “whatever it costs” to have flood insurance. The data suggests that if federal policy required flood insurance for federally backed mortgages and these flood insurance premiums were based on full actuarial commercial rates, less people would choose to buy or build in SFHAs.

Figure 3-1 and Figure 3-2 (i.e., development interests asked how much more homeowners would be willing to pay) suggest that the price of flood insurance is elastic. Specifically, if flood insurance costs more, potential homeowners would be less willing or able to buy the insurance and therefore, less people would be willing to live in flood prone areas.

### **Homeowners: Summary**

After reviewing the homeowner responses, it seems clear that a majority of the respondents surveyed felt that the NFIP was an enabler of development, and did not guide development away from flood hazard areas. No indicator characterized the NFIP as even closely meeting its goals. Every indicator supported the associated hypothesis—and each of the hypotheses proposed that the NFIP was in fact not meeting its goals.

The fact that homeowners thought that flood insurance was important and were sensitive to the cost of flood insurance is significant. If a significant number of homeowners were not willing or able to pay more for non-subsidized flood insurance, then perhaps less development would occur in flood prone areas. Since the NFIP is subsidized by definition (i.e. the NFIP continues to require appropriations to stay solvent) then by definition, the NFIP is an enabler of development.

### **Conclusion**

Development interests and homeowners are aware of the flood risk and the majority of those surveyed find the availability of flood insurance highly desirable. However, many residents currently living in SFHA indicate that, even if flood insurance was not available, they would still live in communities close to the water with the associated flood risk. Therefore, the mandatory purchase requirement of flood insurance for anyone who lives in a SFHA with a federally backed mortgage seems a reasonable measure to help insure against the probability of loss due to flooding.

Further, the important questions asked of floodplain administrators as to the NFIP's environmental impact also seem clear. In the opinion of floodplain administrators, the NFIP has not steered development away from flood prone areas, has not been very successful at preserving open spaces, protecting water quality, or controlling soil erosion.

The response to the question, "Does the NFIP encourage or enable development in flood prone areas?" seems clear to this researcher. The answer is yes. The survey data suggest that if potential home buyers had to fully absorb the cost of flood risk through higher premiums, then perhaps significantly fewer people might choose to live in SFHAs that required flood insurance. Therefore, if the NFIP provides insurance that

the commercial markets will not provide or if NFIP insurance is cheaper than commercial markets could provide, the NFIP can be characterized as an enabler of development. In addition, I believe the NFIP has in fact “normalized” development in SFHA.

As with any research, there are qualifications and limitations to the methodology, data collected, and precision of analysis. There is also always competing research that on the face of it, refutes other research. These types of issues will be dealt with in Chapter 5. The next chapter will explore individual level data to better understand homeowner’s perception of flood risk, risk response and the risk tolerance agency of the NFIP.

## CHAPTER 4 RISK PERCEPTION, RISK RESPONSE AND THE RISK TOLERANCE AGENCY OF THE NFIP

The purpose of this chapter is to build on the discussion from Chapter 1, Introduction, regarding the NFIP's stated objectives and to research the potential unintended consequences of the program as it has evolved. Specifically, this chapter will characterize and test empirically if those who perceive risk may be more likely to seek NFIP insurance. The literature on risk perception and the purchase of insurance will be explored to determine if those who perceive the greatest risk are more likely to seek insurance—resulting in an adverse selection problem. Further, the literature regarding the potential risk tolerance agency of insurance will be reviewed to determine if those who perceive risk and seek insurance, lower their perceived risk by sharing their risk with others.

The data set used by this dissertation allows testing for an empirical link between perception of flood risk and likelihood to seek flood insurance. However, the data to support the decreased perception of risk is not available through this data set. For example, the survey data does not ask homeowners to respond to perceptions of risk before having flood insurance, then offer flood insurance, and then measure the changes to perception of risk. The author must rely on the literature to deduce that people who seek flood insurance are, or are not, doing so to reduce their perceived risk. Therefore, this chapter explores the perceptions of individual homeowner's risk, their response to risk, and potential risk tolerance agency of the NFIP.

This chapter begins with a review of the pertinent literature relating to risk perception and the risk response of obtaining hazard insurance. The literature first characterizes the general nature of hazardous risk perception and moves to a more

specific understanding of risk perception and risk response as it relates to flood hazard.<sup>13</sup> Next, this section provides an empirical evaluation of variables derived from the literature and available in the homeowners' survey.<sup>14</sup> Finally, the NFIP's role as an agency of risk tolerance will be explored through the relevant literature.

The data and analysis herein provide a somewhat different, but complementary, perspective on the NFIP's consequences compared with the approach in Chapters 2 and 3. In this chapter, the focus is on specific variables which link perceptions of risk to the purchase of flood insurance. To have a sufficient number of respondents, the analysis combines in a single group those living in a SFHA or out of SFHA as well as those who are Policyholders versus Non-Policyholders.

### **The Ambiguous Nature of Risk Perception and Risk Response Focused on Insurance**

Richard Boulware, chemist and educator, wryly captured man's ambiguity in perceiving and responding to risk: "More people are killed by falling coconuts every year than have been killed by great white sharks in the last 100 years. But, no one makes scary movies about falling coconuts" (referencing a National Aquarium observation regarding risk of shark attacks and deaths.) As this comment indicates, most humans are not very adept at assessing or reacting to risk in a logical, probabilistic manner (Kunreuther, Novemsky and Kahneman, 2001; Huber, Wilder, and Huber, 1997). Not surprisingly, there is much research attempting to clarify and relate the pieces in the puzzle of risk perception and response.

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<sup>13</sup> The selected literature is more focused on risk as it pertains to hazard versus risk in other areas such as environmental or health.

<sup>14</sup> The source of this individual level data is discussed in detail in Chapter 2, Methodology, The Survey Database.

## **Personal Risk Perception**

There does not seem to be any question that humans perceive risk and may change their behavior based on their assessment (Slovic, 2004; Peters, 2006, Kunreuther, 2004; Messner and Meyer, 2006). However, what drives the human perception and response to risk is complex (Kunreuther, 2004; Messner and Meyer, 2006). Determinations about risk perception “vary between individuals due to different levels of information and uncertainty, due to different intuitive behavior, and also due to specific power constellations and positions of interest” (Messner and Meyer, 2006).

There are clearly individual differences between how one person evaluates a set of risk factors compared to how another person evaluates the same set of risk factors (Peters, 2006). The literature points to a number of different determinants by which individuals perceive and deal with risk. The various authors’ theories do not necessarily conflict, but add dimension to understanding risk perception and behavior. The bulk of the literature appears to divide the perception of risk and the processing of risk information into two modes of thinking: experiential (also referred to as “affective” or “emotional”) and deliberate (also referred to as “analytical”) (Sloman, 1996; Epstein 1994). Of course within these two major theoretical camps, there are a number of different aggregations. This review will begin with some of the ways experiential or emotional theorists evaluate risk perception.

There is a plethora of research focusing on the undeniable role of emotions in determining risk—pointing out that there is just too much information for humans to process and therefore, our emotions provide us cues and channel our thought process with respect to particular risks (Holtgrave, and Weber, 1993; Payne, Bettman, Johnson, 1993; Damasio 1994; Loewenstein, Weber, et al, 2001). Howard Kunreuther, a

Professor of Decision Sciences and Business and Public Policy and author of a number of scholarly articles regarding risk perception and behavior, states that, “Risk perception is concerned with the psychological and emotional factors that have been shown to have an enormous impact on behavior” (Kunreuther, 2004). Emotional decision making is more intuitive, quick and at times lacking conscious deliberation regarding a negative stimulus (Osboo, Suci and Tannenbaum, 1957; Damasio, 1994; Slovic, 2004; Peters, 2006).

Paul Slovic<sup>15</sup> coined the term “risk as feelings” and notes that there may be challenges to “rational decision making” in the face of high risk situations or crises (Slovic, 2004). In some of Slovic’s earlier work, he states, “The notion of risk perception refers to the intuitive risk judgments of individuals and social groups in the context of limited and uncertain information” (Slovic 1987). In Slovic’s more recent research, he notes that risk perception “relies on images and associations, linked by experience to emotion and affect (a feeling that something is good or bad)” (Slovic, 2004). Slovic is quick to point out that the current wisdom suggests that the emotional/experiential aspect of our risk perception works in parallel with the deliberate/analytical thought processes in an integrated manner.

For those who study deliberate/analytic risk perception and decision making, the focus is on how individuals gain information which can be processed and consciously deliberated into a rational response to risk. This body of research leans more to the use of terms in decision making processes as “bounded rationality” (Simon, 1956), employment of “heuristics” (Tversky and Kahneman, 1974), “dominance structuring”

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<sup>15</sup> Paul Slovic is president of Decision Research, a professor of psychology at the University of Oregon, and past president of the Society for Risk Analysis

(Montgomery, 1983) “comparative advantages” (Shafir, Osherson, and Smith, 1989), and “reasoned-based choice” (Shafir, Simonson, and Tversky, 1993).

Ellen Peters, a Senior Research Scientist at Decision Research, explores the individual differences of how people perceive risk using analytic tools based on one’s “numeracy” ability. Numeracy is “how individuals who differ in number ability comprehend and use numeric information about risks differently” (Peters, 2008).

Highly numerate individuals are likely to pay more attention to numbers associated with risk, to better comprehend them, to translate them into meaningful information, and to ultimately use them in decisions. Decisions of the less numerate, are likely to be informed less by these numbers and more by other non-numeric sources of information such as their emotions, mood states, and trust or distrust in science, the government and experts. (Peters, 2008)

Decision making based on analytic analysis is slower and based on the processing of obtaining information. The problem is that humans aren’t always capable of processing information in such a manner that results in good decisions—i.e., good information does not necessarily result in good, rational decisions (Simon, 1955; Hibbard, et al, 2001; Merriman, 2002, Peters, 2006). Individual differences regarding the ability to make accurate analytic decisions based on numeracy are directly correlated with age, education and gender. According to studies conducted by Peters, “...numeracy test ability decreases significantly with age and education. Controlling for age and education, women also tend to score lower than men” (Peters, 2008). Overall, the research suggests that all humans seem to have problems processing quantitative information (Simon, 1955; Lipkus, Samsa, and Rimer, 2001). The capability to process quantitative information declines with age (Salthouse, 1996) and education level (Peters, 2008). An unfortunate reality for individuals with limited numeracy skills is that

“individuals do not necessarily perceive themselves as ‘at risk’ in their lives because of limited skills” (Peters, 2008).

As stated earlier, although some researchers focus on either the emotional/experiential or deliberate/analytical, the currently dominant belief is that these two methods of perceiving risk are complementary, not competing (Slovic, 2004). Both realms of study are required to begin to comprehend the complicated nature of risk perception. Not too surprisingly, the study of how people respond to risk is also complicated.

### **Risk Response Focused on Insurance**

Popular history tells the story of how insurance began at a coffeehouse in London called Lloyds, where merchant shipmen sat around the table drinking coffee and discussing their future voyages. One merchant explained that he was afraid that he would lose everything if his next ship was lost at sea, and another merchant offered to share in his risk – for a fee. Around the table they went, dividing up the risk of loss and the profits of the voyage, and giving birth to insurance. Or, so the story goes. In truth, insurance existed in many early forms long before that conversation could have taken place at Lloyds’ coffeehouse. (Minto, 2008) <sup>16</sup>

Although it is clear that one of the most common ways that people deal with the perception of risk is by obtaining insurance, there are multiple responses people elect when faced with the potential of a disastrous situation. Howard Kunreuther and Mark Pauly wrote an in-depth analysis of disaster insurance called “Neglecting Disaster: Why Don’t People Insure Against Large Losses?” As Kunreuther and Pauly point out,

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<sup>16</sup> Exact origins of insurance are unclear. One of the earliest expressions of risk mitigation through a form of insurance comes from ancient China. There is some evidence to suggest that Chinese “farmers began spreading their crops among numerous boats, so that if one boat sank, any one family would only lose a small portion of their crops, thus avoiding financial devastation” (<http://www.insurancehistory.org/entry/brief-history-of-insurance/> February 2009). There is also evidence to support the finding that the first written records of “what could be considered early insurance law are found in the Code of Hammurabi (circa 1760 B.C.) as promulgated by Hammurabi, the sixth King of Babylonia” (Minto, 2008). Independent of the exact history of insurance, it is today a major industry and bound by the concept of spreading risk across people and markets.

individuals have a fairly good idea of the value of their potential loss “but do not know the probability of the peril occurring.” As individuals try to determine how much insurance to purchase, they must try to estimate their probability of loss while being aware of the cost (in time and effort) of obtaining better information. Kunreuther and Pauly list three potential strategies available to the individual considering purchasing insurance:

- A. **Ignore Insurance:** Incur no search or attention cost, gather no additional information on the probability and buy no insurance.
- B. **Buy Insurance Immediately:** Incur no search or attention cost, gather no additional information on the probability but buy a positive amount of insurance from a randomly selected insurer.
- C. **Seek Information:** Gather information on the probability at a search cost and then decide whether or not to buy insurance based on the content of the information.

According to Kunreuther and Pauly (2003), “individuals with imperfect knowledge often do not bother to obtain additional data on the risk or on purchase insurance coverage.” The question is whether the value of the information obtained during the search justifies the search cost. This finding relates to research suggesting that individuals are not particularly good at understanding probabilistic information (Kunreuther, Novemsky and Kahneman, 2001; Huber, Wilder, and Huber, 1997). Therefore, individuals may not view the cost of obtaining probabilistic information worth the cost because they have difficulty understanding the value of the information. In fact research reveals that “most individuals do not use cost benefit analysis in their insurance purchase decisions” (Kunreuther, Michel-Kerjan et al, 2008).

Thus, the picture of what exactly causes people to buy or not buy insurance, or determine how much to buy is not particularly clear. There also appear to be multiple

goals people try to achieve through buying insurance. This notion was reinforced by an extensive study conducted by the Wharton Risk Management and Decision Processes Center concludes:

In practice, individuals make their insurance decisions by constructing or selecting plans designed to achieve multiple goals: For example, a plan to purchase homeowners insurance may satisfy as many as seven goals simultaneously: (1) reducing the chances of catastrophic loss; (2) reducing anxiety about risks of fire and theft; (3) avoiding regret and/or providing consolation in case a loss occurs; (4) satisfying conditions required by a bank; (5) presenting the appearance of prudence to others who will learn about the insurance purchase; (6) maintaining one's relationship with an insurance agent; and (7) avoiding highly burdensome insurance premium payments. (Kunreuther, Michel-Kerjan et al, The Wharton Risk Management and Decision Processes Center, 2008)

Thus, individuals' perception of risk and their decision to buy insurance are multifaceted and ambiguous. One might predict that the literature focused on perception of flood risk and the individual level risk response focused on the NFIP will be comparably imprecise and complex due to the sometimes random nature of risk perception and risk response.

### **Flood Risk Perception and Risk Response Related to the NFIP**

The following observation points to the idea that the same considerations regarding risk perception and risk response in general, also apply to natural disasters, such as flooding:

In reality, many individuals misperceive risks, and believe that the disaster will not happen to them until after the hurricane, flood or earthquake occurs. Only then do they consider purchasing insurance coverage. A significant number will cancel their coverage if a disaster does not occur within the coming few years. Some homeowners are likely to face budget constraints which limit their interest and/or ability to voluntarily purchase coverage. (Kunreuther, Michel-Kerjan et al, The Wharton Risk Management and Decision Processes Center, 2008)

Along with the blending of literature from risk in general, to risk focused on flooding, the literature on flooding perception and risk response is addressed outside the United States as well. In fact, some of the more quantitatively sophisticated analyses reviewed for this paper come from outside the United States.

### **Flood Risk Perception**

The research about individual perceptions of flood risk indicates that there are a number of reasons for individual differences regarding this perception. This research spans the globe—with recent published research conducted for the European Commission by economists Frank Messner and Voker Meyer. According to these economists, members of the Dresden Flood Research Center in Germany, “individuals of a community may assess the risk of being flooded very differently, because they do not have the same information about the probability of flood hazard events in their region, about flood mitigation measures and their effectiveness, and they perhaps have a different historical background” (Messner and Voker-Meyer, 2005). In the United Kingdom recent research “indicates that more deprived populations, and those belonging to lower social classes, are more likely to be living in zones at risk of flooding. If these people are also less likely to be aware of the risks that they face, they may be considered as doubly vulnerable” (Burningham, Fielding, and Thrush, 2008). In Taiwan, researchers found that “victims with more disaster experience perceived a higher occurrence rate of disasters, saw them as being more life threatening, and had a greater sense of dread” (Ho, Shaw, Lin and Chiu, 2008). Ho, Shaw, Lin and Chiu also found that females were much more likely to sense risk but this may be tied to the lower socioeconomic status of women in Taiwan. They also found that the more education,

the greater the sense of “controllability” over events associated with a natural disaster and therefore, less feeling of “dread” (Ho, Shaw, Lin and Chiu, 2008).

Flood risk perception literature in the United States is often tied to the broader concept of risk perception in general. The literature that deals with flood risk perception is most commonly focused on those who choose to purchase NFIP insurance versus those who do not and, most of the literature is focused on coastal areas.

### **Risk Response Focused on the NFIP**

In the United States, the focus of flood insurance research seems to be on coastal areas and units in the Coastal Barrier Resource System (Rosenbaum, 2005). Researchers found that past experience with disasters is a primary motivator to procuring insurance and those with greater economic resources were more likely to procure flood insurance (Baumann and Sims, 1978). Additional survey research shows that lower income and non-white households, women, and elderly all tend to exhibit greater fear of disaster, but it is unclear if this group purchases insurance at higher rates (Palm, 1998). For coastal areas in the southeast, the average income of NFIP policy owners is over \$100,000; 80% are college graduates, more than a third have at least some graduate school; homeowners average 61 years of age (Landry and Jahan-Parvar, 2008).

Previous studies consistently show that not all people who are subject to flood risk choose to purchase flood insurance. This is attributed in part to the perceived low-probability but high-loss event nature of flood disasters. The decision to purchase insurance for low-probability, high-consequence catastrophes has been studied by many; early sources include Kunreuther et al (1978) and Slovic et al (1978). Later conclusions of Kunreuther and Pauly (2003) and Schade, Kunreuther and Kaas (2004)

are summarized as, “The insurance buying decision process can be so complex and confusing that people will eschew either searching for information or purchasing insurance for low probability high consequence events” (Kunreuther and Pauly, 2003).

Two recent, investigations into the demand for flood insurance arrived at virtually the same conclusion: there is little empirical research to clarify the factors influencing the demand for flood insurance (Rosenbaum, 2005; Landry and Jahan-Parvar, 2008; Michel-Kerjan and Kousky, 2009). One might conjecture that there is little research because nobody cares. More specifically, the various industries which might be concerned with knowing this information (and paying for research) find no need, as flood insurance is available for anyone who wants it through the NFIP. Unless the structure is in a preserved Coastal Barrier Reef System area, absolutely everyone, independent of risk level, is eligible to flood insurance through the NFIP (<http://www.fema.gov/news/newsrelease.fema?id=48976>, November 2009)

The availability of flood insurance for all, independent of flood risk, is the basis for establishing adverse selection and moral hazard situations.

Insurance against flood cannot successfully be written for several reasons. First, losses are a virtual certainty in some areas. Second, flood losses can be catastrophic in nature. Third, consumers are not willing to pay premiums that are sufficiently high to cover the loss exposure. Fourth, insurers are unable to pool insureds with varying degrees of exposure to flood losses because lower risks will not purchase coverage at a pooled rate. (Anderson, 1974)

Dan R. Anderson presented his views on why private insurance markets are not willing to provide flood insurance—what economists call a type of “market failure.” With the advantage of hindsight, the preceding quote might provide the explanation as to why the NFIP is \$20 billion in debt. An important, but not thoroughly studied idea, is

adverse selection—a cause for market failures.<sup>17</sup> If homeowners experience damage to their residences, they know without a doubt they are at risk and are more likely to seek insurance to cover their losses. However, some people who have not experienced a loss but recognize the possibility of risk, may tend not to buy flood insurance due to misperceptions of magnitude of loss; due to the belief that the price of insurance is too high, due to dependence on “charity hazard,”<sup>18</sup> or because of their lack of awareness that flood insurance is even available (Kunreuther 1984, Lewis and Nickerson 1989, Kunreuther 1996, Browne and Hoyt 2000;)<sup>19</sup>.

Further, the chain of events from perceiving flood risk, to purchasing insurance, to changing risk tolerance due to the lowering of individual flood risk will be explored next. The literature cited above will be used to guide the following hypotheses that are focused on how to characterize and clarify empirically perception of risk variables and risk response (i.e. choosing to have flood insurance).

### **Hypotheses and Survey Variables Examined**

The literature review regarding southeastern coastal flood prone areas is clear regarding the fact that if people have experienced a flood, they are more likely to have flood insurance (Landry and Jahan-Parver, 2008). That some homeowners are more aware of their flood risk and seek insurance is essentially an operational definition of adverse selection as applied to flood insurance. Those who perceive themselves most at risk will purchase flood insurance; those who perceive themselves less at risk will be less likely to purchase. If everyone who lives in a flood prone area is not required to

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<sup>17</sup> For a detailed explanation of adverse selection, see Chapter 1.

<sup>18</sup> a reliance on assistance from others

<sup>19</sup> For a more in depth summary of these works, see Landry and Jahan-Parver, 2008

have flood insurance, then an incomplete market occurs and private insurance companies will not enter the market or will most likely lose money if they do (Anderson, 1974). The following research questions, hypotheses, and variables are focused on trying to measure perception of risk and the likelihood that homeowners will seek flood insurance provided by the NFIP. The data available from the Homeowners' Survey<sup>20</sup>, and research questions guided by the literature review, may help explain what risk perception variables impact a homeowner's likelihood to have flood insurance.

It should be noted that an argument can be made regarding what are the potential dependent variables and independent variables. From a logical standpoint, there was significant potential interaction among the variables. Does perceiving risk cause one to have flood insurance? Or, does having flood insurance help one to lower his/her perceived risk by sharing individual risk among others? Due to the way the data was collected and based on the literature, the variable "having flood insurance" is treated as the dependent variable in the statistical analysis. The research completed for this dissertation did not find a data base where homeowners were asked about their perceptions of flood risk, then offered flood insurance, and then surveyed again to measure the change in their perception of risk. However, later in this chapter, the conceptual link between having flood insurance and the impact on risk tolerance will be explored.

### **Rational for Risk Perception Variable Selection**

The literature detailed above suggests that as people perceive risk, they respond by purchasing insurance. As the literature also suggests, perceiving risk and

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<sup>20</sup> For more details on the Homeowners' Survey, see Chapter 2.

responding to risk by purchasing insurance is a complicated decision process. The homeowner survey used in this dissertation had a number of questions which serve as proxies for perceiving flood risk. Due to the sequencing of the questions, only parallel questions asked of most homeowners could be used. Each of the independent variables shown below was selected because the literature suggested they were good proxies of perceiving risk.

**Statement of Risk Perception Hypothesis and Variables**

Hypothesis	Indicators
<p>Hypothesis 1: Homeowners who think a flood could happen will have a higher tendency to have flood insurance.</p> <p>Hypothesis 2: Homeowners who think having flood insurance is important will have a higher tendency to have flood insurance.</p> <p>Hypothesis 3: Homeowners who have personally experienced a flood will have a higher tendency to have flood insurance.</p>	<p><u>Dependent Variable</u>            “Do you have insurance that would cover losses to your home in the event of a flood?”            (type of variable: nominal)            (Coded: “Flood Insurance”)</p> <p><u>Independent Variables</u>            “Is your home in a neighborhood where a flood could happen?”            (type of variable: nominal)            (Coded: “Flood Could Happen”)</p> <p>“Using a scale from 1 o 5, where 1 is not important and 5 is very important; please tell me how important you think it is for you to have insurance that covers your home in the event of a flood”            (type of variable: ordinal)            (Coded: “Insurance Important”)</p> <p>“Have you ever personally experienced a flood at your current home or any other past residences?”            (type of variable: nominal)            (Coded: “Experienced Flood”)</p>

<p>Hypothesis 4: Homeowners who perceive a higher probability of flood damage will have a higher tendency to have flood insurance.</p>	<p>“Consider the probability that a flood will cause damage to your home. Using a percentage, please estimate the probability that your home, or building you live in, will suffer at least moderate damage from a flood within the next 10years.”          (type of variable: continuous, changed to categorical)          (Coded: “Cause Damage”)</p>
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The purpose of Hypotheses 1 through 4 is to evaluate risk perception variables and the likelihood of having NFIP flood insurance. The independent variables were selected as they are a measure of risk perception. Conceptually, it seems logical that if a homeowner believes that he/she lives in a neighborhood where a flood could happen, or think that flood insurance is important, or has previously experienced a flood, or thinks that a flood could cause damage to his/her home—the homeowner will be more likely to seek flood insurance.

As this dissertation attempts to explain the nature of risk, it would also be valuable to know if there are individual differences regarding those who purchase flood insurance based on a number of demographic criteria. The purpose of Hypotheses 5 through 9 is to try to understand if demographic characteristics play a role in risk response in the form of having flood insurance. Hypotheses 5 through 9 test standard categories of demographics: education, race/ethnicity, gender, age, and income.

**Rational for Demographic Variable Selection**

The literature detailed above suggests some demographic variables might influence how people perceive risk and respond to risk by purchasing insurance. As the literature also suggests, perceiving risk and responding to risk by purchasing insurance is a complicated decision process. The homeowner survey used in this dissertation had

a number of questions which provided standard demographic information. Each of the independent variables shown below was selected because the literature suggested they might be statistically significant.

**Statement of Demographic Hypotheses and Variables**

Hypothesis	Indicators
<p>Hypothesis 5: The higher the homeowner’s educational level, the greater the tendency for him/her to have flood insurance.</p>	<p><u>Dependent Variable</u>            “Do you have insurance that would cover losses to your home in the event of a flood?”            (type of variable: nominal)            (Coded: “Have Insurance”)</p> <p><u>Independent Variables</u>            “What is the highest level of education you have completed?”            (type of variable: ordinal)            (Coded: “Education Level”)</p>
<p>Hypothesis 6: White homeowners will tend to purchase flood insurance at higher rates than other races/ethnicities.</p>	<p>“Just to be sure that we have a representative sample, would you please tell me which of the following term or terms best describes you?”            (type of variable: categorical)            (Coded: “Race/Ethnicity”)</p>
<p>Hypothesis 7: Female homeowners will tend to purchase flood insurance at higher rates than male homeowners.</p>	<p>Gender (not asked but coded by interviewer)            (type of variable: categorical)            (Coded: “Gender”)</p>
<p>Hypothesis 8: Older homeowners will tend to purchase flood insurance at higher rates than younger homeowners.</p>	<p>“In what year were you born?”            (type of variable: continuous, changed to categorical)            (Coded: “Age”)</p>
<p>Hypothesis 9: Homeowners with greater income will tend to purchase flood insurance at higher rates than homeowners of lower income.</p>	<p>“What Is your family’s total yearly household income before taxes?”            (type of variable: continuous, changed to categorical)            (Coded: “Income”)</p>

## Linking the Risk Perception Variables to NFIP Insurance

The initial analysis of the variables was a Chi-Square for Independence between the dependent and independent variables<sup>21</sup>. For Hypotheses 1 through 4, all the independent variables were significantly related to the dependent variable. Tables 4-1 through 4-4 summarize the results.<sup>22</sup> In all cases, probability value (“p-value”) was less than .05—suggesting that there is a significant association between the two variables. This result indicates that the null hypothesis (suggesting there is no association) is rejected and the alternative hypothesis (suggesting there is an association) is accepted. The statistics indicate that there is a strong association between each of the independent variables and the dependent variable. The research discussed earlier in this chapter will help to determine the nature of that relationship.

Table 4-1. Relationship between perceiving flood risk and having insurance

Chi Square: DF=1, p<.0001		Flood Could Happen		Total
		Yes	No	
<u>Have Insurance</u>	Yes	89% N=829	68% N=455	N=1,284
	No	11% N=98	32% N=217	N=315
	Total	N=927	N=672	N=1,599

Table 4-1 indicates a significant relationship between people who believe that a flood could happen in their neighborhood and having flood insurance. 89% of the survey respondents who believed a flood could happen had flood insurance. This is a significantly higher percentage than the 68% who did not perceive risk and still had

<sup>21</sup> A personal thanks to Dr. George Casella, Distinguished Professor, University of Florida Statistics Department, who helped interpret the data.

<sup>22</sup> All of the raw data output runs are shown in Appendix F.

flood insurance. As discussed earlier, the literature generally supports the idea that people who perceive risk are more likely to mitigate that risk by insuring against losses. This is tied to the notion of adverse selection, in which people who perceive risk will seek out insurance at higher rates than those who do not.

Table 4-2. Relationship between believing flood insurance is important and having insurance

		Flood Insurance Important					Total
		1 (Not)	2	3	4	5 (Very)	
<u>Have Insurance</u>	Yes	42% N=104	56% N=50	73% N=1	95% N=95	92% N=974	N=1,338
	No	58% N=144	44% N=40	27% N=42	5% N=5	8% N=90	N=321
	Total	N=248	N=90	N=157	N=100	N=1,064	N=1,659

Table 4-2 indicates something rather obvious: if one believes that flood insurance is important, he/she is more likely to purchase flood insurance.

Table 4-3. Relationship between personally experiencing a flood and having insurance

		Experienced Flood		
		Yes	No	Total
<u>Have Insurance</u>	Yes	87% N=325	79% N=1017	N=1,342
	No	13% N=50	21% N=275	N=325
	Total	N=375	N=1,292	N=1,667

Likewise, if someone has personally experienced a flood, they are more likely to have flood insurance than those who have not experienced a flood. It is interesting to note that 13% of the respondents had experienced a flood but still responded that they did not have flood insurance. The way the full question was asked, it is unclear if the individual experienced a flood in this particular residence or in a previous residence.

Either way, previous experience with a flood increased the likelihood of seeking flood insurance.

Table 4-4. Relationship between the probability that a flood will cause damage and having insurance

		Cause Damage					Total
		0-20%	21-40%	41-60%	61-80%	81-100%	
<u>Have Insurance</u>	Yes	87% N=298	98% N=88	93% N=100	89% N=33	96% N=65	N=584
	No	13% N=45	2% N=2	7% N=8	11% N=4	4% N=3	N=62
	Total	N=343	N=90	N=108	N=37	N=68	N=646

The first observation one might make when looking at this variable is that the vast majority of respondents have flood insurance. The way the survey instrument was constructed, only people who responded “yes” to the question “Is your home in a neighborhood where a flood could happen?” were ever asked the question “Consider the probability that a flood will cause damage to your home.” Therefore, this group was by definition more sensitive to the risk flooding. Because both of these questions were selected as independent variables, they cannot be used together in the same regression model. It is interesting to note that although this group perceived more risk and were more likely to have flood insurance, the majority still perceived the risk of actual damage to be relatively low.

There were no surprises in this initial analyses of association between the dependent and independent variables. The variables selected relating to perceptions of risk all indicate that if one perceives greater flood risk, one is more likely to have flood insurance. Once again, this is a clear indication of the problem of adverse selection

regarding flood insurance. If those who perceive flood risk are more likely to seek out flood insurance, it is harder for private insurance companies to stay profitable.

In addition to Chi Square analyses being performed on the dependent variable and independent variables as set forth in Hypothesis 1 through 4, each of the independent variables were cross tabulated with each other to determine if there were an association among these variables (except for “Flood Could Happen” and “Cause Damage” which are directly correlated with each other due to the sequencing of the questions). All the independent variables were significantly related to each other—generally in ways that the literature and logic would suggest.

Table 4-5. Relationships between the independent variables based on Chi Square analysis

1. If respondents believed that a flood could happen...	they were significantly more likely to think that flood insurance was important.
2. If respondents had previously experienced a flood...	they were significantly more likely to think that a flood could happen.
3. If a respondent had previously experienced a flood...	they were significantly more likely to think that flood insurance was important.
4. The higher the probability of perceived flood damage...	the more likely the respondent was to think that flood insurance is important.
5. If the respondent had previously experienced a flood...	they perceived the probability that a flood could happen as more likely.

Next, a logistic regression was performed on the original dependent variable (Have Insurance) with the four previously selected independent variables (Flood Could Happen, Insurance Important, Experienced Flood, and Cause Damage). Because of the way the survey instrument was constructed, the question, “Consider the probability that a flood will cause damage to your home. Using a percentage, please estimate the

probability that your home, or building you live in, will suffer at least moderate damage from a flood within the next 10 years” was only asked to respondents who answered yes to, “Is your home in a neighborhood where a flood could happen?” Therefore, the regression was run once with the variable “Flood Could Happen” in and the variable “Cause Damage” out. And then ran a second time with the variable “Cause Damage” in and “Flood Could Happen” out.

The results of the two logistic regression runs are displayed in Tables 4-5 and 4-6.

Table 4-6. Logistic Regression Model 1 (Includes IV “Cause Damage”)

Parameter	DF	Estimate	Standard Error	p value
Intercept	1	-0.3091	0.3772	0.4125
Cause Damage	1	0.00721	0.00566	0.2026
Insurance Important	1	0.5433	0.0965	<.0001
Experienced Flood	1	0.6704	0.3871	0.0833

Total N=632

In Model 1, the higher the value of each of the independent variables,<sup>23</sup> the more likely the homeowner was to have flood insurance—indicating a positive correlation between these variables. The variable that explains the most is the degree to which a respondent felt flood insurance was important. This variable may be the most important because it is the result of all the prior decisions previously made by the homeowner to determine that flood insurance was in fact important.<sup>24</sup> The overall model likelihood ratio p value was <.0001. This statistic suggests strong evidence that the model

<sup>23</sup> Specifically, the higher the probability of perceived damage from a flood; the more important flood insurance was to the respondent. Likewise, if respondents had previously experienced a flood; the more likely they were to seek flood insurance.

<sup>24</sup> See earlier discussion on the work of Kunreuther and Pauly (2003) regarding the complex decision making process for individuals to decide to seek insurance against risk.

explains much in predicting the likelihood of a homeowner who perceives risk choosing to have life insurance.

Model 2 removes the independent variable “Cause Damage” and substitutes in the independent variable “Flood Could Happen.”

Table 4-7. Logistic Regression Model 2 (Includes IV “Flood Could Happen”)

Parameter	DF	Estimate	Standard Error	p value
Intercept	1	-1.3167	0.1622	<.0001
Flood Could Happen	1	1.0096	0.1514	<.0001
Insurance Important	1	0.6171	0.0437	<.0001
Experienced Flood	1	0.3174	0.1960	0.1055

Total N=1,565

In Model 2, the higher the value of each of the independent variables, the more likely the homeowner was to have flood insurance—indicating a positive correlation between these variables. The variables that explain the most are “the degree to which a respondent felt a flood could happen in their neighborhood” and “flood insurance is important.” In particular, if the respondent answered yes to “Is your neighborhood where a flood could happen?” there is a strong correlation with a homeowner choosing to have flood insurance. The overall model likelihood ratio p value was <.0001. This statistic suggests strong evidence that the model explains much in predicting the likelihood of a homeowner who perceives risk choosing to have life insurance.

The final statistical analysis that was run on the variables was Pearson Correlation Coefficients to test for multicollinearity. Table 4-7 shows the coefficients between the variables are relatively low and therefore, the issue of multicollinearity in the model is not significant—the influence of each of the variables is relatively independent of the others.

Table 4-8. Pearson Correlation Coefficient: Test of Multicollinearity

	Cause Damage	Insurance Important	Flood Insurance	Experienced Flood
Flood Could Happen	N/A	0.29867	0.26955	0.11006
Cause Damage	1.0	0.23406	0.09827	0.13562
Insurance Important	0.23406	1.0	0.46371	0.11092
Flood Insurance	0.09827	0.46371	1.0	0.08381

Along with trying to understand how individual homeowners responded to the perception of risk, this paper attempts to evaluate if demographics play a role in how people perceive and respond to flood risk.

### **Linking Demographic Variables to NFIP Insurance**

The initial analysis of the variables was a Chi-Square for independence between the dependent and independent variables. Hypotheses 5 through 9 were measuring individual differences among those who have flood insurance and those who do not based on demographics. The only variable that was statistically significant in this bivariate analysis was age. The group causing the variation was 30-55 year olds. None of the demographic independent variables were found significant with the respect to the dependent variable, "Have Insurance" based on a Chi Square analysis. All of the p values were  $>.05$ . This result indicates that the null hypothesis (suggesting there is no association) is not rejected. The statistics indicate that there is not a strong association between each of the independent variables and the dependent variable. These variables will be revisited later in the chapter when a consolidated model involving perception of risk factors and demographics is run in one logistic regression.

Table 4-9. Relationship between education level and having insurance

		Education Level*							Total
		1	2	3	4	5	6	7	
<u>Have Insurance</u>	Yes	83% N=10	86% N=36	84% N=257	82% N=53	80% N=285	79% N=414	78% N=262	N=1,317
	No	17% N=2	14% N=6	16% N=49	18% N=12	20% N=73	21% N=108	22% N=73	N=323
	Total	N=12	N=42	N=306	N=65	N=358	N=522	N=335	N=1,640

\*Code Structure: 1= less than 8<sup>th</sup> grade  
 2=some high school  
 3=high school graduate  
 4=vocational/technical school  
 6=some college  
 8=college graduate  
 9=graduate/professional school

Table 4-10. Relationship between race/ethnicity and having insurance

		Race/Ethnicity					Total
		Black	White	Asian	Hispanic	Other	
<u>Have Insurance</u>	Yes	86% N=63	80% N=1109	86% N=42	79% N=30	83% N=59	N=1,303
	No	14% N=10	20% N=274	14% N=7	21% N=16	17% N=6	N=313
	Total	N=73	N=1,383	N=49	N=36	N=75	N=1,616

Table 4-11. Relationship between gender and having insurance

		Gender		
		Male	Female	Total
<u>Have Insurance</u>	Yes	79% N=548	82% N=802	N=1,350
	No	21% N=149	18% N=176	N=325
	Total	N=697	N=978	N=1,675

Table 4-12. Relationship between age and having insurance

		Age				Total
		<30	30-55	56-64	≥65	
<u>Have Insurance</u>	Yes	85% N=70	76% N=391	83% N=333	83% N=556	N=1,350
	No	15% N=12	24% N=126	17% N=70	17% N=117	N=325
	Total	N=82	N=517	N=403	N=673	N=1,675

Table 4-13. Relationship between income and having insurance

		Income*					Total	
		≤30K	>30-45K	>45-60K	>60-75K	>75-90K		>90K
<u>Have Insurance</u>	Yes	88% N=167	79% N=139	80% N=163	74% N=130	78% N=96	78% N=253	N=948
	No	22% N=26	21% N=38	20% N=42	26% N=46	22% N=27	22% N=72	N=261
	Total	N=193	N=177	N=205	N=176	N=123	N=325	N=1,209

Essentially, the proportion of people who chose to have flood insurance (or did not have flood insurance) was not explained by education, race/ethnicity, gender, or income based on this statistical tool. Age was statistically significant, mainly due to homeowners between 30-55 years of age were the least likely to have flood insurance. The literature does not provide an explanation for this phenomenon nor does the survey data.

However, the data presented in Table 4-8 though Table 4-12 still allow for some interesting observations regarding the demographics of those who were included in the survey. The “N” values (the number of people who responded to a given question) suggest that based on demographic characteristics, one was more likely to live in a flood prone area and therefore, more likely to have been part of the survey pool.

In general, as education level increased, one was more likely to live in a flood prone area. 97% of those who were asked the “education level” question had at least a high school diploma. 74% had at least some college with 52% earning at least a college degree. Whites make up a significant proportion of the survey respondents at 86%. As with education, the number of respondents rose with income level. 37% of the respondents reported an income over \$75,000 per year while only 17% reported an income under \$30,000 per year. Age also appeared to play a role in being more likely to live in a flood prone area. 64% of the respondents were over the age of 55, with the largest category of respondents, 40%, being 65 years of age or older.

These statistics indicate that the primary benefactor of subsidized flood insurance from the NFIP are not those who are typically viewed as low socio-economic status in need of help in the form of a government “social safety net.” In fact, these statistics indicate that those who are in the best position to “rent seek” preferences for government subsidies are most likely to be in a higher socio-economic status when it comes to the NFIP.

### **Linking Risk Perception, Demographic, and Years at Residence Variables to NFIP Insurance in a Consolidated Model**

The final model presented in this paper includes a number of risk perception and demographic variables previously considered plus a new variable, “Years at Residence.” This newly considered variable comes from a deceptively simple survey question, “How many years have you lived at this residence?” This particular variable is not covered in the literature regarding risk perception and therefore, was not included in earlier models. However, the idea that some homeowners would not purchase flood insurance unless required as a condition of their mortgage is studied in the literature

(Dixon et al, 2006; Evaluation of the NFIP: Final Report, 2006). This variable may be a proxy variable for a homeowner being required to have flood insurance as a condition of their mortgage. A fuller explanation of the potential reasons why this variable might be significant is discussed after the results of the model are presented and suggested as a case for future research.

A number of preliminary models were run using a combination of variables. Variables were included in some models and not included in others to develop the most statistically significant model that had the least amount of multicollinearity. “Education Level” and “Income” are highly correlated variables and therefore, were not good candidates to be run simultaneously in a regression model. In the preliminary models, “Income” was a more significant indicator than “Education Level” and therefore, was used in the final model while “Education Level” was not. As with the previous models, only “Flood Could Happen” or “Cause Damage” can be in the model at any one time as they are directly correlated with each other due to the sequencing of the questions. Since “Flood Could Happen” was statistically more significant, it was used in the final model while “Cause Damage” was not. “Race” was taken out as not being significant—probably because the data base is skewed towards whites (80%) and all other races/ethnicities were put into one variable, “Other Races/Ethnicities.” Age was also not significant in the model during the initial regression runs and was taken out. “Experienced Flood” was kept in the model because the literature suggests this should be an important variable, but as Table 4-13 shows, “Experienced Flood” does not add much to explaining the likelihood of an individual homeowner having NFIP insurance.

The resulting model is displayed in Table 4-13 and the overall model has a Chi Square p-value of <.00001.

Table 4-14. Risk Perception, Demographics and Years at Residence Logistic Regression: Model 3

Parameter	DF	Estimate	Standard Error	p value
Intercept	1	-0.4202	0.3432	0.2208
Flood Could Happen	1	1.1168	0.1761	<.0001
Insurance Important	1	0.5778	0.0510	<.0001
Experienced Flood	1	0.3614	0.2204	0.1010
Gender (male=1)	1	0.3999	0.1754	0.0226
Income	1	-0.1027	.0400	0.0103
Years at Residence	1	-0.0308	0.00743	<.0001

Total N=1151

In evaluating Table 4-13, the variables, “Flood Could Happen” and “Insurance Important” were very significant indicators of a homeowner having flood insurance. This relationship makes sense—if one perceives risk and thinks it is important to respond to risk through procurement of insurance, then that person is more likely to seek NFIP flood insurance. “Gender” (dummy variable male was coded as 1 and female was coded as 0) was significant and the model and indicated that being male in the survey made the respondent more likely to have flood insurance.

Income was significant, but the relationship was inverse—the higher the income the less likelihood of having flood insurance. This could be because people with higher income may be more likely to “self-insure” or have the resources to apply for a letter of rate map revision (LOMR) based on fill<sup>25</sup>. This action technically takes their property

<sup>25</sup> For a more complete explanation of LOMRs, see Rosenbaum “The Developmental and Environmental Impacts of the NFIP Literature: A Review of the Literature” 2005

out of the SFHA and therefore, not be required to have flood insurance. People of higher income may also be less likely to have mortgages and therefore, are not subject to the requirements to have flood insurance by their mortgage company. As Tables 4-8 and 4-12 indicate, the most likely group of people to respond that they have flood insurance were not high school graduates and had an annual incomes of under \$30K. Therefore, it is also possible that due to the complicated nature of reading and understanding an insurance policy, homeowners may have thought that they had flood insurance when in fact they did not. In fact, studies that focused specifically on lower-income households showed that they tended to not be insured (Sarmiento and Miller, 2006).

“Years at Residence” is also a highly significant variable with respect to having flood insurance and the relationship is inverse. Once again, this variable is based on the survey question, “How many years have you lived at this residence?” This result may be due to a number of reasons. First, the longer a homeowner has lived in their home, the more likely the homeowner is to not have a mortgage which requires flood insurance, or to have a mortgage at all. The federal law mandating flood insurance for homes in a SFHA was originally passed in the Flood Disaster Protection Act of 1973 but was not considered very effective (Tobin and Calfee, 2006). That was followed by the National Flood Insurance Reform Act of 1994 which strengthened the requirements for various federal agencies to enforce the purchase of flood insurance for homes with federally backed mortgages in SFHAs (Tobin and Calfee, 2006). The enforcement of the mandatory flood insurance purchase requirement has increased over the years (Tobin and Calfee, 2006). Therefore, the “Years at Residence” may serve as a proxy

for identifying homeowners who are more likely to be subject to mandatory flood insurance requirements due to their federally backed mortgage.

Second, the longer homeowners have lived in their home, the more likely they are to know their flood risk, based on experience. If they have not experienced a flood, they may be more likely to drop their flood insurance. Finally, the longer homeowners live in their home, the more likely they are to apply for a LOMR for fill. Due to the type and sequencing of the questions in the survey instrument, clarity into the exact reasons why this variable is significant is not available by analyzing the data. This interesting variable is a candidate for future research.

To test for independence among the independent variables, a Pearson Correlation Coefficient analysis was run for the independent variables. The results of these coefficients are displayed in Table 4-14.

Table 4-15. Pearson Correlation Coefficient: Test of Multicollinearity, Model 3

	Insurance Important	Experienced Flood	Gender (male=1)	Income	Years at Residence
Flood Could Happen	0.29867	0.11006	-0.05326	0.05120	-0.06980
Insurance Important	1.0	0.11092	-0.06802	-0.06039	-0.07991
Experienced Flood	0.11092	1.0	-0.00169	0.08771	-0.02798
Gender (male=1)	-0.06802	-0.00169	1.0	0.17883	-0.04420
Income	-0.06039	0.08771	0.17883	1.0	-0.08708

All of the coefficients are <.5 suggesting that the variables are acting independently of each other. Therefore, no other adjustments were made to the model.

### **Linking the NFIP to Risk Tolerance**

Up to this point in the dissertation, the focus of the statistical analysis has been on the variables that make a homeowner more likely to seek NFIP flood insurance. In these cases having flood insurance was treated as the dependent variable or the

variable that responded to various influences. However, the literature suggests that the availability of the NFIP might also be considered an independent variable as it has the potential to impact on an individual homeowner's willingness to live in a flood prone area.

An important consideration in evaluating the NFIP must include a discussion of what role the NFIP plays in affecting the risk tolerance of individuals who live in flood prone areas. A logical question to ask is, "if people in fact perceive risk and believe damage will be done to their property, would they still be willing to live in flood prone areas if flood insurance were not available?"

Unfortunately, the question "Do you feel less risk because you have flood insurance" was not asked in the survey. However, the thought process is, if people perceive risk and have previously experienced a flood and yet still live in a flood prone area--having flood insurance must likely affect their tolerance of flood risk. Having flood insurance therefore, became what I measured as a "proxy" for risk tolerance—recall that the literature presented earlier in this chapter, people buy insurance to lower their risk. However, just as the literature suggests, determining an individual's response to flood risk is complicated.

The following quote comes from an email response from Dr. Freudenburg to Dr. Rosenbaum. Dr. Rosenbaum's initial email solicited thoughts and sources on the issue of how homeowners respond to the perception of flood risk which might be included in this dissertation chapter.

One classic definition of insanity, of course, is to keep doing the same thing, even when it keeps giving us bad results...well-meaning folks tried to analyze the thinking of homeowners, and for decades, our government has been trying to encourage the owners of potentially vulnerable homes to buy

flood insurance, often at greatly discounted prices, but almost always with disappointing results... But if it hasn't worked for several decades, now, why do we keep focusing on those individual homeowners, disparaging their "flawed decision-making,...

William R. Freudenburg  
Dehlsen Professor of Environment and Society  
Environmental Studies Program  
University of California  
October 2009

Coincidental to Dr. Rosenbaum's email, Dr. Freudenburg had just co-authored a book entitled, *Catastrophe in the Making: The Engineering of Katrina and the Disaster of Tomorrow* (Freudenburg, Erikson, Laska and Gramling, August 2009).

Freudenburg's central argument in the book regarding development in risk-prone areas is, "If we keep seeing the same results, maybe it's because we keep encouraging them. White<sup>26</sup> called it a 'levee effect,'<sup>27</sup> but the real influence doesn't come from the levees -- it comes from our policies." Consistent with the literature from Chapter 1 of this dissertation, Freudenburg concludes that the NFIP creates a moral hazard by encouraging risky behavior through providing government sponsored subsidized flood insurance.

Another issue is the relationship of "moral hazard" to NFIP marketing.<sup>28</sup> Moral hazard may exist because the NFIP could create an environment where people perceive that a potentially unsafe, and possibly dangerous, property is a safe property—

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<sup>26</sup> Freudenburg is referring to Gilbert White who is often quoted throughout this dissertation and considered, "The Father of Floodplain Management."

<sup>27</sup> According to Gilbert White, the "Levee Effect" occurs when the government lowers risk perception by building levees. Unfortunately, this encourages development in flood prone areas which ultimately suffer catastrophe as the levees tend to fail (Gilbert, 1945).

<sup>28</sup> For a detailed explanation of moral hazard, see Chapter 1.

this would be another form of market failure.<sup>29</sup> Related to moral hazard is the possibility that the NFIP elicits “institutional trust” and may lower perceived flood risk. The NFIP literature never states, “People should not live in a flood prone area.” In fact their website offers the following, “Homeowners, renters and businesses in high risk areas *do* qualify for flood insurance, even if their property previously has flooded...” (<http://www.fema.gov/news/newsrelease.fema?id=48976>, November 2009). Some observers might argue that through statements such as this, homeowners perceive less risk because the government is a partner in the assumption of flood risk.

An early discussion of institutional trust was offered by Cohrssen and Covello in 1989. Their research looked at the role of government (as an institution) in changing the perception of risk. Specifically, if the institution providing the regulation or service or insurance was trusted, the perception of risk decreased. In Chapter 1 of this paper, Raymond Burby’s notion of the government-backed NFIP creating a perception of “safe development” in flood prone areas was discussed.<sup>30</sup> Burby’s argument is that if the government is providing subsidized insurance to build in a flood prone area, it will be perceived to be safe.

The point of the preceding literature is that there may exist a conceptual link between the NFIP and its role in risk tolerance (i.e. making the risk of living in a flood prone area more tolerable—less financially risky). Therefore, for a substantial number of homeowners<sup>31</sup> who enjoy subsidized insurance, the availability of NFIP insurance

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<sup>29</sup> For more on this concept, see Burby’s concept of “safe development” discussed in Chapter 1 as well as a summary of this concept offered later in this chapter

<sup>30</sup> For a more detailed discussion of “safe development,” see Chapter 1.

<sup>31</sup> See Chapter 3, Homeowner Response Indicator 20 and Figure 3.2 for details of “Homeowners: how much more”

may be an enabler of development in flood prone areas through its risk tolerance agency. This is in conflict with the NFIP's stated goal "to restrict the development of land which is exposed to flood damage and guide the development of future construction away from locations which are threatened by flood hazards." This dissertation does not have access to data to statistically analyze the risk tolerance agency of the NFIP. Therefore, this link is conceptual, based on the literature.

In Chapter 3, Homeowner response indicator #19 asked homeowners if they would have purchased, built or stayed in a flood prone area without flood insurance. The majority of homeowners said, "yes." This variable in isolation does not support the notion that the NFIP is the factor that allows for risk tolerance. However, this question was asked of homeowners who had already invested their time and money into a home in a flood prone area. It is unclear if people, who were in the process of making the decision to buy or build, would have made the same decision to take on uninsured risk.

Perhaps more significant is the fact that lenders and developers are not likely to lend money or build in flood prone areas without the ability to insure against flood losses. The reader will remember from Chapter 3<sup>32</sup> that the availability of the NFIP is important to lenders, developers and realtors in deciding to do business in the floodplain. Based on an indicator that posed the question to developers, lenders, and realtors, "Suppose that federal flood insurance is NOT available for a property located in the flood plain that you or your company is considering...", 76% of developers would not develop land in the floodplain, 80.8% of lenders would not provide mortgages to a property in the floodplain, and 78.4% of realtors would not recommend purchasing

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<sup>32</sup> Please see Chapter 3, Table 3-12 for a complete explanation of this finding.

property in a floodplain. Of the 140 development interest respondents surveyed, nearly 80% would have difficulty conducting business in a floodplain without the benefit of the NFIP. This indicator from development interest respondents alone demonstrates the importance of the NFIP in business decisions involving development in the floodplain. Therefore, along with the impact on individual homeowners, the NFIP must have some effect on risk tolerance regarding business groups' perception and response to risk when deciding to invest financial resources.

This dissertation does not provide clear survey evidence that having flood insurance lowers individual homeowner's perception of risk. However, the literature presented earlier in the chapter does suggest that people who perceive risk are more likely to seek insurance to lower their perception of risk—especially financial risk. The NFIP adds another factor, subsidy, which allows individual homeowners to lower their personal financial risk without bearing the true cost of the insurance. Survey data from Chapter 3 strongly suggest that development interest respondents would not develop in a flood prone area. Therefore, flood insurance appears to have some capacity for making people more tolerant of risk.

### **Conclusion**

This chapter began by considering whether the NFIP created a moral hazard by encouraging risky behavior through providing government sponsored subsidized flood insurance. Also, the problem of adverse selection was suggested as those who perceived a higher degree of risk were more likely to seek insurance than those who perceived less risk—thus creating a situation where a government insurance program would most likely always require subsidies.

In the end, this chapter is studying individual behavior, which by definition, is not an exact science. However, the data in this study clearly points out that those who perceive flood risk, believe damage will be done to their home, have experienced a flood, or think flood insurance is important—will in fact be more likely to seek flood insurance—the operational definition of adverse selection. The literature indicates that, since the beginning of recorded history, people seek insurance to spread risk and thus increase their tolerance of risk. This general notion of why individuals seek insurance appears to hold true for those who perceive risk of flooding—they seek flood insurance. The public policy issue with respect to flood insurance is that, in the United States, the flood insurance is provided by the Federal Government and is subsidized.

Thus, Dr. William R. Freudenburg thoughts seem appropriate to consider. Do homeowners have “flawed decision making?” Or, is the NFIP, as a matter of public policy, encouraging risky behavior through the risk tolerance agency of the NFIP? The conclusion of this researcher is that the NFIP does in fact cause a moral hazard by allowing individual homeowners a method of lowering their perceived risk by obtaining subsidized flood insurance from the government. Added to this thought is the evidence that of the 140 development interest respondents surveyed, nearly 80% they would not conduct business in a floodplain without the benefit of the NFIP.

The final chapter, Chapter 5, will draw on the results and implications of the data collected in Chapters 3 and 4; discuss the current status of the NFIP; and detail the limitations and qualifications of this dissertation.

## CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

A flood insurance program is a tool that should be used expertly or not at all. Correctly applied, it could promote wise use of flood plains. Incorrectly applied, it could exacerbate the whole problem of flood losses. For the Federal Government to subsidize low premium disaster insurance or provide insurance in which premiums are not proportionate to risk would be to invite economic waste of great magnitude.

-Gilbert F. White, 1966

When the author began his dissertation research in 2003, he would sometimes be asked, “What’s your dissertation about?” The answer was, “the NFIP.” What usually followed was the listener’s admission of ignorance about the topic and a disinterest in learning anything more about it. In many ways, the subsequent Hurricanes Katrina, Rita, and Wilma have had a catalytic effect on the public policy discourse that compels greater attention to the NFIP and its national impact.

When this author first learned that the concepts of “moral hazard,” “adverse selection,” and “price elasticity” clearly applied to the study of the NFIP—little research was available to build on. Further, in early meetings with FEMA NFIP personnel during the beginning of this project, they preferred not to discuss the idea that NFIP might enable development or that the NFIP premiums might not be actuarially sound.

However, Katrina and her sisters proliferated discourse and research surrounding the NFIP. Reauthorization of the NFIP since 1968 has been relatively easy, but the devastating effect of these hurricanes has fiscally strained the insolvent NFIP and opened the door to a critical evaluation of this program. Although still not a salient topic for those outside the issue network surrounding the NFIP, there are at least more voices

and research which question the merits of a public policy which enables people to live in hazardous areas.

One may not appreciate the value or authoritative nature of the following reference, but it is interesting that NFIP public policy debate has even found its way into “pop culture” research outlets such as Wikipedia:

As critics predicted, the NFIP encouraged people to locate in areas more susceptible to flood damage. Prior to the NFIP's existence, insurance coverage for flood losses was not provided by any private insurance carriers. Insurance losses stemming from flood damage were largely the responsibility of the property owner, although the consequences were sometimes mitigated through provisions for disaster aid. Today, owners of property in flood plains frequently receive disaster aid and payment for insured losses, which in many ways negates the original intent of the NFIP. Consequently, these policy decisions have escalated losses stemming from floods in recent years, both in terms of property and life.[http://en.wikipedia.org/wiki/National\\_Flood\\_Insurance\\_Program](http://en.wikipedia.org/wiki/National_Flood_Insurance_Program) (July 2009)

Likewise, another pop culture medium is being used to broaden the audience of those who have access to information about the NFIP. A “YouTube” video of the House of Representatives Subcommittee on Housing and Community Opportunity hearings regarding H.R. 1682 covers the testimony to reauthorize the NFIP (<http://www.youtube.com/watch?v=w0c-MpNuReg&feature=related>). The video is also instructive as it chronicles the activities of the issue networks or “iron triangle.” The “iron triangle” refers to the policy-making relationship which involves congressional committees, government agencies, and interest groups (Rourke, 1984). The Chairwoman of the House Subcommittee is Representative Maxine Waters (D-California) who advocates for and is a co-sponsor of the bill to reauthorize the NFIP. The testimony provided is from senior FEMA officials involved with the NFIP, insurance executives, The Association of Independent Insurance Agents and Brokers of America,

and The National Association of Realtors. As a group, they all sit at the table before the House Subcommittee and in unison, give testimony supporting the reauthorization of the NFIP.

In this concluding chapter, the results and implications of the data collected will be summarized, the current status of the NFIP will be discussed, and the limitations and qualifications of this dissertation will be detailed.

## **Results and Implications**

### **Has the NFIP Met Its Goals?**

It seems from the data cited previously that the NFIP, as implemented, has not met its goals. In fact, the earlier, hypothesized unintended consequences of the NFIP are more likely to be the case:

1. **Accelerated floodplain development:** Development appears to have accelerated in flood prone areas in recent decades. Further, evidence suggests that the NFIP has sometimes enabled development and, in doing so, creates a “moral hazard” or “perverse incentive” to encourage development in flood prone areas.
2. **Unsatisfactory flood risk mitigation:** Property owners, who want to live near water, have taken advantage of the government-backed flood insurance policies that private insurance companies were unwilling to assume. NFIP policies have steadily increased. NFIP claims, due to flood damage, have steadily increased since the NFIP’s inception. One might argue that the risk of a structure being in a flood has increased, not mitigated, due to the NFIP.
3. **Insufficient floodplain conservation:** Flood plain administrators surveyed provide no indication that the NFIP has preserve or restore the natural resources of the nation’s floodplains.

The original research in this study shows that flood insurance is important to homeowners and that as the price of insurance rises, the demand (willingness to pay) appears to decline. Therefore, for a substantial number of homeowners, the subsidized price of NFIP insurance has been an enabler of development in the floodplain. The

unintended consequences of (1), (2) and (3) above lead to the most basic question:  
“Has the NFIP enabled development?”

To begin to clarify the answer, even as this dissertation is written, FEMA states the following on its November 2009 website in “Myths and Facts about the National Flood Insurance Program” originally published in March 2007

(<http://www.fema.gov/library/viewRecord.do?id=3002>) :

**MYTH:** The NFIP encourages coastal development.

**FACT:** One of the NFIP’s primary objectives is to guide development away from high-flood-risk areas.

FEMA’s “myth” and “fact” combination is also compelling in the following as it speaks to the mindset of those who manage the NFIP with respect to risk:

**MYTH:** You can’t buy flood insurance if you are in a high-flood-risk area.

**FACT:** You can buy National Flood Insurance no matter where you live...

The intrinsic advice from the government is NOT to avoid developing, building, or buying in a “high-flood-risk area” but rather to make sure one has NFIP-sponsored insurance. One might suggest that this sounds inviting to a prospective builder/buyer who is standing on a piece of property admiring the view of the nearby water and considering the possibilities. Some might even view the NFIP marketing as encouraging or enabling.

The post-NFIP household growth rate in flood hazard areas is estimated at 40% across the country (Sarhou, Gulf Restoration Network, 2002). Twenty-five per cent of all land conversions from rural to urban/suburban occurred since the mid-1980s. Further, over 50% of the United States population now lives in coastal counties and,

closer to home, 80% of the total population of Florida lives within 10 miles of the coast (Beach, Oceans Commission, 2002).

In the comprehensive textbook, *Changing Land Use Patterns in the Coastal Zone*, G. S. Kleppel (Professor and Director of the Biodiversity, Conservation and Policy Program at the State University of New York at Albany), M. Richard DeVoe (Executive Director of the South Carolina Sea Grant Consortium in Charleston, South Carolina) and Mac V. Rawson, Jr. (Director of the Georgia Sea Grant Program at the University of Georgia, Athens) bring together scientists from a variety of ecosystem specialties. Chapter Two of this textbook emphasizes the contention of this paper--that the NFIP became an enabler of development by shifting risk from the individual to the public by offering subsidized flood insurance:

When risks can be externalized, and when associated costs can be reduced or borne by others, perversions in markets, as well as in individual behaviors, occur. This is, perhaps, nowhere better illustrated than by the National Flood Insurance Program (NFIP)...Until the NFIP became available, banks usually refused to grant mortgages for beachfront home construction without additional backing with low-risk securities. It was only after the federal government assumed the risk private insurers were unwilling to undertake, that the coastal real estate market boomed. (Kleppel, Becker, Allen, and Lu, 2006)

A main focus of the editors and various authors of this textbook is to detail the environmental impact of the growth in the floodplain, wetlands, coastal watersheds, and coastal areas. A motivation for writing the book is that projections of future growth are troubling. The estimated growth rate in the Southeastern United States coastal plain is expected to be 50-75% in the next 30 years (Kleppel, Becker, Allen, and Lu, 2006).

*Changing Land Use Patterns in the Coastal Zone* also provides both a non-scientific as well as highly technical explanation of the decline of the ecosystem tied directly to

development. Even a quick read of the book will convince the reader that the link between development and environmental degradation is undeniable.

It is important to understand the link between the three unintended consequences of development, mitigation and conservation. If the NFIP encourages/enables development in the floodplain, then it encourages/enables the problem of increased risk of property damage and personal injury. If the NFIP encourages/enables development in the floodplain, the problem of increased damage to the environment also naturally occurs.

From a public policy standpoint, it would seem that prudent measures should shift the financial risk back to the banks, insurers, developers and individual homeowners. To do this, the question of the subsidized nature of the NFIP must be addressed.

### **Is The NFIP Subsidized?**

The NFIP, by design, is not actuarially sound.

-David M. Walker, Comptroller General of the United States, 2006

The NFIP has routinely borrowed money from the US Treasury and has previously been bailed out. In the YouTube video referenced above of Mr. Edward L. Connor (FEMA's Deputy Assistant Administrator for Insurance) being questioned by the Subcommittee on Housing and Community Opportunity, he doesn't have an answer when asked how much it would cost the average policy holder to make the NFIP premiums actuarially sound. An insurance lobbyist answers "more" to the same

question and the realtors' lobbyist estimates that the current rates charge approximately 35% of the actuarially sound rate.<sup>33</sup>

The GAO in recent years has studied the NFIP extensively, but did not recommend actuarially sound premiums in a letter to Representative Barney Frank (D-NY), Chairman of the Committee on Financial Services. The GAO did quote one insurer in their report, who indicated an increase of approximately 80% might bring the current NFIP premiums into line with private insurance rates.<sup>34</sup>

Private flood insurance can be significantly more expensive than NFIP insurance for similar levels of coverage. For example, one insurer told us that the cost for a specified level of residential coverage could be as low as \$500 from the NFIP and as high as \$900 from a private insurer. For contents insurance, the cost averages around \$350 from NFIP but around \$600 in the private market. (GAO, 2009)

Since the NFIP is currently insolvent and is seeking \$18 billion in debt forgiveness from the United States Treasury, the question of the NFIP being subsidized appears self-evident.

### **Are Policy Holders Sensitive to the Price of Flood Insurance and Do Homeowners View Having Flood Insurance as Important?**

The original research conducted for this study indicated that all respondent groups (homeowners, realtors, insurers, developers, lenders, and floodplain administrators) believed that as the cost of flood insurance increased, the demand for insurance would decrease. The results in Chapter 3 indicated that only approximately 12% of NFIP policy holders in SFHAs were willing to pay between 75-100% more. Only 11% of NFIP policy holders near SFHAs indicated they were willing to pay between 75-100% more.

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<sup>33</sup> Also see House Report 110-340, Flood Insurance Reform and Modernization Act of 2007 which covers the hearings shown on the YouTube website.

<sup>34</sup> As an example, for every \$1.00 the NFIP charges for coverage, the private insurer would charge \$1.80 to be actuarially sound.

Development interest groups were a bit more optimistic about homeowners' willingness to pay, i.e. they estimated that 30% of homeowners would be willing to pay 75-100% more. However, lenders (those with perhaps the best insight) believed that only 15% of homeowners would be willing to pay 75-100% more. Therefore, if flood insurance rates were to be increased 80% to become actuarially sound, the number of people willing (or able) to pay for flood insurance might significantly decline.

The original research conducted for this study also indicated that for the majority of homeowners, flood insurance was important. 68.9% of policy holders in SFHAs and 80.4% of policy holders living outside the SFHA believe it is important. Therefore, if one wants to enable future development in the United States floodplains, keeping a public policy that subsidizes flood insurance makes good sense. However, if one wants to curtail future development and make living in a flood zone less attractive, the risk (i.e. cost) of owning property in the flood zone needs to be placed back on the owner as well as the insurers, lenders and developers.

### **Current Status of the NFIP**

When work began on this report, there was a dearth of substantial research about the NFIP and little public attention. Although still not on the national agenda for the average citizen<sup>35</sup>, interest group activity, research and writing about the NFIP has increased—especially among economists and environmentalists, even though the topic still receives little attention from the Political Science community. In this section, the current controversy over the proposal to add wind coverage to the NFIP will be discussed as well as the most recent legislative status of the NFIP will be characterized.

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<sup>35</sup> The author has not noticed that this is the topic of discussion at the “water cooler” nor a headline issue in local or national news outlets.

## **Adding Wind Damage to the NFIP**

I urge the Obama Administration to support H.R. 1264, the Multiple Peril Insurance Act, to protect homeowners and taxpayers by creating an option in the National Flood Insurance Program to offer coverage of both wind and flood risk in one policy. By covering wind and flood risk in one policy, the multiple peril option will allow coastal homeowners to buy insurance and know that hurricane damage would be covered.

-Rep. Gene Taylor (D-MS), 1 July 2009

After considering this research, one might think that policymakers would be concerned about adding additional insurance liability to the federal budget. However, that does not appear to be the case for members of Congress. Admittedly, wind and water damage tend to occur together; differentiating which calamity causes which damage is difficult. That being said, as a matter of public policy, one might suspect that the unintended consequences of the flood portion of the NFIP would result in similar costly unintended consequences for wind damage.

Representative Taylor has conducted a two year campaign to add wind coverage to the NFIP and has proposed that all premiums be actuarially based. In large part, his argument is that insurance companies have committed, and will continue to commit, fraud by attributing the loss in a natural disaster to flood/water damage rather than wind damage (Representative Taylor's Congressional Website, July 2009). This "alleged" fraud results in a policy holder being denied reimbursement for damage or in the NFIP being inappropriately charged for damage not caused by flood/water damage. This argument has played well in the media and with Representative Taylor's constituents.

In fact, the House of Representatives has passed a version of the bill proposed by Representative Taylor that includes adding wind damage to the NFIP. This is referred to as the Multiple Peril Act and was included as an amendment to H.R. 3121, the Flood

Insurance Reform and Modernization Act

(<http://www.govtrack.us/congress/bill.xpd?bill=h110-3121>). However, there are mounting forces against this proposed legislation.

A 2007 Towers-Perrin study commissioned by The American Insurance Association estimated that if wind coverage is added to the NFIP, program deficits from catastrophic wind events in a single year could be \$100 to \$200 billion, or even higher (Tower-Perrin, 2007). A relatively new interest group, Americans for a Smart Natural Catastrophic Policy (also referred to as SmarterSafer), appears to be focusing specifically on preventing the addition of wind insurance to the NFIP and to eliminate the subsidized nature of hazard insurance in general (<http://www.smartersafer.org/>, 2009). The interest group claims support from environmental organizations such as the National Wildlife Federation, Sierra Club, Environmental Defense Fund, and Friends of the Earth. Other supporters come from the insurance industry (USAA, Liberty Mutual, Chubb, and the Reinsurance Association of America) as well as consumer/taxpayer advocates (American Consumer Institute, Taxpayers for Common Sense, and Americans for Tax Reform). Organized interests such as the Americans for a Smart Natural Catastrophic Policy, among others, may be part of the reason that NFIP reauthorization in a *carte blanche* manner during the past two legislative sessions has been difficult. In fact, the Reinsurance Association of America credits Americans for a Smart Natural Catastrophic Policy's lobbying efforts with stopping the addition of wind insurance to the NFIP as well as preventing amendments which would create a federal loan program for state reinsurance funds (Reinsurance Association of America Newsletter, July 2009).

## **Current Legislative Status**

The National Flood Insurance Program is set to expire in September—right in the middle of hurricane season. Letting the program expire in the middle of hurricane season would have serious repercussions for areas prone to flooding. A six-month extension is prudent and necessary.

-Representative Maxine Waters (D-CA), July 2009

According to FEMA's website, the NFIP is currently operating under the authority of The National Flood Insurance Reform Act of 1994. The NFIP has been limping along with stop-gap legislation that continues its operation for six months at a time. This is not for a lack of legislative interest—there have been a number of bills introduced to re-authorize and reform the NFIP.

The most recent, major proposed legislation includes: The Flood Insurance Reform and Modernization Act of 2006; The National Flood Insurance Program Enhanced Borrowing Authority Act of 2006; The Multiple Perils Insurance Act of 2007; Flood Insurance Reform and Modernization Act of 2007; Flood Insurance Choice Act of 2007; Commission on Natural Catastrophe Risk Management and Insurance Act of 2008 (aka The Flood Insurance Reform and Modernization Act of 2008 and H.R. 3121 (re-titled, see below); and The Multiple Peril Insurance Act of 2009. There are also hundreds of proposed amendments to these various legislative efforts.

H.R. 3121 was re-titled: "To restore the financial solvency of the national flood insurance program and to provide for such program to make available multiple peril coverage for damage resulting from windstorms and floods and for other purposes." H.R. 3121 has passed the House and Senate. However, the House and Senate bills have never been reconciled and have not gone to the President for signature (the Library of Congress: THOMAS, July 2009).

According to the Library of Congress online bill tracking system, THOMAS, the major provisions of the H.R. 3121 are to:

- Reauthorize the NFIP through 2013
- Prohibit federal subsidies for new or lapsed policies and increase from 10% to 15% the annual limitation on risk premium rate increases for any properties within any single risk classification
- Exempt the St. Louis District of the Mississippi Valley from increased premium rates and not require the purchase of flood insurance after new rate maps are established
- Authorize the establishment of a National Insurance Reserve Fund
- Forgive all of the NFIP's debt (approximately \$20B)
- Add wind coverage to the NFIP via House amendment; the Senate version does not have this provision

*(Note: A full summary of the bill from the Congressional Research Service is contained in Appendix E)*

Presidential Candidate Barack Obama was reported to support adding wind damage to the NFIP, but the Obama Administration has most recently taken a stand against the addition of wind damage. In a written letter by the Secretary of Homeland Security, Janet Napolitano, to the Chairman of the Committee on Financial Services, Barney Frank, the administration supported the following:

- Phase-in of actuarial rates for nonresidential properties, non-primary residences, and repetitive loss properties
- Raise the cap on chargeable annual increases in premiums from 10% to 15%
- Authorize updating of flood insurance rate maps
- Reestablish the Technical Mapping Advisory Council

The letter clearly did not support the inclusion of wind damage in the NFIP (Napolitano, April 2009). It should also be noted that the letter does not support charging actuarial rates to homeowners of primary residences. Moreover, if the true actuarial rates were 80% greater than current rates, it could take a number of years before the NFIP began to charge actuarial rates. In the intervening time, one suspects that the NFIP would continue to build debt.

On October 30, 2009, President Obama signed H.R. 2996, the bill containing the Continuing Resolution that extends the National Flood Insurance Program through December 18, 2009 (Connor, 2009). There is new legislation proposed (H.R. 3139) to provide another temporary authorization through 31 March 2010. A 9 July 2009 news release from Representative Frank's office stated "This program is very important and very much in need of revision...Passing an extension of the act will prevent any gap in the important work it does while giving us the chance to improve it both from the economic and environmental perspectives."

([http://www.house.gov/apps/list/press/financialsvcs\\_dem/press\\_070909.shtml](http://www.house.gov/apps/list/press/financialsvcs_dem/press_070909.shtml) ).

No doubt, the progress of the legislation will attract substantial interest group involvement. Prior to the previously noted catalytic effect of Katrina and her sisters, only the environmental lobby was concerned about the NFIP. Now various economists and taxpayer groups seem to have joined the fray. The NFIP is not quite as invisible as it once was not so long ago.

### **Limitations and Qualifications of this Dissertation**

The intent of this research is to answer the basic question: "Is the NFIP meeting its strategic goals?" There are many interest groups who would disagree about the final answer to this question. One important aspect of this argument is contention that the NFIP is, in fact, good public policy because development is inevitably going to occur near water due to market forces. With this in mind, there is some evidence to support the idea that the NFIP has minimized environmental impact and promoted "smart growth" policies.

## **NFIP Might Minimize Environmental Impact**

FEMA personnel point out that the NFIP can encourage floodplain conservation and the protection of floodplain environmental values. For example, the NFIP requires communities to review development proposals to ensure that all necessary federal and state environmental permits are obtained, and requires the establishment of a “regulatory floodway” in the most environmentally sensitive riverine floodplains. The NFIP regulations encourage communities to adopt an approach to floodplain management that relies more on non-structural floodplain management techniques than on flood control measures.<sup>36</sup> The NFIP is also assisting to facilitate desirable floodplain development in many communities. The NFIP’s requirement of stringent building codes in flood-prone areas, for instance, makes floodplain occupancy safer. The availability of NFIP insurance often makes financing of floodplain properties attractive to financial lenders and a less risky investment for buyers.

In addition, FEMA personnel also state that the Community Rating System (CRS) represents an important FEMA effort to promote the protection of natural and beneficial floodplain uses through the NFIP. Components of the CRS currently create opportunities for communities to receive CRS credit for activities associated with floodplain protection and conservation. However, the impact of these activities has not been well documented.

In some communities, the NFIP has often restrained development in high-hazard floodplains and promoted safer construction in flood-prone areas through its community floodplain mapping and management requirements. Many aspects of the NFIP

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<sup>36</sup> The FEMA’s definition of “non-structural floodplain management” appears to refer to all actions, especially zoning prohibitions, which discourage people from living in the floodplain.

contribute to this impact. For example, the NFIP's requirement that riverine communities establish a "regulatory floodway" places a significant limitation on development in the most hazardous and most environmentally sensitive area of riverine floodplains. Once this floodway is designated, the community must prohibit development in the floodway which would cause any increase in flood heights. The CRS also encourages communities to exceed the NFIP's basic floodplain management guidelines by additional actions conserving open space and environmentally sensitive areas.

### **NFIP Might Encourage "Wise" or "Smart" Growth**

Research conducted for this report generally confirms that the NFIP is perceived to be a facilitator of floodplain development. However, the NFIP's influence is also nuanced. The NFIP's contribution to floodplain development appears to be greatest in coastal states and communities. In states and communities where the vast majority of NFIP policies exist, the availability of NFIP insurance, together with property characteristics, appear to be the most significant considerations in decisions to develop, buy or build in flood risk areas. The relative influence of these two factors appears to be virtually equivalent and greater than other considerations in floodplain development. In achieving the NFIP's fundamental objectives, FEMA has also promoted safer, better planned urban development.

Where the NFIP may not significantly discourage floodplain development, it is often perceived to encourage "wise" or "smart" development that reduces property and environmental destruction that might otherwise occur (Baumann and Emmer 1976; Bollens, Kaiser and Burby 1988). A few empirical studies suggest that the NFIP's floodplain conservation impact may be most evident in riverine, rather than coastal,

communities (Kriesel and Landry 2004). The distinction between riverine and coastal zones may be significant in assessing the NFIP's national impact. While time and budget constraints precluded such an investigation in this report, the issue merits more careful investigation than it has so far received, since much of the ongoing controversy over the NFIP's developmental impact focuses upon coastal settings.

Recent research (paid for by FEMA) among coastal NFIP policyholders also suggests that neither an increase nor decrease in NFIP premiums would significantly alter the propensity of property owners to purchase NFIP policies (Kriesel and Landry 2003). In coastal areas, NFIP enrollment appears to be most responsive to perceptions of flood risk and experience with coastal flood hazards, or to mortgage requirements (i.e. if homeowners are required to have flood insurance to secure a mortgage, they will get flood insurance). Kriesel and Landry also found that coastal area property owners were high income earners and that people with high income were more likely to secure flood insurance.

A national survey of residential NFIP policyholders (research paid for by FEMA) indicates that almost three quarters of the respondents would have purchased, built, or remained in their present location even if flood insurance were unavailable or they could not purchase it (Dixon *et al* 2005). For a more detailed explanation of these arguments supporting the NFIP, see Rosenbaum and Boulware, 2006

### **Final Thoughts**

Is the human affinity for water so strong that we will avoid common sense and take great risks independent of the consequences? Would people assume the risk and financial burden of paying higher premiums and still choose to live in flood zones

without government subsidies? Do people care about the damage done to the watershed due to all the development in the flood zone?

At this point, we do not know the answer to these questions because the status quo is in fact one of government subsidy and federal assumption of risk for those who choose to live in flood prone areas. There are a myriad of government programs for which critics often ponder their origins and question their continuation. For this author, the NFIP is one of those programs. It appears to be a well-intentioned good idea gone bad—overtaken by economic interest and myopic bureaucrats in FEMA. This is not to suggest that these people are stupid or evil; they are just a bit close-minded to the impact of unintended consequences of enabling development in risk-laden flood zones, especially in the highly volatile Southeastern coastal areas.

In the end, it is a question of the preponderance of the evidence as to whether the NFIP has actually met the goals of:

1. **Development:** Restrict the development of land which is exposed to flood damage and guide development of future construction, where practicable, away from locations which are threatened by flood hazards.
2. **Mitigation:** Reduce the loss of life, the disruption, and the damages caused by floods.
3. **Conservation:** Preserve and restore the natural resources of the Nation's floodplains.

For this researcher the answer is unequivocal: the burden of proof lies with the NFIP and it has not proven its case. During the course of the research on the NFIP, little evidence suggested the conclusion that the NFIP was meeting its stated goals. The research suggests that the NFIP is an enabler of development in the flood plains and all that goes with it—causing a moral hazard, adverse selection problem, damaging the environment and creating the need for \$20 billion in government subsidies. The

Obama Administration appears to be headed in the right direction; but ultimately, as long as the NFIP is a government run program, the nature of politics will result in peculiar benefits to those with salient interests while unsuspecting bill-payers have another beer.

APPENDIX A  
CONSERVATION RELEVANT INTERPRETATIONS OF THE NATIONAL FLOOD  
INSURANCE ACT OF 1969

**Appendix A.1: Senate Committee on Currency and Banking**

[Parenthetical numbers reference pages in U.S. Congress, Senate, Committee on Banking and Currency, *National Flood Insurance Act of 1967: Report of the Committee on Banking and Currency to Accompany S. 1985*. 90<sup>th</sup> Congress, 1<sup>st</sup> Session, Report No. 549. August 29, 1967.]

“The Secretary should develop criteria which will be flexible while at the same time accomplishing the regulation of the development and use of flood plains where it is needed.” (p. 6)

General Purposes:

1. “A most important public purpose which the program will serve will be to encourage state and local governments to adopt and enforce appropriate land use provisions to restrict the future development of land which is exposed to flood hazard.” (p. 2)
2. “Flood insurance is viewed both as a means of helping the individual bear more easily the risks of flood damage to which his location often exposes him, and equally, as a means of discouraging unwise occupancy of flood-prone areas.” (p. 2). Also: “Subsidies to some present occupants of flood-prone areas should be viewed as part of a program of land use adjustment, aimed at ultimate reduction in the exposure to flood hazard...” (p. 3)
3. “Achieving a sensible use of flood-prone land is equally as important as indemnification of loss. This requires far-sighted land use planning and control. Zoning of land against occupancy, or against certain kinds of uses is one mechanism for achieving this aim...But any federal subsidy which will accrue under the program is justifiable only as part of an interim solution to long-range readjustments in land use. Such assistance should not prejudice these needed long-range adjustments, or the program would be self-defeating.” (p. 6)

Statutory Language:

Section 2: “...a critical ingredient of such a program will be the encouragement of state and local government to adopt land use regulations to govern the development of land exposed to flood damage.” (p. 15)

## Appendix A.2: House Committee on Currency and Banking

[Parenthetical numbers reference pages in U.S. Congress, House of Representatives, Committee on Banking and Currency, *National Flood Insurance Act of 1967: Report of the Committee on Banking an Currency*. 90<sup>th</sup> Congress, 1<sup>st</sup> Session, Report No. 786. October 16, 1967.]

1. Encourage state/local governments to encourage land use planning to restrict development on land exposed to flood hazards:  
“A most important feature of the program that would be authorized under the bill would be to encourage state and local governments to adopt and enforce appropriate land use provisions to restrict the future development of land which is exposed to flood hazards.” (p. 2)
2. Encourage state/local governments to adopt various forms of land use planning and zoning:  
“High among the considerations of any insurance program, in the committee’s view, is an assessment of its effect upon the national effort to abate damages, and upon state and local governments” efforts to achieve good planning in the use of flood-prone lands.” (p. 10).
3. “Coordination of Flood Insurance With Land Management Programs in Flood-Prone Areas:”  
“...based upon studies and investigations, the Secretary will develop comprehensive criteria designed to encourage, where necessary, the adoption of permanent state or local measure which will lessen the exposure of land to flood losses, improve the long range land management, and use of flood-prone areas, and inhibit, the maximum extent feasible, unplanned and economically unjustifiable future development in such areas.” (p. 20).
4. Section 114 directs the Secretary of ... to consult with other federal agencies and interstate, state and local agencies with responsibility for flood control to assure maximum possible consistency between agencies and flood insurance program.
5. Subsections (a) and (b) of Section 302 authorize the Secretary to carry out studies and investigations “with regard to the adequacy of state and local measures in flood prone areas as to land management and use, flood control, flood zoning, and flood damage prevention.” (p. 42)

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6. Subsection (c) of Section 302 directs the Secretary on the basis of studies and investigations to “develop comprehensive criteria designed to encourage, where necessary, the adoption of permanent state or local measures which will lessen the exposure of property and facilities to flood losses, improve the long-range land management and use of flood prone areas, and inhibit to the maximum extent feasible, unplanned and economically unjustifiable future development in such areas.” (p. 42-43)

The general purpose of the NFIA relates is to control flood-prone area development.

7. The purpose of the flood insurance program in general is “a means of discouraging unwise occupancy of flood prone areas.” (p. 3)
8. “Land use planning for flood-prone areas, to keep development out of areas where risks are higher than probable gains, must be an adjunct to flood insurance.”
9. Section 112 provides that after June 30, 1970, no new flood insurance coverage to any area unless an appropriate public body has adopted permanent land use and control measures, with effective enforcement provisions, which the Secretary finds consistent with criteria for land use management as prescribed in Section 302 of the bill.
10. Section 113 of the NFIA prohibits, after June 30, 1970, new flood insurance or renewals for property in violation of state/local laws intended to discourage or otherwise restrict land development or occupancy in flood-prone areas.

## APPENDIX B COMMUNITY SURVEY INFORMATION

### **Appendix B.1: Community Selection**

#### Purpose

The survey addressed two closely related concerns in AIR's report on the NFIP's developmental and environmental impacts: (a) the extent to which the NFIP encourages or accelerates the development of floodplains; and (b) the environmental consequences of such development.

Program budget and time constraints precluded a comprehensive fifty-state strategy. It was practical, however, to survey states and communities deliberately identified on the basis of variables which provided important, missing, information essential for evaluating the NFIP's current developmental and environmental impact at the community level.

### **Appendix B.2: Statistical Methodology for Stratification and Sample Selection**

The survey design consists of is three stages, beginning with state selection, then community identification within selected states, and finally designation of respondent groups.

#### Stage 1: States Selection

States included in the survey were:

- regionally distributed among the northwest, southeast, southwest, Midwest, and mid-Atlantic areas;
- inclusive of coastal and riverine states;
- among the highest third of states in total population growth between 1990-2000; and
- among the highest third of states in total number of NFIP policy holders.

These criteria were selected because prior research suggests that they may be related, singly or in combination, to variability in the onset and magnitude of development and the environmental consequences of development in flood hazard areas. Regions differ, for example, in the extent to which their political cultures encourage aggressive local governmental planning for floodplain conservation. Also, significant regional differences exist in the rate of population growth and the increase of NFIP policyholders between 1990 and 2000 that may, in turn, imply important variability in regional economic, political or geographic contexts for floodplain management. All Midwestern states in this survey, for instance, are among the lowest third of all states in population growth during 1990–2000. The southeastern and northwestern states are in the upper third of national population growth during 1990–2000, and the mid-Atlantic

states generally rank in the middle-third among state growth rates during this period. Since research also suggests that coastal and riverine states may differ significantly in developmental effects on floodplains, the six-state survey includes two riverine states (Arizona and Illinois) and four coastal states (South Carolina, Texas, Florida, and North Carolina).

States ranked nationally among the upper third in population growth between 1990 and 2000 were selected (with the exception of Illinois) because the development of floodplains appears to be most intensive within these states and, consequently, the magnitude and character of such environmental transformation is most apparent. Illinois was added to ensure that at least one Midwestern state was included in the survey. All states are among the top third nationally in the total number of policyholders, ensuring that the surveyed areas contained large numbers of policyholders.

#### Stage 2: Community Selection

Three communities were selected for study within each state. Within each state, communities were ranked according to the total number of NFIP policies in community SFHAs, then rank-ordered by the percent of post-FIRM contracts. The three highest-scoring communities in each state were then designated for interviews.

#### Stage 3: Respondent Selection

The survey was conducted among individuals likely to have a significant influence on community floodplain development, or to be well informed about floodplain management in the studied communities. These individuals were identified as developers, mortgage lenders and development underwriters, real estate brokers, insurance agents, and floodplain administrators. The sampling frame was composed of various businesses in the research communities with the exception of the floodplain administrators, who were local government officials.

Budget constraints precluded a large, statistically valid random sample of the respondents, but interviews of a smaller number of randomly selected individuals in each group did yield valuable interpretations of factors affecting floodplain development in specific communities, that could not be obtained from policyholders themselves. Individuals chosen for these interviews were randomly selected from appropriate community, professional, and business association rosters.

#### Stage 4: Protocol Pretest and Administration

All survey instruments were designed, pre-tested, and administered by the Florida Survey Research Center, University of Florida, in collaboration with the study authors.

The field testing was conducted by a supervisor or an interviewer with several years of experience conducting surveys. The pretest was designed to test the following aspects of a survey instrument:

- spelling, grammar, branches (go-to questions);
- clarity of the introductory statement;
- question wording and flow from one question to another;
- interviewer’s ease in reading the questions
- respondent’s ability to understand and answer the questions;
- ease of transition from one survey section to another; and
- other problems or issues observed during the pretest.

A maximum of nine pretest interviews will be conducted of the following target groups:

1. mortgage lenders;
2. real estate brokers;
3. insurance agents;
4. developers; and
5. floodplain administrators.

An appropriate geographic location was selected that had not been subject to a recent flood or natural disaster such as a hurricane.

Responses:

	<u>Number</u>
Administrators:	17
Developers:	25
Insurers:	31
Lenders:	78
Realtors:	37
TOTAL :	188

## APPENDIX C THE NATIONAL HOMEOWNER SURVEY INFORMATION

Since the goal of the study is to draw inferences regarding attitudes, beliefs, and risk perceptions regarding floods and flood insurance where it is available, the sample frame is developed to generalize across NFIP communities rather than nationally including areas not within the NFIP. The sample frame therefore is limited to communities participating in the NFIP.

Because the study attempts for the first time to account accurately flood zone status, a critical piece of information in understanding risk perceptions, few data sources were available. The sample thus is drawn from two sources. The first is a database developed by the RAND Corporation as part of the Evaluation of the NFIP for a report on market penetration rates. This dataset provides crucial information on respondent flood zone, which provides an objective measure of risk that would not be available for non-policyholders through other means given the budget available. This dataset was merged with several variables including policyholder status. Because this dataset was developed to estimate market penetration rates, for most policyholder strata where there was a low market penetration rate, there were insufficient potential respondents for a survey. This Market Penetration dataset was used for all strata where a sufficient number of potential respondents were found to conduct a survey.

The Market Penetration database was developed in three stages. In the first stage, a stratified cluster sample of 100 communities was created from the approximately 19,200 NFIP communities.<sup>37</sup> Clustering was necessary so that there was a reasonably small number of communities for flood determination agents to visit drawn parcels and make flood zone determinations for the study, as discussed later.<sup>38</sup> From these 100 communities, a random sample of parcels was drawn in the second stage to form a database of 27,667 properties. These parcels were matched with tax identification number of FEMA's BureauNet database of policyholders. They also were assessed by a determination company for their flood zone and distance from any change in NFIP regulatory flood zone, as determined by the determination companies. From this set of properties, a stratified random sample of NFIP non-policyholders was drawn for interviews. More details about the development of this sample, can be found in Appendix B.

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<sup>37</sup> At the time of the initial development of the database, only 19,200 communities were in the NFIP. Although several hundred more communities have joined the NFIP at the time of writing, most of these are very small communities with few policyholders. About a third of NFIP communities have fewer than ten policyholders, and many of those have none, generally because residential development has not occurred in the SFHAs. The actual number of communities of real interest to this research is smaller than 19,200.

<sup>38</sup> The clustering contributes to what is called a "design effect," or a difference between the ability to draw inference with this design versus from a random sample drawn across all NFIP communities; although the large number of clusters (100) and stratification helps offset some of the design effect of the sampling approach relative to a random draw from all NFIP communities.

The characteristics of properties were selected for stratification based on the results of the literature review and focus groups that suggested the importance of policyholder status, location of the community on a coast versus inland, housing occupancy type, and flood zone as primary determinants of risk perceptions. To simplify the stratification, we restricted each characteristic to two strata. For policyholder status, the two strata are simply policyholders and non-policyholders. Similarly, for location of the community, the strata are a coastal community versus an inland community.<sup>39</sup>

For flood zones, the V zones, or wave velocity zones, were too small on their own to include as a separate stratum, and so they are combined with A zones as the zone that represents all residences within SFHAs.<sup>40</sup> To simplify the stratification into two strata, we aggregate B, C, X, or D zones since they all represent people outside of a SFHA, or, in the case of the very few D zones found, an unmapped region. For non-policyholders, where more addresses were in the sample frame, we were able to limit addresses selected to those within 1,000 feet of the change in flood zone in order to represent those most likely to share similar perceptions of risk to those within SFHAs.

For residential housing occupancy type, we focused on single family-types of structures versus condominium-type residences. This is intended to explore differences in perceptions between condominium and single family houses, since little is found about this issue in the literature and because market penetration rates for condominiums is expected to be lower than for other housing types. Occupancy type is a difficult characteristic for stratification since condominiums technically are a method of financing rather than a unique occupancy type. Condominium financing commonly is associated, however, with multi-unit structures lacking significant land, including apartment-style buildings. The common connotation of condominiums also is apartment-style buildings. We included in the category of condominiums cooperatives and multi-unit buildings with more than three units, and we excluded condominiums above the first floor through a survey question based on the assumption that owners of units on the second floor or higher are unlikely to see flooding as a direct threat. Single family-type structures included single family residences, townhouses or rowhouses, duplexes, and triplexes. Mobile home units and lots were excluded from the analysis. To the extent to which our groupings do not accurately represent residences with different characteristics relative to flood risks, any differences in perceptions and beliefs should be attenuated.

Because the stratification already was very complicated, the team did not further stratify by other characteristics including whether respondents resided at the location. Owners

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<sup>39</sup> Not all residences in coastal communities are immediately on the coast nor are all in V zones. Although there is some reason to believe that people who do not live directly the coast do foresee flooding differently than people in inland riverine communities, we do not have the data to test whether people who live directly on the coast or in V zones have different perceptions. Further, although the expectation is that there would be a difference, there are sufficiently few houses in V zones in general, and without flood insurance specifically, that this does not represent a big new potential market for flood insurance.

<sup>40</sup> The flood zones also do not distinguish among types of zones within a lettered zone (e.g., AO, AH, A1-A50, A99, etc.).

may not reside at the location either because they are absentee landlords, have other family members living there, or use it as a vacation home. The reason for choosing non-residential owners as a group not to stratify was based on the lack of reason from the literature to believe that the attitudes, beliefs, and perceptions of non-residential owners are expected to differ substantively from residential owners. The literature found reason to expect possible differences for all other characteristics on which the sample is stratified.

Because the Market Penetration dataset was developed for the purpose of assessing the market penetration of flood insurance, there were insufficient policyholders in most strata to reach targets. A sample of policyholders was drawn from this database for single-family residences in either A or V flood zones. For these other policyholder strata, we use the 100 communities selected into the first stage of the Market Penetration dataset and sample directly from the total population of policyholders available from FEMA's Bureau of Flood Insurance Database of flood insurance policyholders. FEMA's Bureau of Flood Insurance Database includes flood zone status as well, although if there was a conflict between the flood zone determination made for the Market Penetration dataset and the Bureau of Flood Insurance Database, we used that found in the Market Penetration dataset.<sup>41</sup>

The initial sample size was chosen to determine a level of difference between groups that suggest substantive differences in preferences or policy states. An initial sample size was chosen to detect differences of about 8 to 10 percent in proportions (conservatively assuming equal proportions) after accounting for the estimated design effect for cross-cutting strata such as all policyholders versus all non-policyholders. The initial sample size was chosen in order to try to get 1,600 responses.

Strata were created that represent the most important remaining questions to be answered by the study. The primary characteristics on which strata are formed are policyholder status, flood zone, and housing type. Each of these characteristics were treated so that only two strata would be created. Thus, there are policyholders and non-policyholders, people within SFHAs (A or V flood zones from the flood insurance rate maps) or outside of them (B, C, X, or D flood zones), and single family houses and similar detached or semi-detached structures or condominiums or other multi-family units with at least four units.<sup>42</sup> Additional stratification was made when possible within each of those eight strata based on whether the community was located on the coast or

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<sup>41</sup> One difficulty in assessing flood zone accurately is that FEMA has grandfathered the rates of some residences that obtain flood insurance when the flood maps indicate they are outside of the SFHA after a map revision indicates they are inside an SFHA. No records are kept when rates are grandfathered. Thus, some residences may have obtained insurance before they were actually mapped as being in a flood zone. When data from the flood determination company indicates a different flood zone from what FEMA records indicate, we rely on the flood determination company's assessment on the assumption that our interest testing the hypothesis that location relative to the flood zone rather than insurance rate price signals for determining beliefs and risk perceptions.

<sup>42</sup> In a few counties, the county did not include information in the occupancy type field. In these cases, we sampled from these counties based only on the other stratifying variables. The actual occupancy type is determined by the respondents' answers.

inland. Thus, there are 16 individual strata, although they generally are each sufficiently small that the expectation was that they would be aggregated with other strata across a characteristic, such as all policyholders versus all non-policyholders, to have sufficient power.

Because some of these strata are small nationally as well as in the actual population of the 100 NFIP communities in the sample, the survey over-samples those strata. The over-sampled strata include all strata with condominium-type structures as well as policyholders in single-family style housing outside of the SFHA and non-policyholders in single-family style housing inside the SFHA. Table 1 provides the planned size of all

APPENDIX D  
INTERVIEW PROTOCOLS

**Appendix D.1: Residential Mortgage Lenders**

“May I please speak with [name or job titles]?”

“Hello, my name is ... and I’m calling from the Florida Survey Research Center at the University of Florida. We are conducting an evaluation of the National Flood Insurance Program for the Federal Emergency Management Agency, the organization responsible for administering this program. We’re doing short interviews with lenders who finance development and housing, so that we can learn more about your concerns about flood risk. This is not a sales call and your answers will be confidential. You may stop the interview at any time. This will only take about 10 minutes to complete.

“First, we’d like to ask you some general questions about your perceptions of flooding in [community]:

- 
1. “Please consider the likelihood of some part of [community] flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will “not happen at all” and 5 is flooding will “definitely happen,” how would you characterize the likelihood of flooding in [community]?” [1-5, DR]
  2. “Using the same scale” [INTERVIEWER: repeat if needed], “please tell me how you think the residents of [community] would characterize the risk from significant flooding when considering buying or building on property in [community’s] flood plain.” [1-5, DR]
  3. “Now, please think about people considering whether to purchase property or build on property in [community’s] floodplain. What percentage of these individuals do you think are AWARE that the property they’re considering for purchase is located in a floodplain?” [%, DR]
  4. “How often does your company evaluate the likelihood of flooding for property that you consider financing BEFORE that purchase takes place? Would you say you (or your company) always, most of the time, sometimes, rarely, or never evaluate the likelihood of flooding for property before a purchase takes place?” [Always, Most of the time, Sometimes, Rarely, Never, DR]

Next, please consider the factors that might influence a person’s decision to purchase or build on property in the [community] flood plain.

5. “Could you please tell me what factors you think influence a person’s decision to purchase or build on property in the [community] flood plain?” [INTERVIEWER: First, mark all mentioned without prompting, then READ those NOT mentioned.] [CHECKBOX: mention
  - i. “Availability of Flood Insurance

- ii. "Characteristics of the property (size, aesthetics, resources, etc.)
- iii. "Financial considerations (price, loan provisions, down payment, etc.)
- iv. "Flood Risk
- v. "Proximity to shopping, schools, employment
- vi. "Proximity to friends / relatives
- vii. "The surrounding area (businesses, community reputation, etc.)
- viii. "Other
- ix. "Don't know
- x. "Refuse"]

For each response:

"Using a scale from 1 to 5, where 1 is "not important at all" and 5 is "very important," please tell me how important you think [factor] is in a person's decision to purchase or build on property in the [community] flood plain." [1-5, DR]

For each response, except "Availability of Flood Insurance":

"And, do you think [factor] is more important, equally important, or less important than the availability of flood insurance in a person's decision to purchase or build on property in the [community] flood plain?" [More, Equal, Less, DR]

"Now, we have some more specific questions about flood insurance."

6. "How familiar would you say you are with the National Flood Insurance Program administered by FEMA, the Federal Emergency Management Agency, using a scale from 1 to 5 where 1 is "not familiar at all" and 5 is "very familiar?"
7. "Suppose that federal flood insurance is NOT available for a property located in the flood plain that you or your company is considering for purchase or development. Would you still purchase or develop the property if federal flood insurance were not available? "[Y, N, DR]
  - If Yes:
    - a. "Why?" [Do NOT read list; Mark ALL mentioned] [checkbox]
  - If No:
    - b. "Why not?" [Do NOT read list; Mark ALL mentioned] [checkbox]
8. "Again, suppose that flood insurance was not available, but was still required for federally backed mortgages in [community], and property owners in [community] had to consider purchasing commercial insurance, not guaranteed by the federal government. What percentage of property owners in [community] do you think would be willing to:
  - a. "Pay up to 10 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  - b. "Pay up to 25 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]

- c. “Pay up to 35 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - d. “Pay up to 50 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
  - e. “Pay up to 100 percent more than their current premium for commercial insurance not guaranteed by the federal government” [%, DR]
9. “Would you please estimate what percentage of your clients who bought or built on property in the flood plain of [community] applied for documents to revise the mapping of the property to remove it from the flood plain?” [INTERVIEWER: Prompt if asked – “a Letter of Map Change” or a “Letter of Map Revision.”] [%, DR]

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“Now, I have a few questions about development in [community].”

10. “Using a scale from 1 to 5, where 1 is “very little” and 5 is “very much,” please estimate how much new development has occurred in the [community] flood plain in the past three years.” [1-5, DR]
11. “Do you think that growth in the number of seasonal residents, as opposed to year-round residents, moving into [community] is leading to increased development in the flood plains?” [Y,N,DR]  
 If Yes:  
 “Please estimate as best you can, what percentage of new construction on the flood plains of [community] in the last three years is the result of seasonal residents buying or building on property there.” [%, DR]
12. Do you think that growth in the number of year-round residents moving into [community] is leading to increased development in the flood plains? [Y, N, DR]  
 If Yes:  
 “Please estimate as best you can, what percentage of new construction on the flood plains of [community] in the last three years is the result of year-round residents buying or building on property there.” [%, DR]
- [CBRS communities only]
- “Part of your community is located in, or near, what is called the Coastal Barrier Resource System.
13. “Is new development occurring in the Coastal Barrier Resource System?” [Y, N, DR]  
 If Yes:  
 “Why do you think that new development is occurring in the Coastal Barrier Resource System, despite the absence of federal flood insurance coverage?” [Do NOT Read List, Mark all that apply.]

[Checkbox: Characteristics of the property (size, aesthetics, resources, etc.); Financial considerations (price, loan provisions, down payment, etc.); Proximity to shopping, schools, employment; Proximity to friends / relatives; The surrounding area (businesses, community reputation, etc.); Other (describe); Don't know; Refuse]

"Finally, I just have a few demographic questions for statistical purposes.

14. "How long have you held your present position? [# years]
15. "Do you live in [community]?" [Y, N, DR]  
If Yes:  
"How long have you lived in [community]?" [# years]
16. "Do you have any other comments about the National Flood Insurance Program or flooding in [community]?" [Y, N, DR]  
If Yes:  
[text from response]
17. "Do you have any questions regarding this study or your rights as a participant?" [Y, N, DR]  
If Yes:  
"For questions regarding this study, you may contact Dr. Mike Scicchitano at the Florida Survey Research Center toll free at 1-866-392-3475. For questions regarding your rights as a participant you may contact the University of Florida Institutional Review Board at 352-392-0433."

"That concludes our survey. Thank you very much for your time and participation. Have a nice evening (day)."

## Appendix D.2: Real Estate Brokers

“May I please speak with [name or job titles]?”

“Hello, my name is ... and I’m calling from the Florida Survey Research Center at the University of Florida. We are conducting an evaluation of the National Flood Insurance Program for the Federal Emergency Management Agency, the organization responsible for administering this program. We’re doing short interviews with real estate brokers, so that we can learn more about your concerns, and your clients’ concerns, about flood risk. This is not a sales call and your answers will be confidential. You may stop the interview at any time. This will only take about 10 minutes to complete.

“First, we’d like to ask you some general questions about your perceptions of the risks from flooding in [community].

1. “Please consider the likelihood of some part of [community] flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will “not happen at all” and 5 is flooding will “definitely happen,” how would you characterize the likelihood of flooding in [community]?” [1-5, DR]
2. “Using the same scale [INTERVIEWER: repeat if needed], please tell me how you think the residents of [community] would characterize the risk from significant flooding when considering buying or building on property in [community’s] flood plain.” [1-5, DR]
3. “How often do you discuss the likelihood of flooding for a property with clients BEFORE a purchase takes place? Would you say you (or your company) always, most of the time, sometimes, rarely, or never discuss the likelihood of flooding for property with clients before a purchase takes place?” [Always, Most of the time, Sometimes, Rarely, Never, DR]

“Next, please consider the factors that might influence a person’s decision to purchase or build on property in the [community] flood plain.

4. “Could you please tell me what factors you think influence a person’s decision to purchase or build on property in the [community] flood plain?” [INTERVIEWER: First, mark all mentioned without prompting, then READ those NOT mentioned.] [Checkbox: mention
  - i. “Availability of Flood Insurance
  - ii. “Characteristics of the property (size, aesthetics, resources, etc.)
  - iii. “Financial considerations (price, loan provisions, down payment, etc.)
  - iv. “Flood Risk
  - v. “Proximity to shopping, schools, employment
  - vi. “Proximity to friends / relatives
  - vii. “The surrounding area (businesses, community reputation, etc.)
  - viii. “Other (text)
  - ix. “Don’t know

x. "Refuse"]

For each mentioned:

- a. "Using a scale from 1 to 5, where 1 is "not important at all" and 5 is "very important," please tell me how important you think [factor] is in a person's decision to purchase or build on property in the [community] flood plain." [1-5, DR]  
[All responses except "Availability of Flood Insurance:"]
- b. "And, do you think [factor] is more important, equally important, or less important than the availability of flood insurance in a person's decision to purchase or build on property in the [community] flood plain?" [More, Equal, Less, DR]

"Now, we have some more specific questions about flood insurance.

5. "How familiar would you say you are with the National Flood Insurance Program administered by FEMA, the Federal Emergency Management Agency, using a scale from 1 to 5 where 1 is "not familiar at all" and 5 is "very familiar?"
6. "Suppose that federal flood insurance is NOT available for a property located in the flood plain that a client is considering for purchase through you or your agency. Would you still recommend that a client purchase the property if federal flood insurance were not available?" [Y, N, DR]  
If Yes:
  - a. "Why?" [Do NOT read list; Mark ALL mentioned] [checkbox]If No:
  - b. "Why not?" [Do NOT read list; Mark ALL mentioned] [checkbox]
7. "Again, suppose that federal flood insurance was not available, mortgage companies still required flood insurance for loans and property owners had to consider purchasing commercial insurance. What percentage of property owners in [community] do you think would be willing to:
  - a. "Pay up to 10 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  - b. "Pay up to 25 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  - c. "Pay up to 35 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  - d. "Pay up to 50 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  - e. "Pay up to 100 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
8. "Would you please estimate what percentage of your clients who bought or built on property in the flood plain of [community] applied for documents to revise the mapping of the property to remove it from the flood plain?" [INTERVIEWER: Prompt if asked – "a Letter of Map Change" or a "Letter of Map Revision."] [%, DR]

"Now, we have a few basic questions about development in [community].

9. "Using a scale from 1 to 5, where 1 is "very little" and 5 is "very much," please estimate how much new development has occurred in the [community] flood plain in the past three years." [1-5, DR]
10. "Do you think that growth in the number of seasonal residents moving into [community] is leading to increased development in the flood plains?" [Y, N, DR]  
If Yes:  
"Please estimate as best you can, what percentage of new construction on the flood plains of [community] in the last three years is the result of seasonal residents buying or building on property there." [%, DR]
11. "Do you think that growth in the number of year-round residents moving into [community] is leading to increased development in the flood plains?" [Y, N, DR]  
If Yes:  
"Please estimate as best you can, what percentage of new construction on the flood plains of [community] in the last three years is the result of year-round residents buying or building on property there." [%, DR]

[CBRS communities only]

"Part of your community is located in, or near, what is called the Coastal Barrier Resource System

12. "Is new development occurring in the Coastal Barrier Resource System?" [Y, N, DR]  
If Yes:
  - a. "Why do you think that new development is occurring in the Coastal Barrier Resource System, despite the absence of federal flood insurance coverage?" [Do NOT Read List, Mark all that apply.]  
[Checkbox: Characteristics of the property (size, aesthetics, resources, etc.);  
Financial considerations (price, loan provisions, down payment, etc.);  
Proximity to shopping, schools, employment; Proximity to friends / relatives;  
The surrounding area (businesses, community reputation, etc.); Other (describe); Don't know; Refuse]

"Finally, I just have a few demographic questions for statistical purposes.

13. "How long have you held your position?" [# years]
14. "Do you live in [community]?" [Y, N, DR]
  - a. If Yes:
  - b. "How long have you lived in [community]?" [# years]

15. "Do you have any other comments about the National Flood Insurance Program or flooding in [community]?" [Y, N, DR]  
If Yes: [text from response]
16. "Do you have any questions regarding this study or your rights as a participant?" [Y, N, DR]
  - a. If Yes: "For questions regarding this study, you may contact Dr. Mike Scicchitano at the Florida Survey Research Center toll free at 1-866-392-3475. For questions regarding your rights as a participant you may contact the University of Florida Institutional Review Board at 352-392-0433.

"That concludes our survey. Thank you very much for your time and participation. Have a nice evening (day)."

### Appendix D.3: Insurance Agents or Brokers

“May I please speak with [name or job titles]?”

“Hello, my name is ... and I’m calling from the Florida Survey Research Center at the University of Florida. We are conducting an evaluation of the National Flood Insurance Program for the Federal Emergency Management Agency, the organization responsible for administering this program. We’re doing short interviews with insurers, so that we can learn more about your concerns, and your clients’ concerns, about flood risk. This is not a sales call and your answers will be confidential. You may stop the interview at any time. This will only take about 10 minutes to complete.

“First, we’d like to ask you some general questions about your perceptions of the risks from flooding in [community].

1. “Please consider the likelihood of some part of [community] flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will “not happen at all” and 5 is flooding will “definitely happen,” how would you characterize the likelihood of flooding in [community]?” [1-5, DR]
2. “Using the same scale [INTERVIEWER: repeat if needed], please tell me how you think the residents of [community] would characterize the risk from significant flooding when considering buying or building on property in [community’s] flood plain.” [1-5, DR]
3. “How often do you discuss the likelihood of significant flooding for a property with clients BEFORE a policy is issued? Would you say you (or your company) always, most of the time, sometimes, rarely, or never discuss the likelihood of flooding for property with clients before a policy is issued?” [Always, Most of the time, Sometimes, Rarely, Never, DR]

“Next, please consider the factors that might influence a person’s decision to purchase or build on property in the [community] flood plain.

4. “Could you please tell me what factors you think influence a person’s decision to purchase or build on property in the [community] flood plain? [INTERVIEWER: First, mark all mentioned without prompting, then READ those NOT mentioned.] [Checkbox: mention
  - i. “Availability of Flood Insurance
  - ii. “Characteristics of the property (size, aesthetics, resources, etc.)
  - iii. “Financial considerations (price, loan provisions, down payment, etc.)
  - iv. “Flood Risk
  - v. “Proximity to shopping, schools, employment
  - vi. “Proximity to friends / relatives
  - vii. “The surrounding area (businesses, community reputation, etc.)
  - viii. “Other (text)

- ix. "Don't know
- x. "Refuse"]

For each mentioned:

- a. "Using a scale from 1 to 5, where 1 is "not important at all" and 5 is "very important," please tell me how important you think [factor] is in a person's decision to purchase or build on property in the [community] flood plain. [1-5, DR]

[All responses except "Availability of Flood Insurance"]

- b. "And, do you think [factor] is more important, equally important, or less important than the availability of flood insurance in a person's decision to purchase or build on property in the [community] flood plain? [More, Equal, Less, DR]

"Now, we have some more specific questions about flood insurance.

- 11. "How familiar would you say you are with the National Flood Insurance Program administered by FEMA, the Federal Emergency Management Agency, using a scale from 1 to 5 where 1 is "not familiar at all" and 5 is "very familiar?"
- 12. "If the federal government discontinues government backed flood insurance but still requires flood insurance for federally backed loans on floodplain property, do you think private insurance companies will assume all policies currently in place?" [Y, N, DR]
- 13. "Are you an independent insurance agent or do you work for a company?" [independent, company, other, DR]

"Now, suppose that federal flood insurance were NOT available for property located in the floodplain of [community]."

If the response to question #13 is INDEPENDENT:

- 14. "Do you presently have a policy or policies available that you could offer as a substitute for federal flood insurance?" [Y, N, DR]

If No:

"Would you develop a policy to substitute for federal flood insurance if it were necessary?" [Y, N, DR]

If the response to question #13 is COMPANY:

- 15. "Does your company presently have a policy or policies available that you could offer as a substitute for federal flood insurance?" [Y, N, DR]

If No:

"Would your company develop a policy to substitute for federal flood insurance if it were necessary?" [Y, N, DR]

- 16. "Suppose that federal flood insurance was not available, mortgage companies still required flood insurance for loan and property owners had to consider

purchasing commercial insurance. What percentage of property owners in [community] do you think would be willing to:

- a. "Pay up to 10 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
- b. "Pay up to 25 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
- c. "Pay up to 35 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
- d. "Pay up to 50 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
- e. "Pay up to 100 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]

17. "Would you please estimate what percentage of your clients who bought or built on property in the flood plain of [community] applied for documents to revise the mapping of the property to remove it from the flood plain?" [INTERVIEWER: Prompt if asked – "a Letter of Map Change" or a "Letter of Map Revision." ] [%, DR]

"Now, I have a few questions about development in [community]."

18. "Using a scale from 1 to 5, where 1 is "very little" and 5 is "very much," please estimate how much new development has occurred in the [community] flood plain in the past three years." [1-5, DR]

19. "Do you think that growth in the number of seasonal residents, as opposed to year-round residents, moving into [community] is leading to increased development in the flood plains?" [Y, N, DR]

If Yes:

"Please estimate as best you can, what percentage of new construction on the flood plains of [community] in the last three years is the result of seasonal residents buying or building on property there." [%, DR]

20. "Do you think that growth in the number of year-round residents moving into [community] is leading to increased development in the flood plains?" [Y, N, DR]

If Yes:

"Please estimate as best you can, what percentage of new construction on the flood plains of [community] in the last three years is the result of year-round residents buying or building on property there." [%, DR]

[CBRS communities only]

"Part of your community is located in, or near, what is called the Coastal Barrier Resource System."

21. "Is new development occurring in the Coastal Barrier Resource System?" [Y, N, DR]

If Yes:

“Why do you think that new development is occurring in the Coastal Barrier Resource System, despite the absence of federal flood insurance coverage?”

[Do NOT read list; mark all that apply.]

[Checkbox: Characteristics of the property (size, aesthetics, resources, etc.); Financial considerations (price, loan provisions, down payment, etc.); Proximity to shopping, schools, employment; Proximity to friends / relatives; The surrounding area (businesses, community reputation, etc.); Other (describe); Don't know; Refuse]

“Finally, I just have a few demographic questions for statistical purposes.

22. “How long have you sold flood insurance in [community]?” [# years]

23. “Do you live in [community]?” [Y, N, DR]

If Yes:

“How long have you lived in [community]? [# years]

24. “Do you have any other comments about the National Flood Insurance Program or flooding in [community]?” [Y, N, DR]

If Yes:

[text from response]

25. “Do you have any questions regarding this study or your rights as a participant?” [Y, N, DR]

If Yes:

“For questions regarding this study you may contact Dr. Mike Scicchitano at the Florida Survey Research Center toll free at 866-392-3475. For questions regarding your rights as a participant you may contact the University of Florida Internal Review Board at 352-392-0433.

“That concludes our survey. Thank you very much for your time and participation. Have a nice evening (day).”

## Appendix D.4: Residential Developers

“May I please speak with [name or job titles]?”

“Hello, my name is ... and I’m calling from the Florida Survey Research Center at the University of Florida. We are conducting an evaluation of the National Flood Insurance Program for the Federal Emergency Management Agency, the organization responsible for administering this program. We’re doing short interviews with developers and builders, so that we can learn more about your concerns about flood risk. This is not a sales call and your answers will be confidential. You may stop the interview at any time. This will only take about 10 minutes to complete.

“First, we’d like to ask you some general questions about your perceptions of the risks from flooding in [community].

1. “Please consider the likelihood of some part of [community] flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will “not happen at all” and 5 is flooding will “definitely happen,” how would you characterize the likelihood of flooding in [community]?” [1-5, DR]
  2. “Using the same scale [INTERVIEWER: repeat if needed], please tell me how you think the residents of [community] would characterize the risk from significant flooding when considering buying or building on property in [community’s] flood plain.” [1-5, DR]
- 
3. “How often do you, or does your company, evaluate the likelihood of flooding for property that you consider purchasing or developing BEFORE that purchase or development takes place? Would you say you (or your company) always, most of the time, sometimes, rarely, or never evaluate the likelihood of flooding for property before a purchase or development takes place?” [Always, Most of the time, Sometimes, Rarely, Never, DR]

“Next, please consider the factors that might influence a decision to purchase or build on property in the [community] flood plain.

4. “Could you please tell me what factors influence your company’s decision to purchase or develop property in the [community] flood plain?” [INTERVIEWER: First, mark all mentioned without prompting, then READ those NOT mentioned.]  
[Checkbox: mention
  - i. “Availability of Flood Insurance
  - ii. “Characteristics of the property (size, aesthetics, resources, etc.)
  - iii. “Financial considerations (price, loan provisions, down payment, etc.)
  - iv. “Flood Risk
  - v. “Proximity to shopping, schools, employment
  - vi. “The surrounding area (businesses, community reputation, etc.)
  - vii. “Other
  - viii. “Don’t know

ix. "Refuse"]

For each response:

- a. "Using a scale from 1 to 5, where 1 is "not important at all" and 5 is "very important," please tell me how important you think [factor] is in your decision to purchase or develop property in the [community] flood plain." [1-5, DR]  
[All responses except "Availability of Flood Insurance"]
- b. "And, do you think [factor] is more important, equally important, or less important than the availability of flood insurance in your decision to purchase or develop property in the [community] flood plain?" [More, Equal, Less, DR]

5. "Could you please tell me what factors you think might influence a person's decision to purchase or build on property in the [community] flood plain?"  
[INTERVIEWER: First, mark all mentioned without prompting, then READ those NOT mentioned.]

[Checkbox: mention

- i. "Availability of Flood Insurance
- ii. "Characteristics of the property (size, aesthetics, resources, etc.)
- iii. "Financial considerations (price, loan provisions, down payment, etc.)
- iv. "Flood Risk
- v. "Proximity to shopping, schools, employment
- vi. "Proximity to friends / relatives
- vii. "The surrounding area (businesses, community reputation, etc.
- viii. "Other
- ix. "Don't know
- x. "Refuse"]

For each response:

- a. "Using a scale from 1 to 5, where 1 is "not important at all" and 5 is "very important," please tell me how important you think [factor] is in a person's decision to purchase or build on property in the [community] flood plain." [1-5, DR]

[All responses except "Availability of Flood Insurance"]

- b. "And, do you think [factor] is more important, equally important, or less important than the availability of flood insurance in a person's decision to purchase or build on property in the [community] flood plain?" [More, Equal, Less, DR]

Next, we have some more specific questions about flood insurance.

5. "How familiar would you say you are with the National Flood Insurance Program administered by FEMA, the Federal Emergency Management Agency? Would you say that you're very familiar, somewhat familiar, or not at all familiar with the National Flood Insurance Program?" [VF, SF, NF, DK, R]
6. "Suppose that federal flood insurance is NOT available for a property located in the flood plain that you or your company is considering for purchase or

development. Would you still purchase or develop the property if federal flood insurance were not available?" [Y, N, DR]

If Yes:

a. "Why?" [Do NOT read list; Mark ALL mentioned] [checkbox]

If No:

b. "Why not?" [Do NOT read list; Mark ALL mentioned] [checkbox]

"Now, consider residents of [community].

7. "Again, suppose that federal flood insurance was not available, mortgage companies still required flood insurance for loans and property owners had to consider purchasing commercial insurance. What percentage of property owners in [community] do you think would be willing to:
  - a. "Pay up to 10 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  - b. "Pay up to 25 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  - c. "Pay up to 35 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  - d. "Pay up to 50 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  - e. "Pay up to 100 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  
8. "Would you please estimate what percentage of your clients who bought or built on property in the flood plain of [community] applied for documents to revise the mapping of the property to remove it from the flood plain?" [INTERVIEWER: Prompt if asked – "a Letter of Map Change" or a "Letter of Map Revision."] [%, DR]

"Now, we have a few basic questions about development in [community].

9. "Do you think that there are particular advantages to developing property **inside** a floodplain where flood insurance is required?" [Y, N, DR]  
If Yes:  
"What are those advantages?" [text from response]
  
10. "Do you think that there are particular **disadvantages** to developing property **inside** a flood plain where flood insurance is required? [Y, N, DR]  
If Yes:  
"What are those disadvantages?" [text from response]
  
11. "Do you think that there are particular advantages to developing property **outside** of a flood plain where federal flood insurance is not required?" [Y, N, DR]  
If Yes:  
"What are those advantages?" [text from response]

12. "Do you think that there are particular **disadvantages** to developing property **outside** of a flood plain where federal flood insurance is not required? [Y, N, DR]  
If Yes:  
"What are those disadvantages?" [text from response]
  
13. "Using a scale from 1 to 5, where 1 is "very little" and 5 is "very much," please estimate how much new development has occurred in the [community] flood plain in the past three years. " [1-5, DR]
  
14. "Do you think that growth in the number of seasonal residents, as compared to year-round residents, moving into [community] is leading to increased development in the flood plains?" [Y, N, DR]  
If Yes:  
"Please estimate as best you can, what percentage of new construction on the flood plains of [community] in the last three years is the result of seasonal residents buying or building on property there." [%, DR]
  
15. "Do you think that growth in the number of year-round residents moving into [community] is leading to increased development in the flood plains?" [Y, N, DR]  
If Yes:  
"Please estimate as best you can, what percentage of new construction on the flood plains of [community] in the last three years is the result of year-round residents buying or building on property there." [%, DR]
  
16. "Using a scale from 1 to 5, where 1 is "very unsuccessful" and 5 is "very successful," please tell me how successful you think the National Flood Insurance Program has been in accomplishing the following:
  - a. "Preserving open spaces in [community]?" [1-5, DR]
  - b. "Protecting water quality in [community]?" [1-5, DR]
  - b. "Controlling soil erosion and sedimentation in [community]?" [1-5, DR]
  - c. "Guiding residential development away from locations that are threatened by flood hazards?" [1-5, DR]
  - d. "Guiding business development away from locations that are threatened by flood hazards?" [1-5, DR]

[CBRS communities only]

"Part of your community is located in, or near, what is called the Coastal Barrier Resource System.

6. "Is new development occurring in the Coastal Barrier Resource System?" [Y, N, DR]  
If Yes:  
"Why do you think that new development is occurring in the Coastal Barrier Resource System, despite the absence of federal flood insurance coverage?" [Do NOT Read List, Mark all that apply.]

[Checkbox: Characteristics of the property (size, aesthetics, resources, etc.); Financial considerations (price, loan provisions, down payment, etc.); Proximity to shopping, schools, employment; Proximity to friends / relatives; The surrounding area (businesses, community reputation, etc.); Other (describe); Don't know; Refuse]

Finally, I just have a few demographic questions for statistical purposes.

7. "How long have you held your present position with your company?" [# years]
8. "How many residential units has your company built in the past 12 months?" [#]
9. "Does your company engage in only building, only land development, or a combination of both?" [Building, Land Development, Both, DK, R]
10. "Do you live in [community]?" [Y, N, DR]  
If Yes:  
"How long have you lived in [community]?" [# years]
11. Do you have any other comments about the National Flood Insurance Program or flooding in [community]?" [Y, N, DR]  
If Yes:  
[text from response]
12. "Do you have any questions regarding this study or your rights as a participant?" [Y, N, DR]  
If Yes:  
"For questions regarding this study, you may contact Dr. Mike Scicchitano at the Florida Survey Research Center toll free at 1-866-392-3475. For questions regarding your rights as a participant you may contact the University of Florida Institutional Review Board at 352-392-0433.

"That concludes our survey. Thank you very much for your time and participation. Have a nice evening (day)."

## Appendix D.5: Flood Plain Administrators

“May I please speak with [name] (or the Flood Plain Administrator)?

“Hello, my name is ... and I’m calling from the Florida Survey Research Center at the University of Florida. We are conducting an evaluation of the National Flood Insurance Program for the Federal Emergency Management Agency, the organization responsible for administering this program. We’re conducting short interviews with administrators associated with the NFIP, so that we can learn more about participation in the program and how the program might be improved. This is not a sales call and your answers will be confidential. You may stop the interview at any time. This will only take about 15 minutes to complete.

“First, we’d like to ask you some general questions about your perceptions of flooding in [community].

1. “Please consider the likelihood of some part of [community] flooding within the next 10 years. Using a scale from 1 to 5, where 1 is flooding will “not happen at all” and 5 is flooding will “definitely happen,” how would you characterize the likelihood of significant flooding in [community]?” [1-5, DR]
2. “Using the same scale [INTERVIEWER: repeat if needed], please tell me how you think the residents of [community] would characterize the risk from significant flooding when considering buying or building on property in [community’s] flood plain.” [1-5, DR]
3. “Now, please think about people considering whether to purchase property or build on property in [community’s] floodplain. What percentage of these individuals do you think are AWARE that the property they’re considering for purchase is located in a floodplain?” [%, DR]

If the response to question #3 is not “100 percent”:

4. “Consider those prospective buyers in [community] who do NOT know that the property they are considering for purchase is in a floodplain. Using a scale from 1 to 5, where 1 is flooding will “not happen at all” and 5 is flooding will “definitely happen,” how do you think these prospective buyers would characterize the likelihood of significant flooding on the property?” [1-5, DR]

If the response to question #3 is not “100 percent”:

5. “Again, consider those prospective buyers in [community] who do NOT know that the property they are considering for purchase is in a floodplain. Using a scale from 1 to 5, where 1 is “not important at all” and 5 is “very important,” please tell me how important you think the availability of flood insurance is to prospective buyers who are NOT aware the property is in a floodplain?” [1-5, DR]

If the response to question #3 is between 1-percent and 100 percent:

6. "Now consider those prospective buyers in [community] who ARE aware that the property they are considering for purchase is in a floodplain. Using a scale from 1 to 5, where 1 is flooding will "not happen at all" and 5 is flooding will "definitely happen," how do you think these prospective buyers would characterize the likelihood of significant flooding on the property?" [1-5, DR]

If the response to question #3 is between 1-percent and 100 percent:

7. "Again, consider those prospective buyers in [community] who ARE aware that the property they are considering for purchase is in a floodplain. Using a scale from 1 to 5, where 1 is "not important at all" and 5 is "very important," please tell me how important you think the availability of flood insurance is to prospective buyers who ARE aware the property is in a floodplain?" [1-5, DR]

"Now, I'd like to ask you some more specific questions about flood insurance.

8. "How familiar would you say you are with the National Flood Insurance Program administered by FEMA, the Federal Emergency Management Agency, using a scale from 1 to 5 where 1 is "not familiar at all" and 5 is "very familiar?"
9. "Suppose that federal flood insurance was not available, mortgage companies still required flood insurance for loan and property owners had to consider purchasing commercial insurance. What percentage of property owners in [community] do you think would be willing to
  - a. "Pay up to 10 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  - b. "Pay up to 25 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  - c. "Pay up to 35 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  - d. "Pay up to 50 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]
  - e. "Pay up to 100 percent more than their current premium for commercial insurance not guaranteed by the federal government" [%, DR]

10. "Would you please estimate what percentage of residents who bought or built on property in the flood plain of [community] applied for documents to revise the mapping of the property to remove it from the flood plain?" [INTERVIEWER: Prompt if asked – "a Letter of Map Change" or a "Letter of Map Revision."] [%, DR]

"Next, I have some general questions about property purchases in [community].

11. "Is there a legal requirement in [community] that a buyer must be informed if property is located in a floodplain before he/she purchases the property?" [Y, N, DR]

If Yes:

"Is that legal requirement:

- a. "at the state level?" [Y, N, DR]
- b. "at the county level?" [Y, N, DR]
- c. "at the city level?" [Y, N, DR]

12. "Can you please estimate what percentage of developers evaluates the likelihood of flooding for property they consider purchasing for development BEFORE that purchase takes place?" [%, DR]

"Next, please consider the factors that might influence a person's decision to purchase or build on property in the [community] flood plain.

13. "Could you please tell me what factors you think influence a person's decision to purchase or build on property in the [community] flood plain?" [INTERVIEWER: First, mark all mentioned without prompting, then READ those NOT mentioned.] [Checkbox: mention

- i. "Availability of Flood Insurance
- ii. "Characteristics of the property (size, aesthetics, resources, etc.)
- iii. "Financial considerations (price, loan provisions, down payment, etc.)
- iv. "Flood Risk
- v. "Proximity to shopping, schools, employment
- vi. "Proximity to friends / relatives
- vii. "The surrounding area (businesses, community reputation, etc
- viii. "Other"
- ix. "Don't know"
- x. "Refuse"]

For each mentioned:

- a. "Using a scale from 1 to 5, where 1 is "not important at all" and 5 is "very important," please tell me how important you think [factor] is in a person's decision to purchase or build on property in the [community] flood plain." [1-5, DR]

[All responses except "Availability of Flood Insurance"]

- b. "And, do you think [factor] is more important, equally important, or less important than the availability of flood insurance in a person's decision to purchase or build on property in the [community] flood plain?" [More, Equal, Less, DR]

"Now, I have a few questions about development in [community].

14. "Using a scale from 1 to 5, where 1 is "very unsuccessful" and 5 is "very successful," please tell me how successful you think your community flood plain management program has been in accomplishing the following:
- a. "Preserving open spaces in [community]?" [1-5, DR]
  - b. "Protecting water quality in [community]?" [1-5, DR]
  - c. "Controlling soil erosion and sedimentation in [community]?" [1-5, DR]

- d. "Guiding residential development away from locations that are threatened by flood hazards?" [1-5, DR]
  - e. "Guiding business development away from locations that are threatened by flood hazards?" [1-5, DR]
15. "Using a scale from 1 to 5, where 1 is "very little" and 5 is "very much," please estimate how much new development has occurred in the [community] flood plain in the past three years. " [1-5, DR]
16. "Do you think that growth in the number of seasonal residents, as opposed to year-round residents, moving into [community] is leading to increased development in the flood plains?" [Y, N, DR]  
 If Yes:  
 "Please estimate as best you can, what percentage of new construction on the flood plains of [community] in the last three years is the result of seasonal residents buying or building on property there." [%, DR]
17. "Do you think that growth in the number of year-round residents moving into [community] is leading to increased development in the flood plains?" [Y, N, DR]  
 If Yes:  
 "Please estimate as best you can, what percentage of new construction on the flood plains of [community] in the last three years is the result of year-round residents buying or building on property there." [%, DR]

[CBRS communities only]

"Part of your community is located in, or near, what is called the Coastal Barrier Resource System.

18. "Is new development occurring in the Coastal Barrier Resource System?" [Y, N, DR]  
 If Yes:  
 "Why do you think that new development is occurring in the Coastal Barrier Resource System, despite the absence of federal flood insurance coverage?"  
 [Do NOT Read List, Mark all that apply.]  
 [Checkbox: Characteristics of the property (size, aesthetics, resources, etc.); Financial considerations (price, loan provisions, down payment, etc.); Proximity to shopping, schools, employment; Proximity to friends / relatives; The surrounding area (businesses, community reputation, etc.); Other (describe); Don't know; Refuse]

"Finally, I just have a few demographic questions for statistical purposes.

14. "How long have you been professionally involved in floodplain management?" [# years]

15. "How long have you held your present position in [community]?" [# years]
16. "Is there floodplain manager on the staff that administers your program who is certified by a national or state organization?" [Alternatives?]
17. "Do you live in [community]?" [Y, N, DR]  
If Yes:  
How long have you lived in [community]?" [# years]
18. "Do you have any other comments about the National Flood Insurance Program or flooding in [community]?" [Y, N, DR]  
If Yes:  
[text from response]
19. "Do you have any questions regarding this study or your rights as a participant?" [Y, N, DR]  
If Yes:  
"For questions regarding this study, you may contact Dr. Mike Scicchitano at the Florida Survey Research Center toll free at 1-866-392-3475. For questions regarding your rights as a participant you may contact the University of Florida Institutional Review Board at 352-392-0433."

"That concludes our survey. Thank you very much for your time and participation.

Have a nice evening (day)."

## Appendix D.6: Flood Plain Administrators

### NFIP Evaluation Residential Survey

*May I please speak to [sample name]?*

*Hello, my name is [name] and I'm calling from the Florida Survey Research Center at the University of Florida. We are conducting an evaluation of the National Flood Insurance Program for the Federal Emergency Management Agency, the organization responsible for administering this program. We're doing short interviews to learn more about participation in the program and how to improve this program for American homeowners.*

*Your answers will be completely confidential and you will not be asked to purchase anything. You may stop the interview at any time.*

*For most people, this survey takes less than 15 minutes to complete.*

---

*First, we'd like to ask you some questions about the residence at <address field>.*

1. *Do you own this residence? [Prompt if needed: "...or a member of your household."] [YNDR]*

***IF "No": Terminate, Do not save – "Thank you for your time. Have a nice evening (day)."***

***IF "Yes": Continue***

2. *Do you live at this residence? [YNDR]*

***IF "No": Go To Q33 -- "Owner – Not Resident"***

***IF "Yes": Continue***

3. *How many years have you lived at this residence? [INT: If less than 1 year, code as 0] [#, DR]*
4. *What type of housing is this? Is it a [Condominium or Cooperative, House, Mobile Home/Manufactured Housing, Townhouse, Other, DR]*

***IF "Mobile Home/Manufactured Housing": Terminate, Do Not Save - "Thank you for your time. Have a nice evening (day)."***

***IF "Condominium or Cooperative":***

- 4A. *Is your unit located on the ground floor or first floor? [INT: If more than one floor, ask for the lowest floor of their individual unit.][YNDR]*

**IF “No”: Terminate – “Thank you for your time. Have a nice evening (day).”**

5. *Do you currently have a mortgage on your home? [YNDR]*

**IF YES:**

5A. *Did you obtain the original mortgage on this home before 1995? [YNDR]*

**IF YES:**

5B. *Have you ever refinanced your mortgage or taken out a home equity line of credit? [YNDR]*

6. *When you acquired your house, was it a new house or an existing structure? [New house, Existing structure, Don’t know, Refused]*

*Next, we’d like to ask you some questions about flooding in your community.*

7. *Is your home in a neighborhood where a flood could happen? [INT: If asked, exclude water heaters and internal sources of flooding.] [YNDR]*

**IF NO: Go To Q11**

**IF YES:**

7A. *Please estimate how close the nearest body of water that could flood is to your home.*

*Would you say the nearest body of water that could flood is: [Within 300 feet of your home (about the length of a football field); From 300 to 1,000 feet from your home; More than 1,000 feet – up to 1 mile from your home; or More than 1 mile from your home; DK; R]*

7B. *When did you first learn of the potential for floods near your home? Did you learn about this: [Prior to the offer to buy; Prior to closing on the home; During closing on the home; After moving into the home; Only after being flooded; Other (describe); DK, R]*

**IF NOT “Only After Being Flooded”:**

7C. *And, how did you learn that this property was located in a neighborhood that could flood? [INT: Do NOT Read; Mark ALL that apply.] [If “Internet” – ask what type of website: government, media, or other?]*

*[checkbox:*

*Attorney*

*Figured it out on own*

*Friend / family member / acquaintance*

*Insurance agent / insurance company*

*Internet / Website (non-government, non-media)*

*Lender / bank / mortgage company*

*Media (TV, Newspaper, Magazine, Media website)*

*Neighbor*

*Previous Owner*  
*Public official / Government / Government website*  
*Real estate agent / broker*  
*Other (describe)*  
*DK*  
*R]*

8. *Imagine an area extending one mile out in all directions from your home. Using a percentage, please estimate, as best you can, the probability that some part of that area will flood within the next 10 years. [INT: Prompt if needed: For example, if you believe that there's no chance that this area will flood in the next 10 years, you should say 0% probability; or if you think a flood definitely would happen in this area, you'd say a 100% probability...]* [#, DR]

**IF Q8 = 0%: GO TO Q11**

9. *Again, using a percentage, please estimate the probability that water from a flood would come up at least to the foundation or higher on your home, or the building you live in, within the next 10 years.* [#, DR]
10. *Next, consider the probability that a flood will cause **damage** to your home. Using a percentage, please estimate the probability that your home, or the building you live in, will suffer at least moderate damage from a flood within the next 10 years.* [#, DR]
11. Without having to be an expert, we'd like your view of evaluating flood risks. Which do **you** think has a higher risk of flooding – a home in an area subject to a “100 year flood” or a home in an area subject to a “1 percent annual chance flood”? [INT: Prompt if needed – A “100 year flood” measures how many floods, on average, are expected to occur in a specific span of time. The percent annual chance of flood measures the likelihood that a flood will occur in any given year.] [“100 year flood”; “1 percent annual chance flood”; Equal chance; DK; R]

Next, we have a few questions about any insurance policies you may have for your home.

12. Using a scale from 1 to 5, where 1 is not important and 5 is very important; please tell me how important you think it is for you to have insurance that covers your home in the event of a flood. [1-5, DR]
13. Do you have insurance that would cover losses to your home in the event of a flood? [YNDR]

**IF NO: GO TO Q24**  
**IF YES:**

13A. Which of the following types of insurance do you have that would cover losses to your home in the event of a flood? **[Mark ALL that Apply.]**

[checkbox:

Homeowners' Insurance

Flood Insurance

Hurricane Insurance

Insurance through Condominium or Cooperative Fees

Earthquake Insurance

Other (describe)

Don't know

Refused]

**IF "Homeowners' Insurance":**

13A1. Do you think that your homeowners' insurance policy would cover most damages to your home in the event of a moderate flood? [YNDR]

**IF NO:**

13A2. Do you think that your homeowners' insurance policy would cover at least half of the damages to your home in the event of a moderate flood? [YNDR]

**IF "Flood Insurance":**

13B1. Does your flood insurance policy cover the structure of your home? [YNDR]

13B2. Does it cover the contents of your home? [YNDR]

---

**Owner-Occupied, Policyholders Section**  
**CONTINUE WITH ALL POLICY HOLDERS**

Next, we'd like to ask you some questions about your flood insurance policy. Please keep in mind that most flood insurance policies come from the federal government even though they are sold by private insurance companies.

14. Does the financial institution that holds your mortgage **require** you to have this flood insurance? [Yes, No, Don't have a mortgage, DK, R]

**IF NO or No Mortgage: GO TO Q15**

**IF YES:**

14A. If you were not required to have flood insurance as a condition of your mortgage, would you still carry a flood insurance policy on your home? [YNDR]

**IF YES: GO TO Q15**

**IF NO:**

14B. Please tell me how important each of the following factors would be in your decision not to carry a flood insurance policy on your home if your mortgage company did not require it. Please rate each factor as “very important,” “somewhat important,” or “not at all important” in your decision to discontinue coverage.

- 14B1. Little or no past flooding in the neighborhood where you live
- 14B2. Limited damage floods would do to your home
- 14B3. Federal disaster relief would cover any flood damage
- 14B4. The cost of flood insurance
- 14B5. The time or complication involved in buying flood insurance
- 14B6. Uncertainty about whether insurance companies actually pay out benefits after a flood
- 14B7. Flood insurance wouldn't provide sufficient coverage to parts of your home or property that are at risk

**IF “Somewhat” or “Very” Important:**

14G1. What parts of your home would not be sufficiently covered by flood insurance? [**Do NOT Read; Mark ALL that apply.**] [checkbox: Basement, Decks/Patios, Landscaping, Other (no text), DK, R]

14C. If your mortgage company did not require you to have flood insurance, but your insurance agent or company recommended that you have flood insurance, how likely would you be to keep your flood insurance policy? Would this recommendation make you “much more likely,” “somewhat more likely,” or “make no difference” in your decision to keep your flood insurance policy? [MML, SML, ND, DK, R]

**[GO TO Q17]**

15. I'll read you a list of factors that sometimes influence people's decisions about flood insurance. Please tell me how important each of these factors was in your decision to obtain or keep a flood insurance policy by rating each as “very important,” “somewhat important,” or “not important.”

- 15A. Past flooding in the neighborhood where you live
- 15B. Extent of damage a flood could do to your home
- 15C. Past personal experience with a flood
- 15D. An advertisement you saw for flood insurance
- 15E. A recommendation from your real estate agent
- 15F. A recommendation from your insurance agent or company

16. And, which of these factors was most important in your decision to obtain or keep a flood insurance policy? [**INT: Repeat if necessary. Mark ONE Response.**] [checkbox:

Past flooding in the neighborhood where you live  
Extent of damage a flood could do to your home  
Past personal experience with a flood  
An advertisement you saw for flood insurance  
A recommendation from your real estate agent  
A recommendation from your insurance agent or company  
Other (describe)  
DK  
R]

[ALL]

17. Do you know how much you pay each year for your flood insurance? [YNDR]

**IF YES:**

17A. Could you please estimate about how much you pay each year for your flood insurance? [INT: **Prompt for closest estimate if unsure.**] [\$, DR]

17B. When did you first learn of the cost of flood insurance associated with your home? Was it: [Prior to the offer to buy; Prior to closing on the home; During closing on the home; After moving into the home; Only after being flooded; Other (describe); DK, R]

17C. Did you find that the cost of the insurance was: [Higher than you expected; About what you expected; or Lower than you expected]?

18. Suppose that flood insurance had not been available for your property or that you could not purchase the insurance. Would you still have purchased, built, or stayed at this location? [YNDR]

**IF YES:**

18A. Can you please tell me the three most important reasons why you would have purchased, built, or stayed at this location even if flood insurance were not available? [Mark three responses; Do NOT Read]

[checkbox

Characteristics of the property (size, aesthetics, resources, etc.)

Financial considerations (price, loan provisions, down payment, etc.)

Inherited or received as gift

Proximity to shopping, schools, employment

Proximity to relatives or friends

The surrounding area (businesses, community reputation, etc.)

Other (describe)

Other (describe)

Other (describe)

Don't know

Refused]

18B. Again, suppose federal flood insurance were not available or required for your property. Knowing that it costs more, would you purchase commercial insurance to cover your property if federal insurance were not available or required? [YNDR]

**IF YES:**

18B1. About how much more would you be willing to pay for a commercial flood insurance policy if federal policies were no longer available or required?

[1 to 10% more than your current premium

11 to 25% more than your current premium

26 to 50% more than your current premium

51 to 75% more than your current premium

75 to 100% more than your current premium

Whatever it cost

Already pay for supplemental commercial policy

DK

R]

Now, we'd like to ask you some questions about enhancements to current flood insurance policies, such as additional coverage for specific parts of your home and property.

*19. Please tell me if your home has any of the following:*

*19A. A patio or deck? [YNDR]*

*19B. Landscaping? [YNDR]*

*19C. A finished basement? [YNDR]*

**[IF "No" to ALL (Q19A, B, & C) – Go To Q63: Flood Experience]**

**[IF "Yes" to Q19A, B, or C]**

Most flood insurance policies do not pay for damage to patios and decks, landscaping, or finished basements and belongings stored there. Suppose it were possible to purchase coverages for these amenities for an additional charge.

Knowing that spending money on insurance means that you have less money to spend on other personal or household items:

**IF "Yes" to Q19A:**

20. How likely would you be to purchase coverage for decks and patios up to \$10,000 at a cost of an additional \$400 per year? Would you be "very likely," "somewhat likely," "somewhat unlikely," or "very unlikely" to purchase this additional coverage? [VL, SL, SU, VU, DK, R]

**IF “Yes” to Q19B:**

21. How likely would you be to purchase coverage for landscaping up to \$5,000 at a cost of an additional \$200 per year? Would you be “very likely,” “somewhat likely,” “somewhat unlikely,” or “very unlikely” to purchase this additional coverage? [VL, SL, SU, VU, DK, R]

**IF “Yes” to Q19C:**

22. How likely would you be to purchase coverage for a finished basement and its contents up to \$10,000 at a cost of an additional \$450 per year? Would you be “very likely,” “somewhat likely,” “somewhat unlikely,” or “very unlikely” to purchase this additional coverage? [VL, SL, SU, VU, DK, R]

23. And, how likely would you be to purchase unlimited coverage for a finished basement and its contents at a cost of an additional \$1,000 per year? Would you be “very likely,” “somewhat likely,” “somewhat unlikely,” or “very unlikely” to purchase this additional coverage? [VL, SL, SU, VU, DK, R]

**[GO TO Q63: Flood Experience]**

---

**Owner-Occupied, Non-Policyholders Section**

**IF NO Flood Insurance in Q13:**

24. Some people purchase flood insurance, but later decide not to renew. Did you previously have a flood insurance policy on the property at this location? [YNDR]

**IF YES:**

24A. About how many years did you have that flood insurance policy? [INT: **If less than one year, code as zero**] [#, DR]

24B. Do you know about how much you paid each year for that flood insurance policy? [YNDR]

**IF YES:**

24B1. Could you please estimate about how much you paid each year for that flood insurance policy? [INT: **Prompt for closest estimate if unsure.**] [\$, DR]

**IF NO to Q24:**

24C. Is it possible for homeowners in your community to get flood insurance policies to cover damages from floods? [YNDR]

**IF YES:**

24D. Do you know about how much a flood insurance policy for your home would cost per year? [YNDR]

**IF YES:**

24D1. Could you please estimate about how much you think a flood insurance policy for your home would cost per year? [INT: Prompt for closest estimate if unsure.] [\$, DR]

25. I'll read you a list of factors that can influence people's decisions about flood insurance. Please tell me how important each of these factors was in your decision not to obtain or not to keep a flood insurance policy by rating each as "very important," "somewhat important," or "not important."

25A. Little or no past flooding in the neighborhood where you live

25B. Limited damage floods would do to your home

25C. Federal disaster relief would cover flood damage

25D. The cost of flood insurance

25E. The time or complication involved in buying flood insurance

25F. Uncertainty about whether insurance companies actually pay out benefits after a flood

25G. Flood insurance didn't provide sufficient coverage to parts of your home or property that are at risk

**IF "Somewhat" or "Very" Important:**

25G1. What parts of your home were not sufficiently covered by flood insurance? [Do NOT Read; Mark ALL that apply.] [checkbox: Basement, Decks/Patios, Landscaping, Other (no text), DK, R]

26. And, which of these factors was most important in your decision not to obtain or not to keep a flood insurance policy? [INT: Repeat if necessary. Mark ONE Response.]

[checkbox:

Little or no past flooding in the neighborhood where you live

Limited damage floods would do to your home

Federal disaster relief would cover any flood damage

The cost of flood insurance

The time or complication involved in buying flood insurance

Uncertainty about whether insurance companies actually pay out benefits after a flood

Flood insurance didn't provide sufficient coverage to parts of your home or property that are at risk

Other (describe)

DK

R]

27. Suppose your insurance agent or company recommended that you have flood insurance. How likely would you be to get a flood insurance policy based on that recommendation? Would that recommendation make you "much more likely,"

“somewhat more likely,” or “make no difference” in your decision to get a flood insurance policy? [MML, SML, ND, DK, R]

Now, we'd like to ask you some questions about enhancements to typical flood insurance policies.

28. Please tell me if your home has any of the following:

28A. A patio or deck? [YNDR]

28B. Landscaping? [YNDR]

28C. A finished basement? [YNDR]

**[IF “No” to ALL (Q28A, B, & C) – Go To Q63: Flood Experiences]**

**[IF “Yes” to Q28A, B, or C]**

*Flood insurance covers the structure of your home with the option of coverage for contents above the basement level as well. Most flood insurance policies do not pay for damage to patios and decks, landscaping, or finished basements and belongings stored there. Suppose it were possible to purchase coverages for these amenities for an additional charge.*

Knowing that spending money on insurance means that you have less money to spend on other personal or household items:

**IF “Yes” to Q28A:**

29. How would the option to purchase coverage for decks and patios up to \$10,000 at a cost of an additional \$400 per year affect your decision about purchasing flood insurance? Would this option make you “much more likely” to purchase, “somewhat more likely” to purchase, or make “no difference” in your decision to purchase flood insurance? [MML, SML, ND, DK, R]

**IF “Yes” to Q28B:**

30. How would the option to purchase coverage for landscaping up to \$5,000 at a cost of an additional \$200 per year affect your decision about purchasing flood insurance? Would this option make you “much more likely” to purchase, “somewhat more likely” to purchase, or make “no difference” in your decision to purchase flood insurance? [MML, SML, ND, DK, R]

**IF “Yes” to Q28C:**

31. How would the option to purchase coverage for a finished basement and contents up to \$10,000 at a cost of an additional \$450 per year affect your decision about purchasing flood insurance? Would this option make you “much more likely” to purchase, “somewhat more likely” to purchase, or make “no difference” in your decision to purchase flood insurance? [MML, SML, ND, DK, R]

32. And, how would the option to purchase unlimited coverage for a finished basement and contents at a cost of an additional \$1,000 per year affect your

decision about purchasing flood insurance? Would this option make you “much more likely” to purchase, “somewhat more likely” to purchase, or make “no difference” in your decision to purchase flood insurance? [MML, SML, ND, DK, R]

[GO TO Q63: Flood Experience]

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**Owner – Not Resident**

**IF “NO” to Q2: “Owner – Not Resident”**

33. *How many years have you owned this residence? [INT: If less than 1 year, code as 0] [#, DR]*

34. *What type of housing is this? Is it a [Condominium or Cooperative, House, Mobile Home/Manufactured Housing, Townhouse, Other, DR]*

**IF “Mobile Home/Manufactured Housing”: Terminate, Do Not Save - “Thank you for your time. Have a nice evening (day).”**

**IF “Condominium or Cooperative”:**

34A. *Is your unit located on the ground floor or first floor? [INT: If more than one floor, ask for the lowest floor of their individual unit.][YNDR]*

**IF “No”: Terminate – “Thank you for your time. Have a nice evening (day).”**

35. *Do you currently have a mortgage on this residence? [YNDR]*

**IF YES:**

35A. *Did you obtain the original mortgage on this residence before 1995? [YNDR]*

**IF YES:**

35B. *Have you ever refinanced the mortgage or taken out a home equity line of credit on this residence? [YNDR]*

36. *When you acquired this residence, was it a new house or an existing structure? [New house, Existing structure, Don’t know, Refused]*

*Next, we’d like to ask you some questions about flooding in the community where this residence is located.*

37. *Is this residence located in a neighborhood where a flood could happen? [INT: If asked, exclude water heaters and internal sources of flooding.] [YNDR]*

**IF NO: Go To Q41**

**IF YES:**

37A. Please estimate how close the nearest body of water that could flood is to this residence. Would you say the nearest body of water that could flood is: [Within 300 feet of this residence (about the length of a football field); From 300 to 1,000 feet from this residence; More than 1,000 feet – up to 1 mile from this residence; or More than 1 mile from this residence; DK; R]

37B. When did you first learn of the potential for floods near this residence? Did you learn about this: [Prior to the offer to buy; Prior to closing on the residence; During closing on the residence; After buying the residence; Only after being flooded; Other (describe); DK, R]

**IF NOT “Only After Being Flooded”:**

37C. And, how did you learn that this residence was located in a neighborhood that could flood? [INT: Do NOT Read; Mark ALL that apply.] [If “Internet” – ask what type of website: government, media, or other?]

[checkbox:

Attorney

Figured it out on own

Friend / family member / acquaintance

Insurance agent / insurance company

Internet / Website (non-government, non-media)

Lender / bank / mortgage company

Media (TV, Newspaper, Magazine, Media website)

Neighbor

Previous Owner

Public official / Government / Government website

Real estate agent / broker

Other (describe)

DK

R]

38. Imagine an area extending one mile out in all directions from this residence. Using a percentage, please estimate, as best you can, the probability that some part of that area will flood within the next 10 years. [INT: Prompt if needed: For example, if you believe that there’s no chance that this area will flood in the next 10 years, you should say 0% probability; or if you think a flood definitely would happen in this area, you’d say a 100% probability...’] [#, DR]

**IF Q38 = 0%: GO TO Q41**

39. Again, using a percentage, please estimate the probability that water from a flood would come up at least to the foundation of higher on this residence, or the building it’s located in, within the next 10 years. [#, DR]

40. Next, consider the probability that a flood will cause damage to this residence. Using a percentage, please estimate the probability that this residence, or the building it's located in, will suffer at least moderate damage from a flood within the next 10 years. [#, DR]

41. Without having to be an expert, we'd like your view of evaluating flood risks these ways. Which do **you** think has a higher risk of flooding – a home in an area subject to a “100 year flood” or a home in an area subject to a “1 percent annual chance flood”? [INT: Prompt if needed – A “100 year flood” measures how many floods, on average, are expected to occur in a specific span of time. The percent annual chance of flood measures the likelihood that a flood will occur in any given year.] [“100 year flood”; “1 percent annual chance flood”; Equal chance; DK; R]

Next, we have a few questions about any insurance policies you may have on this residence.

42. Using a scale from 1 to 5, where 1 is not important and 5 is very important; please tell me how important you think it is for you to have insurance that covers this residence in the event of a flood. [1-5, DR]

43. Do you have insurance that would cover losses to this residence in the event of a flood? [YNDR]

**IF NO: GO TO Q54**

**IF YES:**

43A. Which of the following types of insurance do you have that would cover losses to this residence in the event of a flood? [Mark ALL that Apply.]

[checkbox:

Homeowners' Insurance

Flood Insurance

Hurricane Insurance

Insurance through Condominium or Cooperative Fees

Earthquake Insurance

Other (describe)

Don't know

Refused]

**IF “Homeowners' Insurance”:**

43A1. Do you think that this homeowners' insurance policy would cover most damages to this residence in the event of a moderate flood? [YNDR]

**IF NO:**

43A2. Do you think that this homeowners' insurance policy would cover at least half of the damages to this residence in the event of a moderate flood? [YNDR]

**IF “Flood Insurance”:**

43B1. Does this flood insurance policy cover the structure of this residence?  
[YNDR]

43B2. Does it cover the contents of this residence? [YNDR]

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**Non-Resident, Policyholders Section**

**CONTINUE WITH ALL POLICY HOLDERS (YES to “Flood Insurance” Q43)**

Next, we’d like to ask you some questions about the flood insurance policy on this residence. Please keep in mind that most flood insurance policies come from the federal government even though they are sold by private insurance companies.

44. Does the financial institution that holds the mortgage on this residence **require** you to have this flood insurance? [Yes, No, Don’t have a mortgage, DK, R]

**IF NO or No Mortgage: GO TO Q45**

**IF YES:**

44A. If you were not required to have flood insurance as a condition of this mortgage, would you still carry a flood insurance policy on this residence?  
[YNDR]

**IF YES: GO TO Q45**

**IF NO:**

44B. Please tell me how important each of the following factors would be in your decision not to carry a flood insurance policy on this residence if the mortgage company did not require it. Please rate each factor as “very important,” “somewhat important,” or “not at all important” in your decision to discontinue coverage.

44B1. Little or no past flooding in the neighborhood where the residence is located

44B2. Limited damage floods would do to this residence

44B3. Federal disaster relief would cover any flood damage

44B4. The cost of flood insurance

44B5. The time or complication involved in buying flood insurance

44B6. Uncertainty about whether insurance companies actually pay out benefits after a flood

44B7. Flood insurance wouldn’t provide sufficient coverage to parts of this residence or property that are at risk

**IF “Somewhat” or “Very” Important:**

44B7a. What parts of this residence would not be sufficiently covered by flood insurance? [**Do NOT Read; Mark ALL that apply.**] [checkbox: Basement, Decks/Patios, Landscaping, Other (no text), DK, R]

44C. If your mortgage company did not require you to have flood insurance on this residence, but your insurance agent or company recommended that you have flood insurance, how likely would you be to keep your flood insurance policy? Would this recommendation make you “much more likely,” “somewhat more likely,” or “make no difference” in your decision to keep your flood insurance policy? [MML, SML, ND, DK, R]

**[GO TO Q47]**

45. I'll read you a list of factors that sometimes influence people's decisions about flood insurance. Please tell me how important each of these factors was in your decision to obtain or keep a flood insurance policy by rating each as “very important,” “somewhat important,” or “not important.”

45A. Past flooding in the neighborhood where the residence is located

45B. Extent of damage a flood could do to the residence

45C. Past personal experience with a flood

45D. An advertisement you saw for flood insurance

45E. A recommendation from your real estate agent

45F. A recommendation from your insurance agent or company

46. And, which of these factors was most important in your decision to obtain or keep a flood insurance policy? [**INT: Repeat if necessary. Mark ONE Response.**]

[checkbox:

Past flooding in the neighborhood where the residence is located

Extent of damage a flood could do to the residence

Past personal experience with a flood

An advertisement you saw for flood insurance

A recommendation from your real estate agent

A recommendation from your insurance agent or company

Other (describe)

DK

R]

**[ALL]**

47. Do you know how much you pay each year for flood insurance on this residence?  
[YNDR]

**IF YES:**

47A. Could you please estimate about how much you pay each year for flood insurance on this residence? [**INT: Prompt for closest estimate if unsure.**] [ \$, DR]

47B. When did you first learn of the cost of flood insurance associated with this residence? Was it: [Prior to the offer to buy; Prior to closing on the residence; During closing on the residence; After buying the residence; Only after being flooded; Other (describe); DK, R]

47C. Did you find that the cost of the insurance was: [Higher than you expected; About what you expected; or Lower than you expected]?

48. Suppose that flood insurance had not been available for this residence or that you could not purchase the insurance. Would you still have purchased, built, or retained this residence? [YNDR]

**IF YES:**

48A. Can you please tell me the three most important reasons why you would have purchased, built, or retained this residence even if flood insurance were not available? [Mark three responses; Do NOT Read]

[checkbox

Characteristics of the property (size, aesthetics, resources, etc.)

Financial considerations (price, loan provisions, down payment, etc.)

Inherited or received as gift

Proximity to shopping, schools, employment

The surrounding area (businesses, community reputation, etc.)

Other (describe)

Other (describe)

Other (describe)

Don't know

Refused]

48B. Again, suppose federal flood insurance were not available or required for this property. Knowing that it costs more, would you purchase commercial insurance to cover this property if federal insurance were not available or required? [YNDR]

**IF YES:**

48B1. About how much more would you be willing to pay for a commercial flood insurance policy if federal policies were no longer available?

[1 to 10% more than your current premium

11 to 25% more than your current premium

26 to 50% more than your current premium

51 to 75% more than your current premium

75 to 100% more than your current premium

Whatever it cost

Already pay for supplemental commercial policy

DK

R]

Now, we'd like to ask you some questions about enhancements to current flood insurance policies, such as additional coverage for specific parts of this residence.

49. Please tell me if this residence has any of the following:

49A. A patio or deck? [YNDR]

49B. Landscaping? [YNDR]

49C. A finished basement? [YNDR]

**[IF "No" to ALL (Q49A, B, & C) – Go To Q63: Flood Experience]**

**[IF "Yes" to Q49A, B, or C]**

Most flood insurance policies do not pay for damage to patios and decks, landscaping, or finished basements and belongings stored there. Suppose it were possible to purchase coverages for these amenities for an additional charge.

Knowing that spending money on insurance means that you have less money to spend on other personal or household items:

**IF "Yes" to Q49A:**

50. How likely would you be to purchase coverage for decks and patios up to \$10,000 at a cost of an additional \$400 per year? Would you be "very likely," "somewhat likely," "somewhat unlikely," or "very unlikely" to purchase this additional coverage? [VL, SL, SU, VU, DK, R]

**IF "Yes" to Q49B:**

51. How likely would you be to purchase coverage for landscaping up to \$5,000 at a cost of an additional \$200 per year? Would you be "very likely," "somewhat likely," "somewhat unlikely," or "very unlikely" to purchase this additional coverage? [VL, SL, SU, VU, DK, R]

**IF "Yes" to Q49C:**

52. How likely would you be to purchase coverage for a finished basement and its contents up to \$10,000 at a cost of an additional \$450 per year? Would you be "very likely," "somewhat likely," "somewhat unlikely," or "very unlikely" to purchase this additional coverage? [VL, SL, SU, VU, DK, R]

53. And, how likely would you be to purchase unlimited coverage for a finished basement and its contents at a cost of an additional \$1,000 per year? Would you be "very likely," "somewhat likely," "somewhat unlikely," or "very unlikely" to purchase this additional coverage? [VL, SL, SU, VU, DK, R]

**[GO TO Q63: Flood Experience]**

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### **Non-Resident, Non-Policyholders Section**

**IF NO to "Flood Insurance" Q43:**

54. Some people purchase flood insurance, but later decide not to renew. Did you previously have a flood insurance policy on the residence at this location? [YNDR]

**IF YES:**

54A. About how many years did you have that flood insurance policy? [INT: **If less than one year, code as zero**] [#, DR]

54B. Do you know about how much you paid each year for that flood insurance policy? [YNDR]

**IF YES:**

54B1. Could you please estimate about how much you paid each year for that flood insurance policy? [INT: **Prompt for closest estimate if unsure.**] [\$, DR]

**IF NO to Q54:**

54C. Is it possible for homeowners in the community where this residence is located to get flood insurance policies to cover damages from floods? [YNDR]

**IF YES:**

54D. Do you know about how much a flood insurance policy for this residence would cost per year? [YNDR]

**IF YES:**

54D1. Could you please estimate about how much you think a flood insurance policy for this residence would cost per year? [INT: **Prompt for closest estimate if unsure.**] [\$, DR]

55. I'll read you a list of factors that can influence people's decisions about flood insurance. Please tell me how important each of these factors was in your decision not to obtain or not to keep a flood insurance policy on this residence by rating each as "very important," "somewhat important," or "not important."

55A. Little or no past flooding in the neighborhood where the residence is located

55B. Limited damage floods would do to this residence

55C. Federal disaster relief would cover any flood damage

55D. The cost of flood insurance

55E. The time or complication involved in buying flood insurance

55F. Uncertainty about whether insurance companies actually pay out benefits after a flood

55G. Flood insurance didn't provide sufficient coverage to parts of this residence or property that are at risk

**IF "Somewhat" or "Very" Important:**

55G1. What parts of this residence were not sufficiently covered by flood insurance? **[Do NOT Read; Mark ALL that apply.]** [checkbox: Basement, Decks/Patios, Landscaping, Other (no text), DK, R]

56. And, which of these factors was most important in your decision not to obtain or not to keep a flood insurance policy on this residence? **[INT: Repeat if necessary. Mark ONE Response.]**

[checkbox:

Little or no past flooding in the neighborhood where this residence is located

Limited damage floods would do to this residence

Federal disaster relief would cover any flood damage

The cost of flood insurance

The time or complication involved in buying flood insurance

Uncertainty about whether insurance companies actually pay out benefits after a flood

Flood insurance didn't provide sufficient coverage to parts of this residence or property that are at risk

Other (describe)

DK

R]

57. Suppose your insurance agent or company recommended that you have flood insurance on this residence. How likely would you be to get a flood insurance policy for this residence based on that recommendation? Would that recommendation make you "much more likely," "somewhat more likely," or "make no difference" in your decision to get a flood insurance policy? [MML, SML, ND, DK, R]

Now, we'd like to ask you some questions about enhancements to typical flood insurance policies.

58. Please tell me if this residence has any of the following:

58A. A patio or deck? [YNDR]

58B. Landscaping? [YNDR]

58C. A finished basement? [YNDR]

**[IF "No" to ALL (Q58A, B, & C) – Go To Q63: Flood Experiences]**

**[IF "Yes" to Q58A, B, or C]**

*Flood insurance covers the structure of a residence with the option of coverage for contents above the basement level as well. Most flood insurance policies do not pay for damage to patios and decks, landscaping, or finished basements and belongings stored there. Suppose it were possible to purchase coverages for these amenities for an additional charge.*

Knowing that spending money on insurance means that you have less money to spend on other personal or household items:

**IF “Yes” to Q58A:**

59. How would the option to purchase coverage for decks and patios up to \$10,000 at a cost of an additional \$400 per year affect your decision about purchasing flood insurance? Would this option make you “much more likely” to purchase, “somewhat more likely” to purchase, or make “no difference” in your decision to purchase flood insurance? [MML, SML, ND, DK, R]

**IF “Yes” to Q58B:**

60. How would the option to purchase coverage for landscaping up to \$5,000 at a cost of an additional \$200 per year affect your decision about purchasing flood insurance? Would this option make you “much more likely” to purchase, “somewhat more likely” to purchase, or make “no difference” in your decision to purchase flood insurance? [MML, SML, ND, DK, R]

**IF “Yes” to Q58C:**

61. How would the option to purchase coverage for a finished basement and contents up to \$10,000 at a cost of an additional \$450 per year affect your decision about purchasing flood insurance? Would this option make you “much more likely” to purchase, “somewhat more likely” to purchase, or make “no difference” in your decision to purchase flood insurance? [MML, SML, ND, DK, R]

62. And, how would the option to purchase unlimited coverage for a finished basement and contents at a cost of an additional \$1,000 per year affect your decision about purchasing flood insurance? Would this option make you “much more likely” to purchase, “somewhat more likely” to purchase, or make “no difference” in your decision to purchase flood insurance? [MML, SML, ND, DK, R]

**[GO TO Q63: Flood Experience]**

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**ALL RESPONDENTS:**

Now, we have a few questions about your past personal experiences with floods.

63. Have you ever personally experienced a flood at your current home or any other past residences? **[INT: Prompt if needed: An owner non-resident can include their experience with floods at their properties in addition to their personal home]** [YNDR]

**IF YES:**

63A. How would you classify the damage to the structure and contents of your home in that past flood or floods? Would you say the damage your home suffered was severe, moderate, minimal, or that there was no damage? [Severe, Moderate, Minimal, None, DK, R]

63B. Have you ever received a payment from a flood insurance policy to compensate losses after a flood? [YNDR]

63C. Have you ever received federal or state assistance, separate from a flood insurance payment, to compensate for losses after a flood? [YNDR]

**IF YES to 63B or 63C:**

63D. Thinking of all the costs, including the structure of the house and the contents (such as furniture, lost clothing, and even things you did not replace), what percentage of your loss did federal and state aid and insurance pay for? Was it: [Less than 10%, 10% to 24%, 25% to 49%, 50% to 74%, 75% to 90%, or More than 90%, DK, R]

64. Using a scale from 1 to 5, where 1 is “not familiar at all” and 5 is “very familiar,” how familiar would you say you are with the National Flood Insurance Program administered by FEMA, the Federal Emergency Management Agency? [1-5, DR]

Finally, we have a few demographic questions for statistical purposes.

65. Gender: [Don't ask, just record] [Male, Female]

66. In what year were you born? [year, R]

67. What is the highest level of education you have completed? [8<sup>th</sup> grade or less; Some high school; High school graduate; Technical / Vocational; Some college; College graduate; Graduate / Professional School; Refused]

68. Including yourself, how many adult residents, age 18 or older, are there in your household? [#, DR]

69. And, how many children, age 18 or younger, are there in your household? [#, DR]

70. Just to be sure that we have a representative sample, would you please tell me which of the following term or terms best describes you? **[Mark all that apply.]** [checkbox: African American / Black, White / Caucasian, Asian, American Indian or Alaskan Native, Native Hawaiian or Pacific Islander, Other, R]

70A. And, would you say that you are of Hispanic ancestry or not? [YNDR]

71. Is your family's total yearly household income before taxes \$30,000 or less, or more than \$30,000? [\$30,000 or less; More than \$30,000, DR]

**IF \$30,000 or less:**

71A. And, is that: [Under \$15,000; \$15,001 - \$20,000; \$20,001 - \$25,000; \$25,001 - \$30,000; DK; R]

**IF More than \$30,000:**

71A. And, is that: [\$30,001 to \$45,000; \$45,001 to \$60,000; \$60,001 to \$75,000; \$75,001 to \$90,000; Over \$90,000; DK; R]

72. Do you have any questions regarding this study or your rights as a participant? [YNDR]

**IF YES:** *For questions regarding this study you may contact Dr. Mike Scicchitano at the Florida Survey Research Center toll free at 866-392-3475. For questions regarding your rights as a participant you may contact the University of Florida Internal Review Board at 352-392-0433.*

That concludes our survey. Thank you very much for your time and participation. Have a nice evening (day).

APPENDIX E  
CHAPTER 3 AND 4 SAS STATISTICS OUTPUT

Bivariate analysis of the dependent variable question 13, "Do you have insurance that would cover losses to your home in the event of a flood?" with the various independent variables.

Table of Q13 by Q7

Q13	Q7		Total
Frequency,	1,	2,	
Percent ,			
Row Pct ,			
Col Pct ,			
1	829	455	1284
	51.84	28.46	80.30
	64.56	35.44	
	89.43	67.71	
2	98	217	315
	6.13	13.57	19.70
	31.11	68.89	
	10.57	32.29	
Total	927	672	1599
	57.97	42.03	100.00

Frequency Missing = 404

Statistics for Table of Q13 by Q7

Statistic	DF	Value	Prob
Chi-Square	1	116.1820	<.0001
Likelihood Ratio Chi-Square	1	115.7838	<.0001
Continuity Adj. Chi-Square	1	114.8130	<.0001
Mantel-Haenszel Chi-Square	1	116.1093	<.0001
Phi Coefficient		0.2696	
Contingency Coefficient		0.2603	
Cramer's V		0.2696	

Fisher's Exact Test

Cell (1,1) Frequency (F)	829
Left-sided Pr <= F	1.0000
Right-sided Pr >= F	5.333E-27
Table Probability (P)	1.605E-26
Two-sided Pr <= P	7.111E-27

Effective Sample Size = 1599  
Frequency Missing = 404

WARNING: 20% of the data are missing.

Table of Q13 by Q12

Q13	Q12					Total
Frequency, Percent , Row Pct , Col Pct ,	1,	2,	3,	4,	5,	
1	104	50	115	95	974	1338
	6.27	3.01	6.93	5.73	58.71	80.65
	7.77	3.74	8.59	7.10	72.80	
	41.94	55.56	73.25	95.00	91.54	
2	144	40	42	5	90	321
	8.68	2.41	2.53	0.30	5.42	19.35
	44.86	12.46	13.08	1.56	28.04	
	58.06	44.44	26.75	5.00	8.46	
Total	248	90	157	100	1064	1659
	14.95	5.42	9.46	6.03	64.14	100.00

Frequency Missing = 344

Statistics for Table of Q13 by Q12

Statistic	DF	Value	Prob
Chi-Square	4	374.0994	<.0001
Likelihood Ratio Chi-Square	4	330.1488	<.0001
Mantel-Haenszel Chi-Square	1	356.5163	<.0001
Phi Coefficient		0.4749	
Contingency Coefficient		0.4290	
Cramer's V		0.4749	

Effective Sample Size = 1659

Frequency Missing = 344

WARNING: 17% of the data are missing.

Table of Q13 by Q63

Q13	Q63		Total
Frequency,	1,	2,	
Percent ,			
Row Pct ,			
Col Pct ,			
1	325	1017	1342
	19.50	61.01	80.50
	24.22	75.78	
	86.67	78.72	
2	50	275	325
	3.00	16.50	19.50
	15.38	84.62	
	13.33	21.28	
Total	375	1292	1667
	22.50	77.50	100.00

Frequency Missing = 336

Statistics for Table of Q13 by Q63

Statistic	DF	Value	Prob
Chi-Square	1	11.7082	0.0006
Likelihood Ratio Chi-Square	1	12.5273	0.0004
Continuity Adj. Chi-Square	1	11.2071	0.0008
Mantel-Haenszel Chi-Square	1	11.7012	0.0006
Phi Coefficient		0.0838	
Contingency Coefficient		0.0835	
Cramer's V		0.0838	

Fisher's Exact Test

Cell (1,1) Frequency (F)	325
Left-sided Pr <= F	0.9998
Right-sided Pr >= F	2.800E-04
Table Probability (P)	1.267E-04
Two-sided Pr <= P	4.897E-04

Effective Sample Size = 1667

Frequency Missing = 336

WARNING: 17% of the data are missing.

Table of Q13 by newq10

Q13	newq10					Total
Frequency,						
Percent ,						
Row Pct ,						
Col Pct ,	1,	2,	3,	4,	5,	Total
1	298	88	100	33	65	584
	46.13	13.62	15.48	5.11	10.06	90.40
	51.03	15.07	17.12	5.65	11.13	
	86.88	97.78	92.59	89.19	95.59	
2	45	2	8	4	3	62
	6.97	0.31	1.24	0.62	0.46	9.60
	72.58	3.23	12.90	6.45	4.84	
	13.12	2.22	7.41	10.81	4.41	
Total	343	90	108	37	68	646
	53.10	13.93	16.72	5.73	10.53	100.00

Frequency Missing = 1357

Statistics for Table of Q13 by newq10

Statistic	DF	Value	Prob
Chi-Square	4	13.3137	0.0098
Likelihood Ratio Chi-Square	4	15.6920	0.0035
Mantel-Haenszel Chi-Square	1	5.5447	0.0185
Phi Coefficient		0.1436	
Contingency Coefficient		0.1421	
Cramer's V		0.1436	

Effective Sample Size = 646

Frequency Missing = 1357

WARNING: 68% of the data are missing.

Table of Q13 by race

Q13	race					Total
Frequency,						
Percent ,						
Row Pct ,						
Col Pct ,	1,	2,	3,	5,	6,	Total
1	63	1109	42	30	59	1303
	3.90	68.63	2.60	1.86	3.65	80.63
	4.83	85.11	3.22	2.30	4.53	
	86.30	80.19	85.71	83.33	78.67	
2	10	274	7	6	16	313
	0.62	16.96	0.43	0.37	0.99	19.37
	3.19	87.54	2.24	1.92	5.11	
	13.70	19.81	14.29	16.67	21.33	
Total	73	1383	49	36	75	1616
	4.52	85.58	3.03	2.23	4.64	100.00

Frequency Missing = 387

Statistics for Table of Q13 by race

Statistic	DF	Value	Prob
-----------	----	-------	------

Chi-Square	4	2.8411	0.5848
Likelihood Ratio Chi-Square	4	3.0377	0.5515
Mantel-Haenszel Chi-Square	1	0.0880	0.7667
Phi Coefficient		0.0419	
Contingency Coefficient		0.0419	
Cramer's V		0.0419	

Effective Sample Size = 1616

Frequency Missing = 387

WARNING: 19% of the data are missing.

Table of Q13 by Q65

Q13	Q65		Total
Frequency, Percent , Row Pct , Col Pct ,	1,	2,	
1 ,	548 ,	802 ,	1350
, 32.72 ,	, 47.88 ,	, 80.60	
, 40.59 ,	, 59.41 ,		
, 78.62 ,	, 82.00 ,		
2 ,	149 ,	176 ,	325
, 8.90 ,	, 10.51 ,	, 19.40	
, 45.85 ,	, 54.15 ,		
, 21.38 ,	, 18.00 ,		
Total	697	978	1675
	41.61	58.39	100.00

Frequency Missing = 328

Statistics for Table of Q13 by Q65

Statistic	DF	Value	Prob
Chi-Square	1	2.9756	0.0845
Likelihood Ratio Chi-Square	1	2.9568	0.0855
Continuity Adj. Chi-Square	1	2.7633	0.0965
Mantel-Haenszel Chi-Square	1	2.9738	0.0846
Phi Coefficient		-0.0421	
Contingency Coefficient		0.0421	
Cramer's V		-0.0421	

Fisher's Exact Test

Cell (1,1) Frequency (F)	548
Left-sided Pr <= F	0.0486
Right-sided Pr >= F	0.9628
Table Probability (P)	0.0113
Two-sided Pr <= P	0.0906

Effective Sample Size = 1675

Frequency Missing = 328

WARNING: 16% of the data are missing.

Table of Q13 by income

Q13		income					
Frequency,	Percent						
Row Pct							
Col Pct	1,	2,	3,	4,	5,	Total	
1	40	34	38	55	139	948	
	3.31	2.81	3.14	4.55	11.50	78.41	
	4.22	3.59	4.01	5.80	14.66		
	95.24	85.00	73.08	79.71	78.53		
2	2	6	14	14	38	261	
	0.17	0.50	1.16	1.16	3.14	21.59	
	0.77	2.30	5.36	5.36	14.56		
	4.76	15.00	26.92	20.29	21.47		
Total	42	40	52	69	177	1209	
	3.47	3.31	4.30	5.71	14.64	100.00	

(Continued)

Table of Q13 by income

Q13		income				
Frequency,	Percent					
Row Pct						
Col Pct	6,	7,	8,	9,	Total	
1	163	130	96	253	948	
	13.48	10.75	7.94	20.93	78.41	
	17.19	13.71	10.13	26.69		
	79.51	73.86	78.05	77.85		
2	42	46	27	72	261	
	3.47	3.80	2.23	5.96	21.59	
	16.09	17.62	10.34	27.59		
	20.49	26.14	21.95	22.15		
Total	205	176	123	325	1209	
	16.96	14.56	10.17	26.88	100.00	

Frequency Missing = 794

Statistics for Table of Q13 by income

Statistic	DF	Value	Prob
Chi-Square	8	11.3633	0.1820
Likelihood Ratio Chi-Square	8	13.7946	0.0873
Mantel-Haenszel Chi-Square	1	2.8904	0.0891
Phi Coefficient		0.0969	
Contingency Coefficient		0.0965	
Cramer's V		0.0969	

Effective Sample Size = 1209

Frequency Missing = 794

WARNING: 40% of the data are missing.

Table of Q13 by age

Q13      age

Frequency, Percent , Row Pct , Col Pct ^	1, ^	2, ^	3, ^	4, ^	Total
1 ,	70 ,	391 ,	333 ,	556 ,	1350
, 4.18 ,	23.34 ,	19.88 ,	33.19 ,	80.60	
, 5.19 ,	28.96 ,	24.67 ,	41.19 ,		
, 85.37 ,	75.63 ,	82.63 ,	82.62 ,		
2 ,	12 ,	126 ,	70 ,	117 ,	325
, 0.72 ,	7.52 ,	4.18 ,	6.99 ,	19.40	
, 3.69 ,	38.77 ,	21.54 ,	36.00 ,		
, 14.63 ,	24.37 ,	17.37 ,	17.38 ,		
Total	82	517	403	673	1675
	4.90	30.87	24.06	40.18	100.00

Frequency Missing = 328

Statistics for Table of Q13 by age

Statistic	DF	Value	Prob
Chi-Square	3	12.1715	0.0068
Likelihood Ratio Chi-Square	3	11.8706	0.0078
Mantel-Haenszel Chi-Square	1	4.1636	0.0413
Phi Coefficient		0.0852	
Contingency Coefficient		0.0849	
Cramer's V		0.0852	

Effective Sample Size = 1675

Frequency Missing = 328

WARNING: 16% of the data are missing.

Bivariate analysis of the various independent variables.

Table of Q7 by Q12

Q7	Q12					Total
Frequency, Percent , Row Pct , Col Pct ,	1,	2,	3,	4,	5,	
0 ,	182 ,	52 ,	93 ,	40 ,	335 ,	702
, 11.15 ,	3.18 ,	5.70 ,	2.45 ,	20.51 ,	42.99 ,	
, 25.93 ,	7.41 ,	13.25 ,	5.70 ,	47.72 ,		
, 70.54 ,	55.32 ,	60.00 ,	43.48 ,	32.40 ,		
1 ,	76 ,	42 ,	62 ,	52 ,	699 ,	931
, 4.65 ,	2.57 ,	3.80 ,	3.18 ,	42.80 ,	57.01 ,	
, 8.16 ,	4.51 ,	6.66 ,	5.59 ,	75.08 ,		
, 29.46 ,	44.68 ,	40.00 ,	56.52 ,	67.60 ,		
Total	258	94	155	92	1034	1633
	15.80	5.76	9.49	5.63	63.32	100.00

Frequency Missing = 370

Statistics for Table of Q7 by Q12

Statistic	DF	Value	Prob
Chi-Square	4	151.3824	<.0001
Likelihood Ratio Chi-Square	4	152.4514	<.0001
Mantel-Haenszel Chi-Square	1	145.5823	<.0001
Phi Coefficient		0.3045	
Contingency Coefficient		0.2913	
Cramer's V		0.3045	

Effective Sample Size = 1633

Frequency Missing = 370

WARNING: 18% of the data are missing.

Table of Q7 by Q63

Q7	Q63		Total
Frequency,	0,	1,	
Percent ,			
Row Pct ,			
Col Pct ,			
0	583	123	706
	35.53	7.50	43.02
	82.58	17.42	
	45.98	32.98	
1	685	250	935
	41.74	15.23	56.98
	73.26	26.74	
	54.02	67.02	
Total	1268	373	1641
	77.27	22.73	100.00

Frequency Missing = 362

Statistics for Table of Q7 by Q63

Statistic	DF	Value	Prob
Chi-Square	1	19.8767	<.0001
Likelihood Ratio Chi-Square	1	20.2708	<.0001
Continuity Adj. Chi-Square	1	19.3498	<.0001
Mantel-Haenszel Chi-Square	1	19.8646	<.0001
Phi Coefficient		0.1101	
Contingency Coefficient		0.1094	
Cramer's V		0.1101	

Fisher's Exact Test

Cell (1,1) Frequency (F)	583
Left-sided Pr <= F	1.0000
Right-sided Pr >= F	4.513E-06
Table Probability (P)	1.967E-06
Two-sided Pr <= P	7.801E-06

Effective Sample Size = 1641

Frequency Missing = 362

WARNING: 18% of the data are missing.

Table of Q12 by Q63

Q12	Q63		Total
Frequency,	0,	1,	
Percent ,			
Row Pct ,			
Col Pct ,			
1	221	41	262
	12.98	2.41	15.38
	84.35	15.65	
	16.74	10.70	
2	88	14	102
	5.17	0.82	5.99
	86.27	13.73	
	6.67	3.66	
3	133	28	161
	7.81	1.64	9.45
	82.61	17.39	
	10.08	7.31	
4	85	17	102
	4.99	1.00	5.99
	83.33	16.67	
	6.44	4.44	
5	793	283	1076
	46.56	16.62	63.18
	73.70	26.30	
	60.08	73.89	
Total	1320	383	1703
	77.51	22.49	100.00

Frequency Missing = 300

Statistics for Table of Q12 by Q63

Statistic	DF	Value	Prob
Chi-Square	4	24.8798	<.0001
Likelihood Ratio Chi-Square	4	25.9857	<.0001
Mantel-Haenszel Chi-Square	1	20.9407	<.0001
Phi Coefficient		0.1209	
Contingency Coefficient		0.1200	
Cramer's V		0.1209	

Effective Sample Size = 1703

Frequency Missing = 300

WARNING: 15% of the data are missing.

Table of Q12 by newq10

Q12	newq10					Total
Frequency,	1,	2,	3,	4,	5,	
Percent ,						
Row Pct ,						
Col Pct ,						
1	29	0	4	0	0	33
	4.50	0.00	0.62	0.00	0.00	5.12
	87.88	0.00	12.12	0.00	0.00	

	8.50	0.00	3.64	0.00	0.00	
2	26	5	2	0	2	35
	4.04	0.78	0.31	0.00	0.31	5.43
	74.29	14.29	5.71	0.00	5.71	
	7.62	5.56	1.82	0.00	3.03	
3	24	10	2	0	4	40
	3.73	1.55	0.31	0.00	0.62	6.21
	60.00	25.00	5.00	0.00	10.00	
	7.04	11.11	1.82	0.00	6.06	
4	23	9	2	0	4	38
	3.57	1.40	0.31	0.00	0.62	5.90
	60.53	23.68	5.26	0.00	10.53	
	6.74	10.00	1.82	0.00	6.06	
5	239	66	100	37	56	498
	37.11	10.25	15.53	5.75	8.70	77.33
	47.99	13.25	20.08	7.43	11.24	
	70.09	73.33	90.91	100.00	84.85	
Total	341	90	110	37	66	644
	52.95	13.98	17.08	5.75	10.25	100.00

Frequency Missing = 1359

Statistics for Table of Q12 by newq10

Statistic	DF	Value	Prob
Chi-Square	16	52.2438	<.0001
Likelihood Ratio Chi-Square	16	69.1963	<.0001
Mantel-Haenszel Chi-Square	1	27.0120	<.0001
Phi Coefficient		0.2848	
Contingency Coefficient		0.2739	
Cramer's V		0.1424	

WARNING: 40% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

Effective Sample Size = 644

Frequency Missing = 1359

WARNING: 68% of the data are missing.

Table of Q63 by newq10

Q63	newq10					Total
Frequency, Percent, Row Pct, Col Pct	1	2	3	4	5	
0	265	58	83	21	39	466
	40.77	8.92	12.77	3.23	6.00	71.69
	56.87	12.45	17.81	4.51	8.37	
	76.37	64.44	75.45	60.00	57.35	
1	82	32	27	14	29	184
	12.62	4.92	4.15	2.15	4.46	28.31
	44.57	17.39	14.67	7.61	15.76	
	23.63	35.56	24.55	40.00	42.65	
Total	347	90	110	35	68	650
	53.38	13.85	16.92	5.38	10.46	100.00

Frequency Missing = 1353

Statistics for Table of Q63 by newq10

Statistic	DF	Value	Prob
Chi-Square	4	16.0835	0.0029
Likelihood Ratio Chi-Square	4	15.4610	0.0038
Mantel-Haenszel Chi-Square	1	9.9990	0.0016
Phi Coefficient		0.1573	
Contingency Coefficient		0.1554	
Cramer's V		0.1573	

Effective Sample Size = 650

Frequency Missing = 1353

WARNING: 68% of the data are missing.

Logistic regression analysis of the dependent variable question 13, "Do you have insurance that would cover losses to your home in the event of a flood?" with the various independent variables.

The LOGISTIC Procedure: Model 1

Model Information

Data Set	WORK.DATA1
Response Variable	Q13
Number of Response Levels	2
Number of Observations	1565
Model	binary logit
Optimization Technique	Fisher's scoring

Response Profile

Ordered Value	Q13	Total Frequency
1	1	1256
2	0	309

Probability modeled is Q13=1.

NOTE: 438 observations were deleted due to missing values for the response or explanatory variables.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	1557.105	1215.093
SC	1562.461	1236.516
-2 Log L	1555.105	1207.093

R-Square 0.1994 Max-rescaled R-Square 0.3166

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	348.0121	3	<.0001
Score	370.4573	3	<.0001
Wald	280.3573	3	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-1.3167	0.1622	65.8929	<.0001

Q7	1	1.0096	0.1514	44.4462	<.0001
Q12	1	0.6171	0.0437	199.6899	<.0001
Q63	1	0.3174	0.1960	2.6209	0.1055

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
Q7	2.745	2.040	3.693
Q12	1.854	1.702	2.019
Q63	1.374	0.935	2.017

Association of Predicted Probabilities and Observed Responses

Percent Concordant	77.1	Somers' D	0.621
Percent Discordant	14.9	Gamma	0.676
Percent Tied	8.0	Tau-a	0.197
Pairs	388104	c	0.811

Partition for the Hosmer and Lemeshow Test

Group	Total	Q13 = 1		Q13 = 0	
		Observed	Expected	Observed	Expected
1	166	45	57.08	121	108.92
2	183	130	106.14	53	76.86
3	146	102	111.51	44	34.49
4	259	215	221.27	44	37.73
5	132	121	117.64	11	14.36
6	476	448	448.15	28	27.85
7	203	195	194.21	8	8.79

Hosmer and Lemeshow Goodness-of-Fit Test

Chi-Square	DF	Pr > ChiSq
22.2779	5	0.0005

Logistic regression analysis of the dependent variable question 13, "Do you have insurance that would cover losses to your home in the event of a flood?" with the various independent variables.

The LOGISTIC Procedure: Model 2

Model Information

Data Set	WORK.DATA1
Response Variable	Q13
Number of Response Levels	2
Number of Observations	632
Model	binary logit
Optimization Technique	Fisher's scoring

Response Profile

Ordered Value	Q13	Total Frequency
1	1	572
2	0	60

Probability modeled is Q13=1.

NOTE: 1371 observations were deleted due to missing values for the response or explanatory variables.

Model Convergence Status

Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics

Criterion	Intercept Only	Intercept and Covariates
AIC	398.660	359.939
SC	403.109	377.735
-2 Log L	396.660	351.939

R-Square 0.0683 Max-rescaled R-Square 0.1466

Testing Global Null Hypothesis: BETA=0

Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	44.7208	3	<.0001
Score	56.7793	3	<.0001
Wald	45.2045	3	<.0001

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-0.3091	0.3772	0.6716	0.4125

Q10	1	0.00721	0.00566	1.6235	0.2026
Q12	1	0.5433	0.0965	31.6736	<.0001
Q63	1	0.6704	0.3871	3.0002	0.0833

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits	
Q10	1.007	0.996	1.018
Q12	1.722	1.425	2.080
Q63	1.955	0.916	4.175

Association of Predicted Probabilities and Observed Responses

Percent Concordant	70.9	Somers' D	0.451
Percent Discordant	25.8	Gamma	0.466
Percent Tied	3.3	Tau-a	0.078
Pairs	34320	c	0.725

Partition for the Hosmer and Lemeshow Test

Group	Total	Q13 = 1		Q13 = 0	
		Observed	Expected	Observed	Expected
1	64	44	42.63	20	21.37
2	63	51	53.66	12	9.34
3	56	52	51.28	4	4.72
4	50	44	46.01	6	3.99
5	59	54	54.45	5	4.55
6	58	58	54.05	0	3.95
7	64	62	60.22	2	3.78
8	66	64	62.90	2	3.10
9	64	59	61.37	5	2.63
10	88	84	85.42	4	2.58

Hosmer and Lemeshow Goodness-of-Fit Test

Chi-Square	DF	Pr > ChiSq
10.8750	8	0.2089

Correlation Matrix to test for multicollinearity between the independent variables.

5 Variables: Q7 Q10 Q12 Q13 Q63

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
Q7	1659	0.57083	0.49511	947.00000	0	1.00000
Q10	654	31.22324	31.64130	20420	0	100.00000
Q12	1717	3.95515	1.53543	6791	1.00000	5.00000
Q13	1681	0.80547	0.39595	1354	0	1.00000
Q63	1727	0.22525	0.41787	389.00000	0	1.00000

Pearson Correlation Coefficients  
 Prob > |r| under H0: Rho=0  
 Number of Observations

	Q7	Q10	Q12	Q13	Q63
Q7	1.00000 1659	. 650	0.29867 <.0001 1633	0.26955 <.0001 1599	0.11006 <.0001 1641
Q10	. 650	1.00000 654	0.23406 <.0001 644	0.09827 0.0125 646	0.13562 0.0005 650
Q12	0.29867 <.0001 1633	0.23406 <.0001 644	1.00000 1717	0.46371 <.0001 1659	0.11092 <.0001 1703
Q13	0.26955 <.0001 1599	0.09827 0.0125 646	0.46371 <.0001 1659	1.00000 1681	0.08381 0.0006 1667
Q63	0.11006 <.0001 1641	0.13562 0.0005 650	0.11092 <.0001 1703	0.08381 0.0006 1667	1.00000 1727

Chapter 3 Test of Significance

Type:

1=Admin

2=Dev

3=ins

4=lenders

5=real

Table of flood10 by type

flood 10=hypothesis 9 indicator

flood10	type					Total
Frequency,						
Percent ,						
Row Pct ,						
Col Pct ,	1,	2,	3,	4,	5,	
1	6	5	11	19	11	52
	3.19	2.66	5.85	10.11	5.85	27.66
	11.54	9.62	21.15	36.54	21.15	
	35.29	20.00	35.48	24.36	29.73	
2	5	5	5	17	8	40
	2.66	2.66	2.66	9.04	4.26	21.28
	12.50	12.50	12.50	42.50	20.00	
	29.41	20.00	16.13	21.79	21.62	
3	6	14	15	42	17	94
	3.19	7.45	7.98	22.34	9.04	50.00
	6.38	14.89	15.96	44.68	18.09	
	35.29	56.00	48.39	53.85	45.95	
8	0	1	0	0	1	2
	0.00	0.53	0.00	0.00	0.53	1.06
	0.00	50.00	0.00	0.00	50.00	
	0.00	4.00	0.00	0.00	2.70	
Total	17	25	31	78	37	188
	9.04	13.30	16.49	41.49	19.68	100.00

Statistics for Table of flood10 by type

Statistic	DF	Value	Prob
Chi-Square	12	8.4695	0.7475
Likelihood Ratio Chi-Square	12	8.7205	0.7266
Mantel-Haenszel Chi-Square	1	0.0946	0.7584
Phi Coefficient		0.2123	
Contingency Coefficient		0.2076	
Cramer's V		0.1225	

WARNING: 35% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

Sample Size = 188

Table of resrisk by type  
resrisk=hypothesis 10 indicator

resrisk	type					Total
Frequency,	1,	2,	3,	4,	5,	
Percent ,						
Row Pct ,						
Col Pct ,						
1	12	7	17	36	7	79
	6.38	3.72	9.04	19.15	3.72	42.02
	15.19	8.86	21.52	45.57	8.86	
	70.59	28.00	54.84	46.15	18.92	
2	4	10	5	22	17	58
	2.13	5.32	2.66	11.70	9.04	30.85
	6.90	17.24	8.62	37.93	29.31	
	23.53	40.00	16.13	28.21	45.95	
3	1	5	8	18	11	43
	0.53	2.66	4.26	9.57	5.85	22.87
	2.33	11.63	18.60	41.86	25.58	
	5.88	20.00	25.81	23.08	29.73	
8	0	3	1	2	2	8
	0.00	1.60	0.53	1.06	1.06	4.26
	0.00	37.50	12.50	25.00	25.00	
	0.00	12.00	3.23	2.56	5.41	
Total	17	25	31	78	37	188
	9.04	13.30	16.49	41.49	19.68	100.00

Statistics for Table of resrisk by type

Statistic	DF	Value	Prob
Chi-Square	12	24.8389	0.0156
Likelihood Ratio Chi-Square	12	26.0958	0.0104
Mantel-Haenszel Chi-Square	1	1.1371	0.2863
Phi Coefficient		0.3635	
Contingency Coefficient		0.3416	
Cramer's V		0.2099	

WARNING: 30% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

Sample Size = 188

Table of notavail by type  
notavail=Hypothesis 12 indicator

notavail	type					Total
Frequency,	1,	2,	3,	4,	5,	
Percent ,						
Row Pct ,						
Col Pct ,						
1	0	4	0	6	4	14
	0.00	2.86	0.00	4.29	2.86	10.00
	0.00	28.57	0.00	42.86	28.57	
	.	16.00	.	7.69	10.81	
2	0	19	0	63	29	111
	0.00	13.57	0.00	45.00	20.71	79.29
	0.00	17.12	0.00	56.76	26.13	
	.	76.00	.	80.77	78.38	
8	0	2	0	9	4	15
	0.00	1.43	0.00	6.43	2.86	10.71
	0.00	13.33	0.00	60.00	26.67	
	.	8.00	.	11.54	10.81	
Total	0	25	0	78	37	140
	0.00	17.86	0.00	55.71	26.43	100.00

Frequency Missing = 48

Statistics for Table of notavail by type

(Rows and Columns with Zero Totals Excluded)

Statistic	DF	Value	Prob
Chi-Square	4	1.6209	0.8050
Likelihood Ratio Chi-Square	4	1.5324	0.8209
Mantel-Haenszel Chi-Square	1	0.2441	0.6213
Phi Coefficient		0.1076	
Contingency Coefficient		0.1070	
Cramer's V		0.0761	

WARNING: 44% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

Effective Sample Size = 140  
Frequency Missing = 48

WARNING: 26% of the data are missing.

Chapter 3 Significance Tests For Homeowners

Homeowners indicator #14

Table of Q7 by sample

sample:

1=PH in SFHA

2=PH out SFHA

3=NonPH in SFHA

4=NonPH out SFHA

Q7 sample

Frequency,

Percent ,

Row Pct ,

Col Pct ,

	1,	2,	3,	4,	Total
1,	277,	115,	81,	15,	488
,	30.92,	12.83,	9.04,	1.67,	54.46
,	56.76,	23.57,	16.60,	3.07,	
,	57.35,	53.74,	55.48,	28.30,	
2,	186,	86,	59,	34,	365
,	20.76,	9.60,	6.58,	3.79,	40.74
,	50.96,	23.56,	16.16,	9.32,	
,	38.51,	40.19,	40.41,	64.15,	
8,	20,	13,	6,	4,	43
,	2.23,	1.45,	0.67,	0.45,	4.80
,	46.51,	30.23,	13.95,	9.30,	
,	4.14,	6.07,	4.11,	7.55,	
Total	483	214	146	53	896
	53.91	23.88	16.29	5.92	100.00

Frequency Missing = 205

Statistics for Table of Q7 by sample

Statistic	DF	Value	Prob
Chi-Square	6	17.3285	0.0081
Likelihood Ratio Chi-Square	6	17.5344	0.0075
Mantel-Haenszel Chi-Square	1	2.8960	0.0888
Phi Coefficient		0.1391	
Contingency Coefficient		0.1377	
Cramer's V		0.0983	

Effective Sample Size = 896

Frequency Missing = 205

WARNING: 19% of the data are missing.

INDICATOR #15

Table of damage (Q10) by sample

```

damage=.;
if ( 0 le Q10 le 25) then damage=1;
if (26 le Q10 le 50) then damage=2;
if (51 le q10 le 75) then damage=3;
if (76 le q10 le 100) then damage=4;
if Q10 eq 888 then damage=5;
if Q10 eq 999 then damage=6;

```

damage	sample					
Frequency,						
Percent ,						
Row Pct ,						
Col Pct ,	1,	2,	3,	4,	Total	
1	100	52	34	9	195	
	28.33	14.73	9.63	2.55	55.24	
	51.28	26.67	17.44	4.62		
	54.05	56.52	54.84	64.29		
2	42	25	14	2	83	
	11.90	7.08	3.97	0.57	23.51	
	50.60	30.12	16.87	2.41		
	22.70	27.17	22.58	14.29		
3	8	3	5	1	17	
	2.27	0.85	1.42	0.28	4.82	
	47.06	17.65	29.41	5.88		
	4.32	3.26	8.06	7.14		
4	25	10	6	2	43	
	7.08	2.83	1.70	0.57	12.18	
	58.14	23.26	13.95	4.65		
	13.51	10.87	9.68	14.29		
5	10	2	3	0	15	
	2.83	0.57	0.85	0.00	4.25	
	66.67	13.33	20.00	0.00		
	5.41	2.17	4.84	0.00		
Total	185	92	62	14	353	
	52.41	26.06	17.56	3.97	100.00	

Frequency Missing = 748

Statistics for Table of damage by sample

Statistic	DF	Value	Prob
Chi-Square	12	6.3900	0.8952
Likelihood Ratio Chi-Square	12	7.0185	0.8564
Mantel-Haenszel Chi-Square	1	0.6859	0.4076
Phi Coefficient		0.1345	
Contingency Coefficient		0.1333	
Cramer's V		0.0777	

WARNING: 40% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

Effective Sample Size = 353  
Frequency Missing = 748

WARNING: 68% of the data are missing.

INDICATOR #16

Table of Q12 by sample

Q12 sample

Frequency,					
Percent ,					
Row Pct ,					
Col Pct ,	1,	2,	3,	4,	Total
1 ,	79 ,	12 ,	29 ,	19 ,	139
, 8.84 ,	1.34 ,	3.24 ,	2.13 ,	15.55	
, 56.83 ,	8.63 ,	20.86 ,	13.67 ,		
, 16.36 ,	5.61 ,	20.00 ,	36.54 ,		
2 ,	25 ,	10 ,	11 ,	7 ,	53
, 2.80 ,	1.12 ,	1.23 ,	0.78 ,	5.93	
, 47.17 ,	18.87 ,	20.75 ,	13.21 ,		
, 5.18 ,	4.67 ,	7.59 ,	13.46 ,		
3 ,	38 ,	19 ,	19 ,	5 ,	81
, 4.25 ,	2.13 ,	2.13 ,	0.56 ,	9.06	
, 46.91 ,	23.46 ,	23.46 ,	6.17 ,		
, 7.87 ,	8.88 ,	13.10 ,	9.62 ,		
4 ,	29 ,	19 ,	4 ,	2 ,	54
, 3.24 ,	2.13 ,	0.45 ,	0.22 ,	6.04	
, 53.70 ,	35.19 ,	7.41 ,	3.70 ,		
, 6.00 ,	8.88 ,	2.76 ,	3.85 ,		
5 ,	304 ,	153 ,	81 ,	17 ,	555
, 34.00 ,	17.11 ,	9.06 ,	1.90 ,	62.08	
, 54.77 ,	27.57 ,	14.59 ,	3.06 ,		
, 62.94 ,	71.50 ,	55.86 ,	32.69 ,		
8 ,	6 ,	1 ,	1 ,	2 ,	10
, 0.67 ,	0.11 ,	0.11 ,	0.22 ,	1.12	
, 60.00 ,	10.00 ,	10.00 ,	20.00 ,		
, 1.24 ,	0.47 ,	0.69 ,	3.85 ,		
9 ,	2 ,	0 ,	0 ,	0 ,	2
, 0.22 ,	0.00 ,	0.00 ,	0.00 ,	0.22	
, 100.00 ,	0.00 ,	0.00 ,	0.00 ,		
, 0.41 ,	0.00 ,	0.00 ,	0.00 ,		
Total	483	214	145	52	894
	54.03	23.94	16.22	5.82	100.00

Frequency Missing = 207

Statistics for Table of Q12 by sample

Statistic	DF	Value	Prob
Chi-Square	18	63.8491	<.0001
Likelihood Ratio Chi-Square	18	63.9019	<.0001
Mantel-Haenszel Chi-Square	1	12.4205	0.0004
Phi Coefficient		0.2672	
Contingency Coefficient		0.2582	
Cramer's V		0.1543	

WARNING: 36% of the cells have expected counts less than 5. Chi-Square may not be a valid test.

Effective Sample Size = 894  
Frequency Missing = 207

WARNING: 19% of the data are missing.

APPENDIX F  
CONGRESSIONAL RESEARCH SERVICE SUMMARY H.R. 3121

5/13/2008--Passed Senate amended.

**Title I - Flood Insurance Reform and Modernization**

Flood Insurance Reform and Modernization Act of 2008 -

**Section 104 -**

Amends the National Flood Insurance Act of 1968 (Act) to extend the national flood insurance program (Program) through FY2013.

**Section 105 -**

Requires the Director of the Federal Emergency Management Agency (FEMA) to make national flood insurance available for multifamily properties of more than four units to a maximum coverage equal to the coverage amount made available to commercial properties.

**Section 106 -**

Requires the FEMA Director to estimate the exclusion of certain prospective insureds from purchasing flood insurance at risk premium rates less than those estimated for specified properties (including any property not an individual's primary residence, severe repetitive loss property, and any business property). Sets an annual risk premium rate limitation of 25% for such properties.

Prohibits the Director from providing flood insurance to prospective insureds at risk premium rates less than those otherwise estimated (federal subsidy) for new or lapsed policies, or to any prospective insured who refuses to accept any offer for FEMA mitigation assistance by the Administrator.

Increases from 10% to 15% the annual limitation on risk premium rate increases for any properties within any single risk classification.

**Section 107 -**

Instructs FEMA to issue final regulations establishing revised definitions of special flood hazard areas, including residual risk areas.

Subjects such areas to mandatory flood insurance purchase requirements.

Requires the Director to ensure that the flood insurance policy price in residual risk areas accurately reflects the level of flood protection provided by any levee, dam, or other the man-made structure in the area.

Requires the Army Corps of Engineers to notify the Director of the National Flood Insurance Program immediately upon decertification of any levee, dam, or man-made structure under its jurisdiction.

**Section 108 -**

Requires adjustment of flood insurance risk premium rates to reflect the current risk of flood to property located in an area participating in the Program.

Prohibits the Director, until flood insurance rate maps for all areas in the St. Louis District of the Mississippi Valley Division of the Corps of Engineers are updated, from: (1) adjusting the chargeable flood insurance premium rate for any type or class of property located in an area in that District; or (2) requiring the purchase of flood insurance for any type or class of property located in such an area not subject to such purchase requirement before the updating of the national flood insurance program rate map.

States that such an area does not include any area (or subdivision) that has chosen not to participate in the flood insurance program.

**Section 109 -**

Adds a new requirement for those states and areas where flood insurance must be made available.

Requires such states or areas to give satisfactory assurance that by December 31, 2008, state-chartered lending institutions not insured by the Federal Deposit Insurance Corporation shall be subject to state regulations consistent with the Flood Disaster Protection Act of 1973.

**Section 110 -**

Amends the Flood Disaster Protection Act of 1973 to increase from \$350 to \$2000 the civil monetary penalty for a single violation of the Act. Repeals the limitation upon the maximum penalty amount that may be imposed against any single regulated lending institution or enterprise in any calendar year.

**Section 111 -**

Revises the requirement that federal entities responsible for lending regulation require by regulation the payment of flood insurance premiums to a mortgage lender for deposit in an escrow account. Changes the property reference from real estate or mobile home to any property for which a loan has been made for purposes of acquisition or construction.

Extends the same requirement to state entities responsible for lending regulations with respect to lending institutions they supervise.

Requires any regulated lending institution, upon final payment of a mortgage, to notify the policyholder: (1) that insurance coverage may cease with such final payment; and (2) how flood insurance coverage may be continued after the life of the loan.

**Section 112 -**

Declares that the Secretary of the Treasury relinquishes the right to any repayment of loans to FEMA, subject to specified conditions, to the extent such borrowed sums were used to fund the payment of flood insurance claims resulting from the hurricanes of 2005.

Increases from \$1.5 billion to \$20.775 billion, during FY2008 only, the maximum amount of loans and obligations the FEMA Director may issue to the Secretary of the Treasury with the President's approval for the Program.

**Section 113 -**

Prescribes minimum deductibles for claims under the Program for specified properties. Specifies the minimum annual deductible for pre-FIRM properties (containing a structure neither constructed nor substantially improved after the later of December 31, 1974, or the effective date of the initial rate map published by the FEMA Director under the National Flood Insurance Act of 1968 for the pertinent area) as: (1) \$1,500, if the flood insurance covers structural damage of \$100,000 or less; and (2) \$2,000, if the flood insurance covers structural damage greater than \$100,000.

Sets the minimum annual deductible for post-FIRM properties at \$750 in the first instance, and \$1,000 in the second.

**Section 114 -**

Revises requirements for the FEMA Director's prescription of chargeable flood insurance premium rates. Repeals the requirement that the Director consult with certain entities before prescribing rates.

Requires such rates, in addition to meeting other conditions, to be adequate, on the basis of accepted actuarial principles, to cover the average historical loss year obligations incurred by the National Flood Insurance Fund.

**Section 115 -**

Instructs the Director to establish in the Treasury a National Flood Insurance Reserve Fund, which shall maintain 1% of the sum of the total potential loss exposure of all outstanding flood insurance policies in force in the prior fiscal year, or any higher percentage the Director determines appropriate.

**Section 116 -**

Requires any funds borrowed by FEMA for the Program to include a repayment schedule, which shall be transmitted not only to the Secretary but to specified congressional committees.

**Section 117 -**

Prohibits FEMA from denying payment of certain flood insurance claims by condominium owners who purchased such flood insurance separate and apart from the flood insurance purchased by the condominium association, based on the flood insurance coverage of the association or others on the association's overall property.

**Section 118 -**

Establishes the Technical Mapping Advisory Council to make recommendations to the FEMA Director regarding: (1) flood insurance rate maps; (2) mapping standards; (3) interagency and intergovernmental coordination on flood mapping and flood risk determination; and (4) a future conditions risk assessment and modeling report.

**Section 119 -**

**Section 119 -**

Requires the FEMA Director, in coordination with the Technical Mapping Advisory Council, to establish an ongoing program for review, update, and maintenance of Program rate maps.

Requires the Director to work to enhance communication and outreach to states, local communities, property owners, and community residents about the effects: (1) of any potential changes to National Flood Insurance Program rate maps that may result from such mapping program; and (2) that any such changes may have on flood insurance purchase requirements.

Authorizes appropriations for FY2008-FY2013.

**Section 120 -**

Removes the limitation placed upon state or local government contributions for the cost of updating flood maps.

**Section 121 -**

Directs the Secretary of Homeland Security, the FEMA Director, the Director of the Office of Management and Budget (OMB), and the heads of specified federal agencies to: (1) coordinate and share data on flood risk determination and geospatial data; and (2) report to Congress an interagency budget crosscut report that displays the budget proposed for agencies working on flood risk determination data and digital elevation models, including planned agency transfers.

**Section 122 -**

Directs the National Academy of Public Administration to study and report to Congress on how FEMA can: (1) improve interagency coordination on flood mapping, including a funding strategy to leverage and coordinate budgets and expenditures; and (2) establish joint funding mechanisms with other governmental agencies.

**Section 123 -**

Exempts from certain floor insurance purchase requirements any area located within the 500-year flood plain.

**Section 124 -**

Amends the Real Estate Settlement Procedures Act of 1974 (RESPA) to require that certain public information booklets include the availability of federal flood insurance.

**Section 125 -**

States that a temporary residential structure built for the purpose of testing certain new flood proofing technology in any state or community receiving flood mitigation assistance may not be construed to violate any flood risk mitigation plan developed by that state or community and approved by FEMA.

**Section 126 -**

Requires the FEMA Director, upon state insurance commissioner request, to cause Program representatives to participate in state disaster claims mediation programs.

**Section 127 -**

Directs FEMA to: (1) continue to work to implement minimum training and education standards for insurance agents who sell flood insurance policies; and (2) report to Congress on implementation of the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004.

**Section 128 -**

Directs the FEMA Director to collect, from property and casualty insurance companies authorized to participate in the Write Your Own program (WYO), any information needed to determine the accuracy of the resolution of flood claims filed on any property covered by a standard flood insurance policy obtained under WYO that was subject to a flood.

**Section 129 -**

Authorizes such companies to make specified biennial expense reports to Congress. Specifies a civil penalty for any property and casualty insurance company authorized to participate in the WYO program which fails to comply with specified reporting requirements or the requirement for biennial auditing of the flood insurance financial statements.

Requires the FEMA Director to conduct rulemaking proceedings to: (1) devise a data collection methodology to allow FEMA to collect information on the expenses of property and casualty insurance companies participating in the WYO program for selling, writing, and servicing, standard flood insurance policies; and (2) formulate revised reimbursements to property and casualty insurance companies participating in the WYO program for their related expenses.

Directs the Comptroller General to study and report to specified congressional committees on the efficacy, adequacy, and sufficiency of such rules.

**Section 130 -**

Extends the pilot program for mitigation of severe repetitive loss properties through FY2013. Repeals the termination date for such program.

Sec. 131) Establishes in FEMA the Office of the Flood Insurance Advocate (FIA), among other duties, to: (1) assist insureds in resolving problems with FEMA; (2) supervise and coordinate audits and investigations to determine whether insurance companies allocate only flood losses to the national flood insurance program; (3) prevent and detect fraud and abuse; and (4) investigate conflicts of interest.

Requires such Office to report annually to Congress directly, without any prior review or comment from FEMA, Department of Homeland Security, or OMB.

Provides for appointment of regional flood insurance advocates, as well as temporary state or local offices following a flood event.

Authorizes the National FIA, upon application by a qualified insured, to issue a Flood Insurance Assistance Recommendation to take or refrain from taking specified action under any other provision of law, if the qualified insured is suffering a significant hardship, such as a significant delay in resolving claims while incurring significant resulting costs, or where the insured is at risk of adverse action, including the loss of property, as a result of the manner in which the flood insurance laws are being administered by the FEMA Director. Specifies required responses by the FEMA Director to such a Recommendation.

Requires the National FIA to report expeditiously to the Attorney General any reasonable grounds to believe a violation of federal criminal law has occurred.

Requires the FEMA Director and the FIA to establish procedures to take appropriate action against an insurance company, including monetary penalties and removal or suspension from the program, when it refuses to cooperate with an investigation or audit or where a finding of improper conduct has been made.

Authorizes the Director to use the National Flood Insurance Fund to fund the activities of the Office of the Flood Advocate in FY2009-FY2014.

#### **Section 132 -**

Instructs the Comptroller General to study and report to certain congressional committees regarding: (1) the number of flood insurance policy holders currently insuring specified residential and commercial structures; (2) increased losses the national flood insurance program would have sustained during the 2004 and 2005 hurricane season if it had insured all policyholders up to the maximum conforming loan limit; (3) the availability in the private marketplace of flood insurance coverage in amounts that exceed the current limits of federal coverage; and (4) the effect that raising or reducing current limits of coverage amounts would have upon private insurers' ability to continue providing flood insurance coverage.

Directs the FEMA Director to report annually to certain congressional committees on the activities of the national flood insurance program.

Requires the Comptroller General also to report to Congress on: (1) pre-FIRM structures receiving discounted premiums; and (2) a review of the three largest FEMA contractors used in administering the Program.

#### **Section 133 -**

Instructs the Comptroller General to study and report to certain congressional committees on: (1) the feasibility of requiring the FEMA Director to purchase, in addition to mandatory reinsurance coverage, private reinsurance or retrocessional coverage to

underlying primary private insurers for losses due to flood insurance coverage provided by them; (2) the feasibility of repealing mandatory reinsurance and requiring the FEMA Director to purchase such private reinsurance or retrocessional coverage; and (3) the estimated total savings to the taxpayer of taking each such action.

**Section 134 -**

Requires each policy under the national flood insurance program to disclose conditions, exclusions, and other limitations in plain English, in boldface type, and in a font twice the size of the text of the body of the policy.

**Section 135 -**

Requires the FEMA Director to study and report to certain congressional committees on the feasibility of amending the National Flood Insurance Act of 1968 to include widely used and nationally recognized building codes as part of floodplain management criteria.

**Title II - Commission on Natural Catastrophe Risk Management and Insurance**

Commission on Natural Catastrophe Risk Management and Insurance Act of 2008 -

**Section 203 -**

Establishes the Commission on Natural Catastrophe Risk Management and Insurance to report to certain congressional committees on risks posed to the United States by natural catastrophes, and the means for mitigating them and paying for ensuing losses, including an assessment of: (1) the condition of the property and casualty insurance and reinsurance markets before and after specified hurricanes; and (2) the availability and affordability of insurance in all regions of the country.

**Section 210 -**

Authorizes appropriations.

**Title III - Miscellaneous**

**Section 301 -**

Modifies the project for flood control, Big Sioux River and Skunk Creek, Sioux Falls, South Dakota, to authorize reimbursement of the nonfederal interest for funds advanced for the federal share of the project, but only if additional federal funds are appropriated for that purpose.

**Section 302 -**

Directs the Secretary of the Interior and the Secretary of Energy to suspend petroleum acquisition for the Strategic Petroleum Reserve (SPR) from the date of enactment of this Act through December 31, 2008.

Authorizes such Secretaries to resume acquisition 30 days after the date on which the President notifies Congress that the weighted average price of petroleum in the United States for the most recent 90-day period is \$75 or less per barrel.

Requires the Secretary, to the maximum extent practicable, to negotiate a deferral of the delivery of oil under existing contracts for a period of at least one year.

## APPENDIX G ADDITIONAL INFORMATION ON THE EVOLUTION OF FEMA

FEMA's marginal performance from its inception until the mid-1990s is highlighted in a number of articles and congressional hearings (U.S. House of Representative and Senate Hearings, 1992, 1993). The book, *Flirting with Disaster: Public Management in Crisis Situations*, provides excellent case studies of FEMA's failures during this period (Schneider, 1995). In fact, a panel commissioned by Congress from the National Academy of Public Administration (NAPA) reported in May 1993 that, "Currently, FEMA is like a patient in triage. The President and Congress must decide whether to treat it or let it die" (National Academy of Public Administration, 1993, pg ix). The panel concluded that "a small independent agency could coordinate the federal response to major natural disasters...but only if the White House and Congress take significant steps to make it a viable institution" (National Academy of Public Administration, 1993, pg ix). A National Academy of Public Administration report concluded that FEMA was a federal agency in disarray and in need of substantive change.

NAPA's report detailed the conditions required for FEMA to succeed:

Reduction of political appointees to a director and deputy director, development of a competent, professional career staff...Access to, and support of, the President...Integration of FEMA's subunits into a cohesive institution through the development of a common mission, vision and values...A new statutory charter centered on integrated mitigation, preparation, response and recovery...Development of functional headquarter-field relationships. (National Academy of Public Administration, 1993, pg ix)

Consistent with the research of John Kingdon as well as Jameson Doig and Erwin Hargrove, bureaucratic entrepreneurs can transform government organizations (Kingdon 1984, Doig and Hargrove 1987). In the case of FEMA, observers credited FEMA's improvement with the 1993 appointment of James Witt as Director, charged

with evolving FEMA into a responsive federal agency. As Arkansas' Emergency Manager, Witt was the first FEMA Director with state emergency management experience. Since Witt had served as then-Governor Bill Clinton's head of emergency management, he had a lot of political support to impose changes on the bureaucracy. Witt embraced the "reinventing government" movement and was able to use the National Performance Review to bring change to the organization. Witt championed a new Vision and Mission Statement and significantly reorganized FEMA.

One complaint about all government disaster management was that it was an "after-the-fact" reaction to a disaster. Under Witt, the organization tried to put more emphasis on pre-disaster "mitigation to reduce risks to people, property, and communities from various hazards" and began to more closely integrate the activities of the federal government with state and local efforts (FEMA: National Performance Review, 1993, pg 26). Congressional hearings became much friendlier in subsequent years. This 1998 statement by Senator Tim Hutchinson (R-AR) was typical of this changed attitude towards FEMA: "It's always good to see James Lee Witt...I think he's done an outstanding job at FEMA...When he took over FEMA 5 years ago, it was less than a respected organization...apart from the IRS it was one of the least popular Federal agencies" (Hutchinson, Senate FEMA Hearings, 1998). Additional hearings on FEMA's role in managing bioterrorist attack preparations and FEMA response to the September 11, 2001 events were also generally complimentary of FEMA's efforts (U.S. House of Representative and Senate Hearings, 1992, 1993).

Obviously, the "patient in triage" had thrived – at least up until the Hurricanes Katrina, Rita and Wilma. The final paragraphs in this section focus on an aspect of

organizational theory that deals with transformation or change management as it applies to FEMA. It is interesting literature from the standpoint that FEMA was considered a “disaster,” then a “savior,” and now, again, a “disaster.”

One should note that the use of the term “transformation” is based on the popular term describing organizational reform during that era. Business process re-engineering, total quality management, and management by objective are other examples of organizational reform movements.

A future course in American Political Development that covers the “transformation initiatives era” of the late 1990s and early 2000s is likely to reference a number of studies currently being conducted to better understand how to transform a beleaguered agency such as FEMA. An early attempt at understanding FEMA’s metamorphosis is detailed by R. Steven Daniels, Associate Professor and Public Service, University of Alabama at Birmingham in, *Transforming Government: The Renewal and Revitalization of the Federal Emergency Management Agency* (Daniels and Clark-Daniels, 2000). In summary, Daniels highlights “7 Lessons Learned” by Director Witt during the transformation process:

**Lesson 1:** Experience Counts—Recruit the Best

**Lesson 2:** Clarify Your Mission

**Lesson 3:** Structure Your Agency to Reflect the Agency’s Mission

**Lesson 4:** Leverage the Presidency

**Lesson 5:** Use Your Staff

**Lesson 6:** Don’t Be Afraid of the Press

**Lesson 7:** Provide Governmental and Nongovernmental Partners a Stake in the Outcome

Although not discussed in the literature, it seems important to note the factors that serve as catalysts to initiating transformation of an organization. In this author's previous life as a consultant working in the transformation arena, the following conditions for reform are axiomatic. The author has tried to find a sole original source for these conditions, but has been unsuccessful; nonetheless, they seem quite applicable to the transformation of FEMA. The first condition is that the agency must come under intense scrutiny by political forces that demand change based on a public outcry for help (Congressional hearings document this condition). Next, the agency needs a new leader that has credibility among the staff and access to senior political power (in Director Witt's case, that access included President Clinton). Additionally, if the leadership can tie the desired reforms to the reform movement *du jour*, it provides an institutional mechanism and format for change. (In FEMA's case, the National Performance Review provided the institutional mechanism). Finally, if the leadership is able to work with the staff to establish agreed upon metrics to measure success, there is a chance the organization can transform.

After Director Witt's time and FEMA's short phase of being "a savior" during natural disasters, FEMA became an agency under the Department of Homeland Security in 2003. In 2002, FEMA's full-time staff was approximately 2,500 with more than 5,000 additional individuals assigned as stand-by disaster reservists (FEMA website, 2003). Total appropriations for FEMA in FY2002 totaled \$3 billion (Bea, 2002). FEMA's FY 2008 budget request exceeded \$8 billion which included an additional \$215 million for the National Flood Insurance Fund (FEMA website, March 2007).

As the literature suggests, FEMA was able to significantly evolve from a dysfunctional organization to one that drew praise from lawmakers and researchers. However, the laudatory remarks about FEMA turned to scorn by 2005. Many of FEMA's programs came under close, critical scrutiny. In particular, one of FEMA's most controversial programs, the National Flood Insurance Program (NFIP), began to receive lots of attention. Many questions were raised about the NFIP's current policies but relatively few critics were familiar with the origins and prior history of the NFIP.

## LIST OF REFERENCES

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