

Post-Disaster Recovery Planning in Florida:  
A Resilient Solution to Counteract Reactive Federal Policy

A Thesis  
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In partial fulfillment of the requirements  
for the degree of  
Master of Arts  
in  
Urban and Environmental Policy and Planning

Tufts University

August, 2011

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*Abstract*

The opportunity to renew and rebuild after a disaster creates a potential to update and improve on previous infrastructure. This thesis will look at resiliency, the ability to withstand a devastating event by bending, but not breaking, as an ultimate goal for recovery planning. Current federal policy does not encourage recovery in a resilient way, an unintentional result of the five reactive federal recovery procedures and goals that now exist. How has the United States begun to counteract these reactive tendencies? Florida has created a framework document for preparing a Post-Disaster Redevelopment Plan (PDRP) and has mandated PDRP development in all coastal communities. The key to the PDRP is to detail possible advancement strategies in land use, housing, infrastructure, economic development, environmental protection and public participation to facilitate proactive community standards for rebuilding in the wake of a major event. By comparing the PDRP components with the reactive policies that are addressed, the state of Florida provides an example depicting how proactive planning can address problems that reactive planning cannot.

## Table of Contents

Introduction	1
Chapter 1: Resilient Cities: A PDRP Goal	4
Chapter 2: PDRP Background	9
2.1: Background and Goals of PDRP	9
2.2: Window of Opportunity: Why a PDRP Must be Ready	14
2.3: Implementation	19
Chapter 3: Background of Federal Policy	23
3.1: The Current State of Federal Recovery Policy: ESF-14, LTCR, NDRF	30
Chapter 4: The Five Reactive Tendencies of FEMA	32
4.1: The Facilitation of Development in Hazardous Areas	35
4.2: Bureaucracy	42
4.3: Adverse Incentives	43
4.4: Stafford Act Rebuilding Clauses	44
4.5: Emergency Support Function 14 (ESF-14)	46
Chapter 5: The Details of the PDRP in Florida	50
5.1: Land Use	54
5.2: Housing, Infrastructure and Public Facilities	67
5.3: Economic, Redevelopment and Private Sector	79
5.4: Environment	85
5.5: Public Participation	88
Recommendations	93
Conclusion	95

## *Introduction*

Natural disasters affect the lives of millions of Americans each year, causing injury, death, loss of property, financial loss and other suffering. In 2009, flooding alone caused more than \$2 billion in damage. Hurricane Katrina is estimated to have caused \$125 billion in damage, making it the most costly disaster in the history of the United States (NOAA 2009). Over the past one hundred years, while the average annual death rate as a result of disasters has dropped considerably, the financial damage has increased from \$210 million to \$3 billion (all dollar figures in 2009 dollars). Donald Geis states that these “events are human-made disasters: the result of being less of the extreme natural event itself, than that of the inappropriate way we have designed and built our communities and buildings in hazard prone areas” (Geis 2001, 151). Are states and communities taking enough preventative steps to protect its residents from the effect of these natural disasters? The states should not accept loss of life and property as an acceptable outcome of disasters. How do we reverse this process?

The opportunity to renew and rebuild after a disaster creates a potential to update and improve on previous infrastructure. This thesis will look at resiliency as an ultimate goal for recovery planning, followed by the benefits of the advanced recovery planning, prior to a detailed discussion of the five policy failures that have led to the reactive recovery procedures that dominate federal disaster policy. How have people begun to counteract these reactive tendencies? Florida has created a framework document for preparing a Post-Disaster Redevelopment Plan (PDRP) and has mandated PDRP development in all coastal communities. Massachusetts is a state that has far less capacity for post-disaster redevelopment because the mitigation mechanisms do not exist.<sup>1</sup> This paper will combine literature on the benefits and key

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<sup>1</sup> It is important to remember that Florida is a planned state, while Massachusetts has no comprehensive planning requirements because different planning strategies must be considered with such varied structures.

components of PDRPs, using Florida as a best practice, with actual recovery plans in Florida as well as two planning guides: the recent World Bank comprehensive policy and planning guide and the American Planning Association guide to recovery and reconstruction.

The fundamental problem with the way our nation deals with disasters stems from federal policy directives. According to the vice president of a leading disaster consulting firm, The Federal Emergency Management Agency (FEMA) along with the Stafford Act and the National Flood Insurance Program (NFIP) reflects apathy on the part of society. The apathy, in turn, institutionalizes a policy that discourages pre-disaster planning. The government facilitates the construction of infrastructure and buildings in hazardous areas, with the promise of relief in the form of financial aid, afforded through taxation, if the vulnerable residences are destroyed. This policy is counter-productive. The policy goal should be to create more resilient cities. One emergent approach to creating resilient communities is through a PDRP. The PDRP can “inject long range resiliency considerations into short term recovery actions that promote redevelopment that is socially just, economically viable, environmentally compatible and less vulnerable to hazards” (Berke and Campanella 2006, 194).

Why should the goal be resiliency? The basic tenet of a resilient city is that the vulnerability of technological and social systems cannot be predicted perfectly, so an ability to contain and limit the effects of a disaster – resiliency – is necessary to help cities cope with contingencies effectively (Foster 1997).

The state of Florida, with its precariously positioned peninsula separating the warm Gulf of Mexico from the equally warm Atlantic Ocean, is the state most often affected by hurricanes. The 2004 and 2005 seasons were especially destructive, with twelve named storms making landfall in the state, causing billions of dollars in damage (Florida Redevelopment Plan 1).

Officials in the Florida Department of Community Affairs and the Florida Division of Emergency Management decided that the time frame between the disaster and the beginning of recovery was too short to effect meaningful change in the community. The report states that becoming “more disaster resilient, local governments should plan for what must happen after rescue and recovery operations are completed in order to return the community to normal or perhaps rebuild an even better community” (Florida Redevelopment Plan 1).

In Florida the advanced recovery procedures are incorporated into the Post Disaster Redevelopment Plan (PDRP), which defines policies, operational strategies, and roles and responsibilities for implementation that guide the long-term recovery process. It is critical that citizen involvement and local procedures are incorporated into every aspect of the planning and implementation stages of the plan. There are six pilot communities (counties) that designed plans in accordance with the new regulations in the state that require coastal communities to implement a PDRP. The thesis will explore the following questions about current policy at the federal and state level followed by an analysis of Florida’s PDRP.

- How will a PDRP help states ensure resiliency to compensate for current, reactive policy on the federal level?
  - How does current US Policy (based on reactive procedures) undermine the development of PDRPs?
  - What are the main policy elements of the Florida PDRPs? How does Florida state law try to counteract these problems?
  - Why should Massachusetts follow this model?

The thesis aggregates the reactive criticisms of federal disaster policy and provides an example of a system in Florida with solutions that can link back to the reactive tendencies, all while keeping resiliency in mind as a final goal.

### **Chapter 1: Resilient Cities: A PDRP Goal**

The concept of resilience is an important goal for future disaster recovery missions. The United Nations International Strategy for Disaster Reduction (UNISDR) defines resilience as a “capacity to absorb shocks while maintaining function, and when change occurs resilience provides the tools for renewal and reorganization” (UNISDR 2002, 13). The less resilient an area is, the more likely it is to suffer setbacks and unnecessary distress due to changes that result from intense natural disasters. Dennis Mileti defines disaster resilience as the “ability to withstand an extreme natural event without suffering devastating losses, damage, diminished productivity or quality of life, and without a large amount of assistance from outside the community” (Mileti 1999, 32-33). David Godschalk follows by defining urban resilience as a “sustainable network of physical systems and human conditions” (Godschalk 2003, 137). A review of the literature supports the conclusion that the key to resilience is to be able to absorb major shocks and to be able to adapt to changing conditions with as little impact as possible on daily operations.

David Godschalk likens resilient cities to the human body. The physical systems include the infrastructure and natural systems that comprise any given jurisdiction. These physical systems “act as its bones, arteries and muscles” (Godschalk 2003, 137). The other components are the social and institutional parts of the city and can include neighborhood associations, schools, enterprises and task forces, which “act as the brain of the city, directing its activities, responding to its needs and learning from its experience” (Godschalk 2003, 137). When a disaster strikes, all

of these systems must continue to function, or the response will drag and the recovery will be delayed.

Godschalk has aggregated information from researchers who have studied disasters, and he found that resilient systems tend to be redundant, with a number of functionally similar components to prevent total collapse if one component fails. They must be autonomous, strong, interdependent, adaptable and collaborative (Godschalk 2003, 139). All of these qualities lead to a system that can withstand hazards and continue functioning, thus reducing the probability that livelihoods will be interrupted because of a natural event. The PDRP must integrate all of these qualities into its functions to ensure that the plan is effective.

Resilience is important for a number of reasons, and the first is uncertainty. While disasters sometimes strike the same area multiple times, it is never known which place will be struck at a given time or what the frequency of disasters may be in a given year (Godschalk 2003, 138). Tampa Bay has not had a direct hit from a hurricane in over fifty years, but it is still extremely vulnerable to hurricanes, given its coastal location in an active hurricane region. It is also difficult to know with complete certainty how well man-made systems can handle change. Resilience, or an ability to adapt to changing conditions, is key when designing infrastructure and systems in a given region.

Resilience is also important because, in theory, more resilient cities sustain less property damage. There are fewer collapsed buildings, fewer power outages, and fewer interruptions in business and daily life (Godschalk 2003, 138). It is extremely important to look at disaster recovery as a continuous process in search of a “new normal,” instead of striving to return to pre-disaster conditions, including population numbers (Vale 2005, 12). If buildings and lifestyles were severely interrupted due to an event, a recovery priority should be to change what is



“normal” to a more resilient “new normal.”<sup>2</sup> Post-disaster recovery is an opportunity for a city to employ more resilient techniques, but who is in charge of setting the goals? Who decides what is rebuilt and where? What happens to displaced people if their property is deemed too hazardous to inhabit? What is the community’s role in recovery? How can disaster be looked at as an opportunity to advance resiliency? A Post-Disaster Redevelopment Plan (PDRP) can provide answers to the resiliency questions. Resiliency must be looked at as the ultimate goal of a PDRP.

While there is not much resistance to the idea of resilience as an optimal situation in perfect circumstances, there is disagreement about whether it is realistic. Some critics argue that community resilience is not practical. Tobin studied data from Florida on a state level to see if it was possible to create a more sustainable, resilient community. He concluded that major changes politically would be necessary to overcome obstacles to resiliency. Tobin only looked at Florida as one entity, instead of as a state comprising smaller communities with people heavily invested in the integrity and safety of their regions (Tobin 1999, 14). Resiliency does not happen overnight. The best way to achieve a more resilient future is to highlight the systemic changes and damages from previous disasters as motivation to ensure that the same damage never happens again. The key, the research shows, is to seize opportunities to create incremental resiliency planning as money becomes available rather than attempting a full-scale policy change all at once, which is most likely impossible to effect (Mileti 1999, 34). The United States must move forward with resiliency because the alternative (maintenance of the status quo) costs money and disrupts livelihoods.

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<sup>2</sup> During the 1970s and 1980s, Tulsa, OK led the nation in numbers of federally declared disasters due to severe thunderstorms and flash floods. As a result, the city established a flood plain management program that removed over 800 buildings from the flood plain through a small utility fee added to bills (Godschalk 2003, 138). Overall the city greatly reduced risk to create a “new normal” by positioning social *and* physical resilience as a goal.

The alternative to a resilient system is a vulnerable system. Godschalk states, “a city without resilient communities will be extremely vulnerable to disasters” (Godschalk 2003, 137).

Vulnerability describes an area that may be susceptible to disaster because it has not created plans and safeguards to hedge risk adequately. UNISDR defines it as the “propensity of [the] social and ecological system to suffer harm from exposure to external stresses and shocks” (UNISDR 2002, 13). In a resilient system, change (or a disaster) provides an opportunity for advancement and innovation, while change in a vulnerable system can be devastating to a region. The concept of resiliency, as opposed to vulnerability, is far from fluid, as specific areas may be more prone to disaster for a multitude of natural and structural reasons. Cities are complex human creations and are at risk from a wide range of hazards, and it consequently takes a complex set of plans to address vulnerability.

Throughout the history of the United States, there are examples of vulnerability evolving into resilience. Disasters have been used as instruments of progress in an effort to promote resiliency for over one hundred years. The 1871 fire in Chicago and the 1906 earthquake in San Francisco were the most devastating disasters in American history in terms of property destruction. In Chicago, nearly one hundred thousand people (a third of the population) became homeless overnight. In San Francisco two hundred thousand (nearly half of the residents) were homeless after the earthquake. In addition, countless people died stuck in the wreckage of homes not built to withstand the intense shaking from an earthquake. In the decades following the fire, Chicago became the fastest growing city in America, and the city ensured that the most extensive steps possible at the time were taken to prevent a future fire of the same magnitude. San Francisco began implementing strict earthquake standards, which probably saved countless lives in the 1989 earthquake (Vale 2005, 28-32).

Even though these events occurred one hundred years ago, the progress made in the United States is not nearly enough. New Orleans, in 2005, represents vulnerability, illustrating that our cities are still not built with resilient concepts in mind. A major tenet of resiliency is the combination of values that are opposites, such as redundancy and efficiency, strength and flexibility, autonomy and collaboration along with planning and adaptability (Zimmerman 2001). Redundancy is important so that if one system fails, there are other actions that areas can take to prevent disaster. In New Orleans, the levees breached and the pumping stations flooded, rendering them useless. A redundant system would have a pumping station that continues to operate when water flows in rapidly, to begin ridding the city of water immediately. This is not a case of “throwing money” at *new* systems for the sake of having a “plan B.” New Orleans *has* levees *and* pumping stations, but the pumping stations were not designed to work when inundated with water. Why not plan ahead (and, yes, spend some extra money up front) to ensure that pumps can reasonably protect the area with a levee breach, rather than pay for recovery from a flood that inundated 80% of the city and then also have to pay for the special pump later, anyway? Efficiency, autonomy and strength refer to the ability to withstand attack and operate without strong outside control. Interdependence, adaptability and collaboration refer to plans that advocate for components that support each other and that are adaptable to many types of situations (Godschalk 2003, 139). The main goal of PDRPs, as stated in the Florida Report, is to promote a more disaster-resilient style of living and developing.

Stephen Flynn makes the case that resiliency is necessary for our continued existence as a prosperous country because 90% of the United States is vulnerable to some natural hazard. This means that all citizens have a stake in the nation’s safety (Flynn 2007, xxii). Resilient cities should be built on principles derived from past experiences with disasters. If New Orleans

suffered because the pumps were inundated with water, low-lying areas in other cities should take a lesson from this and raise their pumps in new building or renovation projects. What has caused this lack of progress in resiliency, and how can it be addressed? It is fair to assume that, given the choice between living in vulnerable areas or safe areas, a majority of people would choose safety if they have all of the relevant information. This thesis will examine one major cause for the lack of resiliency: current federal policy, and a possible solution to that issue, a PDRP, using the principle of resilience as a guiding feature of the plan.

## **Chapter 2: PDRP Background**

### ***Background and Goals of the PDRP***

While there is not a single, refined concept or specific set of parameters that a PDRP must follow, scholars and the state of Florida have done their best to identify the most important components of any PDRP. For the purposes of this paper, all advanced recovery procedures and theories will be referred to as PDRPs. Berke and Campanella define a PDRP as

A policy document that guides short-range emergency and rehabilitation actions (temporary housing, damage assessment, debris removal, restoration of utilities, re-occupancy permitting, reconstruction policies) and long range redevelopment decisions (building moratoria, re-planning stricken areas, relocation of housing to safer sites). (Berke and Campanella 2006, 193)

The state of Florida cautions that developing a PDRP “requires envisioning potential obstacles to reconstructing a community with a compressed timetable,” with the hopes of reconstructing a safer replacement after destruction (Florida PDRP 2010). The plan will guide recovery strategy following a disaster in hopes of improving mitigation strategies and overall

infrastructure and living conditions. The ultimate goals of a PDRP are to reduce community vulnerability and to improve community recovery.

Florida had many reasons for initiating the PDRP program, most notably the twelve named storms that led to seven disaster declarations in 2004 and 2005 (Florida PDRP 2010, 1). In addition, Hurricane Katrina devastated New Orleans, another low-lying area along the coast, which had flood protection structures as well. The recovery process begins quickly after a disaster and communities that are not ready may be missing opportunities to improve buildings and land use in an effort to mitigate the next potential disaster. It is easy for public officials to overlook the idea of becoming more disaster resilient or involving the community during recovery because of time constraints (Florida PDRP 2010, 2). The PDRP is Florida's answer to the timing issue. If recovery plans are formulated in advance of the disaster, enormous amounts of time and effort are saved during the critical period when resources are stretched in a post-disaster environment.

The state of Florida has developed a robust planning framework with grant assistance from the National Oceanic and Atmospheric Administration (NOAA). The guide is meant to spur development in implementing a PDRP, as a PDRP is now a requirement for all coastal communities in the state (Florida PDRP 2010). Florida has designated six pilot communities that have completed PDRPs to assist in the creation of a report that will help the rest of the state's jurisdictions draft plans. The pilot communities are Panama City, Hillsborough County (Tampa Bay), Manatee County, Nassau County, Polk County and Sarasota County (Florida PDRP 2010, iv). Each of these areas brings a unique quality to the Florida planning process in hopes of addressing most of the common issues throughout the state. Florida has communicated the planning process for a medium-sized residential city (Panama City) as well as a large

metropolitan region (Tampa Bay). Manatee County is an area of Florida that is growing at an incredibly fast rate. Population has increased 20% since 2000. Nassau County will assist in addressing areas that are not as developed. There is enormous opportunity for resilient growth and expansion as these areas develop. Polk County is the only interior county to create a plan as part of the pilot program, and the state hopes that other interior jurisdictions follow suit. Finally, Sarasota County has not experienced a major hurricane since 1960, but it has seen enormous expansion since that time. With thirty-five miles of beaches and low-lying areas along the coast, Sarasota County is highly vulnerable.. All of the cities and counties described bring different concerns and focuses to the PDRP and provide a diverse backdrop for the rest of Florida (Florida PDRP 2010, v).

The best way to establish a resilient city is to prepare for the recovery before the disaster strikes and use the recovery to fortify the city in preparation for the next inevitable event. These PDRPs will allow jurisdictions to prepare for events before they occur in order to minimize damage and impact while expediting recovery (Mileti 1999, 233). The plan can help in a number of ways:

### ***1. Faster and More Efficient Community Recovery***

Ad hoc efforts to rebuild a community following a disaster delay the return of stability. Because many of the major decisions are deliberated during a PDRP's creation, communities with a PDRP can make decisions quickly and be proactive rather than reactive. The state of Florida also mentions that the ability to show efficient and effective use of tax dollars positively affects the perception of recovery (Florida PDRP 2010, 4). Furthermore, if agencies and governments do not act quickly, those residents with the means to do so will begin rebuilding on their own without regard for the greater good of the community (Olshansky 2006, 136).

## ***2. More Resilient Future Development***

Disasters are always tragedies, but communities must consider the positives that may result from good planning and smart reconstruction. The goal is to prevent loss of life and livelihood when the next disaster strikes. In the aftermath of a catastrophic event there is pressure from local residents and the federal government to build back to previous conditions because it is easiest and fastest. “Without a guiding vision, short-term decisions may inadvertently restrict long-term sustainable redevelopment and overlook opportunities to surpass the status quo” (Florida PDRP 2010, 4). With better building plans ready, jurisdictions will find it easier to move quickly with new projects before inaction sparks public unrest.

## ***3. Community Stake in the Planning Process***

Public officials and the community can thoughtfully debate issues and arrive at more concrete solutions that are not impacted by the urgency, financial instability and national political pressure to begin recovery procedures immediately, even if formal procedures do not exist. Each PDRP can follow the framework of a Disaster Resistant Community (DRC) by “respecting the unique qualities of each community, built from the bottom up, not superimposed from the top down” (Geis 2000, 153). A PDRP that involves the community helps create a more knowledgeable constituency that is more likely to support rebuilding programs following major damage (Berke and Campanella 2006, 193).

## ***4. Community Improvement***

The PDRP can provide an opportunity to improve the community through existing channels of the comprehensive and long term regional, transportation or economic plans. There are opportunities in land use changes, hazard mitigation construction techniques, energy efficient

buildings, alternative transportation, environmental protection, and many other areas (Florida PDRP 2010, 4).

### ***5. Local Control***

If the community has invested the time and effort to create a PDRP, then it has done the necessary research in regards to the limitations that may be attached to certain external funding sources. Donors and other funders will be more likely to include fewer criteria if the community can show diligence in its research about why a certain building should be rebuilt or why an area should be converted to open space. It also shows that community is willing and able to play an active role in the recovery of the area, which may not always be evident to the federal government.

### ***6. Cost Minimization for Local Hazards***

Implementing suggestions in the PDRP that could lead to greater resiliency should help minimize the costs of disasters. The scholars and tenets of resiliency advocate that resilient building practices should lead to less damage following an event. Investing a little more heavily in the short-term recovery may eliminate the need to recover in that area for many years and through many disasters (Geis 2000, 153).

### ***7. Immediately Available Procedural Recovery Functions***

Many procedural and administrative issues can be worked out and included in the PDRP. This means that key roles and responsibilities will already be assigned to the appropriate official. As soon as there is a threat of a disaster, this official knows what responsibilities he or she will have following that major event. The PDRP can also assist in identifying potential funding. FEMA will provide a lot of money, but what can it be used for (discussed in chapter 3 as part of current federal policy)? What issues fall outside the restrictions for federal funding and can the



state set up a “rainy day” fund now? The plan would also eliminate duplicative efforts that may result from chaos after a disaster. More than one agency will respond and assist in recovery; therefore ensuring that everyone has defined roles is crucial to a cost-effective and efficient recovery. In the same vein, planning can help eliminate conflicting efforts on the part of different agencies.

### ***8. Improved Land Use and Zoning Policies***

Even though state law varies widely when it comes to land use policy and zoning, a PDRP can still provide an opportunity for safer land use practices when considering future or replacement development. The PDRP can advocate for future changes to zoning and land use in the event that the current use or structure is rendered unusable. Decisions regarding changes to the comprehensive plan or land use principles cannot be made during the short time frame in which a recovery plan is implemented. The PDRP would open a dialogue and lead to a conclusion before any disaster threatens a region (Schwab 2005, 69).

#### *Window of Opportunity: Why a PDRP Must Be Ready*

When a disaster inflicts major damage on an area, a window of opportunity to effect change opens for a period of time. A window is a moment of opportunity when a problem has become urgent enough to push for change of entrenched practices (Berke and Capanella 2006, 193). City officials can find themselves in an advantageous position to push for accelerated mitigation measures because the attention of the community and the country is focused on the destruction (Schwab 2005, 62). Unfortunately, this window is not open indefinitely; other local and world events can shift the focus rapidly, as seen through the simultaneous earthquake recovery in Japan and the armed conflict in Libya. In addition, a desire from homeowners and business owners to return to normalcy, combined with a dramatic inflow of capital in the form of

disaster relief, accelerates the rebuilding process (Berke and Campanella 2006, 193). The PDRP provides a framework for people to follow when recovery begins instead of waiting for local officials to determine future goals.

A window may provide an opportunity for more drastic regulatory changes, which can include rezoning hazard-prone areas to lower densities, deciding which property is best for acquisition and establishing priorities to guide those purchases, as well as retrofitting opportunities on other properties (Schwab 2005, 63). For example, if a section of town needs to be relocated to prevent future damage, but that part of the plan is not pre-approved, officials will find it exceedingly difficult to begin that process when residents are focused on rebuilding and returning to a normal life. In the past, following a disaster, people have not waited for an overarching plan if it did not already exist (Schwab 2005, 63). The PDRP allows the time and the flexibility that is not available when the destruction has already occurred. Currently, the only policy that deals with post-disaster conditions encourages a reactive culture and guarantees insurance and structural hazard protection. The PDRP does not have to be a radical undertaking, as it can be seamlessly integrated into existing plans and it must span across many sectors.

Disasters have the potential to disrupt numerous services and infrastructure within a jurisdiction. Telecommunications and utility service can be damaged if power lines are knocked down or taken off line. Transportation services can be interrupted by damaged infrastructure including roads, bridges and railroad tracks. Education and economic development can experience great loss if the buildings that house these services are damaged or destroyed. Businesses that were functioning without help before the event may now need extensive assistance to survive the downturn that follows a disaster. Hundreds or thousands of people may have lost their homes and need emergency shelter for an extended period of time. Finally, there

is the potential for extensive environmental damage due to the destructive effects of an earthquake or a storm surge from a hurricane. Disasters can affect more than the services above, but this shows the breadth of planning and integration that is needed to deal with a potential crisis (Schwab 2005, 66). The planning for recovery from all of these problems cannot be done after the disaster in hopes of preparing for a more resilient future.

Before looking at the possible plan structure, it is important to consider whether the PDRP should be more locally or regionally based. Is the best way to create a plan for each jurisdiction or to group them into regions? Single-jurisdiction plans can be advantageous because decisions can be made faster, on a hyper-local level. The plan can usually be expanded to fit the needs of a larger region. Hazards, however, are not confined to jurisdictional boundaries, and regions may have more resources to address recovery efforts as a whole. Using a regional approach can also aid in overall comprehensive planning. In the end, the state of Florida decided to use a county-level approach for the plans (Florida PDRP 2010, 12). This is good idea, as it can incorporate aspects of the local jurisdictional planning methods as well as the more regional benefits of resource sharing. The final decision also depends on the structure of the actual PDRP as well as the state of the existing planning structure in the jurisdictions undertaking the PDRP.

The research offers two basic ways to integrate plans into the existing planning structure. A stand-alone plan has the advantage of being easier to revise and can include more technical details (Berke and Campanella 2006, 194). By itself, however, the stand-alone plan is not enough, as it would not have the authority to effect change. The principles of the PDRP must be supported by policy, regulations and procedures (Florida PDRP 2010, 12). The second way to prepare a PDRP would include it as a main section of the larger comprehensive plan. Large integrated plans can bring “more resources together and broaden the scope of understanding

about interactive effects of recovery issues with other local issues” (Berke and Campanella 2006, 194). Because the PDRP includes considerations such as land use and infrastructure (essential parts of any comprehensive plan), it makes sense to pair it closely with the comprehensive plan. The problem is that not all post-disaster recovery concerns, especially operational concepts, can be addressed in the comprehensive plan (Florida PDRP 2010, 13).

In addition to the strategies described above, the state of Florida has three additional suggestions for PDRP implementation. The first is to develop a post-disaster redevelopment ordinance. At a minimum, this should address immediate actions following a disaster, including building moratoria and repair permitting. The second strategy is including PDRP principles as part of the Local Mitigation Strategy (LMS), which applies to either a city or county level. The main function of the LMS is to advance hazard mitigation strategies in order to increase the resiliency of a city. This is one of the main goals of the PDRP, but it is not the only goal, which is why using the LMS as the only vehicle to enact a PDRP is not effective. The final strategy described by Florida involves the Community Emergency Management Plan (CEMP), which is an operational-based plan focused on disaster response. Integrating a PDRP into a CEMP helps facilitate the transfer from the response phase to the recovery phase, but the CEMP would limit the PDRP’s ability to involve the public and address redevelopment issues because it is a document that focuses on short-term response and the roles of emergency managers, instead of looking at the more comprehensive issue of recovery (Florida PDRP 2010, 13).

On a more general level, the American Planning Association (APA) report on Post-Disaster Recovery and Reconstruction has its own recommendations for plan integration. Neighborhood plans, usually the most local plans in a community, provide a unique opportunity to implement disaster recovery principles. High levels of citizen participation can be used to

raise awareness of the potential dangers that the neighborhood faces. A neighborhood meeting can also be a forum to advocate for more sustainable and safer methods of reconstruction. If there is a rule requiring more fire resistant landscaping when that type of work is needed, the neighborhood will gradually move towards a more fire resistant future (Schwab 2005, 67). This is an example of an idea that may slip through the cracks in the stress of a post-disaster situation; after a disaster, resources and labor are limited. Area and corridor plans also can address utilities and transportation networks. In New Orleans, the Twin Span, a bridge that crosses Lake Pontchartrain, was destroyed by Hurricane Katrina, but the new bridge is stronger and wider, solving vulnerability and traffic issues at the same time. Finally, a capital improvement plan should include disaster provisions. When a disaster destroys a major piece of a city or town, the PDRP must ensure that the new capital project will be safer for all residents and, most importantly, ensure that the next disaster does not destroy the new building (Schwab 2005, 68).

All of the strategies have limitations, but what is the most effective way to create and implement a PDRP? It seems that preparing a stand-alone PDRP (separate document or plan) in collaboration with the comprehensive plan is the most effective way to address all post-disaster issues (Berke and Campanella 2006, 194). Florida has decided on this approach with the PDRP guide document describing how to implement a stand-alone plan. The key feature, however, is that the PDRP is fully integrated into all emergency functions. Recovery must be addressed as the plan elements are discussed or updated. This allows all plans to incorporate an awareness of potential problems and mitigating solutions in the event that a building is destroyed.

The PDRP is not designed to overhaul drastically a way of life that communities currently enjoy. It can be assumed that most people would like to feel safer and have their communities become more resistant to disasters in the future. Objections come from the financial

commitment and inability to make large-scale changes at a rapid pace. Proponents of PDRP recognize this limitation, which is why they advocate for a slow and deliberate transformation. As opportunities present themselves, it is important that local governments use them to improve the resilience of an area. The aftermath of a disaster is the best way to improve resiliency in a substantial way. Unfortunately, the pressure and urgency to return to pre-disaster conditions compromise a community's ability to deliberate and debate the possibility of rebuilding in a more resilient way. Making the big decisions about the future of the community is difficult because those decisions may take weeks, months or even years to develop, well after community recovery has begun. A big advantage of a plan developed pre-disaster is that the tough decisions can be made under conditions of relative calm. This can make a huge difference in recovery, and do so without compromising the speed at which daily lives can resume.

### ***Implementation***

The implementation process of a PDRP is tricky because both community members and lawmakers must support a PDRP in order to pass the necessary legislation to mandate it. Also, each state will have different procedures based on the emergency management codes as well as the planning laws. Is the state a planned state or not? Is there a comprehensive plan that can assist with PDRP integration? According to the state of Florida, when the justification and funding are available in any way (either through grant, loan or state budget), a PDRP should be created. The Florida Post-Disaster Redevelopment Planning Guide analyzes the key steps to implementing a PDRP, which is equally important to drafting the specific material. There are two main periods, both of which are important for plan implementation: pre-disaster and post-disaster (Florida Guide 2010). States may have difficult times with the pre-disaster steps because these steps represent a new way of thinking about disaster preparedness.

### *Pre-Disaster Implementation*

Pre-disaster implementation includes adopting all necessary policies and regulations, conducting additional studies and training staff for post-disaster situations. Once the plan is adopted, funding can be tight, and finding staff members to devote hours to the PDRP can be difficult for a local government. It is important the PDRP coordinator does not let specific issues fall through the cracks, or the PDRP may be derailed in a post-disaster setting. Securing grants and loans to perform disaster duties is equally important, and the coordinator should ensure that financing continues to flow at all times (Florida Guide 2010, 104).

Plan maintenance is another important aspect of the pre-disaster implementation process because conditions can change rapidly. Florida recommends that the plan be maintained every year prior to hurricane season, with a major update every five years. The PDRP has very specific information about vulnerabilities and code regulations, which could easily become outdated after five years. Also, most communities will not be able to finance an entire PDRP at once, so the yearly maintenance provides an opportunity to tackle a new action item, to build an effective PDRP on a tight budget. In addition, the PDRP should be updated along with the accompanying plans discussed earlier, such as the Emergency Management Plan and the Comprehensive Plan (Florida Guide 2010, 105-106).

### *Post-Disaster Implementation*

Once the disaster strikes, the PDRP stakeholders must decide how much of the plan to activate. Smaller-scale disasters may not require the activation of all functions, but a large-scale disaster will most likely affect all of the plan sub-topics. The decision to activate should be made as soon as possible after emergency response operations have ended in order to facilitate the fastest recovery possible. Florida also recognizes that issues such as leadership and organization

should be addressed immediately and the more the organization can remain the same as during the planning process, the more effective the post-disaster period will be. Everyone will know his or her role, facilitating a smoother transition to recovery. The Guide outlines specific responsibilities that must be filled in order to facilitate the needs described in the content of the PDRP. Officials must:

1. Oversee recovery on behalf of the county officials or municipal board.
2. Ensure that redevelopment decisions are in line with community vision.
3. Ensure equitability, transparency and accountability.
4. Monitor progress towards meeting long-term development goals and objectives as adopted and set a timetable for such goals.
5. Review damage assessments and evaluate need to modify pre-disaster policies or actions.
6. Initiate recommendations for enactment or repeal of emergency ordinances that affect long-term recovery.
7. Assign or reassign implementation responsibilities as needed.
8. Recommend budget requests and approval of grant agreements.
9. Maintain sub-committee compositions (Florida Guide 2010, 107-108).

Even though many of the decisions regarding the recovery will have been made before the disaster, it is important to continue to engage the public as situations change, so planning meetings after the event are as important as the community input process before the disaster.

Communication and coordination must also be considered during implementation. All disasters create uncertain circumstances, and no amount of planning can completely eliminate uncertainty. The more that stakeholders understand a plan before the disaster, the more adaptable



the plan will be afterwards, creating a truly dynamic situation where everyone can adapt a general plan to a specific disaster situation. Because the PDRP is not replacing anything, but adding to the existing structure, it is important to ensure that officials do not face conflicting demands. If certain officials have responsibilities as part of the Emergency Management Plan, it may be difficult for them to carry out additional responsibilities as part of the PDRP simultaneously. At the same time, it is important to coordinate the requirements of all relevant plans. Exercising certain aspects of the PDRP would make officials with PDRP responsibilities more comfortable with their roles in a disaster situation (Florida Guide 2010, 112).

The final implementation consideration is funding. After a disaster funding will be available for rebuilding, but restrictions may be attached to such aid. In the pre-disaster phase, it is important to identify a primary funding mechanism, whether it is a tax, a grant or an addition to the budget. The PDRP should address the capability of bond financing in case there is a shortfall in budgeted funding. After the disaster, the first step is to analyze the damage assessment to determine the impact on government income and project how long this impact may last. The community should then explore local financing opportunities to fund resilient projects that may not be covered by federal aid. Federal aid should be used to its maximum potential and reach, understanding that there are limitations and restrictions on use. Finally, any cost-cutting measures should be implemented immediately on non-essential services (Florida Guide 2010, 116-117).

Implementation can be costly and difficult to navigate, but the framework that the state uses provides other possible PDRP communities with a roadmap for success. The more planning and communication that can occur in the period before a disaster threatens a coast, the more

likely it is that a flexible and comprehensive plan will emerge that can guide a community through the recovery process.

Florida is the only state in the United States to require any kind of PDRP as part of state law. Federal policy does not address planning for recovery in any way; rather it provides numerous mechanisms to address issues after the event. This reactive approach leads to a more vulnerable system, rather than a resilient system. Current federal policy has led, albeit unintentionally, to increases in risk and damage that were unforeseen by lawmakers when the current policy was implemented. The PDRP is intended to address the reactive problems with the current system. To understand better the origins of reactive policy, it is important to look at the history of disaster management policy in the United States.

### ***Chapter 3: Background of Federal Policy***

Federal Response, as a policy in the United States, is a relatively new concept (Moss 1999). The government, to ensure the safety and security of the population, provides federal protective services, most of which were enacted after World War II. Federal disaster assistance legislation predates FEMA as a discrete agency. The 1950 Disaster Relief Act marked a transition to what Rutherford Platt calls the “Transitional Period [with] limited federal disaster assistance” (Platt 1999, 12). This was the first act to provide a general assurance of limited protection from disasters in all states, instead of specific regions. Between 1950 and the establishment of FEMA in 1979, the Relief Act was amended many times, as various disasters presented unique challenges to specific areas. A few examples of benefits added to Federal Disaster Assistance include temporary housing, grants for repair of damaged state property, unemployment compensation, medical and mental health assistance and payments to communities to offset lost tax revenues. Throughout the 1960s the government continued to

define disaster relief assistance and took steps on a micro-level reacting to very specific floods, hurricanes and earthquakes.

The 1974 Disaster Relief Act was the next significant update in American disaster policy and it had two main goals: implementation of the Individual Assistance (IA) Program and the establishment of methods for requesting federal assistance if the local and state agencies cannot handle the recovery. The justification for a unified emergency management agency began to surface as more than one hundred different organizations had specialized responsibilities under the legislation at the time (Platt 1999, 18). The story of the 1974 Disaster Relief Act can be traced back to April 3 and 4, 1974. An unusually intense spring storm tracked across the Midwest, drawing warm moisture from the Gulf of Mexico and creating three intense storm squalls. The result was “the most intense and widespread tornado outbreak in recorded history” (RMS Special Report, 1) with 148 tornados etched across nine hundred miles of the nation in a span of less than twenty-four hours. The resulting legislation established new efficiency measures that give the governor of a state the power to request a presidential declaration. Once this request is made, the President can direct any federal agency to provide necessary assistance to the affected region immediately. The IA Program was established in this act, allowing the President to approve funds to help individuals, non-profits, educational entities and utilities to receive funds for reconstruction and rebuilding. The act also formalizes the Public Assistance (PA) program, providing funds to local governments to rebuild public facilities and infrastructure (Suburban Emergency Management Project, 2009). The 1974 Act was pivotal in the development of Emergency Management Policy in the United States, as it established the main tenets of the current Stafford Act policy.

The National Flood Insurance Program (NFIP) was created in 1968 as a way for people to purchase flood insurance against potential losses to their home or property. The NFIP deserves special consideration because it is the only program designed to have federal impact on local hazard mitigation practices (Schwab 2005, 63). The Act establishes a mechanism to map flood vulnerability across the country and establish building standard minimums (usually requiring the first floor to be constructed above the 100-year flood zone). If a city or town had a flood mitigation plan and the residents complied with all NFIP requirements, the federal government would provide affordable flood insurance to individual homeowners and businesses. This insurance is designed to provide an alternative to disaster assistance that would meet the escalating costs of repairing damage to buildings and their contents caused by floods (Heinz Center 2000, 12-13). As of April 2010, the NFIP insured about 5.5 million homes (FEMA.gov). Annual premiums for the NFIP in the highest risk zones range from \$379 to \$880 depending on the type of building and previous flood mitigation projects on the property (GAO NFIP 2008, 6-7). The intent of the program is to reduce the burden on property owners as well as the government support itself through insurance premiums. In reality, the NFIP is not self-supporting, as it must borrow from the treasury during large-scale events; its one success – or failure – is that more people than ever live in areas covered by the NFIP (FEMA.gov). Although the NFIP is geared towards all communities, well over 50% of the insured properties are on a coastline.

This history reveals that the federal government took a passive approach to disaster recovery with very little centralized policy on disaster preparedness, response or recovery (Moss 1999, 324). In addition, needs were addressed as they surfaced after a disaster inflicted its

damage on a region. This led to eleven amendments to this policy between 1950 and 1979, compared to just three since 1979, when FEMA was established (Platt 1999. 13).

In 1979, the Federal Emergency Management Agency (FEMA) was created by executive order, and it absorbed more than seven other agencies that dealt with disasters in some form. The main goal of the consolidation was to create continuity and accountability in the field of emergency management. FEMA's mission has always been to advocate an "all-hazards approach that includes...warning systems which are common to the full range of emergencies from small isolated events to the ultimate emergency – war" (FEMA.gov 2010). The all-hazards approach to disaster preparedness rests on the belief that the type of disaster is not as important as the destruction it imposes. The nation must build infrastructure to react to regional vulnerabilities, but FEMA can provide guidance from an all-hazards standpoint -- that is, by providing common preparedness procedures for all disasters.

With the end of the Cold War, FEMA's mission and priorities changed drastically. The Stafford Disaster Relief and Emergency Assistance Act of 1988 is the main legislative guiding principle of FEMA. It is designed to bring an orderly and systemic means of federal natural disaster assistance for state and local governments in carrying out their responsibilities to aid citizens. Much of the Stafford Act is in the form of an amended Disaster Relief Act of 1974, and many of the concepts in the Act are adapted from ideas that existed before the creation of FEMA in 1979. Disaster relief, mitigation and recovery processes became the primary focus of the organization, taking some of the spotlight away from civil defense. New measures in the Act look at cost-sharing measures between local and federal players and mitigation (Stafford Disaster Relief and Emergency Assistance Act of 1988).

The Stafford Act is a major expansion of policies from earlier legislation. The 1988 overhaul addresses disaster mitigation and preparation specifically for the first time, although later amendments expand on this section considerably. The first major section of the act details the administrative procedures and liabilities of state and local governments as well as the federal government after a disaster. This includes everything from environmental requirements, standards of review, methods of funding, auditing procedures and standards for public and private structures. The second main section looks at the major disaster declaration and response mechanisms. This details the methods for a state to declare a disaster as well as policies for general federal assistance, hazard mitigation, public and individual assistance, community disaster loans, emergency communications and many other rules and regulations for the disbursement and tracking of funds to help rebuild after a disaster. The major disaster declaration by the President unleashes all government resources, including 75% of costs for state and local buildings and infrastructure, financial assistance for public or non-profit utilities and up to \$30,000 in individual assistance for households (Stafford Disaster Relief and Emergency Assistance Act of 1988). The Stafford Act is a document that addresses the intricacies and bureaucracy of disaster response. It ensures that systems and redundancies are in place for the immediate relief of an area. It focuses heavily on mitigation and preparedness as well but mentions very little about long-term recovery and contains nothing on long-term recovery as a planning tool.

The Disaster Mitigation Act of 2000 (DMA) amended the Stafford Act by repealing the previous mitigation planning provisions and replacing them with a new set of requirements that emphasizes the need for state and local entities to closely coordinate mitigation planning and implementation efforts. The purpose of the Act is to “reduce loss of life, property, human

suffering, economic disruption and disaster assistance costs,” as well as introduce a source of mitigation funds to help prevent problems before they happen (Disaster Mitigation Act of 2000, 2). The Act strengthens the Hazard Mitigation Grant Program and creates a robust process that allows individuals, represented by their town, to sell land to the government with the agreement that the land will not be used for further development. This legislation reinforces the importance of pre-disaster infrastructure mitigation planning to reduce disaster losses nationwide and is aimed primarily at the control and streamlining of the administration of federal disaster relief and programs to promote mitigation activities. Prior to 2000, federal legislation provided funding for disaster relief, recovery, and limited hazard mitigation planning. One of the main tenets of the DMA includes the NFIP, discussed above. The DMA improves upon the planning process by emphasizing the importance of communities planning for disasters before they occur (Disaster Mitigation Act of 2000, 2-4).

FEMA was re-organized into the Department of Homeland Security (DHS) in 2003, as a result of the September 11<sup>th</sup> terrorist attacks. The organization dramatically changed after this, as it was gradually stripped of much of its preparedness responsibilities, limiting it to response. Moreover, the mission and subsequent budgeting were re-oriented towards preventing another 9/11-type attack, rather than dealing with natural disasters. Senior FEMA experts began leaving the agency in large numbers as the preparedness, response and recovery directors left. The agency had five hundred vacancies and there were eight interim regional directors out of a possible ten when Hurricane Katrina made landfall in 2005 (Grunwald and Glaser 2005; DHS: FEMA In or Out? 7). After the disaster in New Orleans, FEMA’s status was elevated to a “distinct entity” within DHS. Nevertheless, debate continues regarding whether FEMA should

remain part of DHS or return to an independent, cabinet-level agency with direct access to the President.

In addition to FEMA and the Stafford Act, The Department of Homeland Security has also worked to streamline emergency response for all hazards. The National Response Framework (NRF) is a “guide to how the nation conducts all-hazards response...It is intended to capture specific authorities and best practices for managing incidents that range from serious but purely local, to large-scale terrorist attacks or catastrophic natural disasters” (National Response Framework 2007, 1). The plan includes directions to conduct immediate rescue operations, short-term recovery and some short-term mitigation activities. Most of the plan is not relevant to long-term recovery planning, as it is not the intention of the NRF to address that aspect of disaster recovery, but it does include one small section about the topic. The NRF defines recovery functions that should take place at the Joint Field Office (JFO) that include coordinating Individual Assistance programs, coordinating with the private sector and NGOs dealing with donations and coordinating with Public Assistance programs authorized by the Stafford Act (National Response Framework 2007, 44). The only mention of long-term recovery beyond these immediate duties is a definition of the term recovery (National Response Framework 2007, 43). Why is it important to talk about this document, largely focused on response? The NRF has annexes with fifteen emergency support functions; those functions include transportation, communications, public works and engineering, public health and mental health (ESF). ESF-14 is “Long-Term Community Recovery and Mitigation,” the main apparatus for recovery at this time in the United States.<sup>3</sup>

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<sup>3</sup> From this point forward, the term recovery will be synonymous with “long-term recovery”



*The Current State of Federal Recovery Policy: ESF-14, LTCR Plan, Draft NRDF*

When looking at federal recovery policy, there are only a few established sources of legislation whose main function is recovery rather than mitigation or response. Emergency Support Function 14 provides the community with the tools and guidance to assist in the recovery from incidents of national significance. ESF-14 is a framework for federal government support to regional, district, and local governments, nongovernmental organizations (NGOs), and the private sector to enable community recovery from long-term consequences of a disaster affecting the area. The overall goal of this coordination is to expedite, leverage, and increase the effectiveness of federal and other long-term recovery assistance (GAO 2010, 10). The ESF-14 network is deployed after a disaster depending on the needs of a community. Although no funding is available through ESF-14, the network can assist with expertise and can leverage other funding sources.

The NRF annex defines the roles of ESF-14 as differentiating recovery implications from response actions and helping the transition from response to recovery. The other main operational tasks are to conduct a market disruption and a loss analysis, identify federal agencies and allocate support functions, identify gaps in resources, avoid duplication of assistance and to provide a vehicle for many agencies to come together in an effort to respond quickly (ESF-14 Annex, NRF). The main problem for ESF-14 is the lack of accompanying guidance plan for recovery. The National Disaster Recovery Framework (NDRF) is in the drafting stage; as of May 2011, it was unclear when the document would be approved.

The draft version of the NDRF was posted online in February 2010, already behind schedule, with the goal of having Congress pass it during the summer of 2010. FEMA has not updated the website with a new draft since February 2010, and no news has surfaced about the

whereabouts of this document in the implementation process. It is important to emphasize that the document and the following description are currently a draft and the principles are subject to change in the future. The NDRF focuses on how to repair, reconstruct and redevelop the social, natural and economic components of a city. It will have a similar structure to the NRF with a main recovery coordinator and recovery support functions (RSFs). The main goal of the NDRF is to expand on the ESF-14 Annex of the NRF. The NDRF, in its 2010 draft form, professes the following eight principles: individual and family empowerment, leadership and local support for recovery functions, preparation for recovery, partnerships and inclusiveness, communications, unity of effort, timelessness and sustainability. Most of the goals as expressed in the draft are procedures for involving local stakeholders and taking an “interdisciplinary” approach to recovery by involving as many stakeholders as necessary. The vast majority of the document is focused on post-disaster planning, but one section is dedicated to the concept of planning for a recovery before a disaster is imminent. This is the first piece of federal policy that has broached this topic and acknowledges that pre-disaster recovery planning is a necessary and worthwhile focus for a community.

The post-disaster planning aspect is based on the current ESF-14 planning program: Long Term Community Recovery (LTCR) planning. The relationship between LTCR and ESF-14 is outlined as a branch of FEMA responsible for leading the ESF-14 agencies that support long-term recovery (GAO 2010, i). LTCR is defined as “the need to re-establish a healthy, functioning community that will sustain itself” (LTCR 2005, 4). Examples of programs that are funded through this program include providing disaster resistant housing for areas destroyed by the event, initiating a low-interest loan program for downtown areas to revitalize a disaster damaged area, initiating a buyout of flood-prone areas (existing FEMA mitigation grants) and widening or

improving infrastructure for the next disaster (LTCR 2005, 5-7). The LTCR is completely focused on post-disaster functions with little mention of pre-disaster planning. Coincidentally, it emphasizes coordination of support and processes to get a recovery up and running. These are concepts that can equally apply to the PDRP, and the LTCR should be heavily consulted to ensure that these two documents work together in an attempt to create a harmonious and seamless recovery process.

While federal policy is moving in the right direction in regards to recovery planning, it is a slow process, and each time a hurricane slams into the coast, or an earthquake crumbles foundations, people suffer, perhaps more than they should. The United States provides billions of dollars in aid to disaster victims, but is the current system the safest and most efficient and effective way to deal with catastrophe? FEMA tends to be reactive instead of proactive when disaster strikes, and clearly the answer is that much more could be done to plan proactively for these disasters, which would diminish the financial effects and disruption to disaster victims' lives.

#### ***Chapter 4: The Five Reactive Tendencies of FEMA***

While FEMA has made great strides in disaster response and recovery, the federal government has created policy that does not encourage mitigation and pre-disaster planning for recovery. Since the Stafford Act was enacted in 1988, countless disasters have ravaged the United States, and while procedures are refined and improved each time, there is a larger issue that is neglected. Many aspects of current federal policy lead to reactive tendencies in regards to recovery. An effective resilient recovery takes time to plan, and there is an opportunity to be proactive. In the long run it should even save money at all levels of government, as cleanup needs will decrease allowing continued focus on buildings that need to be updated. If FEMA's

goal is to help prevent future disasters, then the current policy includes flaws that conflict with this intention.

Current federal policy does not encourage pre-planning for disaster recovery. When the federal government agrees to step in and cover the cost of protecting property by building hazard control structures and insuring the dangerous area, there is no reason to feel nervous or take extra mitigation steps. Even when an area is decimated, the federal assistance provides people with funding to rebuild in a similar fashion to pre-disaster conditions. Raymond Burby asks,

Why require property owners to invest in the costs of disaster-resistant design and construction (or retrofitting buildings and infrastructure to reduce likelihood of damage) when the federal government will blunt any losses that occur, offering income tax write-offs, generous disaster relief payments and insurance subsidies? (Burby 1999, 250)

The issue of moral hazard is a central theme to these flaws. Moral hazard occurs when a party insulated from risk behaves in a riskier way than it would behave if it were fully exposed to the risk. Burby continues:

Rather than countering psychological and economic factors that make it difficult for people and local governments to deal rationally with natural hazards, federal policies compounded the problem. The government has made it seem foolish to avoid or limit use of areas most at risk or to invest in measures to strengthen buildings and infrastructure (Burby 1999, 250-251).

As Burby explains, federal policy is approaching the disaster issue in a reactive way. Legislators, most likely, did not intend to put people in danger by creating this policy, but the unintended consequence is that people feel that a risk has been completely eliminated, even though a strong event can destroy systems and infrastructure meant to prevent losses. The benefits of these programs that Burby is criticizing and the reasons that legislators created them in the first place are the obvious insurance policy that the federal government can provide for local governments, residents and businesses. People living in hazardous areas will get enough money to rebuild their houses and certain belongings back (federal policy reimburses 100% of rebuilding if the project returns the property to pre-disaster standards). It is time, however, for the government to take a more active role in defining what is hazardous.

When hazardous land is seen as “reasonably safe” and profitable, the economic potential can sometimes outweigh the possible negative effects of a future disaster. Because future disasters are not a certainty, it is not difficult to forget about the concerns in an effort to build new structures in an efficient and economically feasible way. Homeowners and business owners tend to undervalue the risk of loss from disasters and do not adequately prepare their structures for the potential until the threat is imminent. Taking action and mitigating possible future damage does not have tangible benefits in many cases. It is difficult to assess what damage was avoided because of a mitigating measure. This makes investment in mitigation and planning unattractive for certain stakeholders (Burby 1999, 250).

After researching the literature, five main ideas characterize the reactive procedures that seem to guide FEMA policy. This analysis should not imply that the FEMA policy mechanisms should be abandoned. Instead, by examining the reactive qualities of FEMA procedures, we can

later see how the Florida PDRP might act in tandem with these policies to create a more comprehensive approach.

### ***1. Facilitation of development in hazardous areas:***

The reactive policy begins in the area of hazard control structures and financial compensation for losses in vulnerable regions. Many buyers do not fully understand the risk incurred by purchasing land in a hazardous area. The Safe Development Paradox, described by Raymond Burby, is a significant aspect of the reactive nature of FEMA. The basic idea of the paradox is that vulnerable land can be used in a profitable way if proper hazard control structures and policies are in place, but this allows people to feel that an area is safer than it is in reality.<sup>4</sup> In reality, the structures and policies do not completely eliminate risk; this results in a false sense of security. The NFIP, infrastructure protection projects and incentives for local mitigation projects have made attempts to minimize the financial impact for businesses and individuals following a

*Table 1: NFIP Loss Dollars Paid by Year (thousands) (Source: FEMA)*

1990	\$167,897
1991	\$353,682
1992	\$710,225
1993	\$659,059
1994	\$411,075
1995	\$1,295,578
1996	\$828,037
1997	\$519,537
1998	\$886,347
1999	\$754,971
2000	\$251,721
2001	\$1,277,002
2002	\$433,644
2003	\$780,507
<b>2004</b>	<b>\$2,232,051</b>
<b>2005</b>	<b>\$17,714,793</b>
2006	\$640,671
2007	\$612,395
<b>2008</b>	<b>\$3,452,271</b>
2009	\$773,065
2010	\$727,877

disaster. The incentives themselves include generous government loans, tax deductions and subsidized flood insurance (Burby 2006, 179). The NFIP had an unintended consequence, however, as the safeguards meant to protect residents in vulnerable areas have facilitated growth and expansion of dangerous coastal land. Federal incentives that advocate for water, sewage, highways and causeways as well as beach nourishment are “justified to support long-established communities, but too often they promote development in new areas, especially barrier islands”

<sup>4</sup> See New Orleans example on page 30.

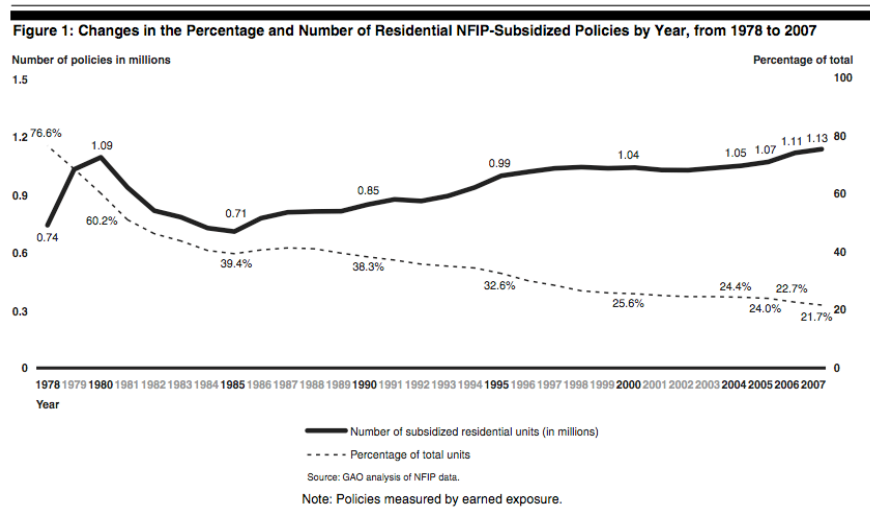
(Heinz Center 2000, 19).

The NFIP has been criticized on a number of fronts. The five main issues are discussed in this paper. One of the most important and fundamental problems is that it is not sustainable in its current form. As of March 2011, the NFIP debt was \$18.3 billion, largely a result of the catastrophic 2004 and 2005 hurricane season (Simpson 2011). The reason for the enormous debt is that NFIP was designed to cover the average historical loss year, not catastrophic loss years. There was no reliable mechanism for dealing with the unexpected peaks in disaster years when there is no corresponding year with minimal flooding. Table 1 shows the NFIP dollars paid in response to claims for each year since 1990. The three most costly years are highlighted in red to depict the stark contrast between the average years and the catastrophic years. Unfortunately, these three costly years happened in a five-year span placing a major strain on the NFIP, which had no mechanism to deal with a problem like this. The typical average loss year estimates payouts of approximately \$500 million to \$1 billion (FEMA.gov). The especially bad years in 2004, 2005 and 2008, have placed an enormous strain on the NFIP, raising its annual operating losses from \$963 million (1986-2004) to \$6.3 billion when 2005 is added in (GAO NFIP 2008, 4). Eventually the federal government, most likely, will have to forgive a large percentage of this debt, making the NFIP more of a disaster aid program than an insurance program. When a program does not price in a way that can cover all possible expenses, taxpayers must subsidize the overage. Is it fair to taxpayers to subsidize a program that provides aid to individuals and businesses that choose to live in one of the unsafe areas (Kousky 2010, 2)?

The second issue deals with the subsidies that are currently received by a growing percentage of the total NFIP subscribers. Currently, groups receive rebates for the following reasons: (1) properties existed before the Flood Insurance Rate Maps were drawn, (2) properties

will be protected by a levee that is currently under construction, (3) policies are now behind a levee but still have a restoration plan and (4) properties were built between 1976 and 1981 and did not account for wave action. The thought was that over time the rebates would decrease because people would know the risk (Kousky 2010, 4). Unfortunately, the Safe Development Paradox has had the opposite effect: people feel adequately insured so they take the risk. The reactive disaster structure that FEMA has created is putting a strain the program.

*Figure 1: NFIP Subsidy Percentage Changes (Source: GAO)*



When the NFIP started, subsidies were offered to many areas with buildings that predated the program in hopes that it would increase participation in the program. Over time, FEMA thought the subsidized properties would decrease, but instead have increased do to longer than predicted building lives and increased flood insurance requirements (GAO NFIP 11-12). Figure 1 shows the increase in subsidized rates as a percentage of total policies, placing more of a burden on NFIP funding. The reason for this increase, according to the Government Accountability Office (GAO), is due to this increased number of mortgages requiring flood insurance, longer than expected life of pre-NFIP structures (subsidies continue after major



renovations), expansion of Special Flood Hazard Areas and this increased number of policies issued after 2005 (GAO NFIP 2007, 13-14).

Third, the NFIP is heavily reliant on flood risk estimates, but the program has been unable to update the numbers and maps in a timely fashion due to sea level rise, subsidence, erosion and runoff. All of these factors can alter the risks in an area over a short period of time (Burby 2006, 177). The rate and flood risk maps are always lagging behind real time data and information. The NFIP has had a significant impact on the built environment along the coast. Even though the NFIP requires that the first floor of a structure sit above the 100-year flood plain, the requirements say nothing about erosion underneath the building. A building that may have been considered safe and up to NFIP code in 1990 may later be closer to the coast or flood zone due to changing land conditions (Heinz Center 2000, 12).

The fourth concern deals with coverage behind levees or dams. Flood insurance is available but not required for people who are protected by flood control structures (Burby 2006, 179). A storm like Hurricane Katrina is the NFIP's worst nightmare. Much of New Orleans is technically protected by a levee, but what happens when the flood control structure fails? The city is inundated, and 80% of the entire municipality is flooded. This is a main reason why the NFIP is in financial trouble. Hazard control structures, it turns out, cannot be relied upon to completely eliminate risk.

Finally, the basis for the NFIP is to protect people in the 100-year flood zone. Similar to the idea that the program only can handle funding for the average historical event, there are many storms in this country that are categorized as worse than the 100-year storm (that is, a storm the intensity of which is seen, on average, every 100 years). Many floods from tropical systems can affect areas well outside the NFIP flood zone (Burby 2006, 180).

The NFIP is based on a reactive structure, as is the entire safe development paradox. People are provided with the necessary insurance (physical and monetary) to build in hazardous areas. Even if extensive research on specific risks is not conducted, it can be assumed that a person who builds near a levee knows there could be a flood risk. The structure of the current system, however, provides little accountability and assigns a low level of responsibility to people who choose to build in dangerous areas. If the disaster destroys an older house that never should have been built as a one-story structure in an area that is five feet below sea level, the NFIP still covers the property. The government essentially pays to facilitate building in risky areas, and in cases such as New Orleans, pays again in the form of flood insurance payouts. The government pays for protection of people who want to take risks and offers a safety net when their property is destroyed. The system is not sustainable, as seen by the current insurmountable debt within the NFIP program. The reactive way in which the federal government chooses to protect people in hazardous areas and finance their rebuilding efforts ends up costing an enormous amount of taxpayer money.

Massive disaster relief creates moral hazard as the government has lowered the price to live in disaster prone areas, which in turn places more of a burden on taxpayers who ultimately pay for large parts of the recovery and reconstruction (Shugart 2005). Over the last fifty years, the federal government has spent billions of dollars on hazard control structures in an effort to make areas “safer.” The idea is to protect people from hazards with man-made structures that keep water or other threats out. The Safe Development Paradox is even more relevant here, as people feel that the “huge wall” in front of them can stop anything, even though experience shows repeatedly that nature has a way of defeating many of the strongest artificial structures (Burby 2006, 171).

*The New Orleans Example*

Many of the economically beneficial and feasible hazard control structures were completed in the 1960s. After this, most of the developing areas in need of a structure were either inappropriate or unable to be supported financially. There is an incentive for local governments to heavily develop areas that are vulnerable, as the federal government insures losses and commits to continue to do all it can to protect the newly developed region. The local governments get the benefit of added tax revenue (Burby 1999, 250).

The New Orleans metropolitan area provides an example of hazard control structure use as a way to facilitate more development in dangerous areas. From 1978 to 2000, the area was exposed to approximately one damaging flood or one hurricane event each year. The story begins in 1947, however, when the levees were constructed (with federal assistance) to convert wetlands to developed land. After Hurricane Betsy in 1965, the Hurricane Protection Project raised the levees to protect against a storm surge from a category 3 storm (Burby 2006, 175). After Congress passed the NFIP in 1968, residents in low-lying areas had the protection of physical structures as well as the financial backing of the federal government to essentially put themselves in harm's way. Even though Hurricane Betsy flooded most of the region, the construction of the new Hurricane Protection System and the NFIP provided reasonable safeguards for people looking to expand into new areas of the city.

In 1969, Hurricane Camille passed close to the city with minimal damage, instilling confidence in the new Hurricane Protection System, which was supposed to protect the city from the 100-year storm, or a storm with an intensity that hits on an average of one time per one hundred years. Between 1970 and 2000, 22,000 new housing units were built in New Orleans East, which previously consisted of marshes and wetlands that helped absorb the blow from

approaching hurricanes (Burby 2006, 176). Zaninetti defines this as a combination of vulnerability and urban sprawl or “hurricane sprawl” (Zaninetti 2007). Hurricane sprawl is urban sprawl in a flood plain. Urban sprawl is the spreading out of a city and its suburbs over more and more land at the periphery of the urban area. It usually means the conversion of open space to developed space (Brueckner 2000). The added protective structures spurred development in hazardous areas but did not eliminate the risk.

The previous example reveals the Safe Development Paradox in practice because federal policy had the intended prospect of sustaining development in dangerous areas but had the “unintended effect of contributing directly to the devastation of Hurricane Katrina” (Burby 2006, 176). It is important to encourage safer building practices behind the structures, knowing that our man-made facilities can fail. Is use of hazardous areas in society’s best interest? Wetlands for example, provide the best protection from hurricanes, but local governments have a difficult time supporting land reclamation when federal policies and practice encourage programs such as the NFIP and floodwalls (Burby 1999, 252-253).

Once the federal government provided perceived protection, people moved to New Orleans East, an extremely flood prone and low-lying area. The limitations of the structures include design criteria that can lead to overtopping (water flowing over the top of the structure) due to catastrophic events that may have been beyond the imagination of the structural design team. The second limitation is that structures can have design flaws, in their architecture as well as in their construction and maintenance. Both of these limitations are relevant to the New Orleans case, as levees were overtopped and breached. The NFIP and hazard control structures have compounded the disaster potential and a PDRP can help combat the reactive policy loops that seem to build walls higher and higher.

## **2. Bureaucracy:**

Integration with the Department of Homeland Security (DHS) has added a layer of decision makers who must approve actions and funding requests. With so many players, there will always be a difference in priorities and incentives within the agency (Sobel and Lesson 2006, 2-3). DHS recently performed a study outlining the positive and negative arguments for FEMA remaining under the umbrella of DHS. The arguments for keeping FEMA within DHS include the threat of terrorism and the loss of a key agency within DHS. FEMA has the unparalleled advantage of being part of one of the largest networks of security-driven resources. DHS, as an agency, has a wealth of resources and specialties to aid FEMA. The study also argues that as an independent agency, FEMA would duplicate the efforts of DHS, as both would be concerned with preparedness and response. Finally, DHS claims that separation would create huge fissures between federal policy and the reality of state and local action (“FEMA In or Out” 2009, 8-13).

Conversely, as an independent organization, FEMA would have only one focus, and would also not need to compete with eight other organizations for resources, attention and approval. This would allow DHS to focus on the prevention of terrorism, instead of also being concerned with hurricanes and floods. FEMA, in theory would have its own funding and ability to set its own agenda, instead of keeping the goals of DHS and terrorism in mind at all times. Finally, a smaller, independent FEMA would have to surmount fewer bureaucratic hurdles before responding to emergencies (Homeland Security Policy Institute 2009, 4). The bureaucracy slows FEMA’s processes because at each level of approval needed for an action, a politician may have his or her own reasons for making a specific decision, muddling the overall goal. FEMA cannot afford a slow process, and the need for more approvals than in the 1990s has led to more

reactive tendencies. Added layers of bureaucracy also lead to many rules that could actually prevent aid from reaching its final destination due to lack of approval.<sup>5</sup> Indeed, this process needs to be streamlined regardless of whether FEMA remains within the DHS framework.

### ***3. Adverse Incentives:***

Sobel and Lesson discuss the issue of adverse incentives as a problem that leads to the reactive nature of FEMA. Decisionmakers frequently study two types of policy errors. A Type One Error involves an agency not being cautious enough. For example, if FEMA responded to a disaster with many resources and it turned out that the threat was minimal, FEMA would have committed a Type One Error. This would reflect badly on the agency because it would have spent money and committed resources unnecessarily. Conversely, a Type Two Error occurs when the agency is too cautious (as FEMA was in New Orleans after Katrina). While the agency endures criticism for this error as well, it is generally thought that a Type Two Error is less damaging to an agency's reputation (Sobel and Lesson 2006, 3-4). This unfortunate reality is based on a few main issues. The first involves uncertainty about the actual cause of stress. In a Type One Error, it is clear that FEMA is at fault because it over-deployed resources, and this caused direct hardship on responders, who put their lives on hold to help out, and it overcommitted resources -- essentially wasting public funds. In a Type Two Error, it is harder to pinpoint exactly who (or what) is at fault. It is nearly impossible to determine how many of the deaths resulting from an unavoidable hurricane might have been avoided with more aid. Thus, agencies are somewhat more protected from some of the blame that accumulates in a Type One

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<sup>5</sup> A macro-level example of an added layer of bureaucracy involves the following FEMA policy. Before the advent of DHS, FEMA was a distinct entity with cabinet-level status and direct access to the President. Now it falls under the DHS umbrella. Previously, FEMA would not need the approval of DHS to enact policy. Under the new system, at least the Secretary of Homeland Security (in DHS) must approve the measure in addition to FEMA, possibly injecting different goals based on the priorities of DHS as a whole.

situation (Sobel and Lesson 2006, 6-7). The government must find a balance between over-committing and taking too long to deploy.

Sobel and Lesson discuss New Orleans as an example of a clear Type Two error by FEMA. Even with all of the knowledge and foresight of countless studies and simulations completed less than a year before Katrina, FEMA refused to pre-stage materials, devise a plan or take immediate action once the report of major flooding occurred. It took FEMA a full day to request military assistance after levee breaches were discovered (Sobel and Lesson 2006, 7). The Type Two error epitomizes reactive organizations. FEMA waited until destruction was all but ensured before it started massive response efforts. While the threat of a type one error is real, FEMA can and should heed warnings for extremely vulnerable regions by creating plans, getting approvals for assistance from individuals and the private sector as well as pre-staging equipment even if it turns out to be overly cautious. FEMA must find a balance or middle ground between the two possible downfalls of disaster response.

#### ***4. Stafford Act Rebuilding Clauses***

The Stafford Act as federal policy has been refined for over fifty years, dating back to the original Disaster Relief Act. Although much of the Act is extremely helpful to emergency managers and responders, there are four ideas dealing with response that keep FEMA in a reactive cycle. The laws have boxed FEMA in, making it very difficult to innovate, most likely causing excess financial expenditures that could be mitigated by more ambitious and safer projects. The four policy measures are:

1. *Mitigation Funding in Disaster Mitigation Act of 2000*: Activities are only funded at a maximum of 75% of the total cost, meaning the jurisdiction must find 25% in difficult economic times for local governments (Disaster Mitigation Act of 2000, 2). It might be advantageous for FEMA to

cover 100% of a project in hopes that it would save money if another disaster strikes that area. Even using mitigation in a recovery is not acceptable for 100% funding.

2. Alternative Project Clause: An Alternative Project occurs when a jurisdiction would like to update infrastructure or a building to a capacity that exceeds pre-disaster capability and function. These projects are only funded at 75% of their total cost (Disaster Mitigation Act of 2000, 4). When recovery costs for returning buildings to the condition they were in before the storm are covered at 100%, the incentive to modernize and improve resiliency (by doing an alternative project) is greatly reduced (Emergency Management and Assistance, US Code §206.204). The vice president of a leading disaster consulting firm says that FEMA is notoriously quiet when dealing with the reasoning for the above percentages. except that FEMA does not have a desire to subsidize the operating budget of a city. If a jurisdiction was going to build a new school in 2011, but it was destroyed in 2010, FEMA does not want to pay for a project that the city was planning on funding anyway. Overall, the Alternative Project Clause is a disincentive to use recovery as a means to prevent future destruction.
3. Multihazard Maps: The multihazard map, which shows the potential destruction if certain disasters strike an area, is introduced by this Act as well. Unfortunately, no requirements are based on the maps: “the multihazard advisory maps shall be considered to be advisory and shall not require the development of any new policy by, or impose any new policy on, any government or private entity” (Disaster Mitigation Act of 2000, 7). Thus the policy fails to ensure that any warning or recommendation stemming from the map must be addressed.
4. Repair v. Replacement Policy: This is a formulaic standard that says if a structure is more than 50% destroyed, it should be rebuilt; otherwise repairs will be adequate (Emergency Management and Assistance, US Code §206.226). Decisions about whether to rebuild or repair should deal



with a multitude of individual conditions based on the use of the building before the disaster and how it may aid resiliency in the future. For example, a building that is flood prone but only 40% destroyed will be repaired, not rebuilt, even if the next disaster completely destroys it, while causing collateral (and catastrophic) damage to surrounding facilities. In other words, sometimes it may be beneficial to build a new building even if it is less than 50% destroyed.

The Stafford Act, then, is too reactive and formulaic. Its policies advocate for a return to conditions before a disaster and do not incentivize resiliency enough to make it appealing to a state that is trying to reduce life cycle costs. When combined with the idea of the Safe Development Paradox, the Stafford Act looks like a document that advocates for the status quo. FEMA is going to spend billions on relief; why not spend it on projects that may be able to withstand the next disaster? The final reactive policy begins to look at this issue.

#### ***5. Emergency Support Function 14 (ESF-14):***

The Government Accountability Office (GAO) in March 2010 produced a report about the effectiveness of ESF-14 and LTCR to provide insights for developing the new NDRF. GAO was tasked to look at “the roles that LTCR played in recent disasters, broad criteria and timing challenges that affected this assistance, and the effectiveness of specific planning assistance practices” (GAO 2010, i). The report highlighted two main issues with the current policy implementation. The first involves the vagueness of the criteria to involve ESF-14 and LTCR in the wake of a disaster. The second problem dealt with timing, as LTCR assistance began before governments were ready for it and ended before critical recovery milestones were met. Along with the broad conclusions, GAO raised many concerns with the current system relevant to recovery planning and issues that a PDRP could address through deliberate pre-event planning.

The GAO did identify important advantages of the LTCR process, as it is a valuable tool for recovery. LTCR provided critical assistance in coordination and planning, with state officials generally remarking that assistance in these sectors was constructive. Meetings coordinated by LTCR officials brought many different federal agencies to the table, something that the state officials probably would not be able to handle without assistance. The LTCR officials also helped create effective long-term recovery plans, since states often lack the resources to create robust plans on short notice. This process occurred between six and twelve months after the disaster, however, hampering implementation (GAO 2010, 27-28). Another main advantage identified by the GAO was the ability to get interagency funding for recovery projects. LTCR's ability to obtain non-traditional sources of money for recovery services is an asset (GAO 2010, 18). A Kansas town, for example, had plans to build a new water tower using FEMA money, but, because of the Alternative Project Clause, the town could only restore the tower to its previous capacity, addressing current need, but not future growth. LTCR identified the USDA as a partner to help fund the final 25% of the project for a larger and stronger facility (GAO 2010, 19).

The GAO report focused on areas needing improvement, as its main focus was to provide recommendations for the pending NDRF. The first main problem with ESF-14 is the vague language dealing with the activation of recovery assistance; according to the NDRF, activation occurs if "the incident is likely to require significant federal long-term community recovery assistance" (NRF 2007). The GAO reports that "other FEMA guidance says that development should be considered when 'routine federal, state, local and tribal disaster assistance mechanisms are insufficient to meet the extraordinary challenges of affected jurisdictions'" (GAO 2010, 12). These statements could easily be interpreted in various ways and cause confusion when

discussing the activation of ESF-14. It can also lead to an issue if a state expects to have ESF-14 support and FEMA decides not to implement it, creating hardship on a community.

The second issue deals with the timing of LTCR and ESF-14. The process frequently ends before the key recovery functions are completed. When producing a recovery plan can take six to nine months following the disaster, it seems necessary that ESF-14 should remain active beyond that time frame (GAO 2010, 8). The study shows that the typical end point is six to eight months (usually right after the plan is produced). Once the process ends, officials in local government do not have enough time to devote extra hours to recovery and the overall plan suffers (GAO 2010, 13). FEMA claims that ESF-14 closes when three conditions are met: (1) long-term impact analysis has been performed, (2) necessary support for plans and strategies has been provided, and (3) resources have been coordinated to launch recovery (GAO 2010, 17). Unfortunately the Joint Field Office (JFO) generally closes before these are complete because the JFO, by nature, is response oriented, and recovery is not its primary focus. FEMA seems to emphasize that ESF-14 ends when the JFO closes instead of when the ESF-14 conditions are met (GAO 2010, 27).

The last issue deals with ranking recovery functions based on importance. LTCR claims that these rankings do not show importance; instead it tries to show which projects have the most relevance to the recovery process. GAO's review of the rankings shows inconsistencies and possible conflicts of interest. Because states, cities and towns are looking for the most improvement possible, the LTCR should reevaluate the ranking procedures (GAO 2010, 26). ESF-14 and LTCR are major advances in United States disaster policy, but what are the next steps? The PDRP and the NDRF can complement these two ailing functions that are out of place, lost in a framework that is focused on response.

All five of these flaws lead to over-development of areas that are vulnerable to disaster. Because federal policy provides generous insurance and relief, we see moral hazard develop. The bureaucracy and adverse incentives are administrative flaws in the way FEMA operates that create a delayed response and more difficult recovery. Additionally, the specific language of the Stafford Act and Disaster Mitigation Act do not encourage innovation and the updating of systems that may have been aging and in need of replacement before the storm, instead only replacing existing buildings and technology. ESF-14 and LTCR plans are a step in the right direction, but the process needs a pre-disaster component.

Florida has realized that employing LTCR is critical, but having a PDRP as a baseline is a must. There is not enough time in the LTCR intensive six-week planning process. In addition it is easy to establish most goals before a disaster. A community knows most of its vulnerabilities and can decide what to do after damage or destruction occurs.

Table 2 summarizes the findings in this chapter and shows that most of the federal policy is reactive and need of reform, but is not detrimental to the development of communities. The NFIP is the only program on the list that has increased the number of people living in hazardous areas, while also increasing the burden on the taxpayer. The program is currently billions of dollars in debt. But the other policies can be improved through proactive state action in the form of a PDRP, as shown in the following chapter. A community knows most of its vulnerabilities and can decide what to do after damage or destruction occurs. Because the federal policy has not addressed proactive solutions, the state of Florida decided to address the recurring problem internally by establishing a process for the PDRP to help local communities. The PDRP addresses all five of the main policy problems, while working in tandem with the current policy

measures to encourage a more proactive mindset when designing future infrastructure and housing within cities.

<i>Table 2: Current Reactive Federal Policies: Reactive or Detrimental?</i>		
<u>Reactive Federal Policy</u>	<u>Quality</u>	<u>Comments</u>
NFIP	Detrimental	The NFIP is a flawed program \$18 billion in debt that must be reformed to fulfill its initial goal of reducing the number of people living in hazardous areas.
Hazard Control Structures	Reactive	These structures help protect livelihoods but should not be the only line of defense.
Integration into DHS	Reactive	FEMA needs to act quickly in a post-disaster setting and may be more equipped to do so without DHS
<u>Stafford Act Rebuilding Clauses:</u>		
<i>Mitigation Funding</i>	Reactive	75% funding for annual mitigation projects, but it may be advantageous to cover 100% in hopes of saving money if a disaster destroys the region.
<i>Alternative Project Clause</i>	Reactive	75% funding for new buildings with advancements is a good policy, but is less attractive than 100% funding to return to pre-disaster conditions.
<i>Multihazard Maps</i>	Reactive	The Maps contain flood vulnerability information for the entire country and this information should be more widely available and used by residents and lawmakers.
<i>Repair v. Replacement Policy</i>	Reactive	Providing a uniform framework for rebuilding is effective, but other factors such as previous use and potential for future resiliency should be considered as well.
ESF-14 and LTRC	Reactive	Effective programs but a National Recovery Framework is needed to improve the effectiveness of ESF-14 and a PDRP would reduce the LTRC drafting and implementation timeline.

### ***Chapter 5: The Details of the PDRP in Florida***

*Chapter 5 outlines Florida laws that require PDRPs before launching into a discussion about the components of the plan and how it can counteract the current reactive policy structure.*

In recent years, Florida has implemented laws requiring that PDRPs begin to address the reactive qualities of FEMA described above. A set of requirements for comprehensive plans for coastal communities states that “a redevelopment component which outlines the principles which shall be used to eliminate inappropriate and unsafe development in the coastal areas when opportunities arise” (Florida Statute §163.3178(2)). Among the opportunities discussed in the statute are post disaster conditions. This one statute addresses the first problem that current FEMA policy inadvertently encourages: facilitation of development in hazardous areas. If a

building is destroyed, what is the justification for re-building it in the same location? The NFIP facilitates development in hazardous areas, but new Florida policy will address this concern by requiring the evaluation of developments instead of allowing reconstruction to pre-disaster standards. In addition, the policy also addresses hazard control structures and limits the moral hazard that is created by protecting assets in the dangerous zone. Hazard Control Structures are no longer the only line of defense. The law now requires evaluation of unsafe development. All of this information can be found in multihazard maps, whose information is used as a backbone for policy.

The comprehensive planning mandate in Florida requires that all counties produce a comprehensive plan that guides future development in areas such as land use, housing, infrastructure and transportation. The general statute requiring comprehensive plans recommends that interior communities prepare PDRPs and the state will make grants available to these communities that may not have other resources to fund planning activities (Florida Statute §163.3177(7)(I)). Because FEMA only pays for mitigation at 75% of cost, the state is committing its own funding sources towards the planning process.

In addition to the comprehensive plan requirements, Florida Administrative codes provides more PDRP requirements. The PRDP must “reduce or eliminate exposure of human life and public and private property to natural disasters” (Florida Administrative Code, Rule 9J-5.012(3)(b)8)). This rule attacks the entire reactive premise of FEMA policy by requiring advanced recovery planning. The next rule in relation to post-disaster redevelopment requires inventory and analysis of information regarding existing and proposed land use in coastal high-hazard areas, structures with a history of repeated damage, infrastructure, and beach conditions. Relocation, structural modification and public acquisition should be analyzed as possible

solutions. Infrastructure is of special importance, and the feasibility of relocating threatened infrastructure must be analyzed (Florida Administrative Code, Rule 9J-5.012(2)(e)). Because FEMA's Alternative Project rule and 50% Repair versus Replacement Policy provide a disincentive to build more resilient infrastructure in a new area, the state of Florida has mandated the study of alternative projects. While the short-term investment might be larger, it may reduce the risk of future damages and subsequent repairs in the same location (Heinz III Center, 14).

Florida also stipulates that a thorough process of evaluation is important; this evaluation must consider the immediate cleanup and repair needs versus long-term health, safety and redevelopment goals. This addresses Repair vs. Replacement Policy by advocating for a more stringent evaluation and needs assessment of what should be fixed first and the prospects for long-term recovery. It is far less formulaic than the 50% rule. The PDRP should address contingencies for relocating, modifying or removing damaged property, while limiting development in areas of repeated damage. Hazard mitigation reports should also be incorporated into comprehensive plans. Finally, and perhaps most importantly, the report requires "identifying areas needing redevelopment, including eliminating unsafe conditions and inappropriate uses as opportunities arise" (Florida Administrative Code, Rule 9J-5.012(3)(c)5). This last statement encourages communities to use the disaster as an opportunity for advancement, the crux of a PDRP.

In stark contrast to Florida's laws, the legislation in Massachusetts (and many other vulnerable states) says very little about disaster recovery. There are two main executive orders that guide disaster policy in the state. The first, issued by Gov. Michael Dukakis in 1978, requires that "each secretariat, independent division, board, commission and authority of the Government of the Commonwealth shall make appropriate plans for the protection of its

personnel, equipment and supplies against the effects of enemy attack or natural disaster..." (MA Executive Order No. 144). The executive order requires agencies to plan for a disaster and a response, but makes no mention of the word recovery. The other main executive order, issued by Gov. Mitt Romney in 2005, requires all state agencies to use the National Response Framework (NRF) for disaster planning. Most of this is included in the National Incident Management System (NIMS), which focuses heavily on response actions, rather than long-term recovery procedures (MA Executive Order No. 469). Massachusetts may not be as vulnerable to natural disasters as Florida, but there is a long history of incidents dating back to strong hurricanes reported as early as the 1600s. Some will argue that advance planning is not worth the time, as Massachusetts sees far fewer disaster declarations. This is true, but the state is much smaller, and New York, an abutting Northeastern state, has experienced 61 disaster declarations compared with Florida's 63 since the mechanism began (FEMA 2010). Massachusetts is vulnerable, and it is time to create legislation that mirrors Florida's efforts.

While no state can follow the Florida model exactly because state laws vary, there are overarching topics that all PDRPs should address. Florida has synthesized these topics into sections that cover five main topic areas: 1) Land Use; 2) Housing, Infrastructure and Public Facilities; 3) Economic Recovery; 4) Environment and 5) Public Participation. Florida has further split up the actions (for the first three topics) into three levels of achievement: minimum, recommended and advanced. The best practice would address all issues, but the state acknowledges that this may not be possible right away, so creating priorities is important.

As previously mentioned, there are currently six pilot communities with enacted PDRPs. This report focuses on examples from three: Hillsborough County (Tampa), Panama City and Polk County (the only interior county with a PDRP). These three plans were chosen for their



variable conditions representing a wide swath of both Florida and the United States as a whole. Hillsborough County includes a major metropolitan area, Panama City is a much smaller city, and Polk County is an interior area. The following sections outline the main tenets of the PDRP with examples, and explain how the policies counteract the federal policies described above.

### ***Land Use***

Land use requirements, through zoning, specify a use or function for a particular parcel. In a disaster situation, any land use assessment should take into account the number of structures destroyed and the accompanied needs of those structures' tenants. The plan should also look at available land and identify regions to concentrate new building rules (World Bank 2010 ,115). One of the most important tenets of the PDRP is limiting expansion into vulnerable areas (Mileti 1999, 7). As the number of people living in hazardous areas, such as a floodplain, decline, there should be a concurrent reduction in NFIP subscribers and payouts. Instead of attempting to strengthen and heighten existing structures, it is necessary to eliminate the risk altogether, creating a more resilient area because the vulnerability is greatly reduced (Florida Report 2010, 42). Before looking at the specific provisions, it is important to explore why land use is a key principle of the PDRP and why Florida places an emphasis on the topic.

Changes in land use following a disaster can provide an opportunity for a community to leap forward technologically, as well as to address land use districts that may be outdated or no longer desirable based on the recent conditions. At the same time, it is hard to predict which areas will be completely destroyed and prime candidates for rebuilding, so a flexible strategy within the PDRP is needed to address all of the possible issues and scenarios that may arise after an event. The land use decisions in the PDRP should be in sync with the comprehensive plan to promote a more resilient city through rebuilding or retrofitting an existing building, controlling

changes in existing building occupancy rates or facilitating the post-disaster rebuilding process in hazardous areas (Florida Report 2010, 44) (Schwab 2005, 123). Floodplain management is a huge opportunity area when dealing with land use. Current information regarding high-risk flood areas should be taken into account for reclamation projects following a disaster. The projects may include reserving pieces of property for the floodplain or, in extreme scenarios, involve relocation.

Over the last two decades, the idea of hazard resilience has been increasingly considered as a criterion for sustainable communities. Land use as a component of a PDRP has a number of benefits. By planning in advance, all stakeholders in an area, whether owners or users, can be made aware of the risks of living or conducting business at that spot. Secondly, understanding the potential dangers, uses can be tailored to ensure minimal loss of usability in the event of a large-scale disaster. This helps with economic efficiency because there is no denying that disasters cost everyone money. Thirdly, land use plans dealing with disaster can be used to educate the public to help preparations for a disaster. Better understanding of the risks that threaten an area may allow people to secure valuable belongings on upper floors or other safe areas. Education can also help lead to a demand for action. If people know the dangers, there may be an incentive to demand new land use regulations that force people to comply with safer measures (Mileti 1999, 156-157). Florida's land use provisions address all three of these goals.

There are barriers to moving forward with land use in a comprehensive, "forward thinking" manner. Government institutions are disjointed and vary widely among states. Florida is one of four states (California, Oregon and North Carolina are the others) that pay close attention to hazards, providing specific requirements for town comprehensive planning, but Florida is the only state to require pre-disaster recovery functions. Six other states require

attention to hazards, but oversight of compliance is not very strict. Massachusetts's towns need not mention hazards in comprehensive plans (Burby 2005, 5). Without a mandate, it is unlikely that MA towns will consider disaster recovery as a critical piece of a comprehensive plan.

Another barrier includes an aversion to managing development projects. Making demands based on hazards seems like a minor issue, because it may be decades between catastrophic events.

Hazard mapping is underutilized as well, as current technology has the ability to address the vulnerability of specific blocks on a street, but this information must be provided to the public.

Finally, regional coordination is always difficult (Mileti 1999, 160).

A meaningful post-disaster land use plan must address many of these issues to ensure effectiveness and resilience. A hazard must be identified, including the location, magnitude and potential impact to a region. Then it must address what probable damage patterns could be. After this, a loss estimation will provide an estimate of potential losses based on the given hazard. The plan must then look at the carrying capacity of an area to see if it can continue to sustain the population that might use it currently. This can be addressed through possible downsizing of certain areas in favor of others. In addition, a build-out analysis can analyze the best land use for a certain area. Finally, the PDRP will look at how to address historical structures and mitigation for future events (Mileti 1999, 157-158). Florida's land use provisions below address all of these points through its minimum, recommended and advanced achievement levels for the PDRP.

#### *Phased Reconstruction and Streamlined Permitting (Minimum)*

Phased reconstruction and streamlined permitting address the issue of building moratoria and other restrictions of immediate rebuilding processes. The community should modify the permitting process to facilitate fast repairs of areas that only suffer minor damage while providing a period of time for owners and officials to assess the viability of heavily damaged

locations. If a temporary permitting plan is not created, the local officials could be flooded with applications and be unable to distinguish critical from non-critical situations. Also, building moratoria must be phased, allowing those who have the means to rebuild and minimal damage to fix their property quickly. Without regulation or direction, people will rebuild with an unknown regard for safer practices.

The regulations regarding building moratoria should be explicit, and residents and business should be informed of the rules before the disaster. Building moratoria are rarely popular with the public, especially if they only find out about restrictions after damage has occurred. If a moratorium is accepted as fact before the event, there is a greater likelihood of acceptance (Schwab 2005, 106). Florida believes that outlining the building moratoria rules before the disaster allows the policy to “sink in,” and the public takes it as fact, just as it would any other law (Florida Report 2010, 46).

Hillsborough County, furthermore, has a very specific code as part of the PDRP that requires a moratorium based on the level of damage. For example, when a structure is destroyed, a thirty-day waiting period is required before applying for a building permit. This accomplishes the above goal of giving all parties time to assess the best future use of the land as well as the best way to rebuild the structure. Buildings that have minor damage must only wait four days, as it is likely that these buildings can be repaired in comparatively easy ways and continue to survive on the current land. The key consideration when looking at permitting and rebuilding, however, is the ability to produce a massive number of permits in a short period of time. This process should include suspension of normal practices in order to expedite the repairs in very lightly damaged areas quickly. If practices are suspended, the county can establish additional principles and requirements for building moratoria to end. These requirements might include

studying high-risk areas more extensively before establishing effective building practices in them. (Hillsborough County PDRP 2010, 7-24).

The revised permitting practices and phased nature of reconstruction can greatly improve the resilience of an area because they give communities time to assess damage and use the PDRP to require safer building practices.

#### *Build Back Standards for Nonconforming and Destroyed Structures*

The second minimum importance action item is reforming build back standards for nonconforming and destroyed structures. Usually a nonconforming use involves structures or uses that predate the update of a plan. In many cases, these structures are grandfathered in to the most current system but are restricted from expanding or rebuilding. After a disaster, it is possible that a high incidence of requests for rebuilding nonconforming structures may come in to the permitting office (Schwab 2005, 124). Dealing with this potential problem requires foresight if a community wants to become more resilient. Should the city rebuild using new land use codes, outdated ones or a hybrid of the two? Requiring everyone to conform to new standards may be onerous, but allowing everyone to build new nonconforming structures will exacerbate hazard vulnerability. Current policies from the federal level deal almost exclusively with flooding through the NFIP. There is limited funding available as the NFIP requires heavily damaged structures to update to current standards. Local governments should be stricter than the federal government and require updates such as wind guards or stronger standards, seismic stabilizers or fire resistant material use to combat the hazards of the area (Schwab 2005, 124). This is a gradual process, as nonconforming structures may update over a period of years, depending on when damage is sustained

In Florida, when a structure is rebuilt, it must adhere to the most recent set of codes and regulations, which may compromise the past use or appearance of the building. Certain communities may have architectural requirements for all buildings. It is important that all PDRPs address the concern before the disaster because there is a delicate balance between tradition and conformity with new safety standards. Once a building is classified as having “substantial damage” (50% destroyed), it must be brought up to the latest code, which may require elevating the structure (Florida Guide 2010, 47).

Hillsborough County and Polk County have similar strategies regarding nonconforming structures. Generally structures that have damage that would exceed 50% of the cost of replacing the building would need to rebuild and adhere to the latest building codes. Debates have raged, however, about the fairness of an “act of God” dictating compliance. Both counties, therefore, allow repairing damage once without updating codes. The financial burden is a problem, but it seems that both of these counties have compromised resiliency and community concern. Polk County is in the process of developing a handbook of best practices to establish the best future policy for dealing with this complicated issue.

Nonconforming buildings provide an enormous challenge for planners and lawmakers because it seems unfair to ignore an opportunity to become more resilient, but it also seems unfair to require people to pay more money to fortify their buildings unless subsidies are provided for current undamaged buildings.

#### *Dealing with Blight (Recommended)*

After a disaster, certain residents may not have the means to rebuild their residences and some areas may have abandoned buildings, or blight. Dealing with this issue from a community perspective can be tricky because there is a cost to demolishing a building, and it should be

ensured that whoever purchases the land has the intention of clearing any blight on the property. As part of the PDRP process, communities should review the codes that deal with demolition to ensure that neighborhoods do not have to deal with blight for months or even years after an event (Florida Guide 2010, 48).

The state of Florida had previously enacted the Community Development Areas (CDA) initiative, which includes neighborhoods that provide substandard forms of living. This could include any combination of poor facilities, dangerous conditions, inadequate transportation and overall economically distressed lifestyles. Each community has decided which neighborhoods are top priorities for redevelopment, and using the PDRP is a perfect opportunity to move forward with CDA projects. These projects have already been approved, so if these areas were damaged, it would be possible to begin redevelopment rapidly and improve life for all residents within the CDA (Polk County PDRP 2009, 78).

#### *Mitigation to Return with Resilience (Recommended)*

The second recommended action is mitigation in an effort to build back at a more resilient level. One method uses land acquisition and reallocation. Funding can be made available to purchase hazardous land from people or to encourage transfer of development rights to provide more sustainable land in other areas. The problem with this method is that the most expensive and desirable land is along the coast (most hazardous). As a result, finding willing sellers is difficult. The current FEMA mitigation grants use this method, but effectiveness is limited because it is a voluntary program and people have made investments in the land. Another strategy that could be used in tandem with this policy might increase resilience in areas that are most vulnerable. For each type of hazard, there are proven building techniques that can lead to a more resilient future, but they are typically not required in the rebuilding stage. Providing

educational and monetary incentives for such strategies during repairs would make the area more sustainable in the future. If a house needs major repairs after a flood, a grant that would assist the owners in elevating the structure to prevent future damage would be an ideal use of mitigation funding. It would also reduce response and recovery costs in the future.

There are many examples of mitigation measures that could be employed beyond the current Stafford Act provisions. If land is reallocated in certain areas (either for new development or because an area was completely destroyed and landowners allowed reallocation for safer practices), the PDRP must stipulate methods for reallocation. Once a lot is created and sold, it is enormously difficult to prevent the owner from building to the minimum requirements. Strategies for increased resilience could be as simple as performing a hazard assessment and providing it to prospective buyers as a caution. If possible, lots can be configured to allow building only in areas that are less susceptible to flooding. Clustering, the idea of placing buildings closer together to disrupt less land, is becoming increasingly popular because it does not necessarily increase density, but can reduce vulnerability. Setbacks are another possibility, with various restrictions based on the hazard. Setbacks are especially effective when dealing with fire and coastal hazards, as they can provide a buffer between the natural environment and the structure. With extensive research that addresses the water flow, seismic hazard or possible lava flow, it might be possible to build in hazardous areas while mitigating much of the risk at the same time. An example of a setback might be to allow beachfront property, but to rezone the lots to be long and narrow to allow beach access while still keeping houses a few hundred feet from the water. The final main aspect that must be considered is in regards to access. There must be more than one access point to an area in case a hazard knocks out one of the transportation



sources. All of these requirements in a PDRP would reduce vulnerability and establish an improvement over current Stafford Act mitigation proceedings.

*Priority Redevelopment Areas (PRA) (Advanced)*

The best way to reduce vulnerability and increase resilience is to direct development to safer areas of the city. The PDRP can outline incentives that would activate in the case of a destructive event and provide reasons for people to rebuild in areas that are less prone to destruction. A PRA would allow for rapid permitting and assessment if people agree to rebuild in more sustainable areas that did not sustain as much damage. By setting up a tiered system that allows for faster rebuilding in safer areas, it could help drive the population to migrate towards these locations.

Hillsborough County has pioneered the idea of the PRA and has assigned four main functions to it; the PRA is designed to: 1.) Rapidly restore centers of economic activity and critical facilities 2.) Provide a staging area for impacted communities nearby, 3.) Locate recovery facilities in hubs and 4.) Facilitate growth into disaster resilient centers. Not all PRAs must fulfill all four functions; the needs and damage within a jurisdiction dictate the priority of functions. The PRAs must be located throughout the county to provide equal services to as many residents and business as possible. Because a PRA can be used for redevelopment as part of a more resilient future, it is imperative that it is located outside of flood zones as well as hurricane surge zones (Hillsborough PDRP 2010, 7-16). Hillsborough County takes PRAs very seriously and outlines specific methods for the development of a PRA. There is a lengthy selection process to ensure that sustainable locations are selected. After this, an analysis process takes place for each potential site because needs vary depending on the housing stock (and vulnerability), the resiliency assessment of current infrastructure, the capacity of the PRA and the vision for the

long term development of the immediate area (Hillsborough PDRP 2010, 7-20). The next step involves a gap analysis to study what needs to be pre-staged at the site to ensure full operational capacity immediately after a storm. Finally, public outreach is critical because people need to know where to go initially for shelter and then to learn about the future of development in Hillsborough County (Hillsborough PDRP 2010, 7-21).

The PRA is identified by the state of Florida as a best practice because it encourages people to congregate and develop in the safest areas within a jurisdiction.

#### *Historic Preservation (Advanced)*

The second advanced achievement level item is historic preservation. Historic structures can be particularly vulnerable to disasters because of their age and possible exemption from the most recent codes. After a disaster, historic structures may be inspected by people without proper historic qualifications, which may lead to detrimental treatment of the building. The PDRP should outline mitigation funding sources and mechanisms that can help fortify historical buildings. At the very least, the PDRP should encourage all communities to perform an inventory of all historical structures, including, as a precaution, any building over fifty years old (Schwab 2005, 126). Engaging the historic preservation society in the area when creating the PDRP could help decide how to handle a structure in hopes of preserving the historical integrity of the area.

In Panama City, all historic structures are considered “most vulnerable” in regards to potential wind damage, with 58% also in the highest storm surge zone. Because mitigating possible damages through retrofitting can be costly, it is important to establish a comprehensive database, cataloging all structures and individual vulnerabilities. Panama City strongly encourages groups to pursue mitigation funds to strengthen the historical structures because Mississippi lost an enormous number of historical structures after Katrina, and it changed the

complexion and historical significance of the coastal communities (Panama City PDRP 2008, 4-11).

Historical structures do not always follow the most recently updated building codes and land use regulations, making a recovery situation difficult and possibly devastating for these specific building types.

#### *Changing Land Use Regulations (Advanced)*

The next advanced achievement level practice according to Florida addresses the reduction of vulnerability through land use and development regulations. Essentially, this method would include changing the use of the land or increasing distances from hazard sources when rebuilding. The main reason for classifying it as an advanced achievement level practice is that changing land use regulations requires a delicate and deliberate process. The opportunity is amazing, as careful consideration of property rights and community outreach can lead to effective new regulatory measures to increase resiliency. These measures could include reducing the density of an area (downsizing), increasing the distance from a hazard source or increasing structural mitigation requirements (setbacks, which are addressed in the recommended section), floating districts and overlay districts (Florida Report 2010, 53).

Downsizing has clearly defined pros and cons. There may be areas that are no longer able to handle their pre-disaster uses; in these cases, downsizing can reduce the overall risk to future development. It can also be a politically polarizing force, as it will result in a perceived reduction in value of the land. Density controls that are established before a disaster, or before development begins, are ideal because they do not result in any surprises after the destruction. The ultimate success or failure of a downsizing plan may be dictated by the pre-disaster outreach efforts to educate people on the benefits (Schwab 2005, 126).

Floating zones and overlay districts are tools that communities can use to add to existing land use procedures. A floating zone has no specific geographical location but is activated in an area based on some other criterion, such as damage. The floating zone can be used to control redevelopment in severely damaged areas by automatically triggering a downsizing ordinance in accordance with overall property damage. It can also trigger building restrictions that might have the effect of reducing density in an area such as a square footage cap. Unfortunately not all states allow floating zones, but Florida uses them as a main tool for land use redevelopment in the PDRP. Overlay districts are generally used to address issues in land use that may cross district lines. They can be used to impose disaster-related restrictions that general land use may not address. The overlay district can be used to change characteristics of a municipality by establishing slope side hazard zones if landslides are a frequent occurrence (Schwab 2005, 127).

The methods described above could be instituted through damage thresholds that would require these measures if a certain level of damage to a structure is reached. The state of Florida believes that the key to instituting this aspect of the PDRP is outreach to make sure that home and business owners know the vulnerability and the requirements if the property is damaged beyond a certain level.

It is extremely difficult to change land use policy after a disaster because everyone demands a speedy recovery, there are property rights at stake and thus possible legal ramifications and many areas are heavily damaged, but not destroyed (Berke and Campanella 2006). The Florida plan elements outlined above provide a framework to deal with damage and slowly migrate to a more resilient community as the needs are justified, instead of demanding sweeping changes when the population may not be amenable to moving.

*Relation to Reactive Policy Problems*

The land use regulations outlined by the PDRP attempt to address many of the deficiencies with the Stafford Act. One of the main tenets of land use planning that should not be overlooked is flood plain management. Flood Insurance Rate Maps (FIRMs) are used to address NFIP regulations discussed in chapters 3 and 4. Floodplain zoning is an ideal platform to achieve multiple land use goals, resource conservation, open space and population density in hazardous areas (Schwab 2005, 124). The PDRP can address the reactive policy by using the FIRMs in a pre-disaster setting to decide which areas should have land use changes in the event of destruction. Using mitigation as a return to resilience is an important part of the PDRP that addresses the lack of innovation standards in the Stafford Act. Using FEMA funds to update buildings and make them compliant with current regulations and standards should be a priority when rebuilding. The Hazard Mitigation Grant Program is a great first step, but mitigation goes beyond land acquisition and the PDRP addresses this by encouraging resilient building methods.

Currently, the formula for reconstruction advocated by FEMA is too formulaic, leaving little room for innovation unless it is planned and can be argued for immediately. The PDRP can help prepare for increased resilience and even facilitate the extra fund raising to cover the 25% of the project that FEMA would not cover.

The Repair v. Replacement Policy and the 50% Rule create a very strict standard for when a building should be repaired or rebuilt. The PDRP provides build back standards that go well beyond the Stafford Act, meaning mitigation and resilience have to be considered in the rebuilding process. By outlining the land use policies before the disaster strikes, the PDRP provides people with an education about any new regulations that might be implemented in the event of a destructive event.

The PRAs address a main part of the first reactive problem: facilitation of development in hazardous areas. By pre-designating locations that should face the lowest hazard possibility, Florida is providing an alternative to the Safe Development Paradox. By providing a location that is deemed safer through data that demonstrates reduced impact from past disasters, Florida hopes to curb the sense of security that people feel behind walls and direct them to higher ground or other more sustainable parts of the city.

Currently, the main plan that all states have for recovery is derived from the LTCR and ESF-14, but the timing for that assistance is not right, resulting in missed opportunities for innovation. Changing land use regulations becomes extremely difficult once building moratoria are lifted. It is very unlikely that any state has a moratorium until the LTCR is completed, thus severely undermining the plan's authority. The PDRP addresses this problem specifically, by performing as much of the LTCR planning as possible before the disaster. Everything listed in the land use section can be studied in great enough detail to make decisions based on past data and vulnerability models. With the PDRP in place and regulations that automatically update in the event of destruction, it is much easier to create a more resilient community.

### ***Housing, Infrastructure and Public Facilities***

Placing infrastructure in an area begins a chain reaction that usually leads to development. If power, water and utilities were extended to a region, it would generally mean that the utility companies see a profit potential in the new part of the municipality. A disaster situation provides a perfect opportunity to reassess the viability of certain parts of a community. If the government along with the utility companies decide not to repair utilities in one space, but to replace them with new services in another sector of the city, the hope is that development would be directed towards the new facilities. If infrastructure and public facilities are sited in

safer areas that are well vetted, it sets an example for the rest of the community when considering expansion or rebuilding options. Seismic hazards provide particularly tricky situations for utilities because of the threat of ruptured gas lines and numerous downed power lines. All post-disaster situations should account for the possibility of an earthquake in the region when rebuilding utilities (Schwab 2005, 118-119).

The PDRP must address any opportunities to upgrade, mitigate or even relocate infrastructure in the event of a disaster. The PDRP, once again, allows the community to make deliberate decisions about long-term resilience that it may not have time to make in the wake a destructive event. The state of Florida defines infrastructure as one of five systems: (1) Transportation; (2) Potable Water, Sewer and Stormwater; (3) Power, Natural Gas and Telecommunications; (4) Public Facilities; and (5) Parks and Recreation Facilities. Every organization involved with the systems on this list can, with proper planning, use the disaster as a way to improve facilities for the future (Florida PDRP 2010, 73).

After a disaster, one of the most pressing issues is providing temporary housing for displaced persons, while beginning the rebuilding process at the same time. Disasters can affect buildings in many different ways. Consequently, it is important to build an adaptive structure that responds to the specific vulnerabilities of a region. Florida has a very low earthquake risk, but a very high flood and wind risk. California has the opposite worry, so officials must consider local conditions. The question of repairing versus replacing a structure is not as definite as FEMA declares in the 50% rule. Houses that are lightly damaged but still in vulnerable areas should also be able to mitigate during the recovery period. The federal government should implement a tiered system of analysis to decide which houses should be rebuilt, retrofitted or relocated. The damage level, cost of repair, willingness and capacity of people to repair or rebuild and the

historical significance of the building should all be considered as part of the recovery process (World Bank 2010, 166). The success of housing recovery is closely tied to the other aspects of the recovery including infrastructure, land use and public participation.

Building codes are of the utmost importance to housing and infrastructure and must be discussed as an overarching theme to all achievement levels that relate to them. A building code is a collection of laws, ordinances or regulations adopted by the government about structural requirements of buildings (Mileti 1999, 163). The new developments that replace destroyed infrastructure should be built in compliance with code standards that take hazard threats into account (Godschalk 2003, 137). Generally planners do not have operational control over building standards, although agencies that have both planning and building officials tend to collaborate very well. Planning control and building codes must work in tandem with each other to create an effective reconstruction process. A comprehensive planning approach in a PDRP must ensure each set of building code controls (Schwartz 2005, 135). An example of this synergy would be requiring stricter building standards in more hazardous areas (beyond the NFIP).

Various construction techniques can minimize obstructions; for example, large waves could pass underneath a structure, and wind damage could be minimized using specialized siding and shingles. To this point, building codes “have played a much larger role in earthquake hazard mitigation than land use regulations,” in order to reduce the risk of structural compromise (Godschalk 2003, 136). Building codes can provide an enormous assistance to the idea of resilience, as a combination of land use fixes and building code-strengthening measures would undoubtedly create a more resilient community.

Building codes are the key to infrastructure and housing, but Florida identifies nine main pieces to a successful recovery in this area. They include temporary housing and infrastructure



recovery, a well-financed, fast rebuilding effort, mitigation measures, residents who are transferred back to permanent housing, reconstruction of most important infrastructure, relocations considerations and enhanced capacity (Florida Report 2010, 42). Basic housing and public infrastructure are the backbone of a city or town and must be rebuilt quickly and safely.

#### *Temporary Housing Siting (Minimum)*

Once the threat of damage is over, it is important for community to have the means to establish temporary housing quickly, before people emigrate to other areas. Temporary housing usually involves FEMA trailers, which can be set up on damaged properties or in a nearby temporary neighborhood during rebuilding. Both methods are effective, and communities should take the time in the PDRP to choose sites that are near employment centers and public transportation. PDRP planners should also take the necessary steps to set up mutual aid agreements with surrounding communities in case a certain damaged jurisdiction cannot house all of its residents for a certain period of time. A mutual aid agreement would create a pact between regional partners that says assistance will be provided in the event of destruction. It is also imperative to ensure that the temporary housing is, in fact, temporary, and that at some point the trailers are removed from the grounds (Florida PDRP 2010, 56).

Polk County has taken an interesting approach to temporary house siting by establishing many possible areas and then making a final decision based on a rapid damage assessment following the disaster. By creating siting criteria, instead of choosing actual sites, Polk County has created flexibility in the post-disaster setting. The flexibility can be an asset because the exact location and intensity of a disaster is impossible to predict, so choosing the site that best weathered the catastrophe is an effective way to prepare areas for temporary residences. In addition, the county also mentions trying a pilot program to assess the usability of vacant land

and empty homes for temporary housing. Lots in neighborhoods that suffered minimal damage could be prime locations for small numbers of temporary units (Polk County PDRP 2009, 53). Finally, Polk County includes planners in the siting process because temporary housing that is needed for one to two years may have an effect on the Transportation, Comprehensive and Land Development Plans (Polk County PDRP 2009, 47).

Conversely, Hillsborough County has chosen to pre-select its temporary housing sites, allowing these communities to operate in any land use or zoning district for a period of one year. Depending on the circumstances, the county may also allow on-site temporary structures as a family rebuilds a home. Finally, corporations would be allowed to erect temporary housing (provided by FEMA) for employees. Once the sites were selected, the county switched its focus to ensure that temporary housing manufacturers would be standing by as soon as the danger passed. If all contracts and other legal documents are in place before the event, construction can begin much sooner. In addition, the county has a backup vendor in case the storm destroys the primary company's ability to build homes. Finally, the county has robust programming to assist residents with the transition to temporary housing as well as the return to permanent housing (Hillsborough County PDRP 2010, 5-26 – 5-28).

Temporary housing is an area that has some flexibility in planning processes, but the result must be an organized plan in order to instill confidence in residents who have just lost their homes and belongings.

#### *Rapid Reconstruction (Minimum)*

The second minimum achievement level criterion is the ability to reconstruct buildings at a rapid pace. When widespread damage occurs, the demand for both contractors and materials rises, causing an increase in construction costs. A focus of the pre-disaster as well as the short-

term recovery phases should be mobilizing resources and contractors to help quell the massive increase in demand for rebuilding. In addition, a disaster-weakened economy can benefit from all of the new building and labor needs in the community (Florida PDDRP 2010, 57). The more quickly a jurisdiction is prepared with a damage assessment, development moratorium, repair permits and demolition regulations, the more quickly recovery can begin. This is another reason why having land use and building codes ready before the disaster can promote resilience *and* speed up the overall rebuilding process (Schwartz 2005, 114). Many new jobs become available, as the town uses the opportunity to become more resilient.

#### *Infrastructure for Temporary Operations (Minimum)*

The third minimum achievement level action is making sure infrastructure for temporary operations is attainable and feasible. Temporary operations can become costly, so one idea would be to provide necessary services to temporary housing areas and then develop these areas once the trailers are removed. Temporary housing sites are excellent locations for new developments (especially affordable housing) because they were deemed safe from hazards and have a more resilient track record due to their use as sites immediately after a catastrophe. Local public works employees and emergency managers should work together with the PDRP coordinator to explore how temporary infrastructure can be incorporated into the planning process (74).

#### *Debris Management (Minimum)*

The fourth minimum achievement level action involves debris management. Obviously, with most disasters much of the early recovery will involve removing debris from an area and knocking down structures that are no longer usable. The town's solid waste department takes the lead on debris removal, which is an incredibly complex process because of the possible

contaminants that may exist on the individual pieces of waste. Landfills may not be able to handle a huge influx of new trash, while emissions standards may prevent other debris from being burned. Debris can also clog waterways, block roadways and contaminate groundwater if it is not disposed of properly and quickly (Florida Guide 2010, 75). Debris management becomes a traffic management issue because it frequently blocks roads. The PDRP should have a plan that directs debris removal to a temporary spot before sending it to a permanent location, but not before any materials that can be recycled are sorted (Schwab 2005, 97). All communities must have a debris management plan that forecasts possible debris fields, creates a plan for removal, identifies potential sites and recycling procedures, identifies priority clearance routes and facilities and addresses removal of debris on private property (Florida Guide 2010, 75).

Panama City has reached a realistic point in the development of a debris management plan. The PDRP states clearly that a debris management plan does not exist at this time. At this point Panama City has specified debris drop-off points, but studies must be conducted to ensure environmental conditions are suitable for debris drops. In addition, the city should look to set up drop off points in an effort to recycle construction materials. In the interim, however, the city has ensured that debris would be handled in a timely and efficient manner, but a formalized plan is not yet ready for inclusion in the PDRP (Panama City PDRP 2008, 2-5). Polk County has a debris management plan, but it is not FEMA approved, thus hurting its ability to receive full FEMA funding for debris removal (Polk County PDRP 2009, 55).

Debris management is a critical piece of the PDRP and the recovery process. The communities in Florida have realized that a debris management plan is necessary but have yet to implement formal plans, instead opting to establish individual contracts with sites and public

works and solid waste departments to ensure roads are clear and private property is ready for repair and reconstruction.

*Financing of Infrastructure and Public Facilities (Minimum)*

The final action that must be considered as part of the minimum achievement level is the financing of infrastructure and public facilities repair. It is important for the PDRP crafters to have detailed knowledge about how the Stafford Act defines acceptable uses of federal funding during a recovery. Using FEMA funding as much as possible is ideal, supplementing the other work with grants and matching funds by both public and private entities. It would be smart for communities to assess which structures are covered by insurance and for what kind of damage. Are there restrictions on rebuilding? Does FEMA's Public Assistance Program protect other structures? How can a community use mitigation grant funding from FEMA to maximize investments and create more open space? The more detailed the assessment, the more likely that all funding sources will be used to promote a more resilient future, as much as possible (Florida Guide 2010, 76). Economic redevelopment will be discussed in more detail in the next section.

*Transition back to Permanent Housing (Recommended)*

The recommended achievement levels for housing and infrastructure include transitioning residents back to permanent housing and infrastructure and public facilities mitigation. Many residents will have the means to begin rebuilding on their own immediately, but will need guidance from authorities regarding regulations and materials to use in the recovery process. Others may need much more assistance in an attempt to deal with public assistance funds, insurance claims and finding reputable contractors to do repair work. The PDRP should outline various resources and processes to ensure that everyone who is entitled to federal and state recovery funds gets an equitable share. Unfortunately, many homeowners may find that

their insurance does not provide enough relief to rebuild completely, and homelessness can be an issue in heavily damaged communities. The average grant from FEMA is only \$5000 - \$6000, with the maximum capped at less than \$30,000, which is usually not enough to rebuild a house. The transition is tricky and requires specific planning goals to achieve success (Florida Guide 2010, 58-59).

Hillsborough County addresses a particularly challenging aspect of the transition back to permanent housing. People who struggle financing their return to private residences may need to stay in the temporary structure longer than the eighteen months that FEMA typically supports. City staff should establish programs to assist people who may take longer to transition because it is probable that FEMA and many of the non-profits will have left the area and ended much of the support in the region. For this reason Hillsborough County places a premium on including transition services to families who may have trouble re-adjusting.

#### *Mitigation After the Disaster (Advanced)*

The advanced achievement level for housing and infrastructure includes encouraging homeowners to mitigate after a disaster, relocating vulnerable infrastructure and facilities, and regional infrastructure considerations. The main goal of the PDRP, as outlined throughout this paper, is furthering community resiliency. In the rush to rebuild after a disaster without a PDRP, residents may overlook new resilient methods to rebuild due to cost and lack of justification for doing so. The window of opportunity is too small to convince owners to improve their property above the minimum standard, so a PDRP could help to disperse relevant information at the right time (before the disaster) and to encourage the resilient development needed after the disaster (Florida Guide 2010, 59).

#### *Relocation (Advanced)*

The second advanced achievement level action involves relocating public facilities due to repeated damage in the disaster. While this method may be the most extreme and expensive, it may be cost effective in the long term to relocate a facility, rather than repair it on more than one occasion. Although the actual decision to relocate cannot be made until the disaster strikes, most of the legwork can be completed in a PDRP, including the permitting and design of the structure. If relocation is deemed necessary, the building will be ready to begin construction more quickly than if the process were begun in the wake of the disaster. This step would be done in lieu of any kind of repair or renovation to a vulnerable facility (Florida Guide 2010, 78).

Relocation of homes or even whole residential neighborhoods is a very sensitive issue and must be approached with the utmost amount of care. Relocation should be a last resort solution in a recovery, as a PDRP and the ensuing rebuilding stage are about rebuilding lives in addition to the structures that may have crumbled. In many cases, the urban poor live in the most vulnerable areas, and this group may not have the means to move without assistance. Certain communities are predisposed to hazards or may have an altered topographic reality after a major event that makes the area uninhabitable. It also could be too expensive to rebuild in a stricken area. Relocation is risky, however, as opposition will be strong in many cases. The new land may not be as suitable for certain uses such as farming, or it might be at risk from a different hazard. Nevertheless, relocation can protect a neighborhood or town from future destruction.

One of the most successful relocation projects in the United States occurred in Valmeyer, Illinois. Using this St. Louis suburb as a case study for relocation would be advantageous for all Florida PDRPs. In 1993, 90% of the town was flooded by the Mississippi River, which continued to flow through the town for two months. The town planning council met and eventually decided to rehabilitate the surrounding farmland, but to move the town and a large percentage of

residences to a bluff on higher ground that overlooks the Mississippi River. The town built a whole new center, with new schools, public buildings and homes. The town was also able to use sustainable resources, making the community more resilient in regards to hazards and environmental degradation ([freshstart.org/](http://freshstart.org/)Valmeyer 2006). Relocation is a touchy choice for officials, but there are success stories in the United States, and it may be a correct decision if vulnerability remains high in a specific area.

### *Regional Planning (Advanced)*

The final advanced achievement level action involves regional planning. Usually a disaster is not confined to one jurisdiction, meaning the recovery of surrounding communities can greatly affect a recovery within a single city or town. If a disaster reaches the level of a presidential disaster declaration, it is a certainty that outside assistance from other communities is a necessity. All PDRPs must address the community's relationship with the surrounding cities and towns and regional planning coalitions. The higher level jurisdictions, such as the state and the federal government, as well as non-profit and for-profit entities that may be able to assist recovery, must have a seat at the planning table. Planning on a regional level is crucial, especially for infrastructure and public facilities because regions are interconnected, sharing the same resources (Florida Guide 2010, 79).

The Tampa Bay Regional Planning Council (TBRPC) has a unique position among the current PDRP pilot communities. Hillsborough, Polk, Manatee and Sarasota Counties are all in the Tampa region, meaning these communities share many of the same risks. In addition, if a hurricane makes landfall in the area, it is likely that all four counties will be negatively affected. Continued regional coordination is pivotal because communities must have a working knowledge of surrounding counties' plans as well as their own (Hillsborough PDRP 2010, 2-7).



*Relation to Reactive Policy Problems*

This section is riddled with connections to federal policy problems, as housing and infrastructure are complex issues that have far-reaching consequences when not executed effectively. The PDRP addresses building codes and advocates for more resilient structures, which federal policy indirectly discourages through the 50% rule and the Alternative Project Rule. In addition, the PDRP addresses debris management and mitigation in a community, as federal policy is silent on these issues. Regional planning is not an issue that can be coordinated from the federal level; a community may be able to work with surrounding areas to coordinate a recovery, but FEMA's limited capacity makes it very difficult to coordinate the intricate mutual aid agreements between jurisdictions. It is not the responsibility of FEMA to provide answers to every problem; states need to assess the limitations and ensure proper local planning accounts for gaps. The Stafford Act indirectly discourages relocation through its Alternative Project rule and the Repair v. Replacement Policy. By not providing full funding for cities and towns that want to be proactive and relocate, FEMA could be indirectly affecting decisions that it would prefer not to be involved in.

Another reactive problem that the housing and infrastructure section of the PDRP deals with is the LTCR plan and the long-term assistance that many communities need, beyond the typical FEMA eighteen-month temporary housing period. Traditionally, the LTCR would be responsible for drafting official plans regarding temporary housing, reconstruction and the transition back to permanent housing. The same problems can be outlined for infrastructure repair and replacement. Are the safest areas currently using the most resilient infrastructure possible? Unfortunately, the LTCR takes at least six weeks to draft, and sometimes much more, and by that point temporary housing, infrastructure and reconstruction could be well underway.

The PDRP would have all of the agreements and requirements for reconstruction as close to ready as possible, facilitating a more orderly and resilient recovery. The other issue with the LTCR plan is that many people will not move back to a permanent residence until the LTCR officials have left, leaving no support system for the transition. The PDRP addresses this deficiency and ensures that city or town officials are trained to assist the late movers.

Housing and infrastructure are key aspects of the PDRP, providing valuable support on local issues that the federal government lacks either the staffing or the jurisdiction to address.

***Economic Redevelopment and Private Sector:***

Economic redevelopment is the fourth key factor in the recovery process, as it will ultimately dictate whether a community can support pre-disaster level population figures. The involvement of the private sector in recovery is pivotal because businesses will ultimately decide if a city is too risky to continue operations. If a community cannot prove that resilience will increase, a company might decide it is safer in the long term to relocate to a less vulnerable area (61).

In a successful economic recovery, major companies in the region must resume normal activities. Most large corporations have dedicated business continuity managers that will implement disaster plans. The private sector can be a resource to assist in workforce retention, as long as the company is included in the initial planning process. If a company has had the foresight to create a disaster response and recovery plan, the town should give company officials the opportunity to assess damage and resume operations as soon as possible. Moreover, people might be more likely to return if they are ensured that the jobs are returning as well. There is risk, however, as companies may also decide to relocate, terminating many jobs that may have sustained a community. The key, therefore, is to make sure the private sector has a voice at the

table and can implement policies within the PDRP to expedite a return to normal business operations (63).

From the private sector perspective, having the capability to respond to and assist in the recovery requires planning; a number of contractual elements must have solutions before building can start. Everything from demolition regulations to historical structure maintenance to design and review decisions must be resolved before rebuilding can start. If the PDRP can outline certain contractual agreements that are ready when a disaster strikes, fewer roadblocks will emerge on the road to recovery.

Florida has focused on economic recovery actions for the community members within the region. The Florida Report identifies six major factors that must be addressed to ensure economic recovery. They include resumption and retention of employers, small business assistance, basic needs and tourism renewal (Florida Guide 2010, 43).

#### *Small Business Assistance*

A minimum achievement level program must address small business assistance, as small businesses do not have the same resources to employ full-time business continuity managers. After a disaster, small businesses are more likely than larger businesses not to reopen because of a lack of reserve funds or the timing of reopening. The Small Business Administration offers small businesses low interest loans of up to two million dollars, but usually the loans are tied to physical damage (Hollywood Site 2011). If a business does not suffer damage but is struggling due to the slow recovery of the surrounding community, loans are much harder to secure. Loans are generally distributed to continue pre-disaster cash flows for a period of time, but changes in business operations may be permanent due to the changed reality of a city or town. Interruption insurance is another option for small businesses in the short term, as a plan will provide funding

in line with pre-disaster levels for a period of time following an event. The PDRP must provide outreach to small business both before and after a disaster to ensure that all avenues are explored to try to bridge the possible gap in profits while the recovery is ongoing (Florida Guide 2010, 64).

Although it is not a pilot PDRP community, Hollywood, Florida has been identified as a best practice in post-disaster small business assistance. The “Open for Business” Program provides a reusable decal for all business owners enrolled in the program that can be placed on a store window once the building is deemed safe for use. The uniform sign design makes it easier for consumers to see which stores are open for business after the storm. In addition, the program provides free marketing services for its members and can assist with Small Business Administration loan applications (Hollywood Site 2011).

#### *Basic Needs*

Economic recovery from a disaster takes more than getting business to return to the area. Housing, schools, childcare and other basic needs must be provided as well, or the workforce will look for employment elsewhere. Another complicating factor could be the permanent change of the market in the region. There may be less demand for certain products or services but much more demand for construction (at least in the short term). Programs to re-train workers in new fields could drastically help workers feel comfortable returning to the region. Tourism may suffer as well, and workers in that field may need to find other employment temporarily until the community begins attracting vacationers again (Florida Guide 2010, 66).

Sarasota County has a number of companies that have developed robust business continuity plans, which address business concerns following a disaster. One company in particular, PGT Industries, developed in addition to the business continuity plan a mitigation

plan, in which employees created their own personal strategies for a large-scale event. Because of the advanced pre-disaster planning, PGT is able to provide services to its employees shortly after a disaster passes, giving out hot meals, allowing people to take showers and even providing sites for temporary housing (Florida Guide 2010, 66).

The state of Florida has also begun implementing the Business Continuity Information Network (BCIN) to facilitate information sharing among business, individuals and non-profits. BCIN is a web-based platform that allows members of all communities to share ideas and plans in an effort to create more preparedness on a macro-level across the state. Once a disaster strikes, businesses can stay up to date with the effects of the storm, and update information about the state of the facilities as well as other information that is relevant to business operations. BCIN allows members to create reports quickly in order to establish a base of post-disaster operations, and it can expand relationships between industries and regions.

The private sector can assist in the recovery almost immediately, if it can prepare the necessary goods and supplies before an event takes place.

#### *Tourism (Recommended)*

Many economies in Florida are dependent on tourism, making disasters even more of a threat because people are generally apprehensive about vacationing in an area that has been devastated by a storm. In communities that rely on tourism for income, it is important to address the reasons that bring people to the area, such as beaches and the accompanying service industry needs including restaurants and hotels. Marketing campaigns, festivals and other events to draw attention to the thriving recovery may not seem important at first, but they could go a long way towards comforting possible vacationers who may be apprehensive about traveling to the damaged area (Florida Guide 2010, 67).

*Tax Incentives*

The literature outlines certain financial incentives that a community could use to lure both developers and community members back to an area. Special taxes or assessment districts establish a principle that some extra taxes will be saved for a disaster situation. They provide an assurance to developers that the government would be there to assist in rebuilding efforts in the event that a building is damaged. Tax Increment Financing (TIF) establishes a base valuation for taxes and then assigns a future valuation on land based on projected land value increases. TIFs have limitations including the burden they place on taxpayers, but they can provide valuable funding for small-scale projects following a disaster. Impact fees essentially require the new developers to finance the necessary infrastructure expansion in the immediate area. These fees can be used to build roads, help schools or even develop a disaster-sheltering plan to prepare materials for an eventual disaster. Impact fees can be an interesting method to finance certain PDRP functions or even the PDRP itself. These tax methods will not create economic recovery by themselves, but they can be useful tools to begin reconstruction by having funds on hand immediately, before other funding sources may become available.

Economic redevelopment is difficult because money is always in short supply, even in “blue skies” conditions. The key is to begin building robust networks, business continuity plans and funding sources that can be used to jump-start a recovery before government aid and grants arrive. In addition, extra funding should be used to pay for the portion of the alternative projects that are not funded by FEMA, to ensure more resilient buildings are constructed after an event. With proper planning and the use of specific tax incentives as well as grants, the economic recovery can bring back an even stronger, more resilient community than the one that existed before the disaster.

*Relation to Reactive Policy Problems*

The economic recovery section, and more specifically, the private sector, can lessen the burden of possible adverse incentives. If FEMA is the sole provider for resources following a disaster, it is prudent for the agency to hold back some resources in order to prevent loss due to staging in the wrong location (a Type Two error). Private industries can team up with FEMA to ensure this type of error does not occur. If private industries in an endangered area have specialized business continuity plans and mitigation procedures (as PGT Industries did) as well as the BCIN web resource, then FEMA could share the burden of responsibility with companies. Private industry could provide resources for its employees, reducing the immediate strain on FEMA to provide all basic needs for every individual in the region.

Using the BCIN as a main policy function for business would speed up the assessment process following an event. Businesses would be able to post the status of their facilities in rapid order and know which of the buildings would need to be replaced or repaired. The BCIN could provide information about the rules and regulations that business would have to follow and how the 50% Rule might apply to the structures. Since many corporations have the means to perform the needed repairs without a major financial burden, and the private sector can facilitate a smooth recovery, rapid permitting should be allowed.

Partnering with the private sector and the possible use of loans and tax incentives to finance the reconstruction and resiliency efforts in the community including possible alternative projects and mitigation projects (where FEMA would only pay for 75% of the cost). FEMA does not and cannot be expected to have all resources needed to facilitate an effective reconstruction without the assistance of the private sector, which should be willing to help because of the stake it has in the local community.

### Environment

Within the environmental section, the PDRP makes coastal wetland protection a priority because the buffer zone that barrier islands and wetlands provide is invaluable to storm surge protection in a hurricane. These areas can also help support a host of recreational and commercial activities that can stimulate economic growth. The community, through the PDRP, should identify areas that it thinks should be protected or revitalized and then work with the state and federal government to realize their goals.

Environmental areas that do not receive proper restoration following a catastrophic event will be more susceptible to pollutants from seaports and other waterways. The Florida Report identifies beach and dune restoration and environmental contamination as critical factors to help establish more resilient cities. Landscaping and other design techniques that take planning and coordination could provide huge benefits to the overall safety of an area. Landscaping can be planned in a way that protects structures and pushes water to predetermined areas. If all houses or buildings employ this type of landscaping, the water could conceivably flow down front yards through small channels or depressions and stay out of people's houses. A similar strategy would require developers to demonstrate that new buildings are resistant to flood and fire conditions.

Actions for the environment include beach and dune restoration, environmental contamination clean-up and environmental review of temporary sites. Storm surge can cause major erosion problems for beaches, dunes and wetlands that can help buffer the developed land from the power of the ocean. Even though erosion is natural, development along coastlines coupled with predicted sea level rise due to climate change compounds the problem and leads to buffers deteriorating at a rapid pace. Beach Management Plans should be incorporated into the PDRP as well as requirements for the implementation of non-structural protective measures to



slow the pace of erosion. Land use policies and flexible permitting can be used in this instance to slow redevelopment along the coast in hopes of building more beach-friendly structures that do not exacerbate the current problem (Florida PDRP 2010, 95).

High winds, storm surge and other natural events can cause major oil spills or other toxic contaminations that have a detrimental effect on the environment. Once these substances are released into the environment, the degradation of the surrounding region can intensify quickly. Each PDRP details all possible environmental vulnerabilities before launching into a discussion about possible mitigating actions that could lessen the damage to the environment and even use the environment as a buffer to lessen the scale of storm surge and wind damage. Hillsborough County discusses the main vulnerabilities of the area as sea level rise, erosion, and hazardous material spills in Tampa Bay. For each environmental issue, the PDRP details the current state of policy and strategies for improvement in the specific area. For example, the wetlands restoration section discusses sea level rise and erosion as issues, followed by strategies for expanding and protecting this vulnerable but pivotal ecosystem (Hillsborough PDRP 2010, 8-19).

#### *Relation to Reactive Policy Problems*

Facilitation of environmental improvement can help to counteract certain reactive federal policies. The first reactive issue that the environment section of PDRP addresses is the problem of development in hazardous areas. The PDRP solutions involve strengthening the original environmental defenses to storms and other disasters and addressing the Safe Development Paradox by providing a buffer between the hazard and a building as well as the residents. It might be possible to remove a structure completely, if the environmental buffer is built to a comfortable size. This program would also assist in reclaiming NFIP lands that would be converted back to a floodplain, reducing the financial burden on the NFIP program. Finally, and

most importantly, improved environmental protection working in tandem with flood control structures provide a necessary redundancy (or resiliency) and actual layer of safety instead of perceived safety. Natural protective mechanisms should be used as a primary buffer against disasters; replacing natural mechanisms with walls is a much less effective alternative (Florida PDRP 2010 95-96).

Environmental improvements can also address the Stafford Act and the Disaster Mitigation Act of 2000. Environmental programs are the crux of the current Disaster Mitigation Grants as well as Severe Repetitive Loss Grants that essentially buy land for reclamation. If FEMA worked with states and communities more closely on these programs, it would be possible to reclaim land directly from owners on a voluntary basis in an attempt to create a safer, more resilient community. These programs have yearly budgets, are available in all 50 states and are independent of disaster declarations.

Finally, both ESF-14 and LTCR are enormous vehicles for growth in the realm of environmental mitigation. A PDRP that worked in tandem with the LTCR would allow environmental restoration projects to begin more quickly, as it would not take six to twelve months after a disaster to determine where the most beneficial reclamation and improvement sites might be. Having the information and ability to assess rapidly the best areas for environmental restoration may assist communities in buying the land from the private owner before rebuilding begins. All of the issues are connected, as better preparation and integration with the LTCR could increase the use of Hazard Mitigation Grants in an effort to create more of a vulnerability buffer.

Restoring natural resources and processes is extremely important to preserving vulnerable regions and protecting jurisdictions from major damage. Current FEMA policy

addresses the issue through Hazard Mitigation Grants, but the PDRP would provide a forum for people to consider environmental mitigation as a possible alternative to hard structures that seem to provide a false sense of complete security.

### Public Participation

Since community members know the most about their surroundings, it is of the utmost importance to include the general public in the recovery planning process. “Public participation is a way for stakeholders to influence development by contributing to project design, influencing public choices and holding public institutions accountable for the goods and services they provide” (World Bank 2010, 183). The World Bank provides an outline of reasons to involve the public, along with key decisions that must be made along the way to ensure continued involvement of the general population. The key decisions are 1.) The lead disaster agency must work with the community to define the role of the general population in the reconstruction process, 2.) Affected communities need to decide how to organize themselves during the reconstruction, 3.) Agencies involved in reconstruction must decide how to empower local citizens to assist in reconstruction processes, 4.) Local government must decide its own role and a forum for public meetings and other input to make sure community buys in to the process, 5.) All players in reconstruction must decide on a way to monitor the ongoing community involvement in the process (World Bank 2010, 183-184). The purposes of public participation include the analysis and identification of the strengths and weaknesses of existing emergency services in a community. The public can also help to set objectives, create strategy, formulate tactics and monitor progress of the reconstruction process. The community must play a role in all of these processes to ensure community acceptance and buy-in to the rebuilding of an area.

All PDRPs include strategies to educate businesses, residents and others on disaster preparedness and recovery. The decision-making process must address pertinent issues that can unify the public and private sectors as well as the general population (Florida PDRP 2010, 118). Florida has identified two key points at which to solicit public input. The drafting stage of the plan is critical because it allows PDRP planners to include localized information that is pertinent to the ultimate consumers and beneficiaries of the plan. The more the community knows about the process, the more likely it is to support the project and assist with implementation in a productive way. A public meeting should be held at this point to ensure that the community could shape its own local plan. The second critical point at which to involve the public is after the draft is written, but before the plan is finalized. At this point the community can review policies and procedures that would be implemented in the event of a disaster for fairness and feasibility. Florida highlights Sarasota County as a best practice for involving the community in the entire planning process. Sarasota created a project website to post all materials on the web as well as a video that described the vulnerabilities of the county. Along with holding specific PDRP public meetings, it took the presentation to other groups, such as homeowners associations and the Chamber of Commerce. The county also encouraged the media to publicize the plan, and it held a public workshop with various booths describing different aspects of the plan (Florida PDRP 2010, 118).

In addition to including the public in the planning process, Florida also outlines the keys to public participation in regards to a PDRP both before and after a disaster. Before a disaster, the PDRP must map the lines of communication between all stakeholders in the recovery process. This includes everyone from local businesses to residents to government officials. All players must understand their responsibilities according to the PDRP. Residents and business

owners must ensure that they follow new land use or other guidelines that may go into effect if property is destroyed. The more information that is communicated before the disaster, the less likely it is that surprises and complications will arise after the event. After the disaster, the Community Emergency Management Plan covers short-term response and recovery, but the transition to long-term recovery is tricky if an organizational structure is not ready to be implemented. The involvement of the local government is crucial because the media usually leaves after a period of time and the spotlight is no longer on the damaged community (Florida PDRP 2010, 119).

Another key aspect of the PDRP highlighted by the Florida planning document involves the use of public meetings, charrettes and other interactive forums to inform the public. Many communities will have made decisions about long-term plans through the Comprehensive Plan. Once the disaster is over, public meetings and charrettes can be used to provide information to residents about new building codes or build back standards to be implemented, rather than using those meetings to establish the codes themselves.

#### *Relation to Reactive Policy*

Assuring public input in the PDRP process will help combat certain reactive federal policies. Firstly, public involvement addresses the problem of bureaucracy because the government process becomes more transparent. Residents and business owners will see their concerns outlined in the PDRP instead of simply having to comply with land use regulations, building code regulations and the overall future vision of the city that were largely decided in a room with federal officials who do not know the intricacies of the community. When the community agrees that a plan is necessary, it becomes much easier to involve everyone in the planning process.

Secondly, because, by nature, this plan is pre-emptive, involving the community will help combat the sentiment that it is safe to develop in hazardous areas. The PDRP will dispel the notion that the federal government is simply here to deal with disaster after the damage is done. While these federal programs should remain in place, more active recovery that addresses vulnerability problems in an area should lead to an overall cost savings over the long term. Currently, there is not any literature designed for the public that discusses both the risks of owning property in an area as well as the steps for recovery after a disaster. If education programs are successful, the PDRP will be well known by most community members and all residents and businesses will have a general idea about the steps that they will need to take after a disaster (Schwab 2005, 83-84). A homeowner may return to his or her property and find a house that is destroyed. Instead of rebuilding with no requirements (leaving the decision about whether to elevate the structure or include other mitigation strategies in construction up to the individual resident), the PDRP will outline a specific set of guidelines and new building codes that will be required for reconstruction on that parcel. This homeowner will live in a more resilient house that will be more likely to survive the next disaster.

The final problem that the PDRP addresses are not specifically outlined as its own reactive policy, but it does underlie all five policies stated above. Currently, there are very few plans and even fewer programs to educate people about the risks to their community. Beginning a public process to create a PDRP will allow people to consider which risks they might be most vulnerable to and begin to think about how to handle a disaster. The public process is a crucial piece of the PDRP because it creates community buy-in to the plan and it also facilitates the best sharing of information.

Chapter 5 has outlined the overall structure of policies contained within a PDRP in Florida as well as examples from actual pilot PDRPs across the state. Not only does the PDRP address important recovery issues that every community must deal with, it also helps combat the reactive federal policies that people in the United States seem to take for granted. All five main reactive tendencies are addressed in at least one of the five PDRP subject areas. The only sub-issue that is not mentioned specifically is ESF-14, but it should be the umbrella organization that oversees the compliance of these plans with state and federal policies. The PDRP is a perfect complement to current LTCR programs that commence immediately after the disaster. It is a perfect position for ESF-14 because it was created as a way for the federal government to support the regional, district and local entities. The association of PDRP plans can be in line with the goals of ESF-14 to give the federal government a role in this process. The PDRP will help Florida protect its citizens while it will also reduce the impact of each successive disaster if the cities and counties can adhere to the restrictions of the plan.

The PDRP guides Florida towards a more resilient future by advocating for the use of technological advances, land use changes, economic reform, environmental buffering and a public stake in the process. These five areas ensure that people will begin thinking about a changed reality after the storm to help recover in a productive way, with an eye towards the next disaster. The window for change is only open for a short period of time; using that window to put an existing plan in motion, instead of frantically trying to devise a plan, will be beneficial for the community and set an example for the country.

### ***Recommendation for Florida and the Federal Government***

The GAO talks about the timing issue dealing with LTCR planning and how the minimum six-week planning period does not match up with the window of opportunity. Florida

and the federal government should work together to integrate the PDRP and LTCR to create a more holistic recovery plan. The LTCR period can focus on specific actions that cannot be planned before the disaster with the PDRP serving as the lead for all of the functions described above. Together LTCR and the PDRP can create a recovery plan that is as close as possible to the post-disaster window of opportunity to create major changes.

### ***Recommendations for Massachusetts and Other States***

A PDRP is an enormous undertaking and a state like Massachusetts, which does not even have any disaster laws dealing with recovery, needs a long term, gradual planning approach if it wants to explore PDRP implementation. The following four recommendations would provide a solid baseline for lawmakers to learn more about the PDRP and then present these findings to communities to see if there is enough support to move forward. The hope is that an established source that depicts community vulnerability will drive citizens to want to take action to fortify their homes, jobs and communities as a whole.

#### *1. Conduct a Statewide Vulnerability Analysis*

The first recommendation is to conduct a statewide vulnerability analysis to assess the most pressing risks, because hurricanes, floods, nor'easters and earthquakes will have drastically different effects depending on a community's location. Over the last five years, there have been two nor'easters to affect the region (2007 and 2010) causing \$188 million and \$225 million in damage respectively (FEMA.gov). Massachusetts should analyze which areas seem to get battered by these storms the most and start thinking about possible ways to reduce this damage potential.



## *2. Evaluate Current Resiliency Best Practices*

Massachusetts should also conduct a study to determine which areas are more resilient than others. Combining this study with the first recommendation will provide a clear picture of where the most vulnerable areas are and where the most resilient areas are. In addition, if best practices are found within the state, it would be important to highlight these cases to provide examples to the community and government that resilience works in Massachusetts as well as in Florida. Stories about the Hazard Mitigation Grant Program, which buys land from private owners to reclaim lands and has allocated \$484,900 to Massachusetts FY2010, would be beneficial to any resiliency best practices (FEMA.gov).

## *3. Start Looking at Minimum Achievement Level Actions*

The PDRP is designed in stages as it could take too many man hours or funding to create an entire plan in planning period. Instead, the state of Florida suggests assessing issues based on their importance and relevancy to the recovery. Massachusetts should begin to look at the minimal issues in the plan such as debris removal, temporary housing siting, phased reconstruction and streamlined permitting. If the state does not have any regulations or codes dealing with the minimum issues, discussing them on an individual basis for later inclusion in a PDRP may seem more palatable to lawmakers and citizens as a trial run on certain policies.

## *4. Learn Lessons from Disaster Stricken Communities*

The United States has suffered from many different types of disasters. Once the vulnerability analysis is complete, Massachusetts's officials should conduct a study to determine how other areas in the country have dealt with similar vulnerabilities. For example, New Orleans is a low-lying city that is built on fill from the Mississippi River. The Back Bay in Boston is also built on fill and would be vulnerable to storm surge if a hurricane entered the Boston Bay. The

City of Boston could learn lessons from New Orleans as it attempts to fortify part of the downtown area.

### **Conclusion**

The purpose of this paper is to provide a single document that could serve as a justification for all states (using Massachusetts as the example) to explore and develop a PDRP in an attempt to reduce vulnerability to specific disasters. Each state's plans would look very different due to the varied laws and the most probable threats, but the idea, main tenets and topic areas remain constant. The detailed analysis of federal policy sets the stage for a discussion about the reactive policy problems that currently permeate disaster regulations. Using the state of Florida as the example, chapter 5 discusses the main components of the plan, considers their importance and introduces examples from various counties around the state. Finally, chapter 5 also outlines the main reasons why each of the five topic areas addresses current reactive policy. The PDRP is meant to augment current systems by changing the perception that society is apathetic about disaster policy. State governments should provide materials and education about the benefits of preparing for a recovery instead of relying federal aid and hazard control structures.

While it is safe to assume that no government (local or federal) tries to be reactive, it has become a reality in this country, because of well-intentioned policies that do not have a proper preparation counterpart. The PDRP can serve as the counter-weight to those policies, balancing the prevailing perception of disaster recovery as an inevitable struggle with the PDRP goal of making the recovery an opportunity for change and resiliency. Chapter 1 outlined the benefits of resiliency as a response to uncertainty and a reduction in building vulnerability (leading to a reduction in recovery costs). The main argument against resilience is due to the perceived cost of

rapid modernization, but the PDRP addresses both of the benefits and the cost. By drafting a PDRP, a community is expecting a disaster even though it does not know when it will occur. Preparing for the recovery will address the uncertainty of what might happen when an area is destroyed; preparation also encourages a reduction in building vulnerability by addressing the five topics of the PDRP: land use, housing and infrastructure, economic recovery, environment and public participation. One of the main characteristics of the PDRP is that it is a gradual process. By creating an advance plan that activates only when a disaster destroys the current use, it advocates for modernization when rebuilding or renovating must happen anyway. The PDRP is a resilient document because it advocates for a proactive but realistic approach to create a city that is able to “weather the storm.”

Because federal policy insulates residents from risk, the federal government encourages moral hazard. Legislators presumably had the intention of creating policy that would encourage economic expansion while providing people with financial assurances that the government would aid any recovery. This is an excellent principle, but there is no guiding document that advocates for more resilient building and a reduction in vulnerable building techniques. The federal government has created a system that does not encourage resilient innovation. As a result, homeowners and businesses tend to undervalue the risk of loss, leading to a cycle in which the government funds projects, such as levees, through the Safe Development Paradox; these projects provide safety, but are not 100% effective. When the structures or programs are breached, entities that rely on their protection are decimated due to the lack of redundant (resilient) systems. The government is charged with providing massive aid to reconstruct the area, but FEMA policy dictates that communities must be built to pre-disaster standards to receive funding. This policy tells stakeholders that the government accepts the responsibility of

recovery, but it does not have to. The PDRP addresses reactive procedures by coaxing community members to make gradual changes to land use, building codes and structures, economic incentives, environmental buffers and public participation.

The specific provisions of the PDRP provide a framework for recovery and allow communities to begin recovering resiliently at a much faster rate than waiting for the LTCR plan, which may not be finalized for months after the disaster. States such as Massachusetts that do not have strong planning mandates will need to employ a different implementation strategy for many of the policies outlined in the Florida PDRP. For example, Massachusetts does not have county governments, which means the PDRP would need to be implemented through another mechanism (jurisdictions or special districts) to become effective regional plans that can incorporate the principles of the Florida PDRP discussed throughout the thesis. The PDRP goals remain the same and the state can adopt a stand-alone plan that addresses many of the recovery issues. But Massachusetts and many other states have a long way to go before they are ready to implement PDRP's, so they should begin exploring small minimum achievement level aspects of the plan.

In the end, the PDRP is not a solution by itself. But, as a complement to current federal recovery policy, it can fundamentally change our nation -- creating a resilient society that will bend in the face of disaster, but not break.

### ***Bibliography***

- Berke, Philip R. and Thomas J. Campanella. "Planning for Post disaster Resiliency." *Annals of the American Academy of Political and Social Science* 604, no. , Shelter from the Storm: Repairing the National Emergency Management System after Hurricane Katrina (Mar., 2006): pp. 192-207.
- Brody, Samuel D. "Are we Learning to make Better Plans?" *Journal of Planning Education and Research* 23, no. 2 (December 01, 2003): 191-201.
- Burby, Raymond J. "Hurricane Katrina and the Paradoxes of Government Disaster Policy: Bringing about Wise Governmental Decisions for Hazardous Areas." *Annals of the American Academy of Political and Social Science* 604, no. , Shelter from the Storm: Repairing the National Emergency Management System after Hurricane Katrina (Mar., 2006): pp. 171-191.
- Business Continuity Information Network. "How it Works." Florida International University (2009) <http://bizrecovery.org/How-It-Works> (Accessed April 2, 2011)
- Cilluffo, Frank J. et al. "Where Does FEMA Fit?" Homeland Security Policy Institute. Issue Brief (Washington D.C: January 13, 2009)  
<[http://www.gwumc.edu/hsi/policy/IssueBrief\\_FEMA.pdf](http://www.gwumc.edu/hsi/policy/IssueBrief_FEMA.pdf)>
- Department of Homeland Security: National Response Plan. "Emergency Support Function #14 – Long-Term Community Recovery and Mitigation Annex." (Washington D.C. 2007).
- Department of Homeland Security. "National Response Framework." (Washington D.C. 2007)
- Department of Homeland Security. "FEMA In or Out?" Office of Inspector General. (Washington D. C. February 2009). <[http://www.dhs.gov/xoig/assets/mgmttrpts/OIG\\_09-25\\_Feb09.pdf](http://www.dhs.gov/xoig/assets/mgmttrpts/OIG_09-25_Feb09.pdf)>
- City of Hollywood, FL. "Open for Business Program" (Hollywood, FL. 2011)  
[http://www.hollywoodfl.org/economic\\_dev/BusinessDisasterPreparedness.htm](http://www.hollywoodfl.org/economic_dev/BusinessDisasterPreparedness.htm) (accessed Mar 25, 2011)
- Disaster Mitigation Act of 2000*, Public Law 106-390, 106<sup>th</sup> Congress. §101-308 (October 30, 2000). <<http://www.fema.gov/library/viewRecord.do?id=1935>>
- Emergency Management and Assistance*, US Code. Title 44, §§ 206.1 et seq. (2007).
- Federal Emergency Management Agency. "Emergency Support Function – Number 14." (December, 2004) <<http://www.fema.gov/library/viewRecord.do?id=2154>> (Accessed December 20, 2010).
- Flynn, Steven. *The Edge of Disaster: Rebuilding a Resilient Nation*. (New York: Random House, 2007)
- Florida Department of Community Affairs and Florida Division of Emergency Management. "Post-Disaster Redevelopment Planning: a guide for Florida Communities." CSA International. October 2010.
- Geis, Donald E. "The Disaster Resistant and Quality-Of-Life Community." *Natural Hazards Review*. (Aug. 2000): 151-160.
- Godschalk, David R. "Urban Hazard Mitigation: Creating Resilient Cities." *Natural Hazards Review*. (2003) 4, 136. <[http://dx.doi.org/10.1061/\(ASCE\)1527-6988\(2003\)4:3\(136\)](http://dx.doi.org/10.1061/(ASCE)1527-6988(2003)4:3(136))>
- Government Accountability Office. "FEMA's Long-term Assistance Was Helpful to State and Local Governments but Had Some Limitations." (Washington D.C. 2007).

- Government Accountability Office. "Options for Addressing the Financial Impact of Subsidized Premium Rates on National Flood Insurance Program." (Washington D.C. 2008).
- Haas, J. Eugene, Robert W. Kates and Martyn J. Bowden. *Reconstruction Following Disaster*. (Cambridge: The MIT Press, 1977)
- "Hillsborough County: Countywide Post-Disaster Redevelopment Plan." Prepared by, Florida Department of Community Affairs and CSA International. (Stuart, FL: 2010).
- Jha, Abhas K. et. al. *Safer Home, Stronger Communities: A Handbook for Reconstructing After Natural Disasters*. (Washington D.C: The World Bank, 2010)
- Kunreuther, Howard. "Linking Insurance and Mitigation: The Need for Public-Private Partnerships." *Dealing With Disaster: Issues and Ideas Papers*. Public Entity Risk Institute. (October, 1999).
- Mileti, Dennis S. *Disasters By Design*. (Washington D.C: Joseph Henry Press, 1999)
- Moss, David. "Courting Disaster? The Transformation of Federal Disaster Policy since 1803" (January, 1999) [http://www.nber.org/chapters/c7954.pdf?new\\_window=1](http://www.nber.org/chapters/c7954.pdf?new_window=1) (Accessed December 20, 2010)
- Nelson, Arthur C. and Stephen French. "Plan Quality and Mitigating Damage from Natural National Disasters: A Case Study of the Northridge Earthquake with Planning Policy Considerations." *Journal of the American Planning Association*. 68: 2, 194 — 207. <<http://dx.doi.org/10.1080/01944360208976265>>
- Olshansky, Robert. "Planning After Hurricane Katrina." *Journal of the American Planning Association* 68(4), 147-153
- "Post-Disaster Redevelopment Plan, City of Panama City, FL." Prepared by, Florida Department of Community Affairs and Panama City Planning and Land Use Services. (Panama City, FL: 2008).
- Platt, Rutherford H. *Disasters and Democracy*. (Washington D.C: Island Press, 1999).
- "Polk County Post-Disaster Redevelopment Plan." Prepared by, Florida Department of Community Affairs and Calvin, Giordano & Associates. (2009).
- Research Council. *Facing Hazards and Disasters: Understanding Human Dimensions*. (Washington D.C: The National Academic Press, 2006)
- Risk Management Solutions (RMS) Special Report. "Analysis and Reconstruction of the 1974 Tornado Super Outbreak." (Risk Management Solutions Inc., 2004)
- Schwab, Jim et al. "Planning for Post-Disaster Recovery and Reconstruction." *American Planning Association*. Planning Advisory Service. Report Number 483 (Washington D.C: 2005)
- Simpson, Andrew. "Republican Flood Insurance Bill Gets Positive Initial Reception." *Insurance Journal*. Mar 8, 2011. <http://www.insurancejournal.com/news/national/2011/03/08/189405.htm>
- Sobel, Russell S. and Peter T. Leeson. "Flirting with Disaster: The Inherent Problems with FEMA." July 19, 2006. [http://www.cato.org/pub\\_display.php?pub\\_id=6516](http://www.cato.org/pub_display.php?pub_id=6516) (accessed December 3, 2010)
- Stevens, Mark. "Implementing Natural Hazard Mitigation Provisions: Exploring the Role That Individual Land Use Planners Can Play." *Journal of Planning Literature* 2010 24: 362. <<http://jpl.sagepub.com/content/24/4/362>.>
- Suburban Emergency Management Project. "U.S. 1974 Tornado Super Outbreak: Super Catalyst for Fed's Disaster Relief Act of 197." (Bid Report #582, January 6, 2009) [http://www.semp.us/publications/biot\\_reader.php?BiotID=582](http://www.semp.us/publications/biot_reader.php?BiotID=582)

- Tobin, Graham A. "Sustainability and Community Resilience: The Holy Grail of Hazards Planning?" *Environmental Hazards* 1999 1: 13-25.
- United Nations International Strategy for Disaster Reduction. "Cities and Resilience." UNISDR Climate Policy Brief (2009).  
[http://www.preventionweb.net/files/12886\\_CitiesResilienceClimatePolicyBriefN.pdf](http://www.preventionweb.net/files/12886_CitiesResilienceClimatePolicyBriefN.pdf)
- United States Government Accountability Office. "FEMA's Long-term Assistance Was Helpful to State and Local Governments but Had Some Limitations." GAO 10-404. March, 2010.
- Vale, Lawrence J. and Thomas J. Campanella ed. *The Resilient City*. (New York: Oxford University Press, Inc., 2006)
- Valmeyer, Illinois. "Operation Fresh Start." Accessed April 28, 2011.  
<http://www.freshstart.ncat.org/case/valmeyer.htm>
- Zaninetti, Jean Marc (2007). Human Settlement At Risk: The New Orleans Case Study. *Bulletin of Geography (Socio-Economic Series)* 8, 179-191.