

Title: Adaptive Planning for Disaster Recovery and Resiliency: An Evaluation of 87 Local Recovery Plans in Eight States

Philip Berke
Professor, Landscape Architecture and Urban Planning
Director, Institute of Sustainable Coastal Communities
3137 TAMU
College Station, TX 77843
pberke@arch.tamu.edu

John Cooper
Associate Professor of Practice, Landscape Architecture and Urban Planning
3137 TAMU
College Station, TX 77843
jcooper@arch.tamu.edu

Meghan Aminto
Program Specialist, Federal Emergency Management Agency
Washington, D.C.
maminto@gmail.com

Shannon Grabich
Research Assistant, Epidemiology
CB# 7435
Chapel Hill, NC 27599
sgrabich@email.unc.edu

Jennifer Horney
Associate Professor, Epidemiology
Campus Box # 8165, 400 Roberson Street
Chapel Hill, NC 27599
jen.horney@unc.edu

(Journal of the American Planning Association, under review)

Acknowledgements: Funding was provided by the National Science Foundation (NSF), Award CMMI-1066310. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the NSF.

Webstract

Problem, Research Strategy, and Findings. A pre-disaster recovery plan based on careful deliberation of how a community should be redeveloped is a logical first step to support resiliency under conditions of high uncertainty and rapid change. While examination of plan quality for traditional plans is well established, only limited attention has been given to recovery plans. An evaluation of local disaster recovery planning in eight southeastern states reveals that planning for disaster recovery receives limited public support. Less than one-third of vulnerable local jurisdictions had a plan that dealt with recovery, and that the plans received low plan quality scores. Multivariate modeling revealed that an unfunded state mandate produced weaker plans compared to plans in other states without mandates, and that stronger plans are produced based on a process that concentrates on building a collaborative network of stakeholders who are initially intent on reordering priorities.

Takeaway for Practice. Local recovery planning should be design to operate under conditions of high uncertainty. Local jurisdictions can chose among plan design options that reflect how they go about building capability for recovery planning: 1) stand-alone communitywide recovery plan; 2) comprehensive land use plan; 3) emergency management plan; and 4) small area recovery plan. Each option varies by stakeholders to be engaged, tasks to be performed, resources to be committed, and information to be gathered. Because recovery planning lacks a public constituency, and is new to most local jurisdictions, the stand-alone communitywide recovery plan design option is the most effective at building local commitment. This option involves a plan making process that concentrates time, effort, and resources focused on a building a network of stakeholders who likely have greatest responsibility in rebuilding efforts, who care most about the impacts of a disaster.

Introduction

Compared to traditional planning approaches (e.g., Berke, Godschalk and Kaiser 2006), planning for disaster recovery must place more emphasis on conditions of high uncertainty, rapid change, and complexity to improve prospects for disaster resiliency (Olshansky et al. 2008, Olshansky and Johnson 2010). To strive for resiliency entails building back to be safer, healthier, and more equitable, and better able to absorb, recover from, and successfully adapt to future adverse events (Chang et al. 2009, Peacock et al. 2008, Smith 2011, Smith and Wenger 2006). While planning scholars have paid considerable attention to the characteristics (or principles) of plan quality for traditional comprehensive plans dealing with, for example, land use, transportation, and housing, and stand alone hazard mitigation plans (Baer 1997, Berke and Godschalk 2009), less attention has been given to what constitutes plan quality for disaster recovery and to understanding the choices planners make to create better plans.

Arguably, a major impediment to planning for disaster recovery is public indifference to disasters. Planning scholar Raymond Burby (2003) observes that natural disasters fall into a general class of planning issues that have a weak public constituency. Unlike issues that attract broad public interest, such as transportation improvements or neighborhood revitalization, disaster recovery lacks stakeholders who appreciate the issues and are actively engaged to deal with them. Lack of support may be due to costs of recovery planning are immediate, benefits are long-term and uncertain, and the physical manifestations of pre-disaster recovery planning are not visible until after disaster occurs (Mileti 1999, ch. 5).

In this article, we examine local recovery plan quality, and the influence of choices that planners can make to improve the quality of recovery plans in the context of public indifference about future disaster events. We combine the well-established principles of plan quality with a

new model of adaptive planning that has emerged from the literature on anticipatory governance to guide an evaluation of 87 local disaster recovery plans in eight southeastern states. We then draw on the literatures in collaborative planning and local institutional development to examine how choices local officials can make influence recovery plan quality.

Theoretical Framework: Adaptive Planning for Disaster Recovery

Principles of Recovery Plan Quality

A degree of consensus has emerged about core principles of plan quality that represent the main functions of a plan (e.g., goals, fact base, policies, implementation, inter-organizational coordination) with measurable indicators of each principle adapted to a particular planning domain (Baer 1997, Berke and Godschalk 2009, Stevens et al. forthcoming). However, the well-established plan quality principles are not fully suited for evaluating recovery plans that must guide decision making under conditions of high uncertainty, as decisions must be made with little time for prolonged deliberation (Olshansky and Johnson 2010). Efforts to forecast disruptions are inexact and must account for large variations in timing, location and severity of impacts on social, natural, and built environment systems.

Anticipatory governance offers a new model for planning and decision-making under high uncertainty, emerging in the literatures on climate change (Berke and Lyles 2013, Quay 2010), public health (Hess, McDowell and Huber 2012), and nanotechnology governance (Guston, 2007). It is based on concepts of foresight, adaptation, and multiple possible futures in which planners not only evaluate alternatives for their communities, but also consider possibilities that they may not fully control. Flexible policies are then designed to anticipate possible change, and monitoring programs track change and the performance of policies.

Our conception of pre-disaster recovery plan quality entails integrating the well-established plan quality principles with the anticipatory governance model. Coupling literatures provides a conceptual foundation for adaptive plan quality principles that are suited to address highly complex and uncertain planning problems associated with rebuilding after a disaster.

We offer six principles of plan quality. *Direction-setting principles* form the foundation for achieving future vision of disaster resiliency (goals that are transformative and restorative; fact base of alternative plausible futures, and flexible policies). *Action-oriented principles* establish the uses and influence of the recovery plan (inter-organizational coordination to adapt to change, participation practices to engage the public before and after the disaster event; and implementation and monitoring to track actions, and evaluate and adapt policies). Figure 1 provides a definition and the measurable indicators of each principle.

Figure 1: Definitions and Indicators of Recovery Plan Quality Principles

Influence of Local Choices on Recovery Plan Quality

We examine three choices local jurisdictions can make in managing a pre-disaster recovery planning process, and how the choices influence recovery plan quality. They include choice to pursue a plan design option, choice to involve the local planning agency, and choice to engage an array of stakeholders groups.

Local jurisdictions can chose among *plan design options* that reflect how they go about building a culture and practice of planning for rebuilding aimed at resiliency. Four design options have been suggested in the prescriptive disaster recovery literature (Florida Division of Community Planning 2009, Smith 2011): 1) stand-alone communitywide recovery plan; 2) comprehensive land use plan; 3) emergency management plan; and 4) small area recovery plan focused on a particular vulnerable location.

Each option varies in stakeholders to be engaged, tasks, resources, and information needs. Drawing on classic studies of consensus building (Innes and Booher's 1999, p. 419) and building capacity of small-scale institutions (Ostrom 1990, ch. 6) we identify four dimensions to conceptualize how well each design option **might influence recovery plan quality**: 1) accounts for representatives of the most relevant stakeholders who are likely to be most invested in recovery; 2) focuses on practical and tangible tasks that are most relevant to rebuilding and disaster resiliency; 3) concentrates time and resources (staff, budget) on the core tasks; and 4) incorporates information that is relevant to understanding the issues (e.g., hazard area mapping, estimates of losses from alternative disaster events) and tailoring policy solutions that fit the issues.

Figure 2 illustrates the hypothesized effect of each of the four dimensions under each design option on recovery plan quality. The stand-alone communitywide recovery and small area recovery design options are conceptualized to have the most positive influence on recovery plan quality. Both options are likely to focus on a core network of stakeholders most affected by a disaster, have a strong sense of purpose with tasks most directly linked to rebuilding and resiliency, commit resources concentrated on a subset of issues associated with recovery, and are well-informed about the recovery issues as data gathering is focused on rebuilding and land use. The small area recovery design option may have somewhat less impact since it is focused on an explicitly defined hazard area and may not be inclusive of all stakeholders, resources, and sources of information that may be captured within a communitywide approach to recovery. Both the comprehensive land use and emergency management designs are less likely to have a positive influence on recovery plan quality. The planning process for comprehensive land use plans focuses on a wide range of stakeholders interested many development issues, disaster

recovery is one among many tasks, resources are diffused, and information gathering is distributed across multiple planning domains. The emergency management option is likely to be less successful as tasks and information gathering are primarily focused on emergency preparedness and response, resources and data gathering deal with the crisis period, and relevant stakeholders do not prioritize long-term recovery.

Figure 2: Relationships Between Design Options and Planning Process Dimensions

Involvement of *a local planning agency* in the planning processes on the official planning committee is conceptualized to have a positive influence of recovery plan quality. Planning practitioners bring training and expertise related to land use and development policies and familiarity with other relevant local planning efforts. The disaster planning field is dominated by emergency management practitioners who may not have such expertise, and are less likely to exert a positive influence on recover plan quality that focuses on rebuilding and land use (NEMA 2011, sec. A). The degree of *diversity of stakeholder groups* that are involved in plan making is posited to have a positive influence on plan quality based prior studies that are based on large sample surveys (Burby 2003) and individual case studies (Innes, Booher and Di Vittorio 2011, Taux 1995). Involvement could range from technical assistance to draft review or a request for feedback and comments.

Influences of Planning Context on Recovery Plan Quality

The planning context includes state policy and local variables. State policy context involves whether or not a jurisdiction is subject to a *state mandate* requiring local communities to adopt a recovery plan. State comprehensive planning mandates that include funding and other incentives lead to stronger treatment of hazards in plans (Burby and May 1997, Dalton and Burby 1994), but when mandates are not funded and lack local capacity building resources, local

compliance and plan quality can be compromised (Bunnell and Jepson 2011, Hoch 2007, Pendall 2001). A recent literature review of over 40 studies on plan evaluation indicates that five local contextual variables are most consistently related to plan quality (author). Four variables are posited to have positive relationships as indicators of capacity to support planning including: *recent disaster experience* and *population growth rates*, as well as *community wealth* (median home value) and *population size*. One variable (*population density*) is negatively related. A sixth variable to measure local commitment to recovery planning was included based on whether a local jurisdiction participated in the *Community Rating System* (CRS) under the National Flood Insurance Program (NFIP-CRS 2013). The CRS program promotes mitigation of flood damage through insurance premium discounts and other financial incentives. To qualify for a NFIP discount, communities must voluntarily enact measures that mitigate flood loss.

Research Design and Methods

Sample Selection and Data Collection

The sampling frame for this study included all coastal counties in eight states along the Atlantic and Gulf coasts between Virginia and Louisiana (n=107), and coastal municipalities with at least 10,000 residents (n=175). Local governments with a population less than 10,000 are unlikely to be able to support planning for recovery. The focus is on coastal communities because they represent diverse geographic locations, are highly vulnerable to disasters, and experience higher growth rates than the rest of the country (Swiss Re 2012).

Local recovery plans were collected from official local government websites over a six-month period (April to November 2012). If a plan was not identified online, a follow-up email or phone call was submitted to the local planning and emergency management agency to locate an online address. For plans to be included in the sample at least two of three minimum criteria

were met: a statement of recovery goals, a fact base that identifies hazards, and recovery policies designed to achieve the goals. If a document did not meet these criteria it did not qualify as a recovery plan. All plans were adopted or amended between 2007 and 2012.

Plan Evaluation and Analysis

We developed a coding instrument with coding indicators to serve as the recording unit for our data (author's website). The indicators were designed to assess how well the six plan quality principles were accounted for in a recovery plan. Consistent with prior studies on plan content analysis, each indicator was measured on a binary scale: 0 denoted that the indicator in question was not included and 1 denoted that the indicator was present in the plan (Berke and Godschalk, 2009). The total number of indicators was 125. Descriptive statistics including mean, standard deviation, and maximum and minimum scores were generated for each of the plan quality principles.

The content analysis procedures followed practices recommended in the communications (Krippendorff 2004), social psychology (Compton, Love and Sell 2012), and plan quality literatures (Berke and Godschalk 2009, [Stevens et al. forthcoming](#)). Reliability of double coded plans (Krippendorff's alpha of 0.549 and percent agreement of 91.5%) is well within the range reported in previous plan quality studies (authors).

An index score was computed for each of the direction setting and action-oriented principles. Consistent with prior plan quality evaluation studies, we computed the index score in three steps (Berke and Godschalk, 2009). First, the scores of the indicators were summed within each of the principles. Second, the summed scores were divided by the total possible score for each principle. Third, this fractional score was converted to an index on a scale of 0–2.

Multivariate Modeling

Multivariate analyses were used to create a final model for each of the six principles of plan quality. A full multivariable model was initially developed for each principle. Backward elimination was used to remove variables to find the most parsimonious model. Binary and monotonic variables were removed from the model one at a time, while categorical indicator variables were removed as a group. Based on Wald χ^2 statistics, variables with a p-value of ≤ 0.10 were retained in the final model (Kleinbaum and Klein 2005). Poisson regression models were used for all principles except inter-organization coordination, which did not meet the Poisson assumption for overdispersion. We assessed overdispersion of each model by informally comparing the standard error and mean of each model and by formally conducting a likelihood ratio test compared to the same negative binomial model. The inter-organization coordination principle was fit using a negative binomial model that included a term to adjust for overdispersion. Model coefficients, robust standard errors, confidence intervals, and p-values are reported for all models.

Local Adoption of Recovery Plans

Our initial analysis focused on the degree to which communities adopt recovery plans that meet our minimum selection criteria. Table 1 shows the distribution of jurisdictions in the sample across states, distribution of jurisdictions with plans across states, and percent of jurisdictions with a plan by state. Florida dominated the sample with 55.0% of the total number of local jurisdictions in the sample (155 of the 282 jurisdictions) and 67.8% ($n = 59$) of all recovery plans included in the sample that met the minimum plan quality criteria. The remaining local jurisdictions comprised 12.1% (Louisiana) or less of the total sample of jurisdictions, and 10.3% (North Carolina) or less of all recovery plans.

Table 1: Sample of Local Jurisdictions, and with Plans Across States and by State

The percentage of local jurisdictions with recovery plans within each state is low and highly variable. While a minority of all local jurisdictions in the entire sample have plans that address recovery (30.9%, n = 87), there is wide variation across states in the percentage of local jurisdictions with plans. Three states with the highest percentage included North Carolina (40.9%), Florida (38.1%), and South Carolina (35.3%). Georgia had less than one-fourth of jurisdictions with plans (23.1%), and the remaining states had very low percentages, including Virginia (18.5%), Mississippi (16.7%), Louisiana (11.8%), and Alabama (0%).

The higher percentages in Florida, North Carolina, and South Carolina could be partially due to state policy.¹ At the time all of the plans in our sample were adopted, Florida was the only state in the sample that required local jurisdictions to prepare a disaster recovery plan.² North Carolina and South Carolina were the only states that use explicit language in the state planning enabling legislation that calls for local jurisdictions to voluntarily prepare a recovery plan. The remaining states have not required or explicitly encouraged local recovery plans and do not have a history of commitment to pre-disaster planning for post-disaster recovery.

As noted, while Florida had a relatively high percentage of jurisdictions with plans under the state's local recovery plan mandate, an unexpected majority of jurisdictions (61.9%) did not have plans. Interviews with two senior planners of the lead planning agency charged with recovery planning in Florida were consistent in their explanations for the high level of non-compliance. They maintained that state legislation offered little guidance about what constitutes a recovery plan. Thus, the plans could not be regularly evaluated to ensure compliance with state requirements. A Florida state planner's observation summed up the situation by indicating that "...without baseline standards...we couldn't hold local governments accountable to prepare recovery plans...this was a core challenge over the more than 20-year life of the mandate."³

What is the Quality of Local Recovery Plans?

Overall Plan Quality Scores

Plans offer an overall weak framework to guide recovery decisions to achieve long-term resiliency. Most plans did not contain elements that accounted for each of the plan quality principles. The three direction setting principles (Table 2) and three action-oriented principles (Table 3) did not receive more than about one-third of the maximum of 2.0. Relative to other plan quality studies, these scores are weak. For example, standardized scores from a meta-analysis of 16 plan quality studies (Berke and Godschalk 2009) that covered a range of topics (e.g., housing, watershed protection, and hazard mitigation) consistently score higher for all six principles compared to scores for recovery plans. The findings indicate that, overall, local jurisdictions do not have well-organized, technically sound, and thoroughly prepared plans that reflect a strong commitment to pre-disaster planning for disaster recovery.

Table 2: Descriptive Statistics for Direction Setting Plan Quality Principles

Table 3: Descriptive Statistics for Action-oriented Plan Quality Principles

Direction Setting Plan Quality Scores

The goals principle had low overall mean scores (overall mean = 0.27, on a 0 to 2 scale). Plans most strongly focused on restorative goals aimed at achieving a “return to normal” compared to transformative goals that emphasize returning to a “new normal.” Restorative goals placed emphasis on alleviation of losses as quickly as possible with a primary attention on building back to pre-disaster conditions (mean = 0.35). Transformative goals tied to resiliency, sustainability, and smart growth (e.g., revitalize blighted areas, replace low-density with transit oriented development, relocate structures from hazard areas) received a lower score (mean = 0.11).

The fact base principle is weak as indicated by the lowest overall mean score among the three direction setting principles (overall mean = 0.10). Identification of hazards scored low but still had the highest score among the four indexes that comprise the fact base (0.18), followed by estimates of current vulnerability to disasters (mean = .008), capability to adapt (mean = 0.06), and future scenarios of disaster impacts (mean = 0.04). These findings suggest that recovery plans are derived without a strong empirical basis of the range of current and future potential disaster impacts. As a result, the merits of alternative policy proposals concerning how they address a range of future disaster events cannot be sufficiently explored.

The policy principle scored the highest among the three direction setting principles (overall mean = 0.40). Among the seven classes of flexible rebuilding policies that guide rebuilding (Schwab et al. 1998, pp. 157-167), temporary building moratorium received the highest score (mean = 0.81) indicating that communities place priority on allowing for deliberation to consider next steps. The next highest scores placed emphasis on promoting flexibility by supporting alternative courses of action, including allowing for adjustments in land use regulations (mean = 0.67), the design and location of public facilities (mean = 0.45), and building relocation schemes (mean = 0.35). Plan policies had the lowest scores on setting damage thresholds that set a baseline for activating new building standards (mean = 0.23), identifying sites for temporary and permanent housing (mean = 0.14), and use of tax incentives that could be triggered after a disaster event (mean = 0.11).

Action-oriented Plan Quality Scores

The organizational coordination principle received the lowest overall mean score among the three action-oriented principles of recovery plans (overall mean = 0.08). The identification of local representatives (utilities, businesses, local government agencies) that serve on the lead

local organization (or task force) charged with coordination of rebuilding after a disaster event was low (mean = 0.20), but the identification of external organizations (federal and state agencies, non-profits) that serve as resources providers was almost non-existent (mean = 0.01). The low scores is a significant concern as organizational coordination is essential in fostering effective adaptive management of the recovery process as indicated by disaster researchers from Rubin, Superstein and Barbee (1985) onward (Olshansky et al. 2006, Olshansky et al. 2008, Olshansky and Johnson 2010).

The overall score for the public participation principle was also low (overall mean = 0.16). Recovery plans revealed a somewhat narrow range of participation tools used to engage the public in the pre-disaster plan making process (mean = 0.29), but tools used to engage the public during post-disaster recovery that are essential for adaptive management were barely mentioned or not identified (mean = 0.10). The narrative about public participation received a low score (0.10), even though planning scholars have consistently demonstrated that plans are more likely to be used if they describe the public participation process that identifies who was involved, how they participated, and what effects they had in the evolution of the plan (Baer 1997, Burby 2003, Hopkins 2001).

The implementation and monitoring principle scored highest among the three action-oriented principles (overall mean = 0.50), with a comparatively strong focus on post-event roles and responsibilities (mean =0.87), pre-event maintenance exercises (mean = 0.99), and specification of damage standards that determine the level of activation (full or partial) of the recovery plan (mean = 0. 71). However, low scores for monitoring outcomes of plan implementation efforts (mean = 0.10) and tracking how external resources are used for rebuilding (mean = 0.33) weakens the influence of the plan to offer guidance to adaptively adjust

policies and institutional arrangements to the changing needs of residents, and to incorporate new ideas and innovations based on experience.

In sum, our analysis of local disaster recovery plans reveals that overall quality of direction setting and action-oriented principles is low. Entire sections of the plans that cover each of the principles were absent in many plans (all principles had minimum scores = 0.00, see tables 2 and 3). Even if plans scored high for goals, facts and polices, the strength of these direction-setting principles will likely be inconsequential since plans do not include well-developed action-oriented principles.

Factors Explaining Recovery Plan Quality

In the past, scholars have observed the difficulties in taking action on issues that lack a public constituency (Burby 2003, Mileti 1999, ch. 5). This is especially the case in securing action in policy arenas like disaster recovery that typically only receive attention from the public and elected officials after a crisis and major loss (Berke and Lyles 2013, May 1991). The multivariate modeling results summarized in tables 4 and 5 indicate that among the three sets of planning process variables, only the plan design option has a significant impact on a majority of plan quality principles. Unexpectedly, involvement of the local planning agency on the official recovery planning committee has no effect on prompting a jurisdiction to improve recovery plan quality for five of the six principles. Simply having a planner involved in a planning process is not adequate for prompting a jurisdiction to create stronger plans. The fact base principle is the exception. When the planning agency is involved, as opposed to other agencies like emergency management, planners are more likely to have access to and familiarity with the types of data most relevant for guiding land use and rebuilding decisions.

Table 4: Poisson Regression Results: Predicting Direction Setting Principles

Table 5: Regression Results: Predicting Action-oriented Principles

The number of stakeholder groups (e.g., business, environmental, and neighborhood groups, local government agencies) involved in developing the plan did not significantly influence on any of the six principles of recovery plan quality. While this finding is unexpected given findings of most prior research (for example, Burby 2003, and Inners, Booher, and Dittorio 2011), our confidence is enhanced as a recent study on hazard mitigation planning found that too many groups may lead to heightened competition for polices supported by different stakeholder groups, thereby reducing chances for broader-based discussion and agreement (Lyles et al., forthcoming).

As noted, plan design options have the strongest impact on plan quality scores when other explanatory factors are controlled for in the multivariate model. To compare the relative influence of each design option, we used the small area recovery plan as the reference category. This approach is the most conservative in detecting statistical significance among the plan design options as the small area recovery plan is the least used by the 87 local jurisdictions in our sample (see table A1).

The importance of the influence of plan design varies by option. Compared to the reference category, the stand-alone communitywide recovery option had the strongest impact as it exerts a significant and positive influence on four of the six principles, but its relationship with the fact base and inter-organizational coordination principles is not significant. This option likely offers the most opportunities to concentrate on developing plans specifically focused on rebuilding issues after a disaster (FL Division of Community Planning 2009). Unlike integrating recovery into comprehensive planning, for example, the stand-alone plan design offers the greatest opportunity to concentrate resources to engage a core group of stakeholders interested in rebuilding issues, and to support the formulation of goals, policies, and the implementation and

monitoring programs that directly focus on these issues. This approach allows jurisdictions to initially gain acceptance and build capacity to directly deal with long-term disaster recovery.

The small area recovery design (reference category) exerts the next strongest influence on recovery plan quality. This design option has a stronger influence compared to the comprehensive land use design and emergency management design. Coefficients for five principles were significant and negative for the comprehensive land use plan, two were significant and negative for the emergency management plan, and the remaining coefficients for both of these plan designs were non-significant. These findings suggest that the small area design has similar advantages of a stand-alone communitywide recovery plan, but a narrow focus on a vulnerable location could preclude association with communitywide recovery goals and policies, and relevant interests with a stake in other vulnerable locations.

The comprehensive land use plan has the most adverse effect on recovery plan quality among all options. This design results in a significant negative impact on five of the six principles of plan quality (compared to the reference category), with goals receiving a negative but insignificant coefficient. When jurisdictions select this option, recovery issues probably become lost in the competition for time and attention with other more salient local issues.

The emergency management plan option has a negative and significant impact on plan goals and policies, and no impact on the remaining four principles. This finding is not surprising. While this option potentially offers opportunities to address short-term recovery issues (e.g., placement of temporary housing or debris removal sites), emergency management practice does not typically deal with long-term recovery issues associated with rebuilding and land use (NEMA 2011).

The effects of the control variables vary but offer no major surprises. States had the strongest effect. With the exception of the goals principle, plans produced by jurisdictions in Florida scored lower across all principles of recovery plan quality. This finding is not surprising given Florida's weak mandate. Consistent with Hoch's (2007) study of comprehensive plans developed under a weak state mandate, jurisdictions that had a plan probably complied to simply meet the letter of the law, but were not motivated to produce high quality plans.

The remaining control variables have no or only limited effect on plan quality principles. Wealth, as measured by median home value, only influenced goals and policy. While wealth provides a source of funds to support planning, it also suggests the presence of environmental groups that can help formulate development-limiting goals and policies and adequate resources to reduce the need for maintaining or increasing tax bases through rebuilding after a disaster. Thus wealthy local jurisdictions are more likely to be supportive of goals and policies that support strong regulations that control rebuilding (Motoloch 1976, Rudel 1989). Other principles of plan quality may not be as directly influenced by wealth.

Population density has no effect on plan quality, and the Community Rating System (CRS) program under the NFIP, prior disaster experience, population growth rate, and population size are not influential on five of the six plan quality principles. Enrollment in the CRS only influenced the public participation principle, but does not affect the remaining principles. The lack of influence is not surprising as prior research indicates the CRS program has no influence on jurisdictional decisions to include mitigation actions in local hazard mitigation plans (Berke, Lyles and Smith forthcoming). Recent disaster experience is limited to only having a positive influence on the fact base principle that probably prompts localities to give more time attention to understanding potential future vulnerability by development of a fact

base. Surprisingly, population growth is inversely related to the fact base, which could be due to local agencies having more time to collect and analyze data when not under intense growth pressure. Population size has an unexpected significant negative effect on public participation, but the coefficient for this variable is extremely small.

Conclusions and Implications

Planning for disaster recovery receives limited support within the eight states of our study. Less than one-third of vulnerable local jurisdictions adopted disaster recovery plans that met our minimal criteria for inclusion in the sample. While Florida was the only state to mandate local recovery plans, findings indicate a low level of compliance that is attributed to the lack of state oversight and a weak mandate that lacks clear standards for local plan making.

The overall low plan quality scores for both direction setting and action-oriented principles indicate that the plans will not foster local resiliency during post-disaster recovery. Poor quality plans will not contribute to local ability to anticipate and adapt to dynamic conditions, and to build back better. We partly attribute the low scores due to the concepts included in our plan analysis that reflect the leading edge thinking from the anticipatory governance literature. The concepts relate to features that we believe should be included in a disaster recovery plan and reflect recent advances in new models of plan making that have yet to be incorporated into plans by local jurisdictions.

Multivariate modeling revealed several important findings. Florida's unfunded mandate produced weaker plans compared to recovery plans in other states. While research has shown that mandates induce higher rates of adoption and higher quality plans (e.g., Burby and May 1997), local jurisdictions are capable of making choices on their own that motivate change

through better plans (Bunnell and Jepson 2011), and that weak and unfunded mandates can generate weaker plans than those prepared voluntarily (Hoch 2007).

Modeling also revealed that action on issues such as recovery planning that lack public support are likely to not be associated with how many stakeholders are engaged and whether the planning agency plays a role in recovery planning. While this study did not directly measure the intensity of stakeholder involvement and plan agency involvement, plan design was used as a surrogate measure of intensity. As noted, plan design has to do with concentrating time, effort, and resources, and engaging a core collaborative network of key stakeholders who likely have greatest responsibility in rebuilding efforts and care about the impacts of extreme events, and who are intent on reordering local priorities. Our findings revealed that the stand-alone communitywide recovery plan design option allows jurisdictions to initially gain acceptance and build capacity to directly deal with long-term disaster recovery. Because recovery planning lacks a public constituency, and is new and novel to most local jurisdictions, this option appears to be most effective at building support for recovery planning.

Once a local jurisdiction has forged commitment to recovery planning, a next step could be to incorporate recovery into a comprehensive plan because the later plan normally is well-established and has standing in the community as a land use and development policy guide. Scholars (Smith and Wenger 2006) and practitioners (FL Division of Community Planning 2009, Schwab et al. 1998) contend that this step would facilitate integration of rebuilding goals and policies with other ongoing local goals and policies.

Critical gaps in knowledge about the influences of planning on urban rebuilding and ultimately on community disaster resiliency must be addressed. Research is needed to test the efficacy of recovery plans on post-disaster social, natural, and built environment outcomes. Plan

quality evaluation theory and metrics offer an initial step to expanding knowledge about the impact of plans. An important next step is future research that examines the role of collaborative planning networks in pre- and post-disaster recovery planning (see, for example, Margerum 2011, ch. 6). This well developed area of planning knowledge could offer critical insights on how local choices in managing the pre-disaster planning process influence local capability to adapt and implement plans under dynamic post-disaster conditions.

Figure 1: Definitions and Indicators of Plan Quality Principles

<i>Direction-Setting Principles</i>	<i>Action-Oriented Principles</i>
<p>I. Goals: Future desired conditions that reflect breadth of values affected by the plan.</p> <ol style="list-style-type: none"> 1. Transformative goals to build back better (examples). <ul style="list-style-type: none"> • Blight removal • Smart Growth (more trans-oriented development) • Enhanced public safety (relocate development to safer locations) • More equitable distribution of services and facilities 2. Restorative goals to alleviate losses efficiently and quickly (examples). <ul style="list-style-type: none"> • Economic resumption to keep businesses alive • Replace/repair development to prior conditions <p>II. Fact Base: An evidence-based foundation to derive future disaster scenarios and recovery policy options.</p> <ol style="list-style-type: none"> 1. Identify hazards 2. Estimate current population and property exposed 3. Scenarios of disaster impacts with varying hazard severity and exposure from alternative development patterns 4. Capability assessment of existing plans, regulations, staff expertise <p>III. Policies: Flexible guides that account for possible future disaster scenarios that vary in severity and location of impacts, and changes in local needs and capacities through different phases of recovery (examples):</p> <ol style="list-style-type: none"> 1. Temporary building moratorium 2. graduated standards for activating bldg. acquisition/relocation 3. Post-disaster housing siting/supply policies 4. Provisions for adjusting capital improvements for public facilities 5. Provisions for change in land use regulations 6. Damage thresholds for change in bldg code stds 	<p>IV. Inter-organizational Coordination: Coordination for mobilizing resources and adaptively managing recovery in ways that fit changing post-disaster needs and take advantage of opportunities that open and close quickly.</p> <ol style="list-style-type: none"> 1. Identifies representatives of lead local recovery task force charged with directing rebuilding (federal, state, local, non-governmental) 2. Identifies external organizations that serve as resource providers from the disaster assistance network (federal, state, local, non-governmental) <p>V. Participation: Engage the public to build a knowledgeable constituency able to create a plan that reflects local values, needs and capabilities, and enable ongoing public input throughout the recovery process.</p> <p>Identifies techniques to engage the public:</p> <ol style="list-style-type: none"> 1. During pre-disaster planning 2. After a disaster event to adaptively manage the recovery process to fit changing needs/conditions (examples of techniques during/after a disaster): <ul style="list-style-type: none"> • designate communication liaison • citizen advisory committee • public meetings for comment • media releases (radio, tv, local paper) • other (website, public notice, public surveys) 3. Include a narrative on who was involved in pre-disaster planning, how they participated, and how they affected evolution of plan <p>VI. Implementation and Monitoring: Involves implementation actions, and tracking plan performance</p> <p>Identifies:</p> <ol style="list-style-type: none"> 1. Post-event roles/responsibilities 2. Pre-event maintenance (e.g., mock exercises, training) to keep implementers familiar with plan 3. Criteria to guide determination of partial/full activation of plan 4. Monitoring indicators to track outcomes, use of recovery funds, and evaluate and adapt policies

Note: All components under each principle are coded, Mentioned = 0, Not Mentioned = 1.

Figure 2: Relationship Between Plan Design Options and Planning Process Dimensions

Plan Design Options	ProcessDimensions			
	Accounts for Stakeholders	Relevance of Tasks	Time and Resources	Information Gathering
Stand Alone Communitywide Recovery Plan	Core network of interests with stake in communitywide rebuilding	Tight focus on recovery and rebuilding work	Concentrates on recovery issues	Focuses on communitywide rebuilding issues
Comprehensive Land Use Plan	Wide network of interests with primary interest in land use and development	Recovery work competes w other more salient issues	Diffuses across multiple interdependent urban systems	Recovery part of larger analysis dealing with multiple urban systems
Emergency Management Plan	Interests focused on emergency operations before and after disaster impact	Recovery is secondary relative to emergency operations	Primary focus on emergency preparedness and response	Focuses on evacuation, sheltering and related emergency issues
Small Area Recovery Plan	Core network of interests with stake in rebuilding, but might overlook interests in other vulnerable areas	Tight focus on recovery and rebuilding work	Concentrates on recovery issues in a single location	Focuses on rebuilding, but on single location

Table 1: Sample of Local Jurisdictions, and with Plans Across States and by State

State	# Juris in Sample Across States (%)	# Juris with Plan Across States (%) ^a	% Juris with Plan by State
Alabama	8 (2.8)	0 (0.0)	0.0
Florida	155 (55.0)	59 (67.8)	38.1
Georgia	13 (4.6)	3 (3.4)	23.1
Louisiana	34 (12.1)	4 (4.6)	11.8
Mississippi	6 (2.1)	1 (1.1)	16.7
N Carolina	22 (7.8)	9 (10.3)	40.9
S Carolina	17 (6.0)	6 (6.9)	35.3
Virginia	27 (9.6)	5 (5.7)	18.5
Total	282 (100.0)	87 (99.8)	30.9

^a Percentages do not add to 100% due to rounding.

Table 2: Descriptive Statistics for Direction Setting Plan Quality Principles^a

Principles (# indicators)	Mean	Standard Deviation	Min	Max
Goals				
Restorative (6)	0.35	0.33	0.00	1.67
Trasnformative (4)	0.11	0.12	0.00	1.33
Overall Mean	0.27	0.28	0.00	1.56
Fact Base				
Hazards identified (6)	0.18	0.12	0.00	0.75
Current vulnerability (13)	0.08	0.17	0.00	0.92
Disaster impact scenarios (8)	0.04	0.07	0.00	0.46
Capability to adapt (4)	0.06	0.13	0.00	0.63
Overall Mean	0.10	0.10	0.00	0.53
Policies for Rebuilding				
Temporary building moratorium for set time period after a disaster event (1)	0.81	0.49	0.00	2.00
Post-disaster housing siting & supply policies (5)	0.14	0.34	0.00	2.00
Provisions for activating bldg. acquisition and relocation (2)	0.35	0.46	0.00	1.50
Provisions for adjusting capital improvements for public facilities (3)	0.45	0.57	0.00	2.00
Provision for change in land use regulations for rebuilding (4)	0.67	0.73	0.00	2.00
Damge thresholds for change in bldg code stds for rebuilt structures (2)	0.23	0.52	0.00	2.00
Activate provisions for tax and fee incentives to guide rebuilding (5)	0.11	0.27	0.00	1.50
Overall Mean	0.40	0.29	0.00	1.82

^a Principle scores are scaled to 0–2.

Table 3: Descriptive Statistics for Action-oriented Plan Quality Principles^a

Principles (# indicators)	Mean	Standard Dev	Min	Max
Organizational Coordination				
Internal (local) task force (9)	0.20	0.35	0.00	1.56
External resource providers (18)	0.01	0.06	0.00	0.50
Overall Mean	0.08	0.15	0.00	0.80
Public Participation				
Pre-disaster tools (12)	0.29	0.33	0.00	1.50
Post-disaster tools (12)	0.10	0.15	0.00	0.58
Narrative (1)	0.10	0.25	0.00	1.00
Overall Mean	0.16	0.22	0.00	1.04
Implementation and Monitoring				
Maintenance exercises (2)	0.99	0.95	0.00	2.00
Activation (1)	0.71	0.96	0.00	2.00
Responsibilities, timelines, funding (2)	0.87	0.95	0.00	2.00
Indicators to monitor outcomes (3)	0.10	0.26	0.00	1.33
Recovery resources (2)	0.33	0.64	0.00	1.00
Overall Mean	0.44	0.43	0.00	1.60

^a Principle scores are scaled to 0–2.

Table 4. Poisson Regression Results: Predicting Direction Setting Principles (n = 87)

Variable	Exponentiated Coefficient ^b	Std. Error (Exponentiated 90% Confidence Intervals)
Goals		
Plan Design Option		
Comprehensive plan	0.656	0.430 (0.323, 1.330)
Stand alone recovery plan	2.085*	0.430 (1.028, 4.229)
Emergency management plan	0.336**	0.441 (0.163, 0.694)
Small area emergency plan	-----	
Wealth (median) ^a		
<\$96,000	1.514 ***	0.143 (1.197, 1.916)
>\$96,000	-----	
Fact Base		
Plan Design Option		
Comprehensive plan	0.436****	0.261 (0.284, 0.669)
Stand alone recovery plan	0.896	0.276 (0.569, 1.411)
Emergency management plan	0.336	0.258 (0.650, 1.517)
Small area recovery plan	-----	
Local Planning Agency		
Present	2.721****	0.212 (1.919, 3.857)
Absent	-----	
State		
Florida	0.625****	0.122 (0.511, 0.764)
Other states	-----	
Population growth	0.586***	0.186 (0.432, 0.795)
Disaster experience (PERI)		
Present	1.950****	0.148 (1.529, 2.486)
Absent	-----	
Policies		
Plan Design Option		
Comprehensive plan	0.439****	0.156 (0.339, 0.568)
Stand alone recovery plan	1.459**	0.157 (1.127, 1.889)
Emergency management plan	0.573****	0.160 (0.441, 0.746)
Small area recovery plan	-----	
State		
Florida	0.509****	0.083(0.444, 0.584)
Other states	-----	
Wealth (median) ^a		
<\$96,000	1.195***	0.061 (1.081, 1.320)
>\$96,000	-----	

^a Wealth (home value) was not linear on a log scale and was converted to a dichotomous variable.

^b Significant level at *p<.10, ** p<.05, ***p<.01, ****p<.001

Table 5. Regression Results: Predicting Action-Oriented Principles (n = 87)

Variable	Exponentiated Coefficient ^c	Std. Error (Exponentiated 90% Confidence Intervals)
Inter-org. Coordination^a		
Plan Design Option		
Comprehensive plan	0.327**	0.562 (0.129, 0.823)
Stand alone recovery plan	1.692	0.602 (0.629, 4.591)
Emergency management plan	1.231	0.575 (0.478, 3.171)
Small area recovery plan	-----	
State		
Florida	0.473****	0.231 (0.324, 0.692)
Other states	-----	
Public Participation^b		
Plan Design Option		
Comprehensive plan	0.079****	0.308 (0.048, 0.131)
Stand alone recovery plan	1.916**	0.258 (1.253, 2.927)
Emergency management plan	1.216	0.245 (0.813, 1.820)
Small area recovery plan	-----	
Community Rating System (CRS)		
Present	1.501****	0.117 (1.238, 1.820)
Absent	-----	
State		
Florida	0.462****	0.116 (0.381, 0.618)
Other states	-----	
Population size	1.00 **	0.000(0.999,1.000)
Implementation and Monitoring^b		
Plan Design Option		
Comprehensive plan	0.039****	0.373 (0.021, 0.071)
Stand alone recovery plan	1.501*	0.254 (0.988, 2.280)
Emergency management plan	1.261	0.246 (0.841, 1.891)
Small area recovery plan	-----	
State		
Florida	0.647****	0.098 (0.551, 0.760)
Other states	-----	

^a Negative binomial regression model used due to over dispersion

^b Poisson regression model

^c Significant level at *p<.10, ** p<.05, ***p<.01, ****p<.001

Table A1: Independent Variables (n=87)

Variable	Measurement	Summary Statistics (n is for jurisdiction)	Source
<i>Local Planning Process</i>			
Planning Agency	Two-level measure: Planning agency involved; Planning agency not involved	n (%) = 9 (10.3%) n (%) = 78 (89.7%)	Plan Content Analysis
Diversity of Groups	Number of 9 different categories of stakeholder groups represented on planning steering committee.	Mean: 1.17 s.d.: 2.95 Range: 16.0	Plan Content Analysis
Plan Design Options ¹	Two level measures: Comprehensive (Yes) Stand alone recovery (Yes) Emergency management (Yes) Small area (Yes)	n (%) = 35 (40.2%) n (%) = 9 (10.3%) n (%) = 40 (46.0%) n (%) = 3 (3.4%)	Plan Content Analysis
<i>Planning Context</i>			
Community Rating System (CRS)	Two-level measure: Community enrolled; Not enrolled	n (%) = 67 (69.0%) n (%) = 27 (31.0%)	National Flood Insurance Program
State Mandated Local Recovery Plan	Two-level measure (Not Florida): Non-mandate state (Florida); Mandated recovery plan	n (%) = 28 (32.2%) n (%) = 59 (67.8%)	State laws; Interviews with state planners
Population Density	The number of persons per square mile of land area	Mean: 1,615.89 s.d.: 2,108.71 Range: 12,492.56	US Census (2000)
Population Size	Total number of persons in local jurisdiction	Mean: 152,501.82 s.d.: 337,137.80 Range: 2,247,536	US Census (2000)
Population Growth	The percent change in population in the 10 years prior to the date of plan adoption	Mean: 24.7% s.d.: 34.3% Range: 297.2%	US Census (2000)
Community Wealth (\$ value owner occupied homes)	Two level measure: Above median value; Below median value	n (%) = 43 (49.4%) n (%) = 44 (50.6%)	US Census (2000)
Recent Disaster Experience (2004-09)	Two Level measure: Experienced Presidentially Declared Disaster; No experience	n (%) = 68(78.2%) n (%) = 19(22.8%)	Public Entity Risk Institute

References

Baer, William. 1997. General Plan Evaluation Criteria: An Approach to Making Better Plans.

Journal of the American Planning Association 63 (3): 329-45.

Berke, Philip, David Godschalk, and Edward Kaiser with Daniel Rodriguez. 2006. *Urban Land*

Use Planning, 5th Edition. Chicago: University of Illinois Press.

Berke, Philip and David R. Godschalk. 2009. Searching for the Good Plan: a Meta-Analysis

of Plan Quality Studies. *Journal of Planning Literature* 23(3): 227-240.

Berke, Philip and Ward Lyles. 2013. Public Risks and the Challenges to Climate Adaptation: A

Proposed Framework for Planning in the Age of Uncertainty. *Cityscape: Journal of Policy*

Development and Research 15(1): 189-216

Berke, Philip, Ward Lyles, and Gavin Smith. Impacts of Federal and State Hazard Mitigation

Policies on Local Land Use Policy, *Journal of Planning Education and Research* (forthcoming).

Bunnell, Gene and Edward Jepson. 2011. The Effect of Mandated Planning on Plan Quality,

Journal of the American Planning Association, 77(4): 338-353.

Burby, Raymond and Peter May. 1997. *Making Governments Plan*. Baltimore, MD: Johns

Hopkins University Press.

Burby, Raymond. 2003. Making Plans that Matter: Citizen Involvement and Government Action. *Journal of the American Planning Association*. 69(1): 33-49.

Chang, S.E., T. McDaniels, and C. Beaubien. 2009. Societal Impacts of Infrastructure Failure Interdependencies: Building an Empirical Knowledge Base, *Proc. 2009 TCLEE Conference*: 693-702.

Compton, D'Lane, Tony P. Love, and Jane Sell. 2012. Developing and assessing intercoder reliability in studies of group interaction. *Sociological Methodology* 42 (1):348-364.

Dalton, Linda and Raymond Burby. 1994. Mandates, Plans, and Planners: Building Local Commitment to Development Management. *Journal of the American Planning Association*. 60(4): 444-461.

Florida Division of Community Planning (FL DCA). 2009. Post-Disaster Redevelopment Planning. Retrieved June 10, 2009 and August 30, 2009, respectively, from Florida Division of Community Planning Web site: <http://www.dca.state.fl.us/fdcp/DCP/PDRP/index.cfm> and www.dca.state.fl.us/fdcp/dcp/PDRP/overview.cfm.

Guston, D. (2007). *Toward anticipatory governance*. Retrieved February 28, 2009, from <http://nanohub.org/resources/3270>

Hess, Jeremy, Julia McDowell and George Luber. 2012. Integrating Climate Change Adaptation into Public Health Practice: Using Adaptive Management to Increase Adaptive Capacity and Build Resilience. *Environmental Health Perspectives* 120 (2): 171-179.

Hoch, Charles. 2007. How plan mandates work: Affordable housing in Illinois. *Journal of the American planning Association* 73 (1): 86-99.

Hopkins, Lewis. 2001. *Urban Development: The Logic of Making Plans*. Washington, DC: Island Press.

Innes, Judith and David Booher. 1999. Consensus Building and Complex Adaptive Systems: A Framework for Evaluating Collaborative Plan Quality. *Journal of the American Planning Association* 65(4): 423-412.

Innes, Judith, David Booher, and Sarah Di Vittorio. 2011. Strategies for Megaregion Governance: Collaborative Networks, Dialogues, and Self-organization, *Journal of the American Planning Association* 77(1): 55-67.

Kleinbaum, DG, Klein, M. *Logistic Regression*. 2nd ed. New York, NY: Springer; 2005.

Krippendorff, K. 2004. *Content Analysis: An Introduction to its Methodology*. Thousand Oaks, CA: Sage Publications.

Lyles, Ward, Philip Berke, and Gavin Smith. 2013. Do Planners Matter? Examining Factors Driving Incorporation of Land Use Approaches into Hazard Mitigation Plans, *Journal of Environmental Planning and Management* (forthcoming).

Margerum, R. D. (2011). *Beyond Consensus: Improving Collaborative Planning and Management*. Boston, MA: MIT Press.

May, Peter. 1991. Reconsidering Policy Design: Policies and Public. *Journal of Public Policy* 11(2): 187-206.

Mileti, D. S. 1999. *Disasters By Design: A Reassessment of Natural Hazards in the United States*. Washington, DC: Joseph Henry Press.

Molotch, Harvey. 1976. The City as a Growth Machine: Toward a Political Economy of Place, *American Journal of Sociology* 82, 2, pp. 309-332.

National Emergency Managers Association (NEMA). 2011. *State Emergency Management Director Handbook*. Washington, D.C.: [same as author].

National Flood Insurance Program-Community Rating System (NFIP-CRS). 2013. Purpose and Goals (<http://www.fema.gov/national-flood-insurance-program-community-rating-system>, accessed August 24, 2013).

Olshansky, Robert B., Laurie A. Johnson, Kenneth C. Topping. 2006. Rebuilding communities following disaster: Lessons from Kobe and Los Angeles, *Built Environment* 32(4): 354-374.

Olshansky, Robert B., Laurie A. Johnson, Jedidiah Horne, and Brendan Nee. 2008. Planning for the Rebuilding of New Orleans, *Journal of the American Planning Association*, 74(3): 273-287.

Olshansky, Robert and Laurie Johnson. 2010. *Clear as Mud: Planning for the Rebuilding of New Orleans*. Washington, D.C.: Island Press.

Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.

Peacock, Walter G., Howard Kunreuther, William H. Hooke, Susan L. Cutter, Stephanie E. Chang, and Philip R. Berke. 2008. *Toward a Resiliency and Vulnerability Observatory Network: RAVON*. Report #08-02R. College Station, TX: Hazard Reduction and Recovery Center.

Pendall, Rolf. (2001). Municipal plans, state mandates, and property rights: Lessons from Maine. *Journal of Planning Education and Research*, 2;(2): 54-165

Rudel, Thomas. 1989. *Situations and Strategies in American Land Use Planning*. New York: Cambridge University Press.

Quay, Ray. 2010. Anticipatory Governance: A Tool for Climate Change Adaptation. *Journal of the American Planning Association* 76(4): 496-511.

Rubin, C., Saperstein, M., and Barbee, D. 1985. *Community Recovery from a Major Disaster* Monograph No. 41. Boulder: Program on Environment and Behavior, Institute of Behavioral Science, University of Colorado, Boulder.

Schwab, J., Topping, K., Eadie, C., Deyle, R., and Smith, R. 1998. *Planning for Post-Disaster Recovery and Reconstruction*. Planning Advisory Service Report Number 483/484.

Shelley, Linda and Karin Brodeen. 2011. Home Rule Redux: The Community Planning Act of 2011. *The Florida Bar Journal*, July/August 85 (7): 49-51.

Smith, Gavin and Dennis Wenger. 2006. "Sustainable Disaster Recovery: Operationalizing an Existing Agenda," Pp. 234-257 in *Handbook of Disaster Research*, edited by Havidan Rodriguez, E.L. Quarantelli and Russell R. Dynes. New York: Springer.

Smith, Gavin. 2011. *Planning for Post-Disaster Recovery: A Review of the United States Disaster Assistance Framework*. Washington, D.C.: Island Press.

Swiss Re. *The Ten Most Costly World Insurance Losses, 1970-2010*. *Sigma*. 2012: 2.

<http://www.iii-insurancematters.org/insurance-and-disasters/facts/index.cfm>. Accessed January 20, 2013.

Taux, C. 1995. Marginalizing Public Participation in Local Planning: An Ethnographic Account, *Journal of the American Planning Association*, 61: 471-481.

Endnotes

¹ Statutes of the eight states were searched for excerpts containing planning for disaster recovery using Lexis-Nexus software. Three states had legislation on recovery plans. Florida Local Government Comprehensive Planning and Land Development. Regulation Act of 1985, Ch163, Part II, Florida Statutes. Rule 9J - 5 requires coastal cities and counties to prepare a post-disaster redevelopment plan. North Carolina's Coastal Area Management Act of 1974 contains voluntary language in SECTION .0500 – Post-disaster Policies 15A NCAC 07M .0501 DECLARATION OF GENERAL POLICY, indicates that, “adequate plans for post-disaster reconstruction should be prepared...” Local jurisdictions decide what constitutes an “adequate” plan (personal interview on 6/28/13 with senior state planner). South Carolina's Local Government Comprehensive Planning Enabling Act of 1994, Title 6, Ch. 29, Article 1 of the SC Code of Laws, “is supportive of policies to rebuild and redevelop damaged areas.”

² In 2011, the Florida legislature returned state authority over planning to local governments under the Community Planning Act (Shelley and Brodeen 2011). All recovery plans for this study were adopted prior to 2011, and not affected by the act.

³ Personal interview with senior planner, Florida Department of Economic Opportunity, 6/3/13.