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# PLANNING FOR RESILIENT COASTAL COMMUNITIES: AN ANALYSIS OF COASTAL PLANS IN SOUTH CAROLINA

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PLANNING FOR RESILIENT COASTAL COMMUNITIES: AN ANALYSIS OF  
COASTAL PLANS IN SOUTH CAROLINA

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A Thesis  
Presented to  
the Graduate School of  
Clemson University

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of City and Regional Planning

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by  
Felicia Boulware  
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Accepted by:  
Dr. Caitlin S. Dyckman, Committee Chair  
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Dr. Clifford Ellis

## ABSTRACT

Resilience is very important to the longevity of inhabited coastal regions. Sea level rise threatens human systems and exacerbates erosion, saltwater intrusion and flooding in coastal regions. Planning for resilience is one way to ensure that coastal communities are prepared for and able to persist through hazardous events, both ongoing and intermittent. This research amasses resilience policies in four categories: ecological, land uses, social, and economic, which reflect concepts of social-ecological resilience. These policies were selected based on their applicability to coastal regions and academic consensus on best practices to increase resilience. These policies were combined in a matrix that can be used in the planning discipline to assess resilience incorporation in coastal planning documents.

Four coastal counties in South Carolina and two cities from each of those four counties were used as case studies to test the matrix. The results revealed a great need for South Carolina think more comprehensively in terms of the needs and priorities of its coastal region.

## DEDICATION

I would like to dedicate this thesis to my family and the friends who have encouraged and motivated me throughout this process. I could not have done it without you all. A special dedication to my sister Pam who has unknowingly been the best role model a little sister could ask for.

## ACKNOWLEDGMENTS

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## CHAPTER ONE

### INTRODUCTION

“It is well known that the land areas adjacent to the world’s shorelines are associated with large growing concentrations of human population, settlement, and socioeconomic activities, including many of the world’s large cities,” (Small and Nicholls 2003, 584). Growth started in the coastal regions and over time moved inland. Over the past few decades there has been a movement back into coastal regions (Small and Nicholls 2003). From 1980 to 2003 there was an increase of 33 million people in coastal areas (Beatley 2009). Over these two decades, the Southeastern population grew by almost 60 percent in coastal areas (Beatley 2009). As a result of increasing sea levels, coastal regions are susceptible to several types of hazards, including man-made and natural ones. This thesis discusses hazards generally, focusing primarily on the effect of sea level rise (SLR) on erosion, salt water intrusion, storm surge, and flooding. Climate change’s role in the rate of sea level rise was underestimated in research findings published before 2011 (Nicholls 2011).

The extent to which coastal regions were adapted to or planning for erosion based on sea level rise projections before 2011 has been minimal due to inconsistencies in science and associated uncertainty. Despite their past or current status it is inevitable that coastal regions will have to address increasing erosion rates caused by SLR, which is now based on new projections. The way in which coastal states and communities have responded to past sea level rise projections and erosion issues can be a clue as to how they will respond in the future (Nicholls 2011). Most regions have responded by

developing plans to address the issue. The policy response to the information is only half the battle and can be done well in a year or two (Laurian, 2004). The rest remains in the implementation phase, which can take several years after plan completion to generate results.

This thesis examines literature on the following types of hazards: SLR, coastal erosion, salt water intrusion, storm surge, and flooding. The remainder of the literature engages concepts of vulnerability, resilience, hazard mitigation, coastal zone management, plan implementation, and plan evaluation. The hazards literature sets the stage for the importance and necessity of policies that foster resiliency in coastal regions, hazard mitigation, and coastal zone management. This literature will guide the methodological process to determine if South Carolina (SC) coastal plans are incorporating resiliency measures to manage coastal erosion, sea level rise (SLR), salt water intrusion, storm surge, and flooding. This research will create a framework to examine resiliency measures and the extent to which they are incorporated into coastal plans.

## CHAPTER TWO

### COASTAL HAZARDS

Hazards are defined in two ways, natural and man-made. “Natural hazards are defined as inevitable and uncontrollable occurrences such as floods, hurricanes, winter storms, and earthquakes,” (Schwab, Eschelbach and Brower 2007, 2). “Man- made hazards are intentional or accidental occurrences caused by human activity, including oil spills or terrorist attacks,” (Schwab, Eschelbach and Brower 2007, 116). With either type of hazard predicting the magnitude and amount of damage resulting can be difficult. This uncertainty is a concern because there is no definite way to prepare a state or community for an unknown measure of harm resulting from a hazardous occurrence (Gallopín 2006).

Coastal communities face their own set of man-made and natural hazards (Schwab, Eschelbach and Brower 2007). A few natural hazards associated with coastal regions include: flooding, storm surge, erosion, sea level rise, and salt water intrusion (Nicholls 2010). This thesis focuses on sea level rise (SLR) and its impacts on erosion, storm surge, salt water intrusion, and flooding. SLR, erosion, and salt water intrusion are complex hazards and happen gradually. Despite their gradual nature they can have devastating effects on human systems. Continued development and the historical movement of people into our coastal regions create a need to understand SLR and how it affects natural and anthropocentric systems in coastal regions (Blanco and Alberti 2009).

## Sea Level Rise

SLR is defined in two ways, global and relative. Global is a general way of measuring SLR and is based on mean high tide levels around the world as affected by significant climatic changes, i.e. glacial melt and thermal expansion (IPCC 2007). Relative sea level rise is more appropriate for the local scale, because it accounts for elevation and geomorphological changes along the coast (Titus and Richman 2001). Global measures are useful when discussing global or large scale sea level rise, but in order to understand how it affects the local scale more specific factors must be considered to ensure accuracy (Titus and Richman 2001).

SLR is a controversial concept in the scientific world and among policy makers. The lack of consensus is not whether it is occurring but more the cause and rate of its occurrence. As of the 2007 Intergovernmental Panel on Climate Change (IPCC) reports on climate change cited the main cause of SLR to be primarily thermal expansion caused by the presence of greenhouse gases (GHG) (IPCC 2007). More recent research shows that a combination of thermal expansion and glacial melt are affecting the rates and heights of SLR (Pilkey and Young 2009). Current research reveals that ice sheet and glacial melt contributes more to SLR than thermal expansion (Nicholls 2011).

Table 2.1 depicts the 2007 projections for sea level rise. Global SLR is anticipated to reach a maximum level of 3.7 meters by the year 2090 if CO<sub>2</sub> emissions reach the 790ppm depicted in the chart (IPCC 2007). The sole cause of the rising sea levels is specifically stated in the table as thermal expansion. Newer research says thermal

expansion does play a role in SLR, however, there are other factors contributing to SLR that were not accounted for in the IPCC report in 2007. The language in the report stresses general changes in temperature related to GHGs over how that temperature change affects SLR. The AR4 report associated rises in sea levels with CO<sub>2</sub> concentrations. For every range of CO<sub>2</sub> concentration there is a projected sea level rise that is caused by warming of the oceans waters as a result of increased global temperatures. Newer research acknowledges that this is occurring, but there are added contributors; namely, glacial and ice sheet melt. The IPCC AR4 report's failure to include glacial melt into its SLR projections translates into policies that underestimate the impacts of SLR. However, coastal U.S growth continues.

CO <sub>2</sub> concentration at stabilization (2005 = 379 ppm) <sup>b</sup>	CO <sub>2</sub> -equivalent concentration at stabilization including GHGs and aerosols (2005=375 ppm) <sup>b</sup>	Peaking year for CO <sub>2</sub> emissions <sup>a,c</sup>	Change in global CO <sub>2</sub> emissions in 2050 (percent of 2000 emissions) <sup>a,c</sup>	Global average temperature increase above pre-industrial at equilibrium, using 'best estimate' climate sensitivity <sup>d,e</sup>	Global average sea level rise above pre-industrial at equilibrium from thermal
ppm	ppm	year	percent	°C	meters
350 – 400	445 – 490	2000 – 2015	-85 to -50	2.0 – 2.4	0.4 – 1.4
400 – 440	490 – 535	2000 – 2020	-60 to -30	2.4 – 2.8	0.5 – 1.7
440 – 485	535 – 590	2010 – 2030	-30 to +5	2.8 – 3.2	0.6 – 1.9
485 – 570	590 – 710	2020 – 2060	+10 to +60	3.2 – 4.0	0.6 – 2.4
570 – 660	710 – 855	2050 – 2080	+25 to +85	4.0 – 4.9	0.8 – 2.9
660 – 790	855 – 1130	2060 – 2090	+90 to +140	4.9 – 6.1	1.0 – 3.7

Table 2.1: Sea level rise projections based on CO<sub>2</sub> concentrations (IPCC 2007, 67 )

This increased interest in developing the coastline may make implementing more stringent policies difficult and potentially impossible. More recent research accounts for glacial melt and as a result of this increased accuracy, it should support a more appropriate policy response.

Tidally adjusted estimates of topographic vulnerability to SLR and flooding for the contiguous United States, is a report published by IOPScience. The report incorporates the contributions of glacial and ice sheet melt into their SLR projections, asserting that global sea levels will approach 1m and in some places 2m by the end of the century (Strauss, et al. 2012). Additionally, this report addresses the concept that topographic vulnerability is an important consideration in making SLR projections. To incorporate topography into SLR we must transition from a global perspective on SLR to a discussion of relative SLR. Relative SLR accounts for geomorphological characteristics of the coastline affected by SLR. How the coastline is shaped, its elevation, and its erosion and accretion rates affect the intensity of SLR impacts. An area with low elevation and high erosion rates will be impacted more intensely than an area of higher elevation whose coast is accreting. Since coastlines vary significantly, a local understanding of the coast is necessary to create applicable policies.

In the United States, some areas can expect to see an increase of more than 2.5m in their current mean high tide levels (Strauss, et al. 2012). Vulnerable areas, as illustrated by Figure 2.1, are determined based on the current mean high water mark. Along the East Coast, the current high tide levels hover between .1m and 1 meter. This tidal elevation may seem insignificant, but when it is coupled with the low elevation of the region it amounts to a large flow of water inland. In Maine, the mean tidal elevation mimics that of the West Coast of the United States. The West Coast currently has high tide levels ranging from 1m to 2.1m as depicted by the map An additional rise of 2.5m in the current



high tide levels means some areas in the United States would experience a total high tide level of 5m (Titus and Richman 2001).

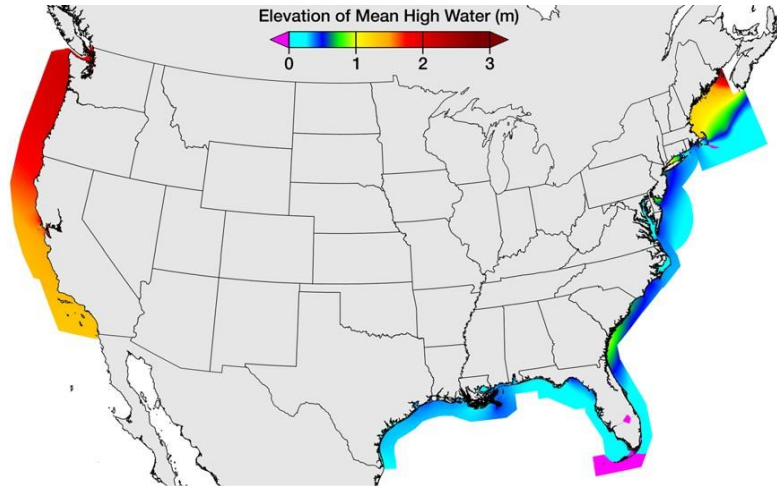


Figure 2.1: Tidally adjusted estimates of topographic vulnerability to sea level rise and flooding for the contiguous U.S. (Strauss et al 2012, 5)

Strauss et al. (2012) examined the population and associated housing quantities that lie under a certain tidal level. Their report also addressed the land area that will be inundated with various tidal levels up to 6m. Figure 2.2 shows the population of coastal counties in the United States that lie less than 1m above the mean high tide mark.

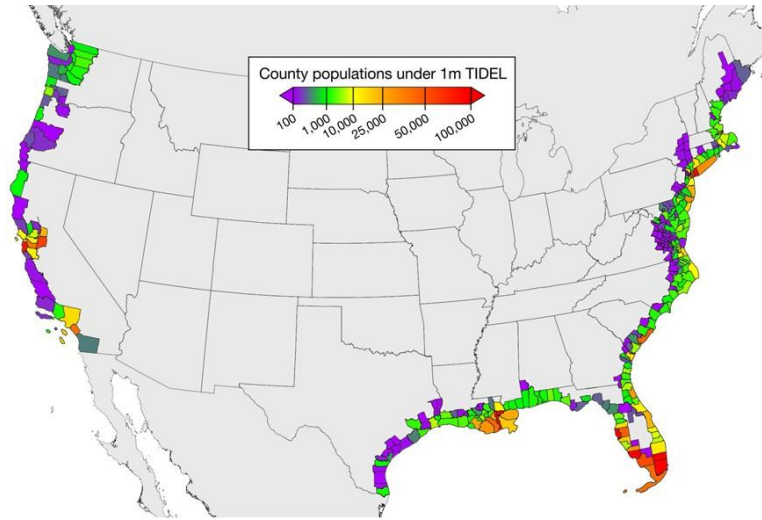


Figure 2.2: County populations (or Census county equivalents) living on land less than 1 m above local Mean High Water high tide lines (under 1 m TIDEL). (Strauss et al 2012, 5)

Table 2.2 and table 2.3 depict the total land area, population, and housing units located below various tidal marks up to 6m. The tables have been edited to only show the southern portion of the East Coast, which has a substantial amount of coastal development. Table 2.2 illustrates total land area that falls below each tidal level. Large amounts of land, including wetlands and estuarine habitat, will be lost with increasing sea levels. These habitats are vital to the productivity of many ecosystems, and their loss would also greatly impact anthropocentric systems. Table 2.3 illustrates the number of housing units that lie below the various tidal levels. If there is more than a .1m increase in sea level along this stretch of coastline, thousands of homes will be inundated and many people will be displaced.

Total land area (km <sup>2</sup> ) below various TIDEL thresholds							
State	<0 m	<1 m	<2 m	<3 m	<4 m	<5 m	<6 m
North Carolina	932	4575	6605	8400	10 271	11 752	12 790
South Carolina	252	1176	2197	2931	4018	5513	6955
Georgia	269	711	1537	2277	3323	4525	4900
Florida	476	5715	12 454	21 166	28 289	34 387	40 821
Alabama	10	358	796	1112	1302	1507	1702
Mississippi	22	125	357	629	822	1101	1346
Louisiana	4650	13 510	16 570	18 882	21 062	23 164	25 015
Texas	69	711	4220	6551	8285	10 612	12 729
Contiguous U.S.	8837	31 827	52 906	73 518	91 830	110	126941

Table 2.2: Total land area below various TIDEL thresholds (Strauss et al. 2012, 9)

Coastal state housing units on land below various TIDEL thresholds.							
State	<0 m	<1 m	<2 m	<3 m	<4 m	<5 m	<6 m
North Carolina	5136	43 102	104	157	199	232	266
South Carolina	11	42 610	111	158	211	269	330
Georgia	2356	15 685	45 513	76 705	117	156	172
Florida	44	894	1945	2932	3535	4242	4861
Alabama	1021	4986	15 818	28 372	40 142	47 301	57 435
Mississippi	317	3077	11 274	24 433	38 527	56 931	74 919
Louisiana	270	413	539	629	714	790	855
Texas	809	12 513	103	172	234	321	407
Contiguous U.S.	482	1946	3999	6102	7697	9456	11 057

Table 2.3: Coastal state housing units below various TIDEL thresholds (Strauss et al 2012, 10)

Using this information, inundation scenarios were created for various SLR projections. Analysis of the research data showed that nearly 32,000km<sup>2</sup> of the coastal contiguous U.S. is less than 1m above the high tide line (Strauss, et al. 2012). More significant than land area alone is that this 32,000km<sup>2</sup> is the location for 1.9 million housing units and 3.7 million people (Strauss, et al. 2012). 9,000km<sup>2</sup> of dry land will become wetland (Strauss, et al. 2012). This means that the remaining 23,000km<sup>2</sup> was already vulnerable wetland area, and from an environmental and hazards perspective, it never should have been developed (Beatley, Brower and Schwab 2002).

Scientists are also researching SLR and how it effects erosion (Feagin, Sherman and Grant 2005). Erosion is a more socially and politically accepted hazard because it is a familiar concept and the research is extensive, with academic consensus. As a result, most communities initially prioritize more politically feasible issues rather than SLR (Beatley 2009). However, over the past ten years, communities began to address SLR impacts and it has become more socially and politically palatable, despite its data inconsistencies.

## Erosion

Despite the political and scientific disputes about SLR, connections have been made linking it to coastal erosion. The effects of erosion can be seen immediately and concretely, while SLR is a bit harder to conceptualize because it overlaps with many other variables. Erosion is a major issue in coastal regions with about 70% of the world's sandy beaches experiencing erosion (Bird 1985).

“Erosion as a stand-alone term is defined as the removal of rock debris by an energy such as moving water, wind, or glaciers; the sculpting or wearing down of the land by erosional agents,” (Marsh 2010, 487). Erosion in the context of coastal areas has a slightly different interpretation. In coastal areas, erosion is often discussed in terms of shoreline retreat, which is the landward displacement of the shoreline (Marsh 2010). To understand the concept of shoreline retreat, the dynamic geomorphological functions of the beach must be understood.

Beaches are locations in which water processes and land processes interact. Interactions of these processes create a dynamic constantly changing landscape (Marsh 2010). The beach can be divided into three sections the inshore, shore, and backshore (figure 2.3). The inshore is primarily under water and only visible during times of low tide. This section of the beach has direct interaction with the ocean on a constant basis. The shore contains berms and the beach scarp, and is the section of the beach most people refer to when they talk about the beach. This is also the region that loses sediment

during the process of shoreline retreat. The backshore consists of the dune system. The beginning of the dune system is typically marked by a vegetation line.

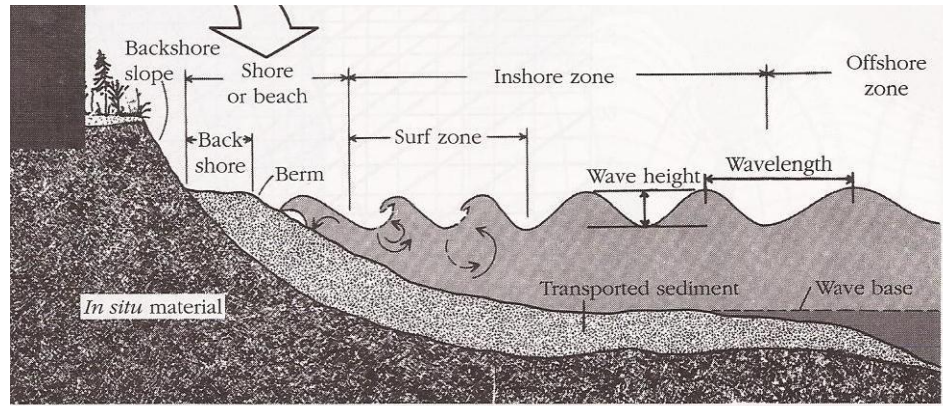


Figure 2.3: Beach Components (March 2010, 321)

The beach is not a stationary system as suggested at in the beginning of this section. Depending on the location of a beach along the coast, it can be labeled a gaining or losing beach (Pilkey et a. 2011). This means the beach is either accreting sediment and moving seaward or eroding away and retreating landward. Retreating beaches are the most concerning of the two because land is being lost.

Beaches naturally migrate, and in the absence of development a retreating beach will shift landward (Pilkey et a. 2011). The dunes will migrate, making room for the foreshore to expand landward and maintain a similarly sized beach area. In this way, retreat is a natural and necessary process for beaches driven by multiple factors. Two of those factors are sea levels and wind. The remainder of this section will focus on the relationship between sea level and erosion. Zeqi Zhang is a researcher who studies the relationships between coastal erosion and rising sea levels. In 2004, Zhang and his

colleagues examined the relationship between SLR and coastal erosion for several cities on the eastern coast of the United States. The study was based on the use of the Bruun theory applied to a real world scenario, and revealed that SLR had a significant influence on coastal erosion (Zhang, Douglas and Leatherman 2004). The Bruun theory states that assuming a profile of equilibrium, as sea level rises the beach shall retreat landward (Schwartz 1967). Figure 2.4 depicts the Bruun theory.

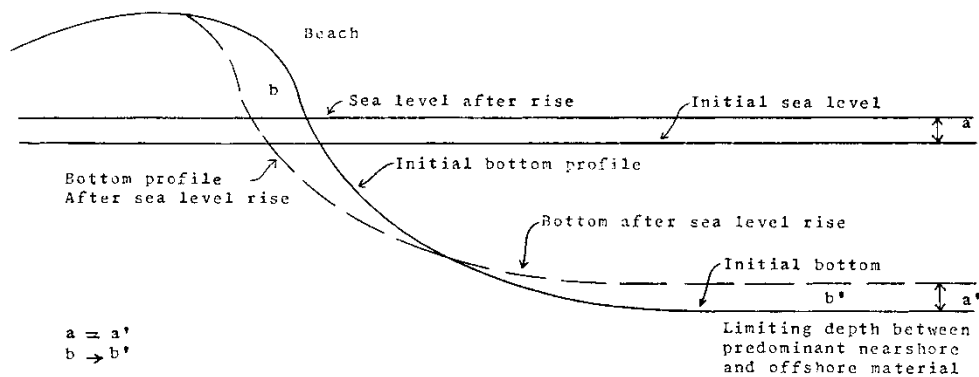


Figure 2.4: The Bruun theory of Sea-Level Rise as a Cause of Shore Erosion. (Schwartz 1967, 77)

While sea level rise and erosion are visible occurrences, there is another less visible hazard that is directly influenced by SLR (Barlow and Reichard 2010). Salt water intrusion, which threatens freshwater supplies in coastal regions, is expected to be made worse by rising sea levels (Barlow and Reichard 2010). As the beaches retreat, the salty oceanic waters migrate closer to the fresh water aquifers, increasing the rate that salt water intrudes (Chang, et al. 2011).

## Saltwater Intrusion

In coastal areas there is a heavy reliance on groundwater aquifers as a source of fresh water. Such a heavy reliance on these aquifers has decreased their productivity. When coastal aquifers don't adequately recharge themselves, the risk of saltwater intrusion rises. Saltwater intrusion is the process of salt water contaminating fresh water aquifers (Barlow and Reichard 2010). This is a gradual process, but the results can be devastating. There are several factors that affect saltwater intrusion; withdrawal and recharge rates of the aquifer, distance between discharge sites, sea level, etc. (Barlow and Reichard 2010). The focus of this section is sea level.

The relationship between sea level and saltwater intrusion is complex. Even though this section is addressing sea level as a factor in saltwater intrusion, there are others and this cause is affected by the others (Barlow and Reichard 2010). Rising sea levels has made this issue more of a concern. With SLR, the rate of intrusion will increase, and coupled with the heavy reliance on the coastal aquifers, fresh water volumes will be diminished. Figure 2.5 below depicts the relationship between sea level and saltwater intrusion. Salt water is denser than fresh water and presses against it (Chang, et al. 2011). When sea levels rise, the balance is upset and the salt water mixes with the fresh water in the aquifer. Image B in figure 2.5 shows the change in amount of salt water in the aquifer and image C shows the amount of salt water present after the ground water table has adjusted (Chang, et al. 2011).



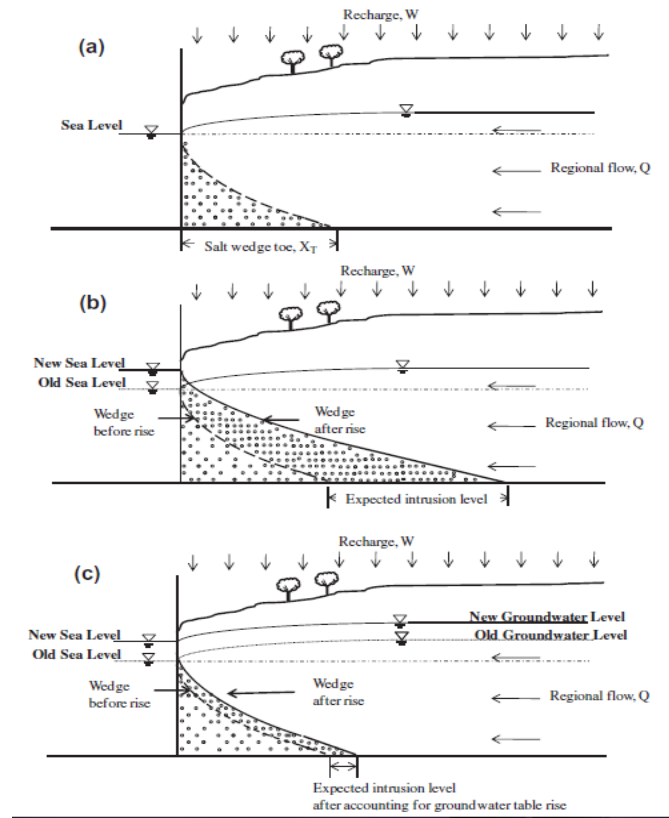


Figure 2.5: Saltwater Intrusion Diagram (Chang et al. 2011, 1285)

Saltwater intrusion is a serious hazard that affects coastal communities across the United States. This issue will only be exacerbated by SLR. Like other hazards, the amount of damage is not certain and it is difficult to plan for uncertainty. Saltwater intrusion is a hazard that should be addressed in plans, since it is affecting a 43 out of the 50 states in the U.S. (Barlow and Reichard 2010).

Hazards create a threat that should be addressed in local planning processes and development policies. Communities have the capacity to influence their relative vulnerability by altering their policies which are represented in planning documents. In

order to increase this capacity a community must be aware of what causes them to be vulnerable and to what extent. There is growing consensus that SLR is a serious threat to coastal regions. Presently, a sense of uncertainty exists within coastal communities about SLR and its impacts (Tibbetts 2009). There is a need for policies that better address the social, ecological, and economic vulnerabilities to coastal hazards, particularly SLR (Beatley 2009; Godschalk 2003; Godschalk et al. 2000). This thesis attempts to develop a method in which planning practitioners can measure the extent to which they identify vulnerabilities to coastal hazards and address them using policy embedded in their planning documents.

## CHAPTER THREE

### VULNERABILITY

Erosion and SLR have prompted coastal states and local coastal municipalities into action. With the influx of people moving to coastal regions, it is imperative that coastal communities be able to absorb the increase in population without making themselves more vulnerable to the negative effects of SLR and other hazards (Godshalk 2003). Most coastal states have coastal management plans and many coastal municipalities within those states have adopted their own management plans that can be more stringent than the state's mandate (Hershman, et al. 1999). The creation of plans is one way that coastal states and coastal communities are being proactive in dealing with sea level rise and erosion (Beatley, Brower and Schwab 2002). The purpose of the plans is to decrease the vulnerability and increase the adaptive capacity and resiliency of coastal communities (Godshalk 2003). Vulnerability can be described in terms of social, economic and environmental variables that contribute to an area's susceptibility to loss during from hazardous events (Beatley 2009). In some contexts, it is defined as an area's or a population's exposure and sensitivity to a hazard (Blanco and Alberti 2009). Exposure is determined by the duration of the hazard; for example, a hurricane passes through an area and causes flooding. The flood may last for weeks after the hurricane has dissipated. Therefore, the exposure to the flood is longer than the exposure to the hurricane event that caused it. Sensitivity is then determined by the area or population's ability to absorb the effects of the hazard (Blanco and Alberti 2009).

Figure 5 illustrates the relationships between vulnerability and resilience.

Vulnerability is a function of exposure and sensitivity. This means that as exposure increases so does sensitivity, and as a result, vulnerability increases. Resiliency, based on this image, can be described as having an inverse relationship to vulnerability. If resiliency increases, exposure and sensitivity must decrease, this means that vulnerability is decreasing.

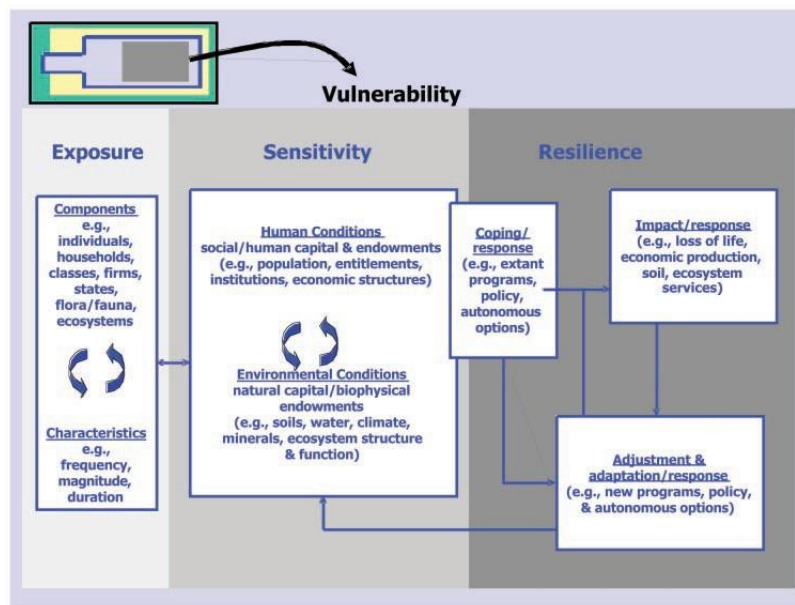


Figure 3.1: Components of vulnerability framework. (Turner et al. 2003, 8077)

Factors other than geographical location affect the vulnerability of an area. For this reason, some are more vulnerable than others. Factors that may increase vulnerability include population and population density, elevation, development density, social characteristics, local and regional economy, and infrastructure location (Godshalk, Norton, et al. 2000). These factors contribute directly to an area's adaptive capacity, defined as its ability to respond to stresses as a result of climate change effects and as a

function of behavior, resources, and technologies (Gallopín 2006). Adaptive capacity can be seen as a function of resiliency. If a region has a high adaptive capacity then in theory the region also has a substantial level of resiliency.

Adaptive capacity is often depicted as a cycle and refers to the social component of adaptation (Armitage 2005). When an area experiences a hazardous event, a community with significant adaptive capacity not only recovers, but recovers to a higher level of functioning. Adaptive capacity relies on the ability of a community to learn and adapt despite uncertainty (Armitage 2005).

Vulnerability to coastal hazards is a key component in the overall resiliency of a coastal community (Folke 2006). The more vulnerable a community is to hazards, the greater the need to incorporate policies that address those hazards, identify susceptible populations, and reduce future exposure (Administration 2010). Incorporating policies that decrease vulnerability into plans is one step toward increasing the resiliency of a community. Coastal communities must fully understand the implications of growth within hazardous coastal regions and plan accordingly. Planning for resiliency is intended to encourage communities to be proactive in addressing hazards that affect them and in determining how to reduce their vulnerability to them, ultimately increasing resiliency.

## CHAPTER FOUR

### RESILIENCY

Resiliency can be defined and interpreted in many ways. As a result of this, some of its initial meaning is being lost. Holling (1973) first used the term in the context of ecology; namely, it means the ability of a system to absorb change and still persist. The term quickly began to influence other fields (Folke 2006). These fields included anthropology, environmental psychology, cultural theory, human geography, and other social sciences (Folke 2006). The resilience concept used in this paper is the social-ecological approach embraced by the geography field. This approach is a spin-off of Holling's (1973) definition of ecological resilience. Social-ecological resilience acknowledges that social and ecological systems are highly integrated. Most social systems are highly dependent on understanding the ecological systems in which they are found. Coastal communities and coastal regions are the focus of social-ecological resilience in the paper.

Social-ecological resilience is defined by Carl Folke (2006) using three criteria:

- “1) the amount of disturbance a system can absorb and still remain within the same state or domain of attraction
- (2) the degree to which the system is capable of self-organization (versus lack of organization, or organization forced by external factors)
- (3) the degree to which the system can build and increase the capacity for learning and adaptation.” (Folke 2006, 259-260)

In the context of this thesis the term “system” in the three criteria can be replaced with coastal region. Spatially connecting the criteria with the coastal region establishes the types of systems being examined for resilience. A few social-ecological systems found in a coastal region include: beaches, estuaries, marshes, social networks, economic systems, infrastructure, and urban development. To look at each of these separately in terms of resilience would be to hold one thing as constant, and this is unrealistic since none of these systems are constant. Rather, they are constantly evolving and adapting for better or worse.

A theoretical example might look like this: a social network in a coastal region could be a fishing community, in which the economic system is tied to the social network. Neither the network nor its associated economic component can operate without the ecological system (estuaries or marshes) upon which they are founded. However, the ecological system may function in its own right, while the social system would collapse in its absence. An example of this is a fishing community that over fished, and as a result, had to relocate or adopt a new lifestyle while the fish population may recover with the absence of humans. Caveat: this is a general statement; there are many variables to consider when determining if the fish population will rebound.

In this example, the relationships between the social and ecological components of the system are heavily reliant upon each other. Therefore, analyzing them separately would result in inconclusive findings.

In most cases, it is reasonable to say that ecological systems are resilient on their own. Human activity is what disrupts natural systems, which is why understanding the human impacts on natural systems are so important. These include development along a beach or in marsh lands that prevents their migration, as well as over-fishing or drilling for oil in the oceans, and emitting CO<sub>2</sub> gasses that cause climate change (Small and Nicholls 2003). The effects of human activities have become more apparent over the years. For this reason, it is important to understand that the health and resilience of social systems depends on the health and resilience of natural systems.

In coastal regions, there has been a move towards understanding the dynamics between social systems (infrastructure, communities, government) and ecology systems (beaches, marshes, estuaries). Social-ecological resilience is a concept under which policies can be developed to promote resiliency in natural systems and human systems. These policies will serve as ways to mitigate the adverse effects on human systems on natural systems and vice versa. Policies that promote resiliency do the following: take a long-term approach; guide new development away from high risk areas; locate facilities out of and away from high risk areas; avoid high risk areas; plan ahead for resilient growth; promote a diverse economy; preserve and restore ecological infrastructure; decentralize infrastructure; and strengthen social networks.

Policies that promote resiliency can be categorized into three areas: ecological and land use policies, social policies, and economic policies. Despite these policies being categorized, they are interrelated and in many ways dependent on each other. Ecological



and land use policies address the physical development and natural processes. Ecological and land use policies that address resiliency include: hazardous area acquisition, conservation of natural systems, restoration of natural systems, shoreline protection using living shorelines, promotion of land use regulations that allow coastal wetland migration, limitation of hard structures to protect the shoreline, redevelopment restriction after a structure has been compromised due to the effects of erosion, encourage cluster development as an alternative to traditional development, and relocating critical facilities out of hazardous areas (Godschalk, et. al. 2000; Beatley 2009; Administration (NOAA) 2010). Social aspects of increasing resiliency include: increasing community awareness of hazards, promoting emotional and physical well-being, identifying vulnerable populations, encouraging stewardship of the environment, determining communities' adaptive capacity, and strengthening social networks (Beatley 2009; Godshalk 2003). Economic aspects of increasing resiliency include: promoting diverse economy, encouraging local production of goods, educating business owners about potential hazards, incentivizing sustainable and green business operations, and encourage relationships between businesses and the community (Beatley 2009). Some of the items that are ideal planning policies to increase resiliency can be costly at the time of implementation but in the long run they create a more resilient community with a higher adaptive capacity and a lower overall risk to hazards (Titus 2001).

The policies previously mentioned need to be used in conjunction with one another to effectively increase the resiliency of an area. Since the resilience of social and economic systems is highly dependent on the resilience of the natural systems, the policy

combinations need to address all three components rather than just one (Administration 2010). Combinations of resilience policies are necessary to achieve resiliency; the types of combinations will vary from state to state and city to city based on resources, political support and other factors (Brody 2003). The combinations should in some way address the issues mentioned throughout this paper. Resulting policies, if written properly, will be contextual, easily incorporated, and implementable for the state or community for which it was written (Godschalk, et. al. 2000).

This literature explains policies that are considered “best practices” for increasing resilience (Beatley 2009; Berke, Smith and Lyles 2012; Godshalk 2003; Administration(NOAA) 2010). The social-ecological approach to resilience is comprehensive and addresses all aspects of vulnerability in a coastal community. This comprehensiveness insures that all vulnerable aspects of the community will be addressed, increasing the long term viability of human and natural systems. The policies that are incorporated into coastal plans are influenced by federal laws, particularly the CZMA, which encouraged states to examine how they were managing their coastal resources. Part of managing coastal resources is developing policies that encourage responsible use of coastal resources and acknowledging the connections of the natural system and human systems in order to foster social-ecological resilience.

## CHAPTER FIVE

### COASTAL ZONE MANAGEMENT

Around the same time resilience was becoming a concept, the United States decided that coastal management was necessary to ensure the health and vitality of its coastal zone (Beatley, Brower and Schwab 2002). In 1972 the United States passed the Coastal Zone Management Act (CZMA). The purposes of this act are defined in the legislation, but can be stated in summation “as to preserve, protect, and enhance the coastal zone to ensure use and viability for future generations,” (Congress 1972, 3). The act also defined the context of coastal zone. The CZMA (1972) defines the coastal zone as:

“the coastal waters (including the lands therein and thereunder) and the adjacent shorelands (including the waters therein and thereunder), strongly influenced by each other and in proximity to the shorelines of the several coastal states, and includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches. The zone extends inland from the shorelines only to the extent necessary to control shorelands, the uses of which have a direct and significant impact on the coastal waters, and to control those geographical areas which are likely to be affected by or vulnerable to sea level rise. Excluded from the coastal zone are lands the use of which is by law subject solely to the discretion of or which is held in trust by the Federal Government, its officers or agents.” (4)

To achieve its purpose, the CZMA provides incentives for coastal states to create/develop coastal management programs (CMPs) (Congress 1972). Participation in the creation or development of a coastal management program is voluntary. The incentives provided by the Federal government are primarily grant-based (Congress 1972). States wanting to participate in the program have to develop a program and have it approved by Secretary of Commerce. Upon approval, the CMP for each state is applied to local level governing bodies. Unlike the CZMA, participation in the state CMP is not

optional for local governments (Beatley, Brower and Schwab 2002). Local governments can meet the requirements of the State CMP by incorporating coastal management policies into an element in the comprehensive plan, a hazard mitigation plan, a beachfront management plan (BMP), special area plan, and/or various other documents (Beatley, Brower and Schwab 2002). Although CMPs are voluntary, 34 of the 35 coastal states in the US have approved programs (NOAA 2012).

The CMPs are specific to state needs and when local municipalities develop their individual plans they become even more context specific. The role local governments play in the creation and implementation of their plans is affected by the type of structure of the state program. There are five options for power allocation and decision making authority in the state CMP structures: Direct, Direct/LCP, Networked, Networked/LCP, and Networked/Regulatory (Hershman, et al. 1999). Each of these program structures have unique regulatory characteristics that significantly effects plan creation and plan implementation.

1. “Direct: The Direct structure is regulated by a single state agency.” (Hershman et al. 1999, 134) In this type of structure all local governments report to a single designated state agency to have plans approved and implemented. Under this structure local governments have no regulatory power in how the plans are implemented. This structure can be ineffective if the state agency doesn’t have the proper resources to collect the necessary data for all the coastal municipalities so appropriate policies can be created. The resulting plan from this type of structure is general and broad in scope and for this reason most communities find the policies in the plans don’t fit their context.
2. “Direct/LCP: The Direct/LCP structure is similar to the direct structure in that a single state agency regulates, but can delegate some regulatory power to local governments under a local coastal program (LCP).” (Hershman et al. 1999, 134) This structure gives local governments the opportunity to have an input on policies that will be incorporated into the state program. The resulting plan has more contexts but still lacks sufficient detail to be fully utilized by all communities in the coastal region of the state.
3. “Networked: This structure has a state agency that coordinates the activities of other state and local agencies that have regulatory power.” (Hershman et al. 1999, 134) This type of structure gives a substantial amount of power to the local government. This approach to coastal program

- management allows local agencies to interact with each other and develop policies that are appropriate for the region.
4. “Networked/LCP: This structure is the same as the Networked structure but it has an enforceable LCP attached to it.” (Hershman et al. 1999, 134) The LCP gives the local agencies the police power to enforce the regulations the state coordinates the agencies to develop.
  5. “Networked/Regulatory: This structure has a lead state agency that shares regulatory authority with other state agencies.” (Hershman et al. 1999, 134)

A second set of federal laws that guides planning for hazards in coastal communities is hazard mitigation planning. The Federal Emergency Management Agency (FEMA) is responsible for overseeing hazard mitigation planning under the Disaster Mitigation Act of 2000. This planning is intended to specifically address hazards that affect communities and encourage them to develop policies that mitigate long-term effects. In the context of coastal communities, the hazards discussed in Chapter Two should be addressed in a hazard mitigation plan. Hazard mitigation planning is beneficial to coastal communities because it gives them a tool to assess the historical and anticipated regional hazards and incentivizes them to identify ways to reduce their vulnerability. The combination of coastal management and hazard mitigation planning should enable a coastal community to sufficiently address hazards through policies that increase resilience.

## CHAPTER SIX

### HAZARD MITIGATION

Cities are increasing coastal resiliency through hazard mitigation (Godshalk 2003). Godschalk (2003) defines hazard mitigation as “any action taken to reduce or eliminate long term risk to people and property from hazards and their effects.” (Godschalk 2003, 176) FEMA describes hazard mitigation as the phase of emergency planning that breaks the cycle of damage reconstruction and repeated damage from disasters (Godshalk 2003). Hazard mitigation includes a variety of methods that work together to increase adaptive capacity and resiliency by being proactive rather than reactive. Avoiding hazardous areas, strengthening buildings and public facilities, controlling hazards, limiting public expenditures, and communicating the mitigation message are all a part of hazard mitigation. These methods are examples of adaptation measures. Adaptive measures come in three categories: engineering, retreat, and accommodation (Schwab, Eschelbach and Brower 2007).

The use of adaptive strategies guide policy making and the resulting policies can sometimes be controversial. Retreat is the most self-explanatory of the three concepts. The idea is to gradually time relocate homes, infrastructure, people, and facilities further inland (Godshalk 2003). The concept of retreat has several complications, one of which is finding a location to which to retreat, as cities along the coast are often already built out to their boundary. When there is nowhere to go, many cities find themselves turning to accommodation and engineering measure for solutions. Accommodation is the act of

adapting to the hazard while staying in place; a common example of this is to stilt houses in flood zones (Administration 2010).

Avoidance, conservation, and limiting public expenditures are strategies that fall under the retreat category (Administration 2010). Limiting public expenditures is a method used to decrease the attractiveness of developing in a hazardous area by not subsidizing public facilities in that location. Avoidance is simply the act of avoiding hazardous areas. Conservation is a method that can help protect the natural systems that provide protection for coastal development.

Strengthening buildings and facilities and controlling hazards fit into the adaptation category. These two ideas rely heavily on engineering to be successful. The engineering of natural systems is centered on shoreline stabilization, flood control, and the use of hard and soft structures to reduce the risks of hazards (Beatley, Brower and Schwab 2002). However, many cities are realizing some of the negative effects of engineering natural systems to control hazards. As a result many cities are turning to altering structures and infrastructure to accommodate the hazard. The temporary protection engineering solutions offer is insignificant to the long term damage it causes. It exacerbates erosion and increases disaster risk (Godshalk 2003).

Policies within the plan attempt to mitigate and adapt to the negative effects of population and development pressures in the coastal zone (Godshalk 2003). Some areas have been more successful with the creation and implementation of plans than others

(Baer 1997). Successful states and communities have increased their resiliency and decreased their vulnerability to coastal hazards (Brody and Highfield 2005).

Incorporating resiliency policies and concepts into coastal management programming and hazard mitigation planning enables communities to comprehensively address hazards. When done properly, coastal communities will have identified and addressed hazards that threaten the viability of social-ecological systems. If a community utilizes coastal management and hazard mitigation programming, they need a process to determine how well or effectively they addressed the needs of the community in terms of the hazards themselves, as well as how social-ecological systems are affected by them (Berke, Smith and Lyles 2012). Plan evaluation is an important planning procedure that allows policy and plan makers to evaluate the quality of their plans and how well they address coastal hazards (Berke, et al. 2006). Evaluating plans can reveal weaknesses and strengths of the plan as a whole as well as individual policies and their applicability to the community. This knowledge enables the community to modify and/or bolster their policy and planning approach to increasing resiliency to coastal hazards.



## CHAPTER SEVEN

### PLAN EVALUATION

Within the planning profession, the creation of plans is an essential task. This creation of plans sometimes follows a rational planning model and covers the development of goals, public involvement, as well as other aspects necessary to creating a plan. In the late 1960s and 1970s, planning professionals would evaluate plans based on the methods used to create the plan (Baer 1997). They used qualitative measures to determine plan quality. However, issues with this purely qualitative method arose and there was a move toward operationalizing qualitative measures used in evaluations. Planning practitioners and academics are continuing to test various operational methods for evaluating plans, as well as the kind of plan components and the planning processes that should be considered in the evaluation.

Plan evaluation is used to analyze various aspects of the planning process in terms of quality and/or effectiveness of the outcomes (Brody 2003). Evaluation can happen during several stages in the planning process. For the purpose of this thesis plan evaluation occurs after the plan has been developed and adopted; the purpose of this evaluation is to determine the quality of the plan. This helps identify whether the planning process was successful in addressing the issues and concerns of the community, and depending on the type of plan, the needs of the state (Berke, Smith and Lyles 2012).

Plan quality evaluation criteria have evolved since the late 1960s and 1970s, when the concept was being tested (Brody 2003). In 1997, William Baer identified five criteria

for evaluating plans. His criteria included; “plan assessment, plan testing and evaluation, plan critique, comparative research and professional evaluations, and evaluation of plan outcomes,” (Baer 1997, 330). Baer also based the content within these five criteria on who, when, and what identifiers to augment the evaluation process. The “who” component identifies who is conducting the evaluation and their relation to the plan (Baer 1997, 330). The “when” identifies the point in the planning process the evaluation is occurring (Baer 1997, 330). The “what” component identifies what aspect of the plan is being evaluated (Baer 1997, 330). Baer’s method has been modified since 1997. The five principles are still evident in some form but the new criteria attempts to provide more comprehensive and thorough the evaluation outcomes.

More recent plan quality evaluations have two components, with distinct criteria, internal quality and external quality. The criteria in each of these components will vary based on what is being evaluated in the plan. Berke, Smith, and Lyles (2012) have six principles they use to evaluate hazard mitigation plans. Principles one through four are internal plan aspects, five and six are external aspects. The four internal aspects are goal development, fact base, policies, and implementation (Berke, Smith and Lyles 2012). The two external aspects are recognition of inter-organizational coordination and participation (Berke, Smith and Lyles 2012).

Within these aspects, there are numerous evaluation criteria for plans. Berke et al. (2012) use eight principles to evaluate comprehensive plans. The first four principles focus on internal plan quality. They are the issues and vision statement, fact base, goals and policy framework, and plan proposals (Berke, et al. 2006). The external plan quality

principles are: encourage plan use, clarity in understanding the plan, account for the interdependency of actions, and participation (Berke, Smith and Lyles 2012). Each of these principles has their own set of criteria to be evaluated.

Berke and colleagues established two ranking systems for operationalizing criteria for plan evaluation. One method is a binary zero (0) to one (1) scale. A ranking of zero indicates the item/measure is not identified and one indicated the item/measure was identified in the plan (Berke, et al. 2006). For this method, instead of a yes or no qualitative response, the numbers zero (0) and one (1) are used so quantitative analysis can be performed. The second method is an ordinal zero (0) to two (2) scale. A ranking of zero (0) indicate an item/measure is not identified, a one (1) indicates the item/measure was identified but only in a general manner, a two (2) indicates the item/measure was identified in detail (Baer 1997). This method is widely accepted in the planning field as a legitimate way to operationalize qualitative planning evaluation measures (Berke, et al. 2006).

The development of a way to quantify plan quality has enabled planners to improve the quality of their plans by determining the areas that need improvement (Dalton and Burby 1994). The quality of the plan has a positive correlation with plan implementation. The higher quality the plan, the more it can be implemented (Laurian, Day, et al. 2004). Plan quality also addresses the relationship between the local agency and the state (Laurian et al. 2004). States require localities to plan and, in many cases, the state has mandated certain criteria that should be addressed or included in the plans (Dalton and Burby 1994).

Plan evaluation is an important component of the comprehensive planning process. The quality of the plan affects its implementation (Berke, Smith, and Lyles 2012; Laurian et al. 2004). So much time and money is put into creating plans, it is important the result be something from which the community can benefit. This evaluation method can be applied to other plans, because in theory the purposes of the plans have a similar purpose. Comprehensive plans balance the anticipated population's future needs with those of the current population (Burby 2003). Hazard mitigation plans and coastal management plans serve a similar purpose, the main difference being the heavy focus on relationships between natural systems and human systems (Administration 2010). In this sense, this comprehensive and general plan evaluation method can also be used to evaluate hazard mitigation plans and coastal management plans.

Plan evaluation allows planners and policy makers to evaluate the quality of their plans and address the strengths and weaknesses of the policies they created (Berke, et al. 2006). This makes plan evaluation an important part of the planning process. Plan evaluation is a valid methodology and will be used to test the incorporation of resiliency policies in South Carolina coastal plans. In order to determine if South Carolina coastal plans are incorporating resiliency policies a plan evaluation will be conducted.

Conducting a plan evaluation to determine if resiliency policies are incorporated to address coastal hazards will be the first step in determining if scientific and academic research is being utilized by policy and plan makers. This evaluation will also reveal the strengths and weaknesses in South Carolina's coastal programming and local government

planning approaches. This information is vital to determine how to approach planning for resiliency in the future.

The first step to accurately planning for a hazard is to determine which hazards are affecting the community. Chapter Two addresses five coastal hazards which are discussed in terms of their causes and effects on coastal communities. Chapters Three and Four address vulnerability to hazards generally and the types of policies that increase resiliency in light of those coastal hazards. Decreasing vulnerability to hazards in coastal communities is critical to the viability of social-ecological system in the future. Incorporating resiliency policies into plans is important because plans serve as guides and if policies are not promoting resiliency, it will never be achieved.

This thesis examines whether South Carolina (SC) coastal plans incorporate resiliency measures to manage coastal erosion, sea level rise (SLR), saltwater intrusion, storm surge, and flooding and their effects on social-ecological systems. The literature examined allows this question to be answered by providing context and showing the importance of fostering resiliency in coastal regions. South Carolina was selected as the case study because it is affected by all coastal hazards noted in the literature, among other reasons to be discussed in Chapters Eight and Nine. This research will help determine if best practices determined by planning and policy academics are being incorporated into plans developed by planning professionals in South Carolina, or whether there is a gap between policies labeled as best practices in academia and the types of policies being touted as best practices within the planning profession to increase resiliency.

## CHAPTER EIGHT

### SOUTH CAROLINA: REGIONAL BACKGROUND

The State of South Carolina is located on the eastern coast of the United States. It has a population of 4,727,723 (Census 2010). The coastal zone is comprised of eight counties with a combined coastal population of nearly 1.5 million people residing along the 2,876 miles of coast. Land uses along the nearly 3,000 miles of coast range from dense historical districts, modern planned unit developments on barrier islands, tourist destination beaches, protected wetlands, and everything in between. It is a diverse and unique landscape where the dynamics of nature and humanity must coexist. Strauss et al. (2012) lists South Carolina as one of the coastal states with one of the top ten most threatened coasts in the continental U.S. According to Strauss et al. (2012) 1176 sq. km of South Carolina's coastal zone and 42,610 housing units lie below 1m of the TIDEL threshold.

Counties and cities along South Carolina's coastal border economies are based heavily on tourism services, and manufacturing. The state has a significant manufacturing base so the coastal area is not unique in this way. It is the tourism oriented economy that drives many of the planning decisions, whether tourism is generated by historical districts full of culture and heritage or the beautiful beaches. Many cities in the South Carolina coastal areas also attract a significant retiree population. Planning for the diverse needs of the region is difficult, but when the needs of the population are at odds with the needs of the natural system, issues are bound to manifest.

South Carolina began its coastal management programming utilizing a “Direct” structure to comply with the 1972 Coastal Zone Management Act. A direct structure is regulated by a single state agency. In this type of structure all local governments report to a single designated state agency to have plans approved and implemented (Hershman, et al. 1999). Currently the regulating agency is the South Carolina Department of Environmental Control (SC DHEC). The division within this department that is responsible for coastal management programming is the Office of Ocean and Coastal Resources Management (OCRM). OCRM provides guidelines for managing coastal resources. The nearly 3,000 miles of coast are managed by an agency with three offices; Charleston, Beaufort, and Myrtle Beach. The Charleston office has the largest concentration of staff of the three. Nonetheless, these three offices are responsible for the entirety of the coast, which is very diverse economically, demographically, and geographically. Figure 8.1 depicts the coastal counties and the coastal zone of South Carolina.

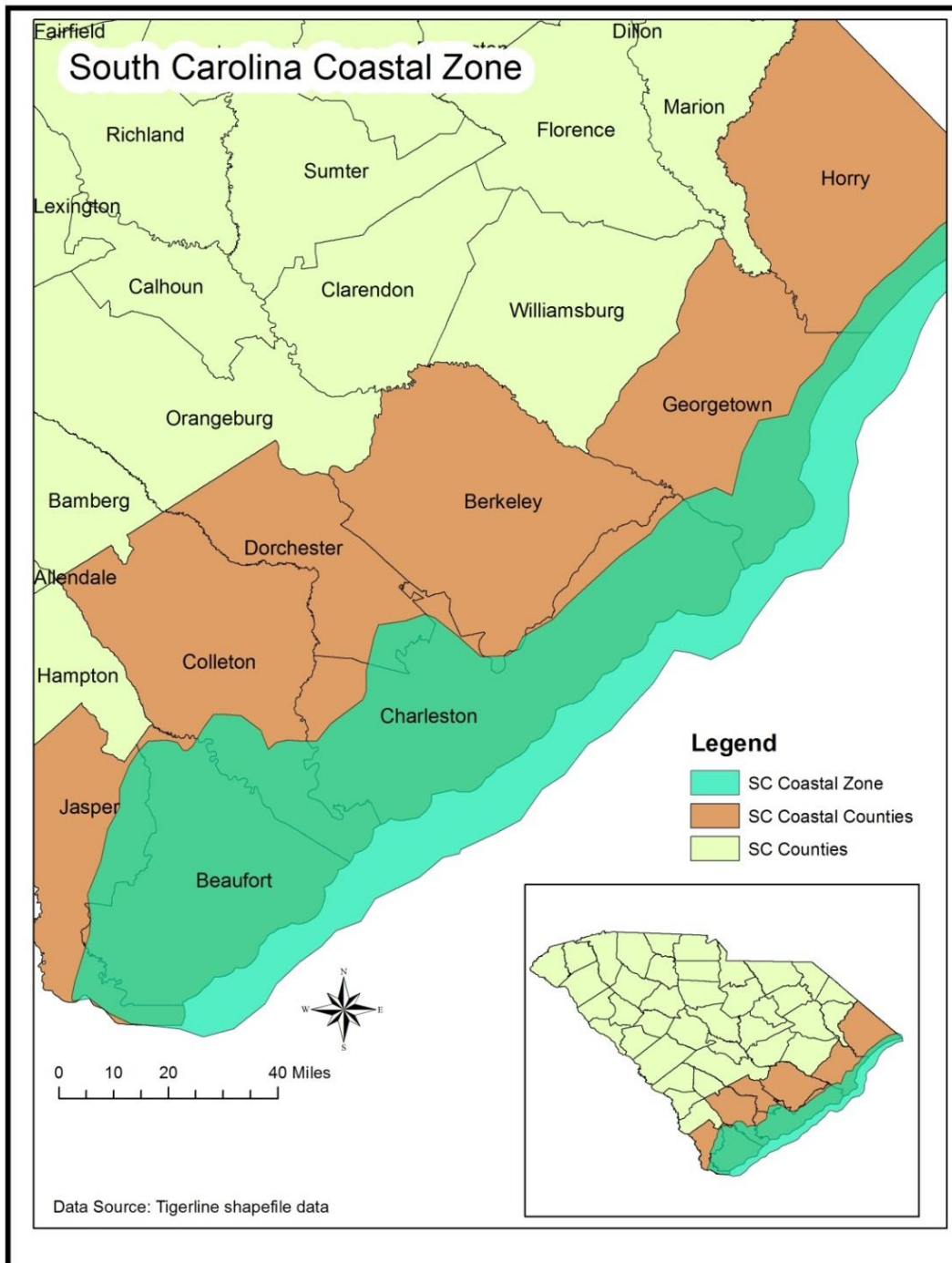


Figure 8.1: South Carolina Coastal Zone (Generated by: Felicia Boulware)



The four counties included in this research were Beaufort County, the second most southern of the coastal counties; Charleston County, the county having the most coastal frontage; Georgetown County; and Horry County, the northern most counties in the coastal zone. The reasoning that supports the selection of these case studies will be discussed in Chapter Nine.

Beaufort County has a population of 162,233 as of the 2010 census and is 923 sq. miles in size. The median household income is 54,085 dollars (Census 2010). The demographic composition of the county is 71.9% white, 19.3% black, and 8.8% other. A substantial amount of the area of Beaufort is water; in fact, 51% of the land area is tidally influenced. This means only 49 percent of the land contains habitable structures. The City of Beaufort and Hilton Head Island are the two case study cities from this county. The City of Beaufort has a population of 12,361 67.1% white, 25.7% black, and 1.8% other. The city has an area of 23 sq. miles and is riddled with inlet waterways as well as categorized as a wetland. Hilton Head Island has a population of 37,099, 82.9% white, 7.5% black, and 9.6% other (H. H. Staff 2012). The island has an area of 56 sq. miles. Hilton Head Island lives up to its name in that it is indeed an island, more specifically a barrier island.

The images below show the City of Beaufort and Hilton Head Island and their locations in Beaufort County. The map of the City of Beaufort clearly shows the relationship of the land areas to the inlet waterways. From this map, one can easily see

why the city is classified as a wetland. The map of Hilton Head shows clusters of development, as well as a river and some preserved areas.

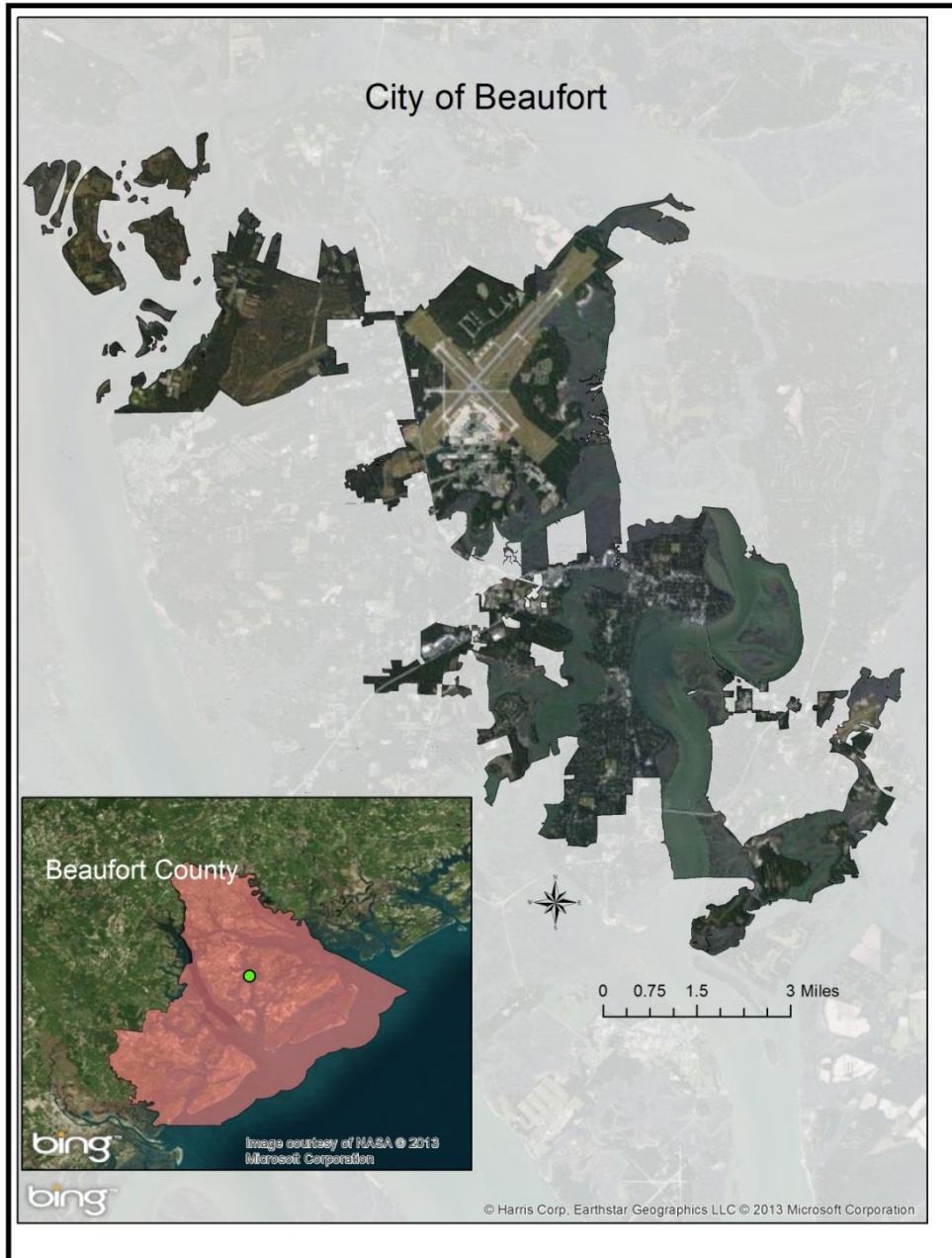


Figure 8.2: The City of Beaufort (Generated by: Felicia Boulware)



Figure 8.3: The Town of Hilton Head (Generated by: Felicia Boulware)

Charleston County has the longest oceanic border in South Carolina. Charleston County has a population of 350,209 and is 1,358 sq. miles in size. The demographic makeup of the county is roughly 61% white, 32% black, and 7% other (Census 2010). The median household income is 46,473dollars (Census 2010). The coast of the county is comprised of primarily of barrier islands and the remainder of the county is riddled with inlets and rivers similar to Beaufort County. Charleston County has implemented an urban growth boundary to guide growth and preserve vital areas of habitat (C. C. Staff 2008). The City of Charleston and Sullivan’s Island are both included in the growth boundary along with several other cities and towns. The City of Charleston spans 156.6 sq. miles and has a population of 122,689; the demographic make-up is 66.9% white, 29.4% black, and ~3% other (C. o. Staff 2010). A large size, coupled with a significant amount of historical development and infrastructure, presents a unique set of planning challenges for the City of Charleston (C. o. Staff 2010). Sullivan’s Island also grapples with unique planning challenges due to its geographic properties and its priority with in the county. Sullivan’s island has a population of 1,830 and the island is 3.3 sq. miles in size (S. I. Staff 2008). The unique planning aspect of Sullivan’s Island is that the summer population is more than 15 times the recorded census population (S. I. Staff 2008). During the summer time this 3 sq. mile island must accommodate the traffic and provide goods and services to upwards of 18 thousand people.

The images below show the City of Charleston and Sullivan’s Island and their locations in Charleston County. The map of The City of Charleston clearly shows the relationship between developed land areas to the inlet waterways. The map of Sullivan’s



Island shows dense development clustered on the ocean facing side of the island and a wetland environment on the land ward side.

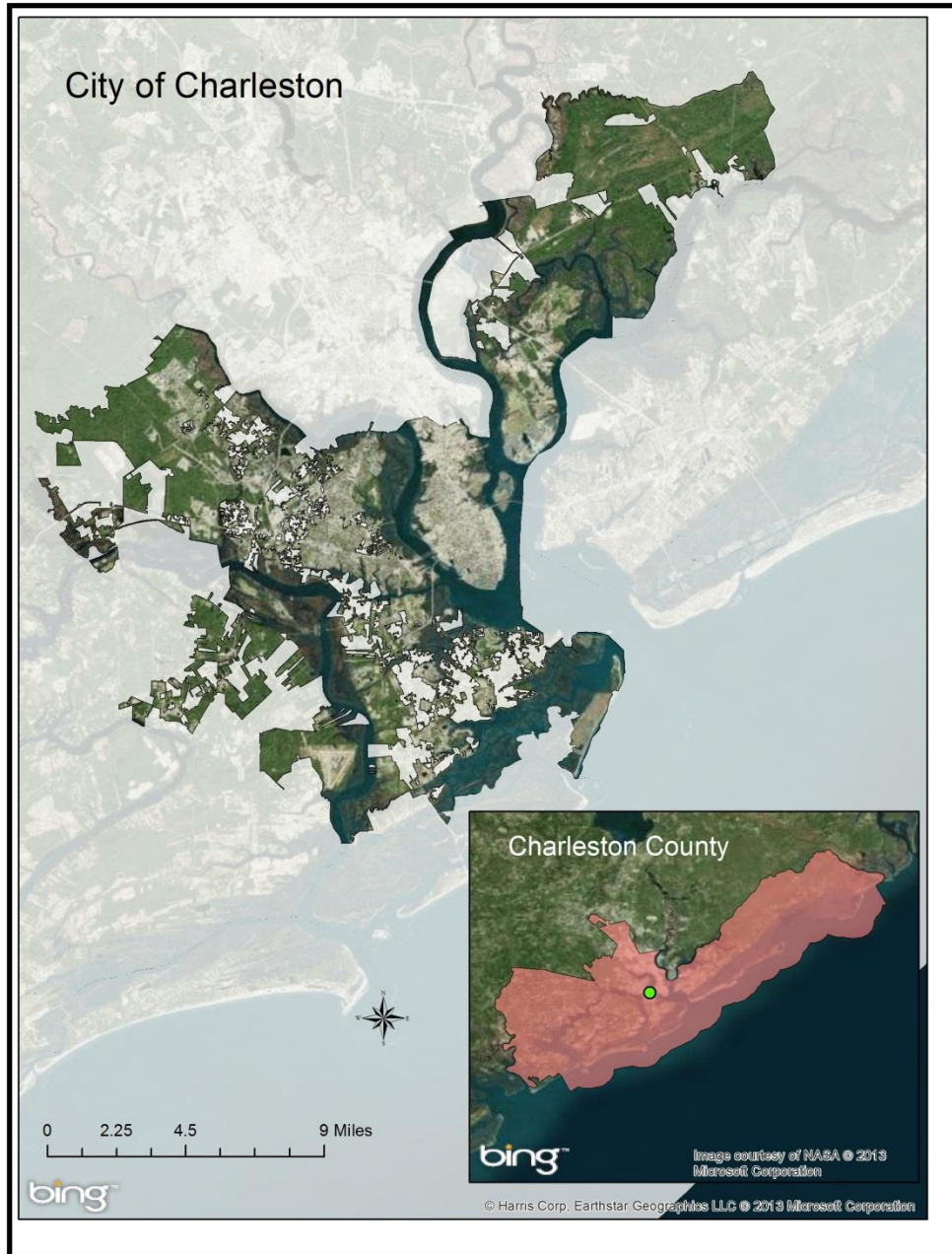


Figure 8.4: The City of Charleston (Generated by: Felicia Boulware)



Figure 8.5: The Town of Sullivan's Island (Generated by: Felicia Boulware)

Georgetown County has a population is of 60,158 with an area of 1,135 sq. miles (G. C. Staff 2009). The demographic make-up of the county is 63.2% white, 33.6% black, and 3.2% other (Census 2010). The median household income for the county is 37,679 dollars (Census, 2010). The County of Georgetown has a more defined coastline, unlike Beaufort County and Charleston County, which have primarily barrier islands and significant amounts of wetland and estuarine environments. There is one significant inlet area that gives the county its wetland environments. The City of Georgetown is located along the inlet waterway that passes though the county. The city's population is 9,163 with an area of 7.2 sq. miles; the demographic make-up is 56.7% white, 37.8% black, and 5.5% other (Census 2010). The median household income for the city is 17,914 (C. o. Staff 2011). Pawleys Island is a barrier island located in Georgetown County. The island has a population of 103 with an area of 640 acres stretching less than four miles. (Census 2010) The island is majority rental and like Sullivan's Island its summer population is several times greater than the census count (T. o. Staff 2011).

The images below show the locations of The City of Georgetown and Pawleys Island in Georgetown County. In the map of The City of Georgetown you can see the inlet waterway and its relationship to the land are of the city. The map of Pawleys Island shows how narrow the island really is as well as where the development is concentrated.



Figure 8.6: The City of Georgetown (Generated by: Felicia Boulware)





Figure 8.7: The Town of Pawleys Island (Generated by: Felicia Boulware)

Horry County has a population is of 269,291 with an area of 1,255 sq. miles (Census 2010). The demographic make-up of the county is 81.0% white, 14.9% black, and 4.1% other (Census 2010). The median household income for the county is 41,321 (Census 2010). Horry County has a defined coastline that consists of mainland beaches. The coastal cities in Horry County rely heavily on tourism, which is anchored by the presence of beaches (H. C. Staff 2008). The cities of North Myrtle Beach and Myrtle Beach make up a majority of the county's coastline and the City of North Myrtle Beach is located in the northern most portion of the county. The city's population is 13,824 with an area of 7.2 sq. miles (Census 2010). The demographic composition is 87.7% white, 3.2% black, and 9.2% other (Census 2010). North Myrtle Beach is tourism driven, but markets itself more towards retirees; Myrtle Beach serves as the major tourist attraction (M. B. Staff 2011). Myrtle Beach makes up the central portion of the county's coastline. The city has a population of 27,245 spread over an area of 16.8 sq. miles (M. B. Staff 2011). The demographic make-up of the city is 68.7% white, 13.7% black, and 17.6% other (M. B. Staff 2011). The city has dense development along the beach to accommodate the tourism oriented economy.

The images below show the locations of North Myrtle Beach and Myrtle Beach in Horry County. In the map of North Myrtle Beach you can see where the development is concentrated. The map of Myrtle Beach clearly shows the dense concentration of development along the coast.



Figure 8.8: The City of North Myrtle Beach (Generated by: Felicia Boulware)



Figure 8.9: The City of Myrtle Beach (Generated by: Felicia Boulware)

## CHAPTER NINE

### METHODOLOGY

The methodological process employed multiple steps to determine whether SC coastal plans are incorporating resiliency policies that address coastal hazards and vulnerabilities, such as the development of a resiliency policy matrix to evaluate plans, case study selection within SC, plan collection, and plan evaluation. This methodology is designed to be utilized by other coastal states and communities that want to assess their resilience incorporation in planning documents.

The first step to evaluate the presence of resiliency policies in coastal plans was to develop a matrix. Matrices are a standard method of evaluating plans in the planning profession as well as in academia (Berke et al. 2006; Baer 1997). The matrix for this particular evaluation is comprised of policies found to be and emphasized as best practices for fostering resiliency in coastal areas throughout the literature (see Appendix A). The matrix is a way to record the presence or absence of resiliency policies within plans and score them using an ordinal 0-2 scale and a nominal scale of 0 or 1 (see Tables 9.1 and 9.2). This scoring method is standard in the planning profession for evaluating plan quality (Berke et al. 2006). The matrix is set up in five categories, ecological, land use, social, economic, and ecological/land use. The first four are scored using the ordinal scale, and the fifth, ecological/land use, is scored using the nominal scale.

Nominal Score Breakdown	
1	Incorporated
0	Not incorporated

Table 9.1: Nominal Ranking

Ordinal Score Breakdown	
2	Well incorporated
1	Somewhat incorporated
0	Not incorporated

Table 9.2: Ordinal Ranking

Each category is weighted to account for 20% of the total number of points. After scoring is complete, the totals for each category are totaled together, giving each plan an overall ranking (see Table 9.3).

Category	Weight	Total Score	(Weight)(Total Score)
Ecological	0.2		
Land use	0.2		
Social	0.2		
Economic	0.2		
Ecological/Land use (nominal)	0.2		
		Rank	
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank.		Rounded Rank	

Table 9.3: Matrix Scoring

The overall rankings are based on Berke et al.'s (2009) classification for plan evaluations and are accepted throughout the planning profession as a standard for ranking. The possible rankings are “well incorporated” (2), “somewhat incorporated” (1),

or “not incorporated” (0). A “well incorporated” score means that policies in the plan are well defined and written in the context of the state, city, or community for which it is intended. A “somewhat incorporated” score means that policies in the plan are vaguely defined and/or not written in the context of the state, city, or community for which it is intended. A “not incorporated” score means that policies are either mentioned but not defined or incorporated into the plan, or are not mentioned or incorporated at all (see Table 9.4).

<b>Rank</b>	<b>Rank Definition</b>
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all.

Table 9.4: Matrix Ranking

By using this scoring and ranking method, categorical bias based on the number of questions and total possible points for each section is negated. This means that if the Ecological category has eight questions and the Economic section only has four, the four questions in the Economic category are equally as important as the eight in the Ecological category despite having a lower number. This is important because the social-ecological resilience literature does not prioritize categorical components. The concept of resiliency can't be accomplished by excelling in only one of the categories because that creates



weakness and vulnerability in the other areas. The literature emphasizes that a well-rounded approach to resiliency will outlast one-sided approaches because it addresses all of the social-ecological components of system (Godschalk 2000, Godschalk 2003, Beatley 2009, NOAA 2010). A strong economy is weak unless the ecological system is strong. For example, planning for a strong tourism based economy in an area that is not planning for the future effects of the severe storm surge and frequent flooding is not fostering resilience.

The second methodological step involved case study selection. The state of South Carolina (SC) was chosen because the coastline is ranked in the top ten of threatened, coastal zones in the continental U.S. (Strauss et al. 2012). Several primary hazards including erosion, saltwater intrusion, flooding, storm surge, and sea level rise, threaten social, ecological, and economic systems in SC coastal communities (Strauss et al. 2012; Tebaldi et al. 2012). Within the state, the focus is on four of the eight coastal counties that have the most beach frontage; Georgetown, Horry, Charleston, and Beaufort. These were selected because the greater volume of beach frontage increases hazard exposure and therefore increasing vulnerability (Turner and al. 2003). The literature suggests that the areas with the greatest amount of exposure are the most sensitive to the hazard and consequently should plan to reduce vulnerability (Blanco and Alberti 2009). From each of these four counties, two cities were selected with an attempt to capture variation in the features that contribute to resiliency. This involved selecting communities with different primary economic sectors, different coastal geomorphology, and different population sizes and densities. Since the selection of cases is not based on a random sample,



selection bias was introduced. However this bias is of little significance to the analysis outcomes because the results were not dependent on one another. If the analysis outcomes were dependent on each other, selection bias would significantly impact the interpretation of the analysis outcomes. Since each of the individual analysis outcomes did not depend on the outcome of any other plan, the bias exhibited in case study selection is not significant. This is a valid approach to case selection because it captures a variety of community types that are directly exposed and vulnerable to coastal hazards and theoretically captures the variety of ways communities approach planning for resiliency based on their size, geography, and economic base. This method of case study selection creates a representative sample of coastal communities in South Carolina because it captures the diversity of the region (Yin 2009). From this representative sample qualitative and quantitative analysis can be conducted to reveal characteristics about the region as a whole (Yin 2009).

The third step was to gather hazard mitigation plans, beach front management plans, and comprehensive plans that were available from the case study sites. All of these plan types were candidates for evaluation because theoretically, they should address the hazards that affect coastal communities in South Carolina. For Georgetown County, the City of Georgetown, and Pawleys Island there were three plans selected, including a hazard mitigation plan that covers all three, Pawleys Island Local Comprehensive Beachfront Management Plan (LCMP), and the City of Georgetown's Comprehensive Plan. For Horry County, Myrtle Beach, and North Myrtle Beach there were five plans; these were the Horry County Comprehensive Plan, Myrtle Beach Beachfront

Management Plan (BMP) and Comprehensive Plan, and North Myrtle Beach BMP and Hazard Mitigation Plan. For Charleston County, the City of Charleston, and Sullivan's Island there were three plans; these were the Charleston County Comprehensive Plan, the City of Charleston Comprehensive Plan, and Sullivan's Island Comprehensive plan. For Beaufort County, Hilton Head Island, and Beaufort there were four plans; these were a Hazard Mitigation plan that covers all three, Hilton Head Island Comprehensive Plan and BMP, and the City of Beaufort Comprehensive Plan.

The final step involved plan evaluation using the resiliency matrix. This evaluation resulted in each plan receiving a resiliency ranking. The results were compared across each case study to develop an overview of resiliency measures evident in SC coastal communities or the lack thereof. The plan evaluation answers the basic question of whether resiliency policies are incorporated into coastal plans in South Carolina, as well as the extent to which they are incorporated. Further analysis shows how each plan compares to others in the state and reveals similarities in planning priorities.

## CHAPTER TEN

### PLAN EVALUATION ANALYSIS

The plan evaluation consistently rated the plans as “not incorporated.” (See Table 10.1), which is an incorporation level of 0 (see Appendix B for full plan evaluations).

Place	Plan Type	Year	Ranking
State of South Carolina	BMP	1992	0.12
Georgetown County	HM	2009	0.10
City of Georgetown	Comp	2011	0.04
Pawleys Island	LCBMP	2011	0.19
Horry County	Comp	2008	0.06
Myrtle Beach	BMP	1992	0.23
Myrtle Beach	Comp	2011	0.21
North Myrtle Beach	BMP	1992	0.20
North Myrtle Beach	HM	2010	0.37
Beaufort County	HM	2009	0.10
Hilton Head Island	BMP	2008	0.22
Hilton Head Island	Comp	2012	0.10
City of Beaufort	Comp	2009	0.12
Charleston County	Comp	2008	0.03
City of Charleston	Comp	2010	0.01
Sullivan's Island	Comp	2009	0.01

Table 10.1: Plan Resiliency Incorporation Ranking  
(BMP; beachfront management plan, HM: hazard mitigation plan, Comp: Comprehensive plan)

In a broad and general sense, the results of the plan evaluations show a need for resiliency measures to be included in all plans in coastal regions. Since no plan type showed a significantly higher incorporation ranking the assumption can be made that, in general, all plans in need to better incorporate resiliency. This assumption reflects ideas presented in the literature surrounding the need to plan for resiliency, as well as to

develop more applicable and implementable plans that address social, ecological, and economic needs of coastal communities (Beatley 2009, Berke et al. 2012, Burby 2003, Godschalk 2003, Folke 2006). When speaking of SC specifically, the low rankings show the need for the state to improve its approach to planning for coastal hazards. There are a number of reasons that could explain why they received this” not incorporated” score. These factors include, but are not limited to: the political climate of the state and local governments, the state’s coastal program structure, and the local governments’ planning priorities.

The political climate of South Carolina can be described as unsettled in regards to sea level rise (SLR), including its causes and whether it is a serious threat (Fretwell 2013). Even though there is significant evidence that it is occurring, there is no true consensus on the rate at which it is occurring, and what is causing it. Despite this information, the current political stance on SLR is that it is not a serious issue and there is no need to spend millions of dollars planning for it (Tibbetts 2009, Schulman 2013). Despite some political movement on the issue, there is not enough positive momentum to influence state policy and legislation (Polefka 2013). This unwillingness to acknowledge and incorporate SLR into existing plans is in part explained by the inability to prepare for an unknown measure of harm, as described by Gallopin (2006). Since science has been inconsistent with regard to SLR projections, the state may not know how to proceed and instead, chooses to do nothing until more concrete evidence manifests (Strauss, et al. 2012).

The political climate in SC greatly influences the type of coastal planning that occurs in the state. SC's direct coastal programming structure gives one agency the responsibility to guide planning efforts for a very diverse coastline. This results in overly generalized policies that lack context for individual municipalities (Administration 2010). Since these policies are also politically influenced, if the state doesn't acknowledge particular hazards, then it is difficult for the local governments to do so effectively even if they are directly affected (Tibbetts 2009). Funding for coastal programming comes from a variety of sources, including the state. If a local government wants to address hazards and issues that don't have political support at the state level (and are not covered by the state plan), then funding may not be available for that effort. Instead, the local government will have to find alternative sources of funding or abandon their efforts. Additionally, planning priorities vary at the local level and may affect the ability of the area to effectively plan for the uncertainty of SLR and associated impacts.

Local economic drivers, social networks, and politics heavily influence the types of policies that are acceptable in the coastal region and how they are prioritized. Many of the coastal communities in South Carolina have tourism economies that are based on the presence of beaches and wetland environments (Council 1992). The area has significant historical and cultural importance in the Southeast, with both the historic City of Charleston and Beaufort County's Gullah culture that attract tourists (C. C. Staff 2008, C. o. Staff 2010, C. o. Staff 2009). The social networks in the region are diverse. They range from the previously mentioned Gullah culture, which has been in place for hundreds of years, to seasonal tourist populations, which are only present for a few months during the

year. The local political stance on SLR varies, but there is generally more acknowledgement of the issue than at the state level (T. o. Staff 2011, H. H. Staff 2012, B. C. Staff 2009). This acknowledgement is providing the positive momentum on the state level. Local governments may have the same issue with planning for an unknown measure of harm with which the state is concerned. Perhaps they accept SLR as a threat and acknowledge that something must be done but they don't know what will be sufficient (Gallopín 2006). This may result in any of the following outcomes: local governments planning insufficiently, attempting to plan but not being able to find funding, or no action at all. When planning attempts are made, they may be pushed aside by more pressing concerns that require immediate attention (C. C. Staff 2008, C. o. Staff 2011).

All of the issues and concerns mentioned above affected how the plans were written and thus determined the outcomes of the plan evaluations. Despite the low rankings received by all the plans, there are still important patterns and areas of emphasis that emerge from further analysis of the plan evaluation outcomes. However, this analysis reveals weaknesses in how SC approaches planning for the coastal zone and whether resiliency policies were addressed at all. From this analysis, recommendations can be made about how SC should modify their approach to improve resiliency in their plans.

## Overall Ranking Analysis

Despite the fact that all of the plans received an overall ranking of “not incorporated,” additional analysis was conducted to examine variation among the plans and between resilience categories. Table 10.2 shows how each plan scored in the five resiliency categories.

Place	Plan Type	Year	Land Use	Ecological	Economic	Social	Ecological /Land Use (nominal)	Ranking
State of South Caroli	BFM	1992	0.02	0.05	0.00	0.03	0.03	0.12
Georgetown County	HM	2009	0.01	0.04	0.00	0.05	0.00	0.10
City of Georgetown	Comp	2011	0.02	0.02	0.00	0.00	0.00	0.04
Pawleys Island	LCBFM	2011	0.04	0.06	0.00	0.00	0.09	0.19
Horry County	Comp	2008	0.00	0.06	0.00	0.00	0.00	0.06
Myrtle Beach	BFM	1992	0.10	0.04	0.00	0.00	0.09	0.23
Myrtle Beach	Comp	2011	0.01	0.07	0.03	0.10	0.00	0.21
North Myrtle Beach	BFM	1992	0.08	0.05	0.00	0.01	0.06	0.20
North Myrtle Beach	HM	2010	0.10	0.20	0.00	0.01	0.06	0.37
Beaufort County	HM	2009	0.00	0.09	0.00	0.01	0.00	0.10
Hilton Head Island	BFM	2008	0.05	0.06	0.00	0.00	0.11	0.22
Hilton Head Island	Comp	2012	0.00	0.02	0.02	0.06	0.00	0.10
City of Beaufort	Comp	2009	0.05	0.07	0.00	0.01	0.03	0.12
Charleston County	Comp	2008	0.00	0.03	0.00	0.00	0.00	0.03
City of Charleston	Comp	2010	0.00	0.01	0.00	0.00	0.00	0.01
Sullivans Island	Comp	2009	0.01	0.00	0.00	0.00	0.00	0.01

Table 10.2: Detailed Plan Evaluation Outcomes

There are two criteria that may have influenced overall plan ranking. These are plan type and year adopted. The year the plan was adopted was assumed to be significant, given the fact that more recent plans should reflect the availability of more recent and updated research. This initial assumption proved inconclusive. Instead, the only year that is significant for the scope of this research is the year the state Beachfront Management plan was adopted.

The date of the state plan is significant because this plan guides coastal planning and determines which coastal issues must be addressed in local beachfront management plans. The fact that coastal planning in the state is being guided by policies and information more than 20 years old has a significant influence on the capacity for a local government to incorporate resiliency policies into recent plans. In 2010, SC recognized the need to improve coastal planning, and thus update the Beachfront Management Plan from 1992. The South Carolina Department of Health and Environmental Control (SCDHEC) developed a committee (Blue Ribbon Committee on Shoreline Management) to provide recommendations on how to improve planning for beaches and estuarine shorelines (William et al. 2013). As of February 2013, they provided SCDHEC with a set of recommendations for how to improve beachfront management in SC, which are still awaiting final approval from the DHEC Board. The recommendations in this document are mainly related to erosion. In this way, the recommendations, if accepted, will not add much to the overall resiliency of the SC BMP or encourage more resilient policies since it focuses on only one aspect of resiliency.

The second criteria that could influence plan rankings is the type of plan. There are three types of plans among the plans evaluated, including comprehensive, beachfront management, and hazard mitigation. There were no assumptions made about which type of plan would incorporate more resiliency policies. Comprehensive plans are general documents that provide guidance for growth, how and where it should or is expected to occur (C. o. Staff 2009). The concept of a hazard mitigation plan is that all hazards for the area are addressed, vulnerable ecological and social systems are identified, and



appropriate implementation measures are stated (Berke, Smith and Lyles 2012). The purpose of a beachfront management plan is to manage the beachfront; this entails addressing a variety of issues and variables, as well as fulfills SC’s Coastal Management Program requirements (Council 1992). The type of plan and the origin of the plan proved to be insignificant, both qualitatively and quantitatively, in terms of how plans scored in the five resiliency categories and how they ranked overall. Tables 10.3 and 10.4 show plan rankings and the combinations of the rankings based on plan origin and type.

Plan	Ranking
SC BMP	0.12
Georgetown County HM	0.10
City of Georgetown Comp	0.04
Pawleys Island BMP	0.19
Horry County Comp	0.06
Myrtle Beach BMP	0.23
Myrtle Beach Comp	0.21
North Myrtle beach BMP	0.20
North Myrtle Beach HM	0.37
Charleston County Comp	0.10
City of Charleston Comp	0.22
Sullivan’s Island Comp	0.10
Beaufort County HM	0.12
Hilton Head Island Comp	0.03
Hilton Head Island BMP	0.01
City of Beaufort Comp	0.01

Table 10.3: Plan Ranking

State BMP	County	City	Barrier Island	Mainland	Hazard		BMP
					Comprehensive	Mitigation	
0.12	0.1	0.04	0.19	0.04	0.04	0.1	0.19
	0.06	0.19	0.1	0.23	0.06	0.37	0.23
	0.1	0.23	0.03	0.21	0.21	0.12	0.2
	0.12	0.21	0.01	0.2	0.1		0.01
		0.2		0.37	0.22		
		0.37		0.22	0.1		
		0.22		0.01	0.03		
		0.1			0.01		
		0.03					
		0.01					
		0.01					

Table 10.4: Various Groupings of Rankings Based on Plan Type and Origin

A Wilcoxon statistical test was chosen to determine if plans addressed resiliency differently based on type and origin. The Wilcoxon test is designed for small sample sizes that are not normally distributed. The test was run on the data in Table 10.4 and each test resulted in a p-value that was greater than alpha ( $\alpha$ ) = .05 at a 95% confidence interval (see Appendix C for complete results). The null hypotheses, which state that plans do not differ in the extent to which they address resiliency based on type and origin, can't be rejected, since the p-values were greater than .05. In each case, the result was a failure to reject the null. This means that there is no significant difference between plans based on type and origin that would suggest they are addressing resiliency differently from one another. The Wilcoxon test comparing county plans to city plans resulted in a p-value of .06. The Wilcoxon test comparing barrier island cities and mainland cities revealed that the geographic origin of the plan did not significantly influence the evaluation outcomes with a p-value of .06. A Wilcoxon test analysis also revealed that there is no significant difference between hazard mitigation plans and comprehensive

plans (p-value=.33) or beachfront management plans and hazard mitigation plans (p-value= 1). The Wilcoxon test also revealed there was no statistical difference between comprehensive plans and beachfront management plans yielding a p- value of .48.

The assumption that the type and origin of the plans would reveal a difference in the extent they incorporated resilience policies proved to be inconclusive. There are a number of reasons that the tests unanimously failed to reject the null hypotheses and determined that there was no difference in the extent to which the different types of plans from different origins addressed resilience policies. One of them could be the objectivity of the questions asked in the Resiliency Matrix. Since the questions in the matrix were not derived based on the type of plan in which the resilience measures could be found, the matrix scored the plans without bias for a specific plan type. This means the plans were scored based solely on the presence or absence of the measure and the extent it was incorporate into the plan. The score was not influenced by where the plan came from or its typology. Another reason for the lack of variation among the plans could be the fact that there was no significant variation present to be detected by the test. This lack of variation in scores does reveal a level of consistency among the plans despite the low level at which they are consistent.

Coastal plans in South Carolina consistently received “not incorporated” rankings on the matrix. Further statistical analysis revealed that plan origin and type had no influence on the plans’ rankings. This finding was strange in that the very nature of the types of plans and what they are designed to address differ, as discussed earlier in this section. In terms of how the plans scored, it makes sense that the Wilcoxon tests yielded

no variation between the plans because they all received the same overall ranking of not incorporated. Literature throughout this thesis stresses the need for plans to incorporate resiliency measures into plans. The Wilcoxon test did not support the assumption that plan type and plan origin effects planning for resiliency. The literature suggested that hazard mitigation plans are more specialized in addressing hazards than other types of plans (Beatley, Brower and Schwab 2002). The results of this analysis did not support this assumption. The results suggest that, in theory, hazard mitigation plans address hazards in greater detail and more comprehensively than other types of plans, but they don't do so in practice.

The lack of variation between the plans could be unique to SC. Perhaps it reflects SC's unique style of addressing hazards and, presumably, this evaluation matrix for applied in a different state would yield significant variation between the plan types and origins. This explanation is inconclusive until further evaluations have been conducted, at which point cross state comparisons can be made.

Since there was no variation in scores and ranking or plan type and origin, it makes sense to examine patterns that emerged in the five categories based on the number of responses to each question.

## Response Rate Analysis

The response rates were used to reveal patterns, including emphasis on categories and which question(s) within the categories were addressed most often. This analysis paints a descriptive picture of what the state and local governments prioritize in terms of resiliency. Tables 10.5 through 10.8 illustrate how each plan compares categorically based on plan origin and type. Table 10.5 shows how all plans compare to the state BMP response rates, Table 10.6 shows how cities and counties compared to one another, Table 10.7 shows how barrier islands and main land cities compared to one another, and Table 10.8 shows how the three types of plans compared to one another based on response rates per category. Overall, emphasis was placed on land use and ecological measures of resiliency. Response rates per category also revealed that some attention was given to social measures, while economic measures were rarely addressed. This pattern reflects the state’s planning priorities and emphasis areas for planning.

	Land Use	Ecological	Social	Economic	L/E (nominal)
All Plans	21.9	32.1	11	2.8	14.3
State BMP	10	35.7	12.5	0	14.3

Table 10.5: Average response rates for all plans compared to the state BMP

	Land Use	Ecological	Social	Economic	L/E (nominal)
Cities	30	31.2	11.6	4	19.5
Counties	2.5	33.9	9.4	0	0

Table 10.6: Average response rates for Cities compared Counties

	Land Use	Ecological	Social	Economic	L/E (nominal)
Barrier Island	20	25	9.4	3.1	25
Mainland	35.7	34.7	12.8	3.2	16.3

Table 10.7: Average response rates plan geographic origin (barrier island city plans compared to mainland city plans, not including county plans)

	Land Use	Ecological	Social	Economic	L/E (nominal)
Comprehensive	10	25	12.5	5.6	18
Hazard Mitigation	20	42.9	16.7	0	9.5
BMP	50	37.5	3.1	0	42.9

Table 10.8: Average response rates for the three plan types

These comparison charts show that there is emphasis placed on the land use and ecological categories. For the cities to counties comparison, both emphasize ecological measures; land use measures were emphasized by the cities while the counties had very little emphasis on land use.

To examine the extent that categorical emphasis addressed individual items within the categories, a question by question analysis was completed. This analysis revealed several questions that were heavily emphasized among the plans. Emphasis was determined by the question(s) in each category that had the highest response rates. Table 10.9 shows the questions that had the greatest number of responses in each category. A complete breakdown of response rates per question can be found in Appendix D.

<b>Land Use</b>	
<b>Measures</b>	<b>Average response rate</b>
Does the plan state the use setbacks to keep development a safe distance from the coast?	<b>43.8%</b>
Is infrastructure protection and relocation a component of the plan?	<b>37.5%</b>
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	<b>37.5%</b>
Is the use of sea walls discouraged?	<b>25.0%</b>
Is there a retreat policy included in the plan?	<b>31.3%</b>
<b>Ecological</b>	
<b>Measures</b>	<b>Average response rate</b>
Does the plan encourage the conservation of natural systems?	<b>68.8%</b>
Does the plan encourage the restoration of natural systems?	<b>56.3%</b>
Are the following addressed as hazards:	
- Erosion?	<b>56.3%</b>
- Flooding?	<b>56.3%</b>
<b>Social</b>	
<b>Measures</b>	<b>Average response rate</b>
Is hazard awareness and education for the community addressed in the plan?	<b>25.0%</b>
Are vulnerable populations identified?	<b>25.0%</b>
<b>Economic</b>	
<b>Measure</b>	<b>Average response rate</b>
Does the plan promote a diverse economy?	<b>12.5%</b>

Table 10.9: Emphasized questions per category

This analysis supports the notion that even though SC plans generally don't incorporate resiliency measures, there is an emphasis on ecological and land use resiliency measures relative to other possible resilience dimensions in the sample. The measures addressed within these categories also reflect the priorities within coastal planning within the state, which revolve mainly around erosion and flooding. The literature states that the best approach to social-ecological resilience is one that addresses

all of the components, not just one or two, since each component is integrated with the rest (Folke 2006).

In order for SC to effectively plan for resilience, the state needs to set a better example by developing policies that address coastal hazards other than erosion, as well as incorporate social and economic policies into the coastal programming agenda. Specifically, the state plan should incorporate these policies so that coastal counties and cities know that they have the state's political and financial support and state financial support for their planning efforts to address these issues on a local level. Despite the emphasis state and local governments put on land use and ecological measures, the extent to which the policies were incorporated was still minimal. Even in the areas emphasized by the state and local governments there is substantial room for improvement.

The land use and ecological categories were the most heavily emphasized, but did not satisfactorily address all components of the category. Within the land use category, few plans addressed policies that related to the accommodation or relocation of structures in hazardous areas, hazardous area acquisition, and redevelopment after hazardous occurrences that compromise structures. All of these measures have long term implications, as well as appear to be the more expensive policies to implement. By not addressing these longer term policies, communities can plateau in maximum resiliency, their hazardous areas will continue to be developed, and/or they will be more susceptible to disaster level loss from hazardous occurrences. The policies that were emphasized



have a shorter term effect and have a perceived lower implementation cost (Administration 2010).

The economic and social categories received little emphasis. The plans did not include social policies that addressed vulnerable populations, hazard awareness for communities, or social networks and how they affect a community's adaptive capacity. The plans also failed to address economic policies that promote a diverse economy, educate businesses about hazards in the area, and encourage businesses to connect with communities, or discuss economic recovery if hazards lead to disastrous events.

These policies or lack thereof reflect the guidelines provided by the state, as well as planning priorities in the coastal region. As far as land use policies in SC's coastal region, it is also clear that policy emphasis is related to perceived or actual implementation costs and long term versus short term planning prioritization. Short term priorities would be represented by policies that address the immediate needs for example establishing a set back line, encouraging conservation, and hazard awareness. Long term priorities would be represented by policies that have phased implementation like a retreat policy, mitigation strategies, and policies that address the needs of future populations and don't immediately benefit current populations. This same pattern emerged in the ecological category. The emphasized policies had short term effects and appeared to cost the least for implementation. It is worth noting that in this category, flooding and erosion were identified as a hazard by a majority of the plans, but there were no associated implementation plans or strategies discussed. This was a common theme throughout the

plans. When items were addressed there were few that had an associated implementation strategies or plans to compliment them. Having an implementation strategy is important in the implementation phase of planning. Without a plan for implementation, all that has been accomplished is the drafting of a set of policies that will sit on the shelf.

The social and ecological categories received the lowest number of responses. Despite the lack of acknowledgement by plans in SC of these policies, they are no less important to the overall resiliency of the coastal region. The economy of the coastal region in SC relies heavily on the natural resources, which are being affected by the hazards discussed throughout this thesis. The fact that SC is not addressing the economic aspects of resiliency and the economic relationship with the health and viability of the natural system has negative implication for the economy in the future as well as the long term viability of the natural systems. Greater efforts should be put toward developing policies that address the natural resource dependency of economies in SC coastal regions. The same applies for the social components. There are dynamic social systems present in the SC coastal region and some of these systems are revolve around vulnerable populations and reduces the overall resiliency of the entire region. Addressing these populations is vital to increasing the regions resiliency. SC plans are consistent in their insufficient acknowledgement of the coastal populations needs in terms of recovery from loss caused by hazards and addressing the adaptive capacity of the population. Needs of coastal populations include but are not limited to recovery plans, emergency assistance programming, and hazard education.

SC would benefit from taking a longer term approach to resilience policies. The policies emphasized in the state plan as well as plans from the coastal region favor short term policies. Short term policies are necessary, but the primary focus, or nearly the only focus, the likelihood that resiliency will be achieved since resiliency is not achieved over a short period of time. Instead, resiliency is an ongoing process and requires long term policies in combination with short term policies that comprehensively cover the four social-ecological resilience categories.

While the coastal region of South Carolina did not adequately address resiliency measures it shows how important it is to continue researching resiliency and finding ways policies can be developed to encourage and foster resiliency in coastal region. Planning for resiliency is necessary and there is a need for a method to assess the extent communities are incorporating resiliency policies into their plans; this research provides such a tool. Available research states ample policies and programming that will foster resiliency, but the research and literature on measuring the incorporation of these policies in plans and planning programs is harder to find (Blanco and Alberti 2009). The literature that is available reflects the need for a method to measure resiliency in plans as well as the need for plans to address hazards that their community faces (Berke et al. 2012, Godschalk 2003). Incorporating resiliency measures into plans is an important step toward fostering resiliency in coastal communities (Beatley 2009). The results of SC coastal plans reveals there is still a need for the incorporation of resiliency into plans as well as the need for identifying the vulnerabilities of coastal regions.

The literature describes several barriers to incorporating resiliency in to plans. Those are: low importance given to natural disasters and hazard vulnerability, limited ability or willingness to confront big issues, limited resources and competing priorities, political impediments, concerns about protecting private property rights, and perceptions of upfront costs (Beatley 2009, Administration 2010). Each of these barriers were present in the analysis of the coastal plans in SC. Coastal communities in SC have economies that rely on the presence of natural resources, and often economic needs conflict with needs to preserve and protect coastal ecosystems. The heavy reliance on natural resources in the state's coastal region creates tension between increasing resiliency and maintaining the region's tourism based economy. The latter has taken priority in SC evidenced by the lack of resiliency policies incorporated into the plan of coastal communities. This may be because residents and policy makers think that increasing resiliency will adversely impact the natural resource and tourism based economy on which the region thrives. In reality, increasing resiliency would make the economy healthier and more stable, because the natural systems on which it is based will be healthy and stable. Political impediments for SC are also prevalent and inhibit the state and local governments from adequately incorporating resiliency measures to address SLR and associated hazards. Each barrier also appears to affect and reinforce the other ones. Prioritizing the over the preservation of natural resources is heavily influenced by the political climate of the state, which determines the extent to which planning for resiliency can occur. As a result of the state's political climate and its economic priorities, local governments aren't able to adequately plan for resiliency.

These barriers also reflect the types of policies that were present in the plans. The political and economic barriers greatly influence the types of policies that are developed. These include the use of setbacks, hazard identification, infrastructure protection, and building accommodation. All of these policies reflect what is acceptable in the economic and political climate of the state. The literature identifies these policies as low hanging fruit because they are the most common in practice and there is state and local government consensus that these types of policies are necessary (Titus 2011).

There is no easy way to overcome the numerous and complex barriers to achieving coastal resilience in SC. The state of can take small steps toward increasing the extent to which they plan for resiliency. Initial steps might include expanding on the policies it currently incorporates into plans, and more thoroughly identifying hazards and their effect on the region. For instance, a majority of the plans examined contained policies that addressed setbacks. While the policy was mentioned in the plan, there was no corresponding implementation strategy. To improve this policy, it should be accompanied by an implementation strategy. Basic changes like this would increase the incorporation of resiliency policies in SC coastal plans. Overcoming political barriers will take time but; however, savvy political figures who understand SLR impacts on a local scale versus a global scale can work to overcome these problems. While it is hard to conceptualize how global SLR impacts SC enough to warrant planning, the local effects of SLR in SC are real and can be seen with the naked eye, regardless of the inconsistencies in the science. The quicker SC's political climate evolves to thinking this

way, the faster state and local governments can begin to incorporate more resiliency policies into their plans and move forward on the road to resiliency.

## CHAPTER ELEVEN

### CONCLUSIONS AND FUTURE RESEARCH

South Carolina is not planning resiliently based on the findings acquired through a case study analysis of a variety of plans from four coastal counties and eight coastal cities. The matrix used to evaluate the plans was strictly based on best practices for building resiliency found in the literature. The matrix was objective and fair, evidenced by the consistent scoring range of South Carolina plans even though none of the plans scored high enough to achieve a well incorporated or a somewhat incorporated ranking. This consistently low ranking for coastal municipalities in South Carolina shows the need for a change in the programming structure in the state. One of these changes might be updating the State BMP to address SLR and its impacts on other coastal hazards. Updating the BMP would provide the cities and counties in the coastal region the guidance, support, and perspective required to comprehensively plan for hazards and their effects on social-ecological systems, which in turn fosters resiliency.

The results of this research show a clear gap between the academic and scientific development of resiliency policies for coastal communities and the incorporation of them into coastal plans. The key to bridging this gap is finding a way to make it financially and politically possible to incorporate resiliency policy into plans. The evaluation of SC coastal plans revealed political constraints as a major barrier to incorporation due to its influence over policy and what is acceptable. Further analysis also revealed the financial connection to political influence.

There are many avenues for future research utilizing this matrix. The concept of resiliency is constantly evolving and as new information emerges more aspects may be added or removed. The matrix can also be used for baseline assessments to see how resiliency policies are being incorporated on an ongoing basis (every two, five, and ten years) when plans are updated. Another component of future research on this topic will be to see how policies are being implemented on the ground. Due to time constraints it was not possible to engage this aspect of the research. However, it would be interesting to see if land use practices are headed toward resiliency despite the restrictive guidelines and limited funding from the South Carolina coastal program. Further research on South Carolina is a logical next step but this matrix can also be tested on other coastal states. After testing several states, state to state comparisons could be made to draw comprehensive conclusions about coastal zones of the Continental U.S.



## APPENDICES

Appendix A

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place \_\_\_\_\_ Type of Plan \_\_\_\_\_ Year \_\_\_\_\_

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?			EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?			NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?			EOC
Is infrastructure protection and relocation a component of the plan?			Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?			Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)			Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?			EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?			Godschalk, NOAA
- Hazardous area zoning?			Beatly
-Land acquisition?			NOAA, EOC
Total	/20		

Ecological	Score	Page #	Source
Is hazardous area acquisition a component of the plan?			NOAA, EOC
Does the plan encourage the conservation of natural systems?			EOC, NOAA
Does the plan encourage the restoration of natural systems?			EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?			NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?			Godschalk, Godschalk et al., NOAA
- SLR?			Godschalk, Godschalk et al., NOAA
- Salt water intrusion?			Godschalk, Godschalk et al., NOAA
- Storm surge?			Godschalk, Godschalk et al., NOAA
- Flooding?			Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?			Godschalk, Godschalk et al., NOAA
- SLR?			Godschalk, Godschalk et al., NOAA
- Salt water intrusion?			Godschalk, Godschalk et al., NOAA
- Storm surge?			Godschalk, Godschalk et al., NOAA
- Flooding?			Godschalk, Godschalk et al., NOAA
Total	/28		

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?			Beatley, Godschalk
Do the plans goals promote emotional and physical wellbeing/ increased quality of life?			Beatley
Are vulnerable populations identified?			Beatley, Godschalk
Does the plan seek to establish a sense of community?			Beatley
Does the plan encourage stewardship of the environment/natural resources?			Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?			Beatley
Does the plan acknowledge social networks?			Beatley
Does the plan have a community recovery component?			Beatley
Total	/16		

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?			Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?			Godschalk, Godschalk et al., NOAA
- SLR?			Godschalk, Godschalk et al., NOAA
- Salt water intrusion?			Godschalk, Godschalk et al., NOAA
- Storm surge?			Godschalk, Godschalk et al., NOAA
- Flooding?			Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?			Beatley
Does the plan state economic recovery options?			
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?			
Total	/18		

Ecological/Land use (nominal)	Score	Page #	Source
Is the use of sea walls discouraged?			EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?			EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?			EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?			EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?			EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?			EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)			EOC
Total	/7		

<b>Category</b>	<b>Weight</b>	<b>Total Score</b>	<b>(Weight)(Total Score)</b>
Ecological	0.2		
Land use	0.2		
Economic	0.2		
Social	0.2		
Ecological/Land use (nominal)	0.2		
		Rank	
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	

<b>Rank</b>	<b>Rank Definition</b>
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Appendix B

Plan Evaluations

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: South Carolina      Type of Plan: Beachfront Management Plan      Year: 1992

<b>Land use</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	2	126-127	EOC
Is infrastructure protection and relocation a component of the plan?	0		Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0		Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	0		Beatly
-Land acquisition?	0		NOAA, EOC
Total	2/20		

Place: South Carolina      Type of Plan: Beachfront Management Plan      Year: 1992



<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	1	4	EOC, NOAA
Does the plan encourage the restoration of natural systems?	1	4	EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	1	12	NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	2	49, 51	Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	2	50, 53, 54, 129-135	Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
<b>Total</b>	<b>7/28</b>		

Place: South Carolina      Type of Plan: Beachfront Management Plan      Year: 1992

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?	2	10, 93, 94,	Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	0		Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	2/16		

Place: South Carolina      Type of Plan: Beachfront Management Plan      Year: 1992

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

Place: South Carolina      Type of Plan: Beachfront Management Plan      Year: 1992

<b>Ecological/Land use (nominal)</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is the use of sea walls discouraged?	0		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	1		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	1/7		

Place: South Carolina      Type of Plan: Beachfront Management Plan      Year: 1992

<b>Category</b>	<b>Weight</b>	<b>Total Score</b>	<b>(Weight)(Total Score)</b>
Ecological	0.2		
Land use	0.2		
Economic	0.2		
Social	0.2		
Ecological/Land use (nominal)	0.2		
		Rank	
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	

<b>Rank</b>	<b>Rank Definition</b>
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: Georgetown County

Type of Plan: Hazard Mitigation

Year: 2009

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	0		EOC
Is infrastructure protection and relocation a component of the plan?	1		Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0		Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	0		Beatly
-Land acquisition?	0		NOAA, EOC
Total	1/20		

<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	0		EOC, NOAA
Does the plan encourage the restoration of natural systems?	0		EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	0		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	2		Godschalk, Godschalk et al., NOAA
- Flooding?	2	2-9, 2-20, A-17	Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	1		Godschalk, Godschalk et al., NOAA
- Flooding?	1	A-29	Godschalk, Godschalk et al., NOAA
Total	6/28		

Place: Georgetown CountyType of Plan: Hazard MitigationYear: 2009

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?	2	3-114, 3-118,	Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	2	A-31, A-46, A51-52	Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	4/16		



<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

Place: Georgetown CountyType of Plan: Hazard MitigationYear: 2009

<b>Ecological/Land use (nominal)</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is the use of sea walls discouraged?	0		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	0		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	0/7		

Place: Georgetown County

Type of Plan: Hazard Mitigation

Year: 2009

Category	Weight	Total Score	(Weight)(Total Score)
Land Use	0.2	1/20	.01
Ecological	0.2	6/28	.04
Social	0.2	4/16	.05
Economic	0.2	0/18	0
Ecological/Land use (nominal)	0.2	0/7	0
		Rank	.10
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

Rank	Rank Definition
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coast  
Communities

Place: City of Georgetown      Type of Plan: Comprehensive Plan      Year: 2011

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	0		EOC
Is infrastructure protection and relocation a component of the plan?	0		Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	1	123	Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	1	123	Beatly
-Land acquisition?	0		NOAA, EOC
Total	2/20		

<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	1		EOC, NOAA
Does the plan encourage the restoration of natural systems?	1		EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	0		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	1		Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Total	3/28		

Place: City of Georgetown

Type of Plan: Comprehensive Plan Year: 2011

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?	0		Beatley, Godschalk
Do the plans goals promote emotional and physical wellbeing/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	0		Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	0/16		

Place: City of Georgetown

Type of Plan: Comprehensive Plan

Year: 2011

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

Place: City of Georgetown

Type of Plan: Comprehensive Plan Year: 2011

<b>Ecological/Land use (nominal)</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is the use of sea walls discouraged?	0		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	0		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	0/7		



Place: City of Georgetown

Type of Plan: Comprehensive Plan Year: 2011

Category	Weight	Total Score	(Weight)(Total Score)
Land Use	0.2	2/20	.02
Ecological	0.2	3/28	.02
Social	0.2	0/16	0
Economic	0.2	0/18	0
Ecological/Land use (nominal)	0.2	0/7	0
		Rank	.04
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

Rank	Rank Definition
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: Pawleys Island

Type of Plan: LC Beachfront Management Plan

Year: 2011

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	1	34	EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	1		EOC
Is infrastructure protection and relocation a component of the plan?	0		Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0		Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	2	34, 38	EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	0		Beatly
-Land acquisition?	0		NOAA, EOC
Total	4/20		

<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	2		EOC, NOAA
Does the plan encourage the restoration of natural systems?	2		EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	0		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	2	8, 47	Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	1	8	Godschalk, Godschalk et al., NOAA
- Flooding?	1	8	Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	1	47	Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Total	9/28		

Place: Pawleys IslandType of Plan: LC Beachfront Management PlanYear: 2011

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?	0		Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	0		Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	2/16		

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

Place: Pawleys IslandType of Plan: LC Beachfront Management PlanYear: 2011

<b>Ecological/Land use (nominal)</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is the use of sea walls discouraged?	1		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	1		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	1		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	3/7		

<b>Category</b>	<b>Weight</b>	<b>Total Score</b>	<b>(Weight)(Total Score)</b>
Land Use	0.2	4/20	.04
Ecological	0.2	9/28	.06
Social	0.2	0	0
Economic	0.2	0/18	0
Ecological/Land use (nominal)	0.2	3/7	.09
		Rank	.19
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

<b>Rank</b>	<b>Rank Definition</b>
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: Horry County      Type of Plan: Comprehensive Plan      Year: 2008

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	0		EOC
Is infrastructure protection and relocation a component of the plan?	0		Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0		Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	0		Beatly
-Land acquisition?	0		NOAA, EOC
Total	0/20		



<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	2		EOC, NOAA
Does the plan encourage the restoration of natural systems?	2		EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	0		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	1	144	Godschalk, Godschalk et al., NOAA
- SLR?	1		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	2		Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Total	8/28		

Place: Horry County

Type of Plan: Comprehensive Plan

Year: 2008

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?	0		Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	0		Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	0/16		

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

<b>Ecological/Land use (nominal)</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is the use of sea walls discouraged?	0		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	0		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	0/7		

<b>Category</b>	<b>Weight</b>	<b>Total Score</b>	<b>(Weight)(Total Score)</b>
Land Use	0.2	0/20	0
Ecological	0.2	8/28	.06
Social	0.2	0/16	0
Economic	0.2	0/18	0
Ecological/Land use (nominal)	0.2	0/7	0
		Rank	.06
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

<b>Rank</b>	<b>Rank Definition</b>
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: Myrtle Beach      Type of Plan: Beachfront Management Plan      Year: 1992

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	2	26	EOC
Is infrastructure protection and relocation a component of the plan?	1		Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	1		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	1		Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	1		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	2	42, 43, 44	Godschalk, NOAA
- Hazardous area zoning?	2	29, 31	Beatly
-Land acquisition?	0		NOAA, EOC
Total	10/20		

Place: Myrtle BeachType of Plan: Beachfront Management Plan Year: 1992

<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	0		EOC, NOAA
Does the plan encourage the restoration of natural systems?	0		EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	0		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	2		Godschalk, Godschalk et al., NOAA
- SLR?	1		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	2		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Total	5/28		

Place: Myrtle Beach

Type of Plan: Beachfront Management Plan

Year: 1992

Social	Score	Page #	Source
Is hazard awareness and education for the community addressed in the plan?	0		Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	0		Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	0/16		



Place: Myrtle Beach

Type of Plan: Beachfront Management Plan

Year: 1992

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

Place: Myrtle Beach

Type of Plan: Beachfront Management Plan

Year: 1992

Ecological/Land use (nominal)	Score	Page #	Source
Is the use of sea walls discouraged?	1	43	EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	1	43	EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	1		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	3/7		

Place: Myrtle Beach

Type of Plan: Beachfront Management Plan

Year: 1992

Category	Weight	Total Score	(Weight)(Total Score)
Land Use	0.2	10/20	.1
Ecological	0.2	5/28	.04
Social	0.2	0/16	0
Economic	0.2	0/18	0
Ecological/Land use (nominal)	0.2	3/7	.09
		Rank	.23
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

Rank	Rank Definition
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: Myrtle Beach      Type of Plan: Comprehensive Plan      Year: 2011

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	0		EOC
Is infrastructure protection and relocation a component of the plan?	0		Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	1		Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	0		Beatly
-Land acquisition?	0		NOAA, EOC
Total	1/20		

<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	1		NOAA, EOC
Does the plan encourage the conservation of natural systems?	1		EOC, NOAA
Does the plan encourage the restoration of natural systems?	1		EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	0		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	1	143	Godschalk, Godschalk et al., NOAA
- SLR?	2	42	Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	2	47	Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	1		Godschalk, Godschalk et al., NOAA
- SLR?	1		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Total	10/28		

Place: Myrtle BeachType of Plan: Comprehensive PlanYear: 2011

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?	0		Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	2		Beatley
Are vulnerable populations identified?	2		Beatley, Godschalk
Does the plan seek to establish a sense of community?	1		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	2		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	2/16		

Place: Myrtle Beach

Type of Plan: Comprehensive Plan

Year: 2011

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	2		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	1	161	Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

Place: Myrtle Beach

Type of Plan: Comprehensive Plan

Year: 2011

<b>Ecological/Land use (nominal)</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is the use of sea walls discouraged?	0		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	0		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	0/7		



Place: Myrtle Beach

Type of Plan: Comprehensive Plan

Year: 2011

Category	Weight	Total Score	(Weight)(Total Score)
Land Use	0.2	1/20	.01
Ecological	0.2	10/28	.07
Social	0.2	8/16	.1
Economic	0.2	3/18	.03
Ecological/Land use (nominal)	0.2	0/7	0
		Rank	.21
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

Rank	Rank Definition
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: North Myrtle Beach

Type of Plan: Beachfront Management Plan

Year: 1992

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	1		EOC
Is infrastructure protection and relocation a component of the plan?	1		Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	1		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	2	27	Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	1		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	2		Beatly
-Land acquisition?	0		NOAA, EOC
Total	8/20		

Place: North Myrtle Beach

Type of Plan: Beachfront Management Plan Year: 1992

<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	0		EOC, NOAA
Does the plan encourage the restoration of natural systems?	1	49	EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	1		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	2		Godschalk, Godschalk et al., NOAA
- SLR?	1		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	1	53	Godschalk, Godschalk et al., NOAA
- SLR?	1	53	Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Total	7/28		

Place: North Myrtle Beach

Type of Plan: Beachfront Management Plan

Year: 1992

Social	Score	Page #	Source
Is hazard awareness and education for the community addressed in the plan?	0		Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	0		Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	1		Beatley
Total	1/16		

Place: North Myrtle Beach

Type of Plan: Beachfront Management Plan

Year: 1992

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

Place: North Myrtle Beach

Type of Plan: Beachfront Management Plan Year: 1992

Ecological/Land use (nominal)	Score	Page #	Source
Is the use of sea walls discouraged?	0		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	1	47, 49	EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	1	52	EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	2/7		

Place: North Myrtle Beach

Type of Plan: Beachfront Management Plan Year: 1992

Category	Weight	Total Score	(Weight)(Total Score)
Land Use	0.2	8/20	.08
Ecological	0.2	7/28	.05
Social	0.2	1/16	.01
Economic	0.2	0/18	0
Ecological/Land use (nominal)	0.2	2/7	.06
		Rank	.2
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

Rank	Rank Definition
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: North Myrtle Beach

Type of Plan: Hazard Mitigation Plan

Year: 2010

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	2	4-20	EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	2	5-1, 5-2	NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	2	3-3, 4-7	EOC
Is infrastructure protection and relocation a component of the plan?	0		Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	2	4-6	Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	0		Beatly
-Land acquisition?	2	5-1, 5-2, 2-3	NOAA, EOC
Total	10/20		



<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	2	3-3, 6-2	EOC, NOAA
Does the plan encourage the restoration of natural systems?	2	6-6, 6-8	EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	0		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	2	2-24, 2-26	Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	2	2-9, 2-10	Godschalk, Godschalk et al., NOAA
- Flooding?	2	2-16, 2-22	Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	1	2-1, 2-10	Godschalk, Godschalk et al., NOAA
- Flooding?	2	2-19, 2-22	Godschalk, Godschalk et al., NOAA
Total	13/28		

Place: North Myrtle Beach

Type of Plan: Hazard Mitigation Plan

Year: 2010

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?	1	3-4	Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	0		Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	1/16		

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

Place: South Carolina

Type of Plan: Beachfront Management Plan

Year: 1992

Ecological/Land use (nominal)	Score	Page #	Source
Is the use of sea walls discouraged?	1		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	1		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	0		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	2/7		

Place: South Carolina      Type of Plan: Beachfront Management Plan      Year: 1992

<b>Category</b>	<b>Weight</b>	<b>Total Score</b>	<b>(Weight)(Total Score)</b>
Land Use	0.2	10/20	.1
Ecological	0.2	13/28	.2
Social	0.2	1/16	.01
Economic	0.2	0/18	0
Ecological/Land use (nominal)	0.2	1/7	.06
		Rank	.37
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

<b>Rank</b>	<b>Rank Definition</b>
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: Charleston County Type of Plan: Comprehensive Plan Year: 2008

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	0		EOC
Is infrastructure protection and relocation a component of the plan?	0		Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0		Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	0		Beatly
-Land acquisition?	0		NOAA, EOC
Total	0/20		

<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	2	44	EOC, NOAA
Does the plan encourage the restoration of natural systems?	0		EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	0		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	1	57	Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	1	56	Godschalk, Godschalk et al., NOAA
Total	4/28		

Place: Charleston County Type of Plan: Comprehensive Plan Year: 2008

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?	0		Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	0		Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	0/16		



<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

<b>Ecological/Land use (nominal)</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is the use of sea walls discouraged?	0		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	0		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	0/7		

Place: Charleston County Type of Plan: Comprehensive Plan Year: 2008

Category	Weight	Total Score	(Weight)(Total Score)
Land Use	0.2	2/20	0
Ecological	0.2	7/28	.03
Social	0.2	2/16	0
Economic	0.2	0/18	0
Ecological/Land use (nominal)	0.2	1/7	0
		Rank	.03
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

Rank	Rank Definition
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: City of Charleston Type of Plan: Comprehensive Plan Year: 2010

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	0		EOC
Is infrastructure protection and relocation a component of the plan?	0		Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0		Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	0		Beatly
-Land acquisition?	0		NOAA, EOC
Total	0/20		

<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	1	51	EOC, NOAA
Does the plan encourage the restoration of natural systems?	0		EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	0		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Total	1/28		

Place: City of Charleston Type of Plan: Comprehensive Plan Year: 2010

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?	0		Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	0		Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	0/16		

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

<b>Ecological/Land use (nominal)</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is the use of sea walls discouraged?	0		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	0		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	0/7		



Place: City of Charleston Type of Plan: Comprehensive Plan Year: 2010

<b>Category</b>	<b>Weight</b>	<b>Total Score</b>	<b>(Weight)(Total Score)</b>
Land Use	0.2	0/20	0
Ecological	0.2	1/28	.01
Social	0.2	0/16	0
Economic	0.2	0/18	0
Ecological/Land use (nominal)	0.2	0/7	0
		Rank	.01
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

<b>Rank</b>	<b>Rank Definition</b>
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: Sullivan's Island Type of Plan: Comprehensive Plan Year: 2009

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	0		EOC
Is infrastructure protection and relocation a component of the plan?	1	11	Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0		Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	0		Beatly
-Land acquisition?	0		NOAA, EOC
Total	1/20		

<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	0		EOC, NOAA
Does the plan encourage the restoration of natural systems?	0		EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	0		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Total	0/28		

Place: Sullivan's Island Type of Plan: Comprehensive Plan Year: 2009

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?	0		Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	0		Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	0/16		

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

<b>Ecological/Land use (nominal)</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is the use of sea walls discouraged?	0		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	0		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	0/7		

Place: Sullivan's Island Type of Plan: Comprehensive Plan Year: 2009

Category	Weight	Total Score	(Weight)(Total Score)
Land Use	0.2	1/20	.01
Ecological	0.2	0/28	0
Social	0.2	0/16	0
Economic	0.2	0/18	0
Ecological/Land use (nominal)	0.2	0/7	.0
		Rank	.01
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

Rank	Rank Definition
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: Beaufort County

Type of Plan: Hazard Mitigation Plan

Year: 2009

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	0		EOC
Is infrastructure protection and relocation a component of the plan?	0		Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0		Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	0		Beatly
-Land acquisition?	0		NOAA, EOC
Total	0/20		



<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	1	52	EOC, NOAA
Does the plan encourage the restoration of natural systems?	0		EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	0		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	2	2-18, 2-19	Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	1		Godschalk, Godschalk et al., NOAA
- Flooding?	2	2-11, 2-15, 3-7	Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	2	2-19	Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	2	2-16, 2-17	Godschalk, Godschalk et al., NOAA
- Flooding?	2	2-15	Godschalk, Godschalk et al., NOAA
Total	12/28		

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?	0	10, 93, 94,	Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	1	3-4	Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	1/16		

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

<b>Ecological/Land use (nominal)</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is the use of sea walls discouraged?	0		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	0		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	0/7		

<b>Category</b>	<b>Weight</b>	<b>Total Score</b>	<b>(Weight)(Total Score)</b>
Land Use	0.2	0/20	0
Ecological	0.2	12/28	.09
Social	0.2	1/16	.01
Economic	0.2	0/18	0
Ecological/Land use (nominal)	0.2	0/7	0
		Rank	.10
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

<b>Rank</b>	<b>Rank Definition</b>
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: Hilton Head Island Type of Plan: Comprehensive Plan Year: 2012

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	0		EOC
Is infrastructure protection and relocation a component of the plan?	0		Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0		Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0		Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	0		Beatly
-Land acquisition?	0		NOAA, EOC
Total	0/20		

<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	0		EOC, NOAA
Does the plan encourage the restoration of natural systems?	0		EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	0		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	1	72	Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?			Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	2	72	Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Total	3/28		

Place: Hilton Head Island Type of Plan: Comprehensive Plan Year: 2012

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?	1	31	Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	2	30, 32	Beatley
Are vulnerable populations identified?	0		Beatley, Godschalk
Does the plan seek to establish a sense of community?	2		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	5/16		



<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	1	92	Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	1	28	
Total	2/18		

Place: Hilton Head Island Type of Plan: Comprehensive Plan Year: 2012

Ecological/Land use (nominal)	Score	Page #	Source
Is the use of sea walls discouraged?	0		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	0		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	0/7		

Place: Hilton Head Island Type of Plan: Comprehensive Plan Year: 2012

Category	Weight	Total Score	(Weight)(Total Score)
Land Use	0.2	0/20	0
Ecological	0.2	3/28	.02
Social	0.2	5/16	.06
Economic	0.2	2/18	.02
Ecological/Land use (nominal)	0.2	0/7	0
		Rank	.10
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

Rank	Rank Definition
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: Hilton Head Island

Type of Plan: Beachfront Management Plan Year: 2008

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	2	65	EOC
Is infrastructure protection and relocation a component of the plan?	1	79, 80	Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	1	79	Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0		Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	1		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	0		Beatly
-Land acquisition?	0		NOAA, EOC
Total	5/20		

<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	1	25	NOAA, EOC
Does the plan encourage the conservation of natural systems?	2	6, 25	EOC, NOAA
Does the plan encourage the restoration of natural systems?	2	6, 25	EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	1	25	NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	2	46, 58	Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	1		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Total	9/28		

Place: Hilton Head Island

Type of Plan: Beachfront Management Plan Year: 2008

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?	0		Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	0		Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	0/16		

Place: Hilton Head Island

Type of Plan: Beachfront Management Plan Year: 2008

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

Place: Hilton Head Island

Type of Plan: Beachfront Management Plan Year: 2008

Ecological/Land use (nominal)	Score	Page #	Source
Is the use of sea walls discouraged?	1		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	1		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	1		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	1		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	4/7		



<b>Category</b>	<b>Weight</b>	<b>Total Score</b>	<b>(Weight)(Total Score)</b>
Land Use	0.2	5/20	.05
Ecological	0.2	9/28	.06
Social	0.2	0/16	0
Economic	0.2	0/18	0
Ecological/Land use (nominal)	0.2	4/7	.11
		Rank	.22
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

<b>Rank</b>	<b>Rank Definition</b>
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

Weighted Matrix for Evaluating the Incorporation of Resilience Policy into Plans for Coastal Communities

Place: City of Beaufort Type of Plan: Comprehensive Plan Year: 2009

Land use	Score	Page #	Source
Is accommodation of structures located in hazardous areas component of the plan?	0		EOC, Godschalk, Godschalk et al., NOAA
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan state the use setbacks to keep development a safe distance from the coast?	2	85	EOC
Is infrastructure protection and relocation a component of the plan?	1	103	Godschalk, NOAA
Is the relocation of critical facilities out of hazardous areas a component of the plan?	1	103	Godschalk, NOAA
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	1	58	Beatly
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0		EOC
Does the plan have specific implementation strategies for policies relating to:			
- Infrastructure relocation and protection?	0		Godschalk, NOAA
- Hazardous area zoning?	0		Beatly
-Land acquisition?	0		NOAA, EOC
Total	5/20		

<b>Ecological</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazardous area acquisition a component of the plan?	0		NOAA, EOC
Does the plan encourage the conservation of natural systems?	2	58-66	EOC, NOAA
Does the plan encourage the restoration of natural systems?	2	58-60, 90	EOC, NOAA
Does the plan encourage shoreline protection using living shorelines?	0		NOAA, EOC, Beatley
Are the following addressed as hazards:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	02	103-104	Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	1		Godschalk, Godschalk et al., NOAA
Does the plan enumerate the areas vulnerable to:			
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	2	104	Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	1		Godschalk, Godschalk et al., NOAA
Total	10/28		

Place: City of Beaufort Type of Plan: Comprehensive Plan Year: 2009

<b>Social</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is hazard awareness and education for the community addressed in the plan?			Beatley, Godschalk
Do the plans goals promote emotional and physical well-being/ increased quality of life?	0		Beatley
Are vulnerable populations identified?	1	119	Beatley, Godschalk
Does the plan seek to establish a sense of community?	0		Beatley
Does the plan encourage stewardship of the environment/natural resources?	0		Beatley, Godschalk
Does the plan discuss the community's adaptive capacity?	0		Beatley
Does the plan acknowledge social networks?	0		Beatley
Does the plan have a community recovery component?	0		Beatley
Total	1/16		

<b>Economic</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Does the plan promote a diverse economy?	0		Beatley
Does the plan have a business owner education component for :			Beatley
- Erosion?	0		Godschalk, Godschalk et al., NOAA
- SLR?	0		Godschalk, Godschalk et al., NOAA
- Salt water intrusion?	0		Godschalk, Godschalk et al., NOAA
- Storm surge?	0		Godschalk, Godschalk et al., NOAA
- Flooding?	0		Godschalk, Godschalk et al., NOAA
Does the plan encourage businesses to connect with the community?	0		Beatley
Does the plan state economic recovery options?	0		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		
Total	0/18		

<b>Ecological/Land use (nominal)</b>	<b>Score</b>	<b>Page #</b>	<b>Source</b>
Is the use of sea walls discouraged?	0		EOC, Godschalk
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		EOC, Godschalk
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		EOC, Godschalk
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		EOC, Godschalk, Godschalk et al., NOAA
Is there a retreat policy included in the plan?	1		EOC, Godschalk, NOAA
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		EOC, Godschalk
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		EOC
Total	1/7		

Place: City of Beaufort Type of Plan: Comprehensive Plan Year: 2009

<b>Category</b>	<b>Weight</b>	<b>Total Score</b>	<b>(Weight)(Total Score)</b>
Land Use	0.2	2/20	.05
Ecological	0.2	10/28	.07
Social	0.2	2/16	.01
Economic	0.2	0/18	0
Ecological/Land use (nominal)	0.2	1/7	.03
		Rank	.16
Note: if rank is a decimal round up or down, based on rounding principles, to calculate final rank		Rounded Rank	0

<b>Rank</b>	<b>Rank Definition</b>
2	Well Incorporated: Policies in the plan are well defined and written in the context of the state, city, or community for which it is intended.
1	Somewhat Incorporated: Policies in the plan are vaguely defined not written in the context of the state, city, or community for which it is intended.
0	Not Incorporated: Policies are mentioned but not defined or incorporated into the plan; or not mentioned at all

## Appendix C

### Plan Evaluation Rank Analysis

#### Raw Data

	SC BMP	Georgetown County HM	City of Georgetown Comp	Pawleys Island BMP	Horry County Comp	Myrtle Beach BMP	Myrtle Beach Comp	North Myrtle beach BMP	North Myrtle Beach HM	Charleston County Comp	City of Charleston Comp	Sullivan's Island Comp	Beaufort County HM	Hilton Head Island Comp	Hilton Head Island BMP	City of Beaufort Comp	
<b>Social</b>																	
Is hazard awareness and education for the community addressed in the plan?		2	2	0	0	0	0	0	0	1	0	0	0	0	1	0	0
Do the plans goals promote emotional and physical well being/ increased quality of life?		0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0
Are vulnerable populations identified?		0	2	0	0	0	0	2	0	0	0	0	0	1	0	0	1
Does the plan seek to establish a sense of community?		0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0
Does the plan encourage stewardship of the environment/natural resources?		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Does the plan discuss the community's adaptive capacity?		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Does the plan acknowledge social networks?		0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Does the plan have a community recovery component?		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<b>Economic</b>																	
Does the plan promote a diverse economy?		0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0
Does the plan have a business owner education component for :																	
- Erosion?		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- SLR?		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Salt water intrusion?		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Storm surge?		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Flooding?		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Does the plan encourage businesses to connect with the community?		0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Does the plan state economic recovery options?		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?		0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0



	SC BMP	Georgetown County HM	City of Georgetown Comp	Pawleys Island BMP	Horry County Comp	Myrtle Beach BMP	Myrtle Beach Comp	North Myrtle beach BMP	North Myrtle Beach HM	Charleston County Comp	City of Charleston Comp	Sullivan's Island Comp	Beaufort County HM	Hilton Head Island Comp	Hilton Head Island BMP	City of Beaufort Comp
<b>Land use</b>																
Is accommodation of structures located in hazardous areas component of the plan?	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0
Is hazardous area acquisition a component of the plan?	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Does the plan state the use setbacks to keep development a safe distance from the coast?	2	0	0	1	0	2	0	1	2	0	0	0	0	0	0	2
Is infrastructure protection and relocation a component of the plan?	0	1	0	0	0	1	0	1	0	0	0	1	0	0	1	1
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0	0	1	0	0	1	1	2	2	0	0	0	0	0	0	1
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0	0	0	2	0	1	0	1	0	0	0	0	0	0	1	0
Does the plan have specific implementation strategies for policies relating to:																
- Infrastructure relocation and protection?	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
- Hazardous area zoning?	0	0	1	0	0	2	0	2	0	0	0	0	0	0	0	0
- Land acquisition?	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
<b>Ecological</b>																
Is hazardous area acquisition a component of the plan?	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Does the plan encourage the conservation of natural systems?	1	0	1	2	2	0	1	0	2	2	1	0	1	0	2	2
Does the plan encourage the restoration of natural systems?	1	0	1	2	2	0	1	1	2	0	0	0	0	0	2	2
Does the plan encourage shoreline protection using living shorelines?	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
Are the following addressed as hazards:																
- Erosion?	2	0	0	2	1	2	1	2	2	0	0	0	2	0	2	0
- SLR?	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	2
- Salt water intrusion?	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
- Storm surge?	0	2	0	1	0	0	0	0	2	0	0	0	1	0	0	0
- Flooding?	0	2	1	1	2	0	2	0	2	1	0	0	2	0	0	1
Does the plan enumerate the areas vulnerable to:																
- Erosion?	2	0	0	1	0	2	1	1	0	0	0	0	2	0	1	0
- SLR?	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
- Salt water intrusion?	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
- Storm surge?	0	1	0	0	0	0	0	0	1	0	0	0	2	0	0	0
- Flooding?	0	1	0	0	0	0	0	0	2	1	0	0	2	0	0	1

	SC BMP	Georgetown County HM	City of Georgetown Comp	Pawleys Island BMP	Horry County Comp	Myrtle Beach BMP	Myrtle Beach Comp	North Myrtle beach BMP	North Myrtle Beach HM	Charleston County Comp	City of Charleston Comp	Sullivan's Island Comp	Beaufort County HM	Hilton Head Island Comp	Hilton Head Island BMP	City of Beaufort Comp
<b>Ecological/Land use (nominal)</b>																
Is the use of sea walls discouraged?	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	1
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Is the use of vegetation encouraged by the plan to stabilize dunes?	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0
Is there a retreat policy included in the plan?	1	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Quartiles:

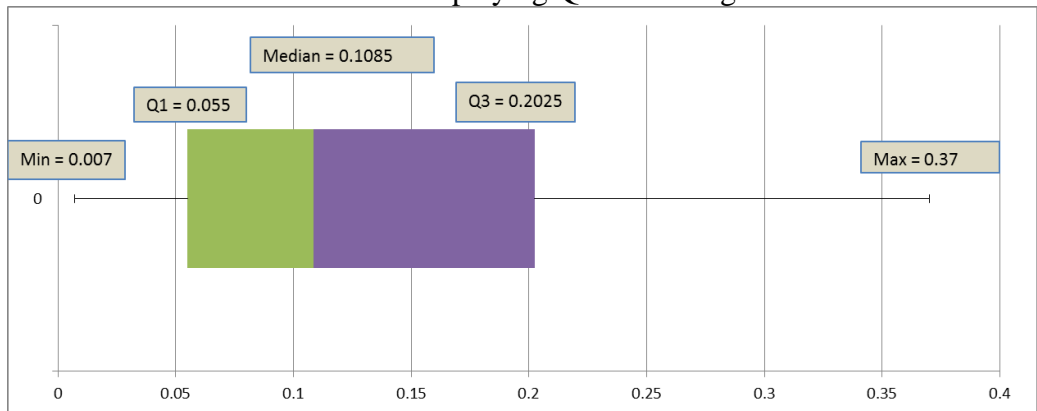
Quartile rankings for plans

Place	Plan Type	Year	Land Use	Ecological	Economic	Social	Ecological/Land Use nominal	Ranking	Quartile
State of South Carolina	BFM	1992	0.02	0.05	0.00	0.03	0.03	0.12	3
Georgetown County	HM	2009	0.01	0.04	0.00	0.05	0.00	0.10	2
City of Georgetown	Comp	2011	0.02	0.02	0.00	0.00	0.00	0.04	1
Pawleys Island	LCBFM	2011	0.04	0.06	0.00	0.00	0.09	0.19	3
Horry County	Comp	2008	0.00	0.06	0.00	0.00	0.00	0.06	2
Myrtle Beach	BFM	1992	0.10	0.04	0.00	0.00	0.09	0.23	4
Myrtle Beach	Comp	2011	0.01	0.07	0.03	0.10	0.00	0.21	4
North Myrtle Beach	BFM	1992	0.08	0.05	0.00	0.01	0.06	0.20	3
North Myrtle Beach	HM	2010	0.10	0.20	0.00	0.01	0.06	0.37	4
Beaufort County	HM	2009	0.00	0.09	0.00	0.01	0.00	0.10	2
Hilton Head Island	BFM	2008	0.05	0.06	0.00	0.00	0.11	0.22	4
Hilton Head Island	Comp	2012	0.00	0.02	0.02	0.06	0.00	0.10	2
City of Beaufort	Comp	2009	0.05	0.07	0.00	0.01	0.03	0.12	3
Charleston County	Comp	2008	0.00	0.03	0.00	0.00	0.00	0.03	1
City of Charleston	Comp	2010	0.00	0.01	0.00	0.00	0.00	0.01	1
Sullivans Island	Comp	2009	0.01	0.00	0.00	0.00	0.00	0.01	1

Stdev  
0.098652589

Min	0	0.007	Min = 0.007
Q1	1	0.055	Q1 = 0.055
Median	2	0.1085	Median = 0.1085
Q3	3	0.2025	Q3 = 0.2025
Max	1	0.37	Max = 0.37
		0	
	Min	0.007	
	Q1	0.048	
	Median	0.0535	
	Q3	0.094	
	Max	0.1675	

Box Plot displaying Quartile Range



Wilcoxon Tests:

**Various groupings of data for Wilcoxon test**

State BMP	County	City	Barrier Island	Mainland	Comprehensive	Hazard Mitigation	BMP
0.12	0.1	0.04	0.19	0.04	0.04	0.1	0.19
	0.06	0.19	0.1	0.23	0.06	0.37	0.23
	0.1	0.23	0.03	0.21	0.21	0.12	0.2
	0.12	0.21	0.01	0.2	0.1		0.01
		0.2		0.37	0.22		
		0.37		0.22	0.1		
		0.22		0.01	0.03		
		0.1			0.01		
		0.03					
		0.01					
		0.01					

**County plans and City plans Wilcoxon test**

Null = There is no significant difference between county plans and city plans.

Cities	Counties	Diff= (Yi-Xi)	Abs(Diff)	Rank	Signed Rank	T	10
0.1	0.04	-0.06	0.06	1	1	n=	4
0.06	0.19	0.13	0.13	3.5	3.5	s{T}	5.477226
0.1	0.23	0.13	0.13	3.5	3.5	a	0.05
0.12	0.21	0.09	0.09	2	2	Action(L)	-10.7352
	0.2					Action(U)	10.73516
	0.37					z	1.825742
	0.22					Accept Null	
	0.1					p	0.067889
	0.03						
	0.01						
	0.01						

**Mainland plans and Barrier Island plans Wilcoxon test**

Null = There is no significant difference between mainland plans and barrier island plans.

Barrier Island	Mainland	Diff= (Yi-Xi)	Abs(Diff)	Rank	Signed Rank	T	10
0.19	0.04	-0.15	0.15	2	2	n=	4
0.1	0.23	0.13	0.13	1	1	s{T}	5.477226
0.03	0.21	0.18	0.18	3	3	a	0.05
0.01	0.2	0.19	0.19	4	4	Action(L)	-10.7352
	0.37					Action(U)	10.73516
	0.22					z	1.825742
	0.01					Accept Null	
						p	0.067889

### Comprehensive plans and hazard mitigation plans Wilcoxon test

Null = There is no significant difference between comprehensive plans and hazard mitigation plans.

Comprehensive	Hazard Mitigation	Diff= (Yi-Xi)	Abs(Diff)	Rank	Signed Rank	T	-14
0.04	0.1	0.06	0.06	3	3	n=	8
0.06	0.37	0.31	0.31	8	8	s{T}	14.28286
0.21	0.12	-0.09	0.09	4	-4	a	0.05
0.1		-0.1	0.1	5.5	-5.5	Action(L)	-27.9939
0.22		-0.22	0.22	7	-7	Action(U)	27.99389
0.1		-0.1	0.1	5.5	-5.5	z	-0.9802
0.03		-0.03	0.03	2	-2	Accept Null	
0.01		-0.01	0.01	1	-1	p	0.326989

### Comprehensive plan and BMP plan Wilcoxon test

Null = There is no significant difference between Comprehensive plans and BMP plans.

Comprehensive	BMP	Diff= (Yi-Xi)	Abs(Diff)	Rank	Signed Rank	T	-10
0.04	0.19	0.15	0.15	6	6	n=	8
0.06	0.23	0.17	0.17	7	7	s{T}	14.28286
0.21	0.2	-0.01	0.01	1	-1	a	0.05
0.1	0.01	-0.09	0.09	4	-4	Action(L)	-27.9939
0.22		-0.22	0.22	8	-8	Action(U)	27.99389
0.1		-0.1	0.1	5	-5	z	-0.70014
0.03		-0.03	0.03	3	-3	Accept Null	
0.01		-0.01	0.01	2	-2	p	0.48384

### Hazard mitigation plans and BMP plans Wilcoxon test

Null = There is no significant difference between hazard mitigation plans and BMP plans.

Hazard Mitigation	BMP	Diff= (Yi-Xi)	Abs(Diff)	Rank	Signed Rank	T	0
0.1	0.19	0.09	0.09	2	2	n=	3
0.37	0.23	-0.14	0.14	3	-3	s{T}	3.741657
0.12	0.2	0.08	0.08	1	1	a	0.05
	0.01					Action(L)	-7.33351
						Action(U)	7.333514
						z	0
						Accept Null	
						p	1

## Appendix D

### Plan Evaluation Response Rate Analysis

	SC BMP	Georgetown County HM	City of Georgetown Comp	Pawleys Island BMP	Horry County Comp	Myrtle Beach BMP	Myrtle Beach Comp	North Myrtle beach BMP	North Myrtle Beach HM	Charleston County Comp	City of Charleston Comp	Sullivan's Island Comp	Beaufort County HM	Hilton Head Island Comp	Hilton Head Island BMP	City of Beaufort Comp		# of responses per question	Response rate per question
<b>Land use</b>																			
Is accommodation of structures located in hazardous areas a component of the plan?	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0		2	12.5%
Is hazardous area acquisition a component of the plan?	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0		1	6.3%
Does the plan state the use setbacks to keep development a safe distance from the coast?	1	0	0	1	0	1	0	1	1	0	0	0	0	0	1	1		7	43.8%
Is infrastructure protection and relocation a component of the plan?	0	1	0	0	0	1	0	1	0	0	0	1	0	0	1	1		6	37.5%
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1		4	25.0%
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0	0	1	0	0	1	1	1	1	0	0	0	0	0	0	1		6	37.5%
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0	0	0	1	0	1	0	1	0	0	0	0	0	0	1	0		4	25.0%
Does the plan have specific implementation strategies for policies relating to:																			
- Infrastructure relocation and protection?	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0		1	6.3%
- Hazardous area zoning?	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0		3	18.8%
- Land acquisition?	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0		1	6.3%
<b>Ecological</b>																			
Is hazardous area acquisition a component of the plan?	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0		2	12.5%
Does the plan encourage the conservation of natural systems?	1	0	1	1	1	0	1	0	1	1	1	0	1	0	1	1		11	68.8%
Does the plan encourage the restoration of natural systems?	1	0	1	1	1	0	1	1	1	0	0	0	0	0	1	1		9	56.3%
Does the plan encourage shoreline protection using living shorelines?	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0		3	18.8%
Are the following addressed as hazards:																			
- Erosion?	1	0	0	1	1	1	1	1	1	0	0	0	1	0	1	0		9	56.3%
- SLR?	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1		5	31.3%
- Salt water intrusion?	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0		1	6.3%
- Storm surge?	0	1	0	1	0	0	0	0	1	0	0	0	1	0	0	0		4	25.0%
- Flooding?	0	1	1	1	1	0	1	0	1	1	0	0	1	0	0	1		9	56.3%
Does the plan enumerate the areas vulnerable to:																			
- Erosion?	1	0	0	1	0	1	1	1	0	0	0	0	1	0	1	0		7	43.8%
- SLR?	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1		3	18.8%
- Salt water intrusion?	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0		1	6.3%
- Storm surge?	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0		3	18.8%
- Flooding?	0	1	0	0	0	0	0	0	1	1	0	0	1	0	0	1		5	31.3%

	SC BMP	Georgetown County HM	City of Georgetown Comp	Pawleys Island BMP	Horry County Comp	Myrtle Beach BMP	Myrtle Beach Comp	North Myrtle beach BMP	North Myrtle Beach HM	Charleston County Comp	City of Charleston Comp	Sullivan's Island Comp	Beaufort County HM	Hilton Head Island Comp	Hilton Head Island BMP	City of Beaufort Comp		# of responses per question	Response rate per question
<b>Social</b>																			
<b>Is hazard awareness and education for the community addressed in the plan?</b>																			
	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0		4	25.0%
Do the plans goals promote emotional and physical well being/ increased quality of life?	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0		2	13.3%
<b>Are vulnerable populations identified?</b>																			
	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	1		4	25.0%
Does the plan seek to establish a sense of community?	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0		2	12.5%
Does the plan encourage stewardship of the environment/natural resources?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.0%
Does the plan discuss the community's adaptive capacity?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.0%
Does the plan acknowledge social networks?	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0		1	6.3%
Does the plan have a community recovery component?	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		1	6.3%
<b>Economic</b>																			
<b>Does the plan promote a diverse economy?</b>																			
	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0		2	12.5%
<b>Does the plan have a business owner education component for :</b>																			
- Erosion?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.0%
- SLR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.0%
- Salt water intrusion?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.0%
- Storm surge?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.0%
- Flooding?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.0%
Does the plan encourage businesses to connect with the community?	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0		1	6.3%
Does the plan state economic recovery options?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.0%
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0		1	6.3%
<b>Ecological/Land use (nominal)</b>																			
<b>Is the use of sea walls discouraged?</b>																			
	0	0	0	1	0	1	0	0	1	0	0	0	0	0	1	0		4	25.0%
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0		3	18.8%
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.0%
Is the use of vegetation encouraged by the plan to stabilize dunes?	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0		3	18.8%
<b>Is there a retreat policy included in the plan?</b>																			
	1	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1		5	31.3%
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0		1	6.3%
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.0%

	SCBMP		# of responses per question	Response rate per question	
<b>State</b>					
<b>Land use</b>					
Is accommodation of structures located in hazardous areas component of the plan?	0		0	0.0%	
Is hazardous area acquisition a component of the plan?	0		0	0.0%	
Does the plan state the use setbacks to keep development a safe distance from the coast?	1		1	100.0%	
Is infrastructure protection and relocation a component of the plan?	0		0	0.0%	
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0		0	0.0%	
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0		0	0.0%	
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0		0	0.0%	
Does the plan have specific implementation strategies for policies relating to:					
- Infrastructure relocation and protection?	0		0	0.0%	
- Hazardous area zoning?	0		0	0.0%	
- Land acquisition?	0		0	0.0%	10.0%
<b>Ecological</b>					
Is hazardous area acquisition a component of the plan?	0		0	0.0%	
Does the plan encourage the conservation of natural systems?	1		1	100.0%	
Does the plan encourage the restoration of natural systems?	1		1	100.0%	
Does the plan encourage shoreline protection using living shorelines?	1		1	100.0%	
Are the following addressed as hazards:					
- Erosion?	1		1	100.0%	
- SLR?	0		0	0.0%	
- Salt water intrusion?	0		0	0.0%	
- Storm surge?	0		0	0.0%	
- Flooding?	0		0	0.0%	
Does the plan enumerate the areas vulnerable to:					
- Erosion?	1		1	100.0%	
- SLR?	0		0	0.0%	
- Salt water intrusion?	0		0	0.0%	
- Storm surge?	0		0	0.0%	
- Flooding?	0		0	0.0%	35.7%
<b>Social</b>					
Is hazard awareness and education for the community addressed in the plan?	1		1	100.0%	
Do the plans goals promote emotional and physical well being/ increased quality of life?	0		0	0.0%	
Are vulnerable populations identified?	0		0	0.0%	
Does the plan seek to establish a sense of community?	0		0	0.0%	
Does the plan encourage stewardship of the environment/natural resources?	0		0	0.0%	
Does the plan discuss the community's adaptive capacity?	0		0	0.0%	
Does the plan acknowledge social networks?	0		0	0.0%	
Does the plan have a community recovery component?	0		0	0.0%	12.5%
<b>Economic</b>					
Does the plan promote a diverse economy?	0		0	0.0%	
Does the plan have a business owner education component for:					
- Erosion?	0		0	0.0%	
- SLR?	0		0	0.0%	
- Salt water intrusion?	0		0	0.0%	
- Storm surge?	0		0	0.0%	
- Flooding?	0		0	0.0%	
Does the plan encourage businesses to connect with the community?	0		0	0.0%	
Does the plan state economic recovery options?	0		0	0.0%	
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0		0	0.0%	0.0%
<b>Ecological/Land use (nominal)</b>					
Is the use of sea walls discouraged?	0		0	0.0%	
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0		0	0.0%	
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0		0	0.0%	
Is the use of vegetation encouraged by the plan to stabilize dunes?	0		0	0.0%	
Is there a retreat policy included in the plan?	1		1	100.0%	
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0		0	0.0%	
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0		0	0.0%	14.3%
# of responses per plan	8		8		
Response rate per plan	16.7%				

	Georgetown County HM	Horry County Comp	Charleston County Comp	Beaufort County HM		# of responses per question	Response rate per question		
<b>Counties</b>									
<b>Land use</b>									
Is accommodation of structures located in hazardous areas component of the plan?	0	0	0	0		0	0.0%		
Is hazardous area acquisition a component of the plan?	0	0	0	0		0	0.0%		
Does the plan state the use setbacks to keep development a safe distance from the coast?	0	0	0	0		0	0.0%		
Is infrastructure protection and relocation a component of the plan?	1	0	0	0		1	25.0%		
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0	0	0	0		0	0.0%		
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0	0	0	0		0	0.0%		
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0	0	0	0		0	0.0%		
Does the plan have specific implementation strategies for policies relating to:									
- Infrastructure relocation and protection?	0	0	0	0		0	0.0%		
- Hazardous area zoning?	0	0	0	0		0	0.0%		2.5%
- Land acquisition?	0	0	0	0		0	0.0%		
<b>Ecological</b>									
Is hazardous area acquisition a component of the plan?	0	0	0	0		0	0.0%		
Does the plan encourage the conservation of natural systems?	0	1	1	1		3	75.0%		
Does the plan encourage the restoration of natural systems?	0	1	0	0		1	25.0%		
Does the plan encourage shoreline protection using living shorelines?	0	0	0	0		0	0.0%		
<b>Are the following addressed as hazards:</b>									
- Erosion?	0	1	0	1		2	50.0%		
- SLR?	0	1	0	0		1	25.0%		
- Salt water intrusion?	0	0	0	0		0	0.0%		
- Storm surge?	1	0	0	1		2	50.0%		
- Flooding?	1	1	1	1		4	100.0%		
<b>Does the plan enumerate the areas vulnerable to:</b>									
- Erosion?	0	0	0	1		1	25.0%		
- SLR?	0	0	0	0		0	0.0%		
- Salt water intrusion?	0	0	0	0		0	0.0%		
- Storm surge?	1	0	0	1		2	50.0%		
- Flooding?	1	0	1	1		3	75.0%		33.9%
<b>Social</b>									
Is hazard awareness and education for the community addressed in the plan?	1	0	0	0		1	25.0%		
Do the plans goals promote emotional and physical well being/ increased quality of life?	0	0	0	0		0	0.0%		
Are vulnerable populations identified?	1	0	0	1		2	50.0%		
Does the plan seek to establish a sense of community?	0	0	0	0		0	0.0%		
Does the plan encourage stewardship of the environment/natural resources?	0	0	0	0		0	0.0%		
Does the plan discuss the community's adaptive capacity?	0	0	0	0		0	0.0%		
Does the plan acknowledge social networks?	0	0	0	0		0	0.0%		
Does the plan have a community recovery component?	0	0	0	0		0	0.0%		9.4%
<b>Economic</b>									
Does the plan promote a diverse economy?	0	0	0	0		0	0.0%		
Does the plan have a business owner education component for :									
- Erosion?	0	0	0	0		0	0.0%		
- SLR?	0	0	0	0		0	0.0%		
- Salt water intrusion?	0	0	0	0		0	0.0%		
- Storm surge?	0	0	0	0		0	0.0%		
- Flooding?	0	0	0	0		0	0.0%		
Does the plan encourage businesses to connect with the community?	0	0	0	0		0	0.0%		
Does the plan state economic recovery options?	0	0	0	0		0	0.0%		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0	0	0	0		0	0.0%		0.0%
<b>Ecological/Land use (nominal)</b>									
Is the use of sea walls discouraged?	0	0	0	0		0	0.0%		
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0	0	0	0		0	0.0%		
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0	0	0	0		0	0.0%		
Is the use of vegetation encouraged by the plan to stabilize dunes?	0	0	0	0		0	0.0%		
Is there a retreat policy included in the plan?	0	0	0	0		0	0.0%		
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0	0	0	0		0	0.0%		
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0	0	0	0		0	0.0%		0.0%
# of responses per plan	7	5	3	8		23			
Response rate per plan	14.6%	10.4%	6.3%	16.7%					



	City of Georgetown Comp	Pawleys Island BMP	Myrtle Beach BMP	Myrtle Beach Comp	North Myrtle beach BMP	North Myrtle Beach HMI	City of Charleston Comp	Sullivan's Island Comp	Hilton Head Island Comp	Hilton Head Island BMP	City of Beaufort Comp		# of responses per question	Response rate per question	
<b>Cities</b>															
<b>Land use</b>															
Is accommodation of structures located in hazardous areas component of the plan?	0	1	0	0	0	1	0	0	0	0	0		2	18.2%	
Is hazardous area acquisition a component of the plan?	0	0	0	0	0	1	0	0	0	0	0		1	9.1%	
Does the plan state the use setbacks to keep development a safe distance from the coast?	0	1	1	0	1	1	0	0	0	1	1		6	54.5%	
Is infrastructure protection and relocation a component of the plan?	0	0	1	0	1	0	0	1	0	1	1		5	45.5%	
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0	0	1	0	1	0	0	0	0	1	1		4	36.4%	
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	1	0	1	1	1	1	0	0	0	0	1		6	54.5%	
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0	1	1	0	1	0	0	0	0	0	1		4	36.4%	
Does the plan have specific implementation strategies for policies relating to:															
- Infrastructure relocation and protection?	0	0	1	0	0	0	0	0	0	0	0		1	9.1%	
- Hazardous area zoning?	1	0	1	0	1	0	0	0	0	0	0		3	27.3%	
- Land acquisition?	0	0	0	0	0	1	0	0	0	0	0		1	9.1%	30.0%
<b>Ecological</b>															
Is hazardous area acquisition a component of the plan?	0	0	0	1	0	0	0	0	0	1	0		2	18.2%	
Does the plan encourage the conservation of natural systems?	1	1	0	1	0	1	1	0	0	1	1		7	63.6%	
Does the plan encourage the restoration of natural systems?	1	1	0	1	1	1	0	0	0	1	1		7	63.6%	
Does the plan encourage shoreline protection using living shorelines?	0	0	0	0	1	0	0	0	0	1	0		2	18.2%	
Are the following addressed as hazards:															
- Erosion?	0	1	1	1	1	1	0	0	0	1	0		6	54.5%	
- SLR?	0	0	1	1	1	0	0	0	0	0	1		4	36.4%	
- Salt water intrusion?	0	0	0	0	0	0	0	0	1	0	0		1	9.1%	
- Storm surge?	0	1	0	0	0	1	0	0	0	0	0		2	18.2%	
- Flooding?	1	1	0	1	0	1	0	0	0	0	1		5	45.5%	
Does the plan enumerate the areas vulnerable to:															
- Erosion?	0	1	1	1	1	0	0	0	0	1	0		5	45.5%	
- SLR?	0	0	0	1	1	0	0	0	0	0	1		3	27.3%	
- Salt water intrusion?	0	0	0	0	0	0	0	0	1	0	0		1	9.1%	
- Storm surge?	0	0	0	0	0	1	0	0	0	0	0		1	9.1%	
- Flooding?	0	0	0	0	0	1	0	0	0	0	1		2	18.2%	31.2%
<b>Social</b>															
Is hazard awareness and education for the community addressed in the plan?	0	0	0	0	0	1	0	0	1	0	0		2	18.2%	
Do the plans goals promote emotional and physical well being/ increased quality of life?	0	0	0	1	0	0	0	0	1	0	0		2	20.0%	
Are vulnerable populations identified?	0	0	0	1	0	0	0	0	0	0	1		2	18.2%	
Does the plan seek to establish a sense of community?	0	0	0	1	0	0	0	0	1	0	0		2	18.2%	
Does the plan encourage stewardship of the environment/natural resources?	0	0	0	0	0	0	0	0	0	0	0		0	0.0%	
Does the plan discuss the community's adaptive capacity?	0	0	0	0	0	0	0	0	0	0	0		0	0.0%	
Does the plan acknowledge social networks?	0	0	0	1	0	0	0	0	0	0	0		1	9.1%	
Does the plan have a community recovery component?	0	0	0	0	1	0	0	0	0	0	0		1	9.1%	11.6%
<b>Economic</b>															
Does the plan promote a diverse economy?	0	0	0	1	0	0	0	0	1	0	0		2	18.2%	
Does the plan have a business owner education component for:															
- Erosion?	0	0	0	0	0	0	0	0	0	0	0		0	0.0%	
- SLR?	0	0	0	0	0	0	0	0	0	0	0		0	0.0%	
- Salt water intrusion?	0	0	0	0	0	0	0	0	0	0	0		0	0.0%	
- Storm surge?	0	0	0	0	0	0	0	0	0	0	0		0	0.0%	
- Flooding?	0	0	0	0	0	0	0	0	0	0	0		0	0.0%	
Does the plan encourage businesses to connect with the community?	0	0	0	1	0	0	0	0	0	0	0		1	9.1%	
Does the plan state economic recovery options?	0	0	0	0	0	0	0	0	0	0	0		0	0.0%	
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0	0	0	0	0	0	0	0	1	0	0		1	9.1%	4.0%
<b>Ecological/Land use (nominal)</b>															
Is the use of sea walls discouraged?	0	1	1	0	0	1	0	0	0	1	0		4	36.4%	
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0	0	1	0	0	1	0	0	0	1	0		3	27.3%	
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0	0	0	0	0	0	0	0	0	0	0		0	0.0%	
Is the use of vegetation encouraged by the plan to stabilize dunes?	0	1	0	0	1	0	0	0	0	1	0		3	27.3%	
Is there a retreat policy included in the plan?	0	0	1	0	1	0	0	0	0	1	1		4	36.4%	
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0	1	0	0	0	0	0	0	0	0	0		1	9.1%	
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0	0	0	0	0	0	1	1	0	0	0		0	0.0%	19.5%
# of responses per plan	5	12	13	15	15	15	1	1	7	14	12		110		
Response rate per plan	10.4%	25.0%	27.1%	31.3%	31.3%	31.3%	2.1%	2.1%	14.6%	29.2%	25.0%				

	City of Georgetown Comp	Myrtle Beach BMP	Myrtle Beach Comp	North Myrtle Beach BMP	North Myrtle Beach HM	City of Charleston Comp	City of Beaufort Comp		# of responses per question	Response rate per question	
<b>Main land Cities</b>											
<b>Land use</b>											
Is accommodation of structures located in hazardous areas component of the plan?	0	0	0	0	1	0	0		1	14.3%	
Is hazardous area acquisition a component of the plan?	0	0	0	0	1	0	0		1	14.3%	
Does the plan state the use setbacks to keep development a safe distance from the coast?	0	1	0	1	1	0	1		4	57.1%	
Is infrastructure protection and relocation a component of the plan?	0	1	0	1	0	0	1		3	42.9%	
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0	1	0	1	0	0	1		3	42.9%	
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	1	1	1	1	1	0	1		6	85.7%	
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0	1	0	1	0	0	0		2	28.6%	
Does the plan have specific implementation strategies for policies relating to:											
- Infrastructure relocation and protection?	0	1	0	0	0	0	0		1	14.3%	
- Hazardous area zoning?	1	1	0	1	0	0	0		3	42.9%	35.7%
- Land acquisition?	0	0	0	0	1	0	0		1	14.3%	
<b>Ecological</b>											
Is hazardous area acquisition a component of the plan?	0	0	1	0	0	0	0		1	14.3%	
Does the plan encourage the conservation of natural systems?	1	0	1	0	1	1	1		5	71.4%	
Does the plan encourage the restoration of natural systems?	1	0	1	1	1	0	1		5	71.4%	
Does the plan encourage shoreline protection using living shorelines?	0	0	0	1	0	0	0		1	14.3%	
Are the following addressed as hazards:											
- Erosion?	0	1	1	1	1	0	0		4	57.1%	
- SLR?	0	1	1	1	0	0	1		4	57.1%	
- Salt water intrusion?	0	0	0	0	0	0	0		0	0.0%	
- Storm surge?	0	0	0	0	1	0	0		1	14.3%	
- Flooding?	1	0	1	0	1	0	1		4	57.1%	
Does the plan enumerate the areas vulnerable to:											
- Erosion?	0	1	1	1	0	0	0		3	42.9%	
- SLR?	0	0	1	1	0	0	1		3	42.9%	
- Salt water intrusion?	0	0	0	0	0	0	0		0	0.0%	
- Storm surge?	0	0	0	0	1	0	0		1	14.3%	
- Flooding?	0	0	0	0	1	0	1		2	28.6%	34.7%
<b>Social</b>											
Is hazard awareness and education for the community addressed in the plan?	0	0	0	0	1	0	0		1	14.3%	
Do the plans goals promote emotional and physical well being/ increased quality of life?	0	0	1	0	0	0	0		1	16.7%	
Are vulnerable populations identified?	0	0	1	0	0	0	1		2	28.6%	
Does the plan seek to establish a sense of community?	0	0	1	0	0	0	0		1	14.3%	
Does the plan encourage stewardship of the environment/natural resources?	0	0	0	0	0	0	0		0	0.0%	
Does the plan discuss the community's adaptive capacity?	0	0	0	0	0	0	0		0	0.0%	
Does the plan acknowledge social networks?	0	0	1	0	0	0	0		1	14.3%	
Does the plan have a community recovery component?	0	0	0	1	0	0	0		1	14.3%	12.8%
<b>Economic</b>											
Does the plan promote a diverse economy?	0	0	1	0	0	0	0		1	14.3%	
Does the plan have a business owner education component for :											
- Erosion?	0	0	0	0	0	0	0		0	0.0%	
- SLR?	0	0	0	0	0	0	0		0	0.0%	
- Salt water intrusion?	0	0	0	0	0	0	0		0	0.0%	
- Storm surge?	0	0	0	0	0	0	0		0	0.0%	
- Flooding?	0	0	0	0	0	0	0		0	0.0%	
Does the plan encourage businesses to connect with the community?	0	0	1	0	0	0	0		1	14.3%	
Does the plan state economic recovery options?	0	0	0	0	0	0	0		0	0.0%	
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0	0	0	0	0	0	0		0	0.0%	3.2%
<b>Ecological/Land use (nominal)</b>											
Is the use of sea walls discouraged?	0	1	0	0	1	0	0		2	28.6%	
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0	1	0	0	1	0	0		2	28.6%	
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0	0	0	0	0	0	0		0	0.0%	
Is the use of vegetation encouraged by the plan to stabilize dunes?	0	0	0	1	0	0	0		1	14.3%	
Is there a retreat policy included in the plan?	0	1	0	1	0	0	1		3	42.9%	
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0	0	0	0	0	0	0		0	0.0%	
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0	0	0	0	0	0	0		0	0.0%	16.3%
# of responses per plan	5	13	15	15	15	1	12		76		
Response rate per plan	10.4%	27.1%	31.3%	31.3%	31.3%	2.1%	25.0%				

	Pawleys Island BMP	Sullivan's Island Comp	Hilton Head Island Comp	Hilton Head Island BMP		# of responses per question	Response rate per question
<b>Barrier islands</b>							
<b>Land use</b>							
Is accommodation of structures located in hazardous areas component of the plan?	1	0	0	0		1	25.0%
Is hazardous area acquisition a component of the plan?	0	0	0	0		0	0.0%
Does the plan state the use setbacks to keep development a safe distance from the coast?	1	0	0	1		2	50.0%
Is infrastructure protection and relocation a component of the plan?	0	1	0	1		2	50.0%
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0	0	0	1		1	25.0%
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0	0	0	0		0	0.0%
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	1	0	0	1		2	50.0%
Does the plan have specific implementation strategies for policies relating to:							
- Infrastructure relocation and protection?	0	0	0	0		0	0.0%
- Hazardous area zoning?	0	0	0	0		0	0.0%
- Land acquisition?	0	0	0	0		0	0.0%
							20.0%
<b>Ecological</b>							
Is hazardous area acquisition a component of the plan?	0	0	0	1		1	25.0%
Does the plan encourage the conservation of natural systems?	1	0	0	1		2	50.0%
Does the plan encourage the restoration of natural systems?	1	0	0	1		2	50.0%
Does the plan encourage shoreline protection using living shorelines?	0	0	0	1		1	25.0%
Are the following addressed as hazards:							
- Erosion?	1	0	0	1		2	50.0%
- SLR?	0	0	0	0		0	0.0%
- Salt water intrusion?	0	0	1	0		1	25.0%
- Storm surge?	1	0	0	0		1	25.0%
- Flooding?	1	0	0	0		1	25.0%
Does the plan enumerate the areas vulnerable to:							
- Erosion?	1	0	0	1		2	50.0%
- SLR?	0	0	0	0		0	0.0%
- Salt water intrusion?	0	0	1	0		1	25.0%
- Storm surge?	0	0	0	0		0	0.0%
- Flooding?	0	0	0	0		0	0.0%
							25.0%
<b>Social</b>							
Is hazard awareness and education for the community addressed in the plan?	0	0	1	0		1	25.0%
Do the plans goals promote emotional and physical well being/ increased quality of life?	0	0	1	0		1	25.0%
Are vulnerable populations identified?	0	0	0	0		0	0.0%
Does the plan seek to establish a sense of community?	0	0	1	0		1	25.0%
Does the plan encourage stewardship of the environment/natural resources?	0	0	0	0		0	0.0%
Does the plan discuss the community's adaptive capacity?	0	0	0	0		0	0.0%
Does the plan acknowledge social networks?	0	0	0	0		0	0.0%
Does the plan have a community recovery component?	0	0	0	0		0	0.0%
							9.4%
<b>Economic</b>							
Does the plan promote a diverse economy?	0	0	1	0		1	25.0%
Does the plan have a business owner education component for :							
- Erosion?	0	0	0	0		0	0.0%
- SLR?	0	0	0	0		0	0.0%
- Salt water intrusion?	0	0	0	0		0	0.0%
- Storm surge?	0	0	0	0		0	0.0%
- Flooding?	0	0	0	0		0	0.0%
Does the plan encourage businesses to connect with the community?	0	0	0	0		0	0.0%
Does the plan state economic recovery options?	0	0	0	0		0	0.0%
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0	0	1	0		1	25.0%
							3.1%
<b>Ecological/Land use (nominal)</b>							
Is the use of sea walls discouraged?	1	0	0	1		2	50.0%
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0	0	0	1		1	25.0%
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0	0	0	0		0	0.0%
Is the use of vegetation encouraged by the plan to stabilize dunes?	1	0	0	1		2	50.0%
Is there a retreat policy included in the plan?	0	0	0	1		1	25.0%
Does the plan encourage a move away from hard stabilization to mitigate erosion?	1	0	0	0		1	25.0%
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0	0	0	0		0	0.0%
# of responses per plan	12	1	7	14		34	
Response rate per plan	25.0%	2.1%	14.6%	29.2%			25.0%

	Georgetown County HM	North Myrtle Beach HM	Beaufort County HM		# of response per question	Response rate per question		
<b>Hazard Mitigation Plans</b>								
<b>Land use</b>								
Is accommodation of structures located in hazardous areas component of the plan?	0	1	0		1	33.3%		
Is hazardous area acquisition a component of the plan?	0	1	0		1	33.3%		
Does the plan state the use setbacks to keep development a safe distance from the coast?	0	1	0		1	33.3%		
Is infrastructure protection and relocation a component of the plan?	1	0	0		1	33.3%		
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0	0	0		0	0.0%		
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0	1	0		1	33.3%		
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0	0	0		0	0.0%		
Does the plan have specific implementation strategies for policies relating to:								
- Infrastructure relocation and protection?	0	0	0		0	0.0%		
- Hazardous area zoning?	0	0	0		0	0.0%		
- Land acquisition?	0	1	0		1	33.3%		20.0%
<b>Ecological</b>								
Is hazardous area acquisition a component of the plan?	0	0	0		0	0.0%		
Does the plan encourage the conservation of natural systems?	0	1	1		2	66.7%		
Does the plan encourage the restoration of natural systems?	0	1	0		1	33.3%		
Does the plan encourage shoreline protection using living shorelines?	0	0	0		0	0.0%		
Are the following addressed as hazards:								
- Erosion?	0	1	1		2	66.7%		
- SLR?	0	0	0		0	0.0%		
- Salt water intrusion?	0	0	0		0	0.0%		
- Storm surge?	1	1	1		3	100.0%		
- Flooding?	1	1	1		3	100.0%		
Does the plan enumerate the areas vulnerable to:								
- Erosion?	0	0	1		1	33.3%		
- SLR?	0	0	0		0	0.0%		
- Salt water intrusion?	0	0	0		0	0.0%		
- Storm surge?	1	1	1		3	100.0%		42.9%
- Flooding?	1	1	1		3	100.0%		
<b>Social</b>								
Is hazard awareness and education for the community addressed in the plan?	1	1	0		2	66.7%		
Do the plans goals promote emotional and physical well being/ increased quality of life?	0	0	0		0	0.0%		
Are vulnerable populations identified?	1	0	1		2	66.7%		
Does the plan seek to establish a sense of community?	0	0	0		0	0.0%		
Does the plan encourage stewardship of the environment/natural resources?	0	0	0		0	0.0%		
Does the plan discuss the community's adaptive capacity?	0	0	0		0	0.0%		
Does the plan acknowledge social networks?	0	0	0		0	0.0%		
Does the plan have a community recovery component?	0	0	0		0	0.0%		16.7%
<b>Economic</b>								
Does the plan promote a diverse economy?	0	0	0		0	0.0%		
Does the plan have a business owner education component for :								
- Erosion?	0	0	0		0	0.0%		
- SLR?	0	0	0		0	0.0%		
- Salt water intrusion?	0	0	0		0	0.0%		
- Storm surge?	0	0	0		0	0.0%		
- Flooding?	0	0	0		0	0.0%		
Does the plan encourage businesses to connect with the community?	0	0	0		0	0.0%		
Does the plan state economic recovery options?	0	0	0		0	0.0%		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0	0	0		0	0.0%		0.0%
<b>Ecological/Land use (nominal)</b>								
Is the use of sea walls discouraged?	0	1	0		1	33.3%		
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0	1	0		1	33.3%		
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0	0	0		0	0.0%		
Is the use of vegetation encouraged by the plan to stabilize dunes?	0	0	0		0	0.0%		
Is there a retreat policy included in the plan?	0	0	0		0	0.0%		
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0	0	0		0	0.0%		
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0	0	0		0	0.0%		9.5%
# of responses per plan	7	15	8		30			
Response rate per plan	14.6%	31.3%	16.7%					

	City of Georgetown Comp	Horry County Comp	Myrtle Beach Comp	Charleston County Comp	City of Charleston Comp	Sullivan's Island Comp	Hilton Head Island Comp	City of Beaufort Comp		# of response per question	Response rate per question		
<b>Comprehensive Plans</b>													
<b>Land use</b>													
Is accommodation of structures located in hazardous areas component of the plan?	0	0	0	0	0	0	0	0	0	0	0.0%		
Is hazardous area acquisition a component of the plan?	0	0	0	0	0	0	0	0	0	0	0.0%		
Does the plan state the use setbacks to keep development a safe distance from the coast?	0	0	0	0	0	0	0	0	1	1	12.5%		
Is infrastructure protection and relocation a component of the plan?	0	0	0	0	0	0	1	0	1	2	25.0%		
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0	0	0	0	0	0	0	0	1	1	12.5%		
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	1	0	1	0	0	0	0	0	1	3	37.5%		
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	0	0	0	0	0	0	0	0	0	0	0.0%		
Does the plan have specific implementation strategies for policies relating to:													
- Infrastructure relocation and protection?	0	0	0	0	0	0	0	0	0	0	0.0%		
- Hazardous area zoning?	1	0	0	0	0	0	0	0	0	1	12.5%		
- Land acquisition?	0	0	0	0	0	0	0	0	0	0	0.0%		10.0%
<b>Ecological</b>													
Is hazardous area acquisition a component of the plan?	0	0	1	0	0	0	0	0	0	1	12.5%		
Does the plan encourage the conservation of natural systems?	1	1	1	1	1	1	0	0	1	6	75.0%		
Does the plan encourage the restoration of natural systems?	1	1	1	0	0	0	0	0	1	4	50.0%		
Does the plan encourage shoreline protection using living shorelines?	0	0	0	0	0	0	0	0	0	0	0.0%		
Are the following addressed as hazards:													
- Erosion?	0	1	1	0	0	0	0	0	0	2	25.0%		
- SLR?	0	1	1	0	0	0	0	0	1	3	37.5%		
- Salt water intrusion?	0	0	0	0	0	0	0	1	0	1	12.5%		
- Storm surge?	0	0	0	0	0	0	0	0	0	0	0.0%		
- Flooding?	1	1	1	1	0	0	0	1	5	62.5%			
Does the plan enumerate the areas vulnerable to:													
- Erosion?	0	0	1	0	0	0	0	0	0	1	12.5%		
- SLR?	0	0	1	0	0	0	0	0	1	2	25.0%		
- Salt water intrusion?	0	0	0	0	0	0	0	1	0	1	12.5%		
- Storm surge?	0	0	0	0	0	0	0	0	0	0	0.0%		
- Flooding?	0	0	0	1	0	0	0	0	1	2	25.0%		25.0%
<b>Social</b>													
Is hazard awareness and education for the community addressed in the plan?	0	0	0	0	0	0	0	1	0	1	12.5%		
Do the plans goals promote emotional and physical well being/ increased quality of life?	0	0	1	0	0	0	0	1	0	2	25.0%		
Are vulnerable populations identified?	0	0	1	0	0	0	0	0	1	2	25.0%		
Does the plan seek to establish a sense of community?	0	0	1	0	0	0	0	1	0	2	25.0%		
Does the plan encourage stewardship of the environment/natural resources?	0	0	0	0	0	0	0	0	0	0	0.0%		
Does the plan discuss the community's adaptive capacity?	0	0	0	0	0	0	0	0	0	0	0.0%		
Does the plan acknowledge social networks?	0	0	1	0	0	0	0	0	0	1	12.5%		
Does the plan have a community recovery component?	0	0	0	0	0	0	0	0	0	0	0.0%		12.5%
<b>Economic</b>													
Does the plan promote a diverse economy?	0	0	1	0	0	0	0	1	0	2	25.0%		
Does the plan have a business owner education component for :													
- Erosion?	0	0	0	0	0	0	0	0	0	0	0.0%		
- SLR?	0	0	0	0	0	0	0	0	0	0	0.0%		
- Salt water intrusion?	0	0	0	0	0	0	0	0	0	0	0.0%		
- Storm surge?	0	0	0	0	0	0	0	0	0	0	0.0%		
- Flooding?	0	0	0	0	0	0	0	0	0	0	0.0%		
Does the plan encourage businesses to connect with the community?	0	0	1	0	0	0	0	0	0	1	12.5%		
Does the plan state economic recovery options?	0	0	0	0	0	0	0	0	0	0	0.0%		
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0	0	0	0	0	0	0	1	0	1	12.5%		5.6%
<b>Ecological/Land use (nominal)</b>													
Is the use of sea walls discouraged?	0	0	0	0	0	0	0	0	0	0	0.0%		
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0	0	0	0	0	0	0	0	0	0	0.0%		
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0	0	0	0	0	0	0	0	0	0	0.0%		
Is the use of vegetation encouraged by the plan to stabilize dunes?	0	0	0	0	0	0	0	0	0	0	0.0%		
Is there a retreat policy included in the plan?	0	0	0	0	0	0	0	0	1	1	12.5%		
Does the plan encourage a move away from hard stabilization to mitigate erosion?	0	0	0	0	0	0	0	0	0	0	0.0%		
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0	0	0	0	0	0	0	0	0	0	0.0%		1.8%
# of responses per plan	5	5	15	3	1	1	7	12	49				
Response rate per plan	10.4%	10.4%	31.3%	6.3%	2.1%	2.1%	14.6%	25.0%					

	Pawleys Island BMP	Myrtle Beach BMP	North Myrtle beach BMP	Hilton Head Island BMP		# of response per question	Response rate per question	
<b>Beachfront Management Plans (BMP)</b>								
<b>Land use</b>								
Is accommodation of structures located in hazardous areas component of the plan?	1	0	0	0		1	25.0%	
Is hazardous area acquisition a component of the plan?	0	0	0	0		0	0.0%	
Does the plan state the use setbacks to keep development a safe distance from the coast?	1	1	1	1		4	100.0%	
Is infrastructure protection and relocation a component of the plan?	0	1	1	1		3	75.0%	
Is the relocation of critical facilities out of hazardous areas a component of the plan?	0	1	1	1		3	75.0%	
Does the plan promote land use regulations that allow coastal wetlands to migrate? (Hazardous area zoning)	0	1	1	0		2	50.0%	
Does the plan limit redevelopment/rebuilding after a structure has been compromised/lost due to a hazardous occurrence?	1	1	1	1		4	100.0%	
Does the plan have specific implementation strategies for policies relating to:								
- Infrastructure relocation and protection?	0	1	0	0		1	25.0%	
- Hazardous area zoning?	0	1	1	0		2	50.0%	
- Land acquisition?	0	0	0	0		0	0.0%	50.0%
<b>Ecological</b>								
Is hazardous area acquisition a component of the plan?	0	0	0	1		1	25.0%	
Does the plan encourage the conservation of natural systems?	1	0	0	1		2	50.0%	
Does the plan encourage the restoration of natural systems?	1	0	1	1		3	75.0%	
Does the plan encourage shoreline protection using living shorelines?	0	0	1	1		2	50.0%	
Are the following addressed as hazards:								
- Erosion?	1	1	1	1		4	100.0%	
- SLR?	0	1	1	0		2	50.0%	
- Salt water intrusion?	0	0	0	0		0	0.0%	
- Storm surge?	1	0	0	0		1	25.0%	
- Flooding?	1	0	0	0		1	25.0%	
Does the plan enumerate the areas vulnerable to:								
- Erosion?	1	1	1	1		4	100.0%	
- SLR?	0	0	1	0		1	25.0%	
- Salt water intrusion?	0	0	0	0		0	0.0%	
- Storm surge?	0	0	0	0		0	0.0%	
- Flooding?	0	0	0	0		0	0.0%	37.5%
<b>Social</b>								
Is hazard awareness and education for the community addressed in the plan?	0	0	0	0		0	0.0%	
Do the plans goals promote emotional and physical well being/ increased quality of life?	0		0	0		0	0.0%	
Are vulnerable populations identified?	0	0	0	0		0	0.0%	
Does the plan seek to establish a sense of community?	0	0	0	0		0	0.0%	
Does the plan encourage stewardship of the environment/natural resources?	0	0	0	0		0	0.0%	
Does the plan discuss the community's adaptive capacity?	0	0	0	0		0	0.0%	
Does the plan acknowledge social networks?	0	0	0	0		0	0.0%	
Does the plan have a community recovery component?	0	0	1	0		1	25.0%	3.1%
<b>Economic</b>								
Does the plan promote a diverse economy?	0	0	0	0		0	0.0%	
Does the plan have a business owner education component for :								
- Erosion?	0	0	0	0		0	0.0%	
- SLR?	0	0	0	0		0	0.0%	
- Salt water intrusion?	0	0	0	0		0	0.0%	
- Storm surge?	0	0	0	0		0	0.0%	
- Flooding?	0	0	0	0		0	0.0%	
Does the plan encourage businesses to connect with the community?	0	0	0	0		0	0.0%	
Does the plan state economic recovery options?	0	0	0	0		0	0.0%	
Does the plan acknowledge the relationship between healthy natural systems and a healthy economy?	0	0	0	0		0	0.0%	0.0%
<b>Ecological/Land use (nominal)</b>								
Is the use of sea walls discouraged?	1	1	0	1		3	75.0%	
Are bulkheads and revetments discouraged in the plan as methods to prevent erosion/SLR?	0	1	0	1		2	50.0%	
Is beach re-nourishment discouraged in the plan as a method to mitigate erosion/SLR?	0	0	0	0		0	0.0%	
Is the use of vegetation encouraged by the plan to stabilize dunes?	1	0	1	1		3	75.0%	
Is there a retreat policy included in the plan?	0	1	1	1		3	75.0%	
Does the plan encourage a move away from hard stabilization to mitigate erosion?	1	0	0	0		1	25.0%	
Does the plan provide incentives for active relocation? (relocation before damage has occurred)	0	0	0	0		0	0.0%	42.9%
# of responses per plan	12	13	15	14		54		
Response rate per plan	25.0%	27.1%	31.3%	29.2%				

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