
SECTION 5.

VULNERABILITY ASSESSMENT

INTRODUCTION

This section of the Hazard Mitigation Plan will assist with gauging the present level of vulnerability throughout the Southeastern NC Region. Vulnerability is defined as the extent to which people experience harm and property damage from a hazard. This section provides an overview of unincorporated and incorporated portions of each participating County by discussing the physical layout, existing development, and hazardous locations.

As a component of this Regional planning effort, the vulnerability analysis was updated to reflect the 2015 development characteristics of each County. The data prepared and presented for each County is presented in a consistent manner. The effort to develop and present the data consistently will promote efficient updating of the plan.

The development of Section 5 also involved the review and update of the critical facilities inventory initially established through each respective jurisdiction's 2010/2011 planning process. This section of the plan outlines the methodology utilized to prepare the vulnerability analysis and information relative to all participating jurisdictions.

This section of the HMP also identifies specific locations and facilities vulnerable to natural hazards with narrative, data, and maps. This section will identify the existing threat posed by each hazard outlined within Section 3 of the plan. Many of the hazards listed pose a direct threat to a defined geographic area, while others are considered to impact each County, and the Region, as a whole. Maps have been provided to further clarify the impact area of a respective hazard type. See Appendix A for maps of each participating jurisdiction. Two maps are provided, one for non-specific hazards (thunderstorms, tornados, etc.) and one for floodprone properties (hurricanes, flooding, etc.).

DEVELOPMENT VULNERABILITY

This section defines vulnerability for each jurisdiction participating in the regional plan. The information presented throughout this section reflects the data that is currently available for use in this plan. Due to the regional nature of this plan, some of the county Hazard Vulnerability Analyses may vary substantially from the jurisdiction's 2011/2012 plan. One of the primary reasons that the data has been compiled in this manner is that each County maintains the data necessary to report existing development vulnerability in a manner achievable for all participating jurisdictions. If in some cases, data to establish potential or future vulnerability is not available; local units of government can establish a strategy in the plan aiming to establish this baseline data prior to the next update cycle. Due to the regional scope of this plan, data has been presented at the County and municipal level in a consistent manner. As noted, the resulting methodology will provide for consistency during future updates.

Vulnerability to Non-Specific Hazards

Several of the hazards outlined within Section 3 result in impacts that are not geographically targeted at a specific area or portion of the Counties. The following hazards typically impact unincorporated and incorporated portions of Brunswick, New Hanover, and Pender Counties overall, but may have significant impacts on specific portions of the Counties: severe winter storms, severe thunderstorms, tornadoes, wildfire, nor'easters, sinkholes, dam/levee failures, and earthquakes. Hurricanes/tropical storms are also considered to potentially impact large portions of the Region, but these hazards potentially may have serious impacts on fairly specific portions of each County. Refer to maps in Appendix A for an overview of the areas impacted by these hazards.

Brunswick County Existing Vulnerability

The following provides an overview of development vulnerability with respect to non-specific hazards for incorporated and unincorporated portions of Brunswick County.

Location	Developed			Undeveloped	
	# of Properties	Acres	Building Value	# of Properties	Acres
Unincorporated County	25,929	75,174.40	\$3,751,705,680	44,939	373,613.20
Bald Head Island	1,051	386.99	\$547,350,550	1,330	1,236.83
Belville	789	450.54	\$117,090,210	155	449.29
Boiling Spring Lakes	2,227	1,556.45	\$303,116,250	6,821	12,569.78
Boliva	83	153.65	\$15,572,790	78	188.62
Calabash	1,031	1,579.23	\$143,829,020	1,180	968.59
Carolina Shores	1,064	433.11	\$153,140,160	202	286.29
Caswell Beach	360	179.59	\$91,300,930	198	1,254.11
Holden Beach	2,227	462.30	\$479,058,570	1,190	927.45
Leland	7,124	6,460.99	\$1,358,999,240	2,767	4,632.02
Navassa	524	753.09	\$57,405,170	509	6,426.57
Northwest	277	794.30	\$22,614,570	439	2,966.70
Oak Island	8,563	2,238.52	\$1,255,649,700	4,453	14,477.52
Ocean Isle Beach	2,337	543.78	\$603,883,980	1,260	1,188.15
Sandy Creek	87	95.46	\$7,898,430	99	261.43
Shallotte	1,638	1,363.48	\$426,881,100	1,686	3,723.44
Southport	1,921	831.31	\$404,904,480	1,130	1,202.31
St. James	2,555	1,162.56	\$820,380,230	2,223	3,610.10
Sunset Beach	3,442	1,214.23	\$671,287,770	1,823	2,348.42
Varnamtown	261	345.12	\$24,092,230	225	182.89
Brunswick County Total	63,490	96,179.10	\$11,256,161,060	72,707	432,513.71

Source: Brunswick County, US Census Bureau, HCP, Inc.

Brunswick County Future Vulnerability

At this time, Brunswick County and its participating jurisdictions do not have the database (including recently developed accurate and usable information) required to perform a detailed analysis of potential future conditions in relation to the non-specific hazard area. The County, in conjunction with participating municipal jurisdictions, will continue to work on improving its GIS capabilities and aim to incorporate this element into future updates of this plan.

New Hanover County Existing Vulnerability

The following provides an overview of development vulnerability with respect to non-specific hazards for incorporated and unincorporated portions of New Hanover County.

Table 5-2. New Hanover County Non-Specific Hazards Development Vulnerability					
Location	Developed			Undeveloped	
	# of Properties	Acres	Building Value	# of Properties	Acres
Unincorporated County	34,832	38,463.21	\$5,973,267,600	7,037	46,600.72
Carolina Beach	3,617	836.68	\$574,416,800	1,267	365.81
Kure Beach	1,696	289.14	\$321,791,800	451	80.94
Wilmington	34,876	20,973.50	\$8,435,111,702	5,127	7,628.23
Wrightsville Beach	1,712	499.67	\$531,789,400	213	161.84
New Hanover Co Total	76,733	61,062.20	\$15,836,377,302	14,095	54,837.54

Source: New Hanover County, US Census Bureau, HCP, Inc.

New Hanover County Future Vulnerability

At this time, New Hanover County and its participating jurisdictions do not have the database (including recently developed accurate and usable information) required to perform a detailed analysis of potential future conditions in relation to the non-specific hazard area. The County, in conjunction with participating municipal jurisdictions, will continue to work on improving its GIS capabilities and aim to incorporate this element into future updates of this plan.

Pender County Existing Vulnerability

The following provides an overview of development vulnerability with respect to non-specific hazards throughout Pender County.

Location	Developed			Undeveloped	
	# of Properties	Acres	Building Value	# of Properties	Acres
Unincorporated County	20,973	128,551.40	\$2,489,174,290	16,522	401,662.98
Atkinson	197	233.75	\$9,937,450	178	356.00
Burgaw	1,273	1,365.43	\$237,307,122	746	1,328.84
Saint Helena	203	794.43	\$21,674,847	196	2,696.33
Surf City	3,326	978.24	\$295,546,684	1,315	2,093.31
Topsail Beach	1,495	283.39	\$154,234,920	390	80.53
Watha	103	270.66	\$5,859,534	104	346.25
Pender County Total	27,570	132,477.30	\$3,213,734,847	19,451	408,564.24

Source: Pender County, US Census Bureau, HCP, Inc.

Pender County Future Vulnerability

At this time, Pender County and its participating jurisdictions do not have the database (including recently developed accurate and usable information) required to perform a detailed analysis of potential future conditions in relation to the non-specific hazard area. The County, in conjunction with participating municipal jurisdictions, will continue to work on improving its GIS capabilities and aim to incorporate this element into future updates of this plan.

Flooding

Flooding primarily impacts the Southeastern NC Region during thunderstorm events, heavy rains, and in some cases when upstream precipitation results in downstream drainage issues. Hurricanes and tropical storm events can also result in heavy flooding. The following section provides an analysis of vulnerability for properties within the Region's flood zones and provides an overview of the impacts associated with: riverine flooding, hurricanes/tropical storms, and dam/levee failure.

Flood Insurance Rate Maps (FIRMS)

Maps provided in Appendix A graphically depict the extent of the high risk flooding areas within each participating jurisdiction as defined by the Flood Insurance Rate Maps (FIRMS) developed by the Federal Emergency Management Agency (FEMA). FEMA defines areas within "flood zones," based on varying levels of risk of flooding in each area. Properties in Zones "A" and "AE" are considered to be high-risk flood zones, as there is a 1% or greater chance of flooding each year.

Properties in Zone VE are also considered to be high-risk flood zones, as there is a 1% or greater chance of flooding per year, with additional hazards due to storm-induced velocity wave action. Properties in Zone "X-500" have an approximately 0.02, or 1 in 500, chance of flooding each year. Table 5-4 provides the acreage within each County located within a flood hazard area.

Type	Pender County		New Hanover County		Brunswick County	
	Acres	% of County	Acres	% of County	Acres	% of County
A	63,334.41	11.4%	0.00	0.0%	98,322.80	18.0%
AE	103,545.11	18.6%	25,100.43	19.6%	82,531.47	15.1%
AEFW	14,267.31	2.6%	1,296.90	1.0%	4,626.54	0.8%
VE	7,682.13	1.4%	11,790.08	9.2%	12,464.55	2.3%
X-500	12,352.28	2.2%	2,455.19	1.9%	6,787.93	1.2%
Total	201,181.24	36.1%	40,642.60	31.7%	204,733.29	37.4%

Source: FEMA, HCP, Inc.

Brunswick County Existing Vulnerability

The following provides an overview of existing conditions for portions of Brunswick County located within a defined flood hazard area, utilizing the same methodology outlined in the Vulnerability to Non-Specific Hazards section for Brunswick County. Data is not currently available to provide a more detailed breakdown.

Location	Developed			Undeveloped	
	# of Properties	Acres	Building Value	# of Properties	Acres
Unincorporated County	5,144	42,207.46	\$936,395,170	9,877	289,727.95
Bald Head Island	943	369.96	\$497,521,870	1,209	1,200.30
Belville	58	93.60	\$16,820,460	43	140.17
Boiling Spring Lakes	490	488.98	\$69,759,680	617	3,227.51
Bolivia	22	72.33	\$9,920,910	30	132.51
Calabash	69	852.26	\$8,449,500	133	372.87
Carolina Shores	0	0.00	\$0	0	0.00
Caswell Beach	353	179.32	\$90,112,170	196	1,253.07
Holden Beach	2,223	461.70	\$477,817,230	1,161	923.33
Leland	507	4,352.90	\$140,921,330	416	2,510.72
Navassa	63	361.88	\$17,308,010	118	4,897.27
Northwest	9	11.82	\$889,720	10	520.46
Oak Island	5,403	1,500.61	\$861,110,810	3,082	7,454.69

Location	Developed			Undeveloped	
	# of Properties	Acres	Building Value	# of Properties	Acres
Ocean Isle Beach	2,289	320.60	\$593,404,480	1,203	1,058.18
Sandy Creek	0	0.00	\$0	2	92.71
Shalotte	222	337.29	\$81,234,500	361	1,773.21
Southport	317	318.44	\$91,116,380	352	883.52
St. James	827	528.13	\$257,504,770	583	810.77
Sunset Beach	1,455	459.09	\$320,880,570	757	1,282.37
Varnamtown	90	171.25	\$8,623,640	91	75.55
Brunswick County Total	20,484	53,087.62	\$4,479,791,200	20,241	318,337.16

Source: Brunswick County, US Census Bureau, HCP, Inc.

Brunswick County Future Vulnerability

At this time, Brunswick County does not have the database required to perform a detailed analysis of potential future conditions in relation to flood hazard areas. The County will continue to work on improving its GIS capabilities and aim to incorporate this element into future updates of this plan.

New Hanover County Existing Vulnerability

The following provides an overview of existing conditions for portions of New Hanover County located within a defined flood hazard area, utilizing the same methodology outlined in the Vulnerability to Non-Specific Hazards section for New Hanover County. Data is not currently available to provide a more detailed breakdown.

Table 5-6. New Hanover County Floodprone Properties					
Location	Developed			Undeveloped	
	# of Properties	Acres	Building Value	# of Properties	Acres
Unincorporated County	6,036	20,492.65	\$1,688,120,800	2,063	28,417.00
Carolina Beach	2,490	535.66	\$401,763,900	756	221.32
Kure Beach	395	88.35	\$93,635,300	118	22.71
Wilmington	3,452	5,688.93	\$1,542,978,101	797	3,679.96
Wrightsville Beach	1,680	481.04	\$519,798,000	210	160.78
New Hanover Co Total	14,053	27,286.63	\$4,246,296,101	3,944	32,501.77

Source: New Hanover County, US Census Bureau, HCP, Inc.

New Hanover County Future Vulnerability

At this time, New Hanover County does not have the database required to perform a detailed analysis of potential future conditions in relation to flood hazard areas. The County will continue to work on improving its GIS capabilities and aim to incorporate this element into future updates of this plan.

Pender County Existing Vulnerability

The following provides an overview of existing conditions for portions of Pender County located within a defined flood hazard area, utilizing the same methodology outlined in the Vulnerability to Non-Specific Hazards section for Pender County. Data is not currently available to provide a more detailed breakdown.

Table 5-7. Pender County Floodprone Structures					
Location	Developed			Undeveloped	
	# of Properties	Acres	Building Value	# of Properties	Acres
Unincorporated County	4,733	75,669.61	\$880,015,246	4,967	308,857.20
Atkinson	18	97.91	\$1,139,317	17	74.27
Burgaw	320	665.47	\$107,308,870	252	614.51
Saint Helena	20	189.24	\$1,354,299	18	1,099.40
Surf City	2,689	580.79	\$9,920,910	911	1,594.70
Topsail Beach	1,495	283.39	\$154,234,920	390	80.53
Watha	13	83.38	\$672,762	9	48.59
Pender County Total	9,288	77,569.79	\$1,154,646,324	6,564	312,369.20

Source: Pender County, US Census Bureau, HCP, Inc.

Pender County Future Vulnerability

At this time, Pender County does not have the database required to perform a detailed analysis of potential future conditions in relation to flood hazard areas. The County will continue to work on improving its GIS capabilities and aim to incorporate this element into future updates of this plan.

Drought/Extreme Heat

No analysis was performed to address the drought/extreme heat hazard within the Southeastern NC Region. All properties and citizens are equally vulnerable to this risk within Pender, New Hanover, and Brunswick Counties. The Counties, the participating municipalities, and servicing public drinking water utilities will continue to monitor the drought situation in conjunction with the State of North Carolina to ensure that water supply resources are protected and maintained. Over the last few years, each has nearly been required to institute mandatory water restrictions as a result of persistent drought conditions. The Regional MAC will continue to work closely with all participating jurisdictions to ensure that water resources are protected.

FRAGILE AREAS

Fragile areas are areas which could easily be damaged or destroyed by inappropriate, unplanned, or poorly planned development. These areas include Areas of Environmental Concern (AECs), Natural Resource Fragile Areas, and 404 Wetlands. The AECs located in the Southeastern NC Region include wetlands and public trust areas. The presence and protection of fragile areas can provide natural hazard mitigation benefits. Wetlands and open space areas in general act as natural flood controls by storing tremendous amounts of floodwater and slowing/reducing downstream flows. Riparian (vegetated buffer) habitat protection programs can help preserve the natural mitigating features of streams while also achieving wildlife preservation objectives. Following are definitions of the types of fragile areas that can be found throughout Pender, New Hanover, and Brunswick Counties. These areas are protected from haphazard development by Coastal Area Management (CAMA) regulations.

Public Trust Areas (AECs)

Public trust areas are all waters of the Atlantic Ocean and the lands thereunder from the mean high water mark to the seaward limit of state jurisdiction; all natural bodies of water subject to measurable lunar tides and lands thereunder to the mean high water mark; all navigable natural bodies of water and lands thereunder to the mean high water level or mean water level as the case may be, except privately-owned lakes to which the public has no right to access; all water in artificially-created bodies of water containing significant public fishing resources or other public resources which are accessible to the public by navigation; and all waters in artificially-created bodies of water in which the public has acquired rights by prescription, custom, usage, dedication, or any other means.

Natural Resource Fragile Areas

Natural resource fragile areas are generally recognized to be of educational, scientific, or cultural value because of the natural features of the particular site. Features in these areas serve to distinguish them from the vast majority of the landscape. These areas include complex natural areas, areas that sustain remnant species, pocosins, wooded swamps, prime wildlife habitats, or registered natural landmarks.

404 Wetlands

404 wetlands are areas covered by water or that have water-logged soils for long periods during the growing season. Plants growing in wetlands are capable of living in soils lacking oxygen for at least part of the growing season. Some wetlands, such as swamps, are obvious. Others are sometimes difficult to identify because they may be dry during part of the year. Wetlands include, but are not limited to, bottomlands, forests, swamps, pocosins, pine savannahs, bogs, marshes, and wet meadows.

Section 404 of the Clean Water Act requires that anyone interested in depositing dredged or fill material into "waters of the United States," including wetlands, must apply for and receive a permit for such activities. 404 wetland areas are scattered throughout the Southeastern NC Region. Specific wetlands locations must be delineated in the field on case-by-case basis by the US Army Corps of Engineers.

CRITICAL FACILITIES (including participating jurisdictions)

After a hazard event, it is important to be aware of those facilities that are essential to the health, safety, and viability of each County. The damage or destruction of publicly-owned facilities could disrupt the everyday lives of citizens throughout the Southeastern NC Region. For the purpose of completing this plan, critical facilities are defined as those facilities that are essential to the preservation of life and property during a disaster, those that are critical to the continuity of government, those necessary to ensure timely recovery, and those that provide shelter to individuals needing that service. Following are lists of the most critical facilities for Pender, New Hanover, and Brunswick Counties (including all participating municipalities). Critical facilities located throughout each County are mapped in Appendix A, with the exception of water treatment facility infrastructure and associated capital improvements. These facilities are not mapped due to concerns related to public safety. The critical facilities listing and associated maps were compiled by the MAC through the planning process associated with this update.

Table 5-8. Brunswick County Critical Facilities			
Map ID	Facility	Type	Location
MAP 2 - UNINCORPORATED BRUNSWICK COUNTY			
1	Belville Elementary School	Schools	Leland
2	Brunswick County Early College	Schools	Bolivia
3	Cedar Grove Middle School	Schools	Supply
4	Charter Day School	Schools	Leland
5	Jessie Mae Monroe Elementary	Schools	Ash
6	Lincoln Elementary School	Schools	Leland
7	Supply Elementary School	Schools	Supply
8	Town Creek Elementary	Schools	Winnabow
9	Union Elementary School	Schools	Shalotte
10	Virginia Williamson Elementary	Schools	Bolivia
11	Waccamaw School	Schools	Ash
12	Brunswick Community College Campus Police	Emergency Services	Bolivia
13	Brunswick County Sheriff's Department/Brunswick County Jail	Emergency Services	Bolivia
14	Novant Health Brunswick Medical Center	Emergency Services	Supply
15	Town of Shalotte Fire Department Station 2	Emergency Services	Shalotte
16	Tri-Beach Volunteer Fire Department Station 1	Emergency Services	Supply
17	Tri-Beach Volunteer Fire Department Station 3	Emergency Services	Supply
18	Sunset Harbor and Zion Hill Volunteer Fire Department	Emergency Services	Bolivia
19	Winnabow Volunteer Fire Department	Emergency Services	Winnabow
20	Supply Volunteer Fire Department	Emergency Services	Supply
21	Shalotte Point Volunteer Fire Department	Emergency Services	Shalotte
22	Civietown Volunteer Fire Department	Emergency Services	Supply

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Map ID	Facility	Type	Location
23	Grissettown - Longwood Fire and Rescue	Emergency Services	Ocean Isle Beach
24	Calabash Fire Department Station 12-2	Emergency Services	Calabash
25	Sunny Point Fire Department-DOD	Emergency Services	Southport
26	Waccamaw Volunteer Fire and Rescue	Emergency Services	Ash
27	Coastine Rescue Squad	Emergency Services	Supply
MAP 3 - BALD HEAD ISLAND			
1	Bald Head Island Police Department	Emergency Services	Bald Head Island
2	Bald Head Island Volunteer Fire and Rescue	Emergency Services	Bald Head Island
3	Bald Head Island Town Hall	Government	Bald Head Island
MAP 4 - BELVILLE, LELAND, AND NAVASSA			
1	Belville Elementary School	Schools	Belville
2	North Brunswick High School	Schools	Leland
3	Leland Middle School	Schools	Leland
4	Leland Fire & Rescue	Emergency Services	Leland
5	Leland Police Department	Emergency Services	Leland
6	Leland Town Hall	Government	Leland
7	Navassa Police Department	Emergency Services	Navassa
8	Navassa Volunteer Fire Department	Emergency Services	Navassa
9	Navassa Town Hall	Government	Navassa
MAP 5 - BOILING SPRING LAKES			
1	South Brunswick High School	Schools	Boiling Spring Lakes
2	South Brunswick Middle School	Schools	Boiling Spring Lakes
3	Boiling Spring Lakes Police Department	Emergency Services	Boiling Spring Lakes
4	Boiling Spring Lakes Volunteer Fire Department - 1	Emergency Services	Boiling Spring Lakes
5	Boiling Spring Lakes Volunteer Fire Department - 2	Emergency Services	Boiling Spring Lakes
6	Boiling Spring Lakes Volunteer Fire Department -3	Emergency Services	Boiling Spring Lakes
7	Boiling Spring Lakes EMS	Emergency Services	Boiling Spring Lakes
8	Boiling Spring Lakes Town Hall	Government	Boiling Spring Lakes
MAP 6 - BOLIVIA			
1	Bolivia Elementary School	Schools	Bolivia
2	Bolivia Volunteer Fire Department	Emergency Services	Bolivia
3	Bolivia Town Hall	Government	Bolivia
MAP 7 - CALABASH AND CAROLINA SHORES			
1	Calabash Fire Department	Emergency Services	Calabash
2	Calabash Volunteer EMS	Emergency Services	Calabash
3	Calabash Town Hall	Government	Calabash
4	Carolina Shores Town Hall	Government	Carolina Shores

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Map ID	Facility	Type	Location
MAP 8 - CASWELL BEACH, OAK ISLAND, AND ST. JAMES			
1	Caswell Beach Police Department	Emergency Services	Caswell Beach
2	Caswell Beach Town Hall	Government	Caswell Beach
3	Oak Island Police Department	Emergency Services	Oak Island
4	Oak Island Fire and Rescue Department	Emergency Services	Oak Island
5	Oak Island Fire and Rescue Department - Station 3	Emergency Services	Oak Island
6	Oak Island Fire and Rescue Department - Station 2	Emergency Services	Oak Island
7	Oak Island Water Rescue Team	Emergency Services	Oak Island
8	Oak Island Town Hall	Government	Oak Island
9	St. James Fire Department	Emergency Services	St. James
10	St. James Town Hall	Government	St. James
MAP 9 - HOLDEN BEACH AND VARNAMTOWN			
1	Holden Beach Police Department	Emergency Services	Holden Beach
2	Tri-Beach Volunteer Fire Department - Station 2	Emergency Services	Holden Beach
3	Holden Beach Town Hall	Government	Holden Beach
4	Varnamtown Town Hall	Government	Varnamtown
5	All Holden Beach Sewer System Lift Stations (not mapped)	Government	Holden Beach
MAP 10 - NORTHWEST AND SANDY CREEK			
1	Northwest Police Department	Emergency Services	Northwest
2	Northwest Volunteer Fire and Rescue Department	Emergency Services	Northwest
3	Northwest Town Hall	Government	Northwest
4	Sandy Creek Town Hall	Government	Sandy Creek
MAP 11 - OCEAN ISLE BEACH			
1	Ocean Isle Beach Fire Department	Emergency Services	Ocean Isle Beach
2	Ocean Isle Beach Police Department	Emergency Services	Ocean Isle Beach
3	Ocean Isle Beach Town Hall	Government	Ocean Isle Beach
MAP 12 - SHALLOTTE			
1	Shallotte Middle School	Schools	Shallotte
2	West Brunswick High School	Schools	Shallotte
3	Brunswick County EMS	Schools	Shallotte
4	Shallotte Fire Department - Station 1	Emergency Services	Shallotte
5	Shallotte Fire Department - Station 5	Emergency Services	Shallotte
6	Shallotte Police Department	Emergency Services	Shallotte
7	Shallotte Rescue Squad	Emergency Services	Shallotte
8	Shallotte Town Hall	Emergency Services	Shallotte
MAP 13 - SOUTHPORT			
1	Brunswick County Academy	Schools	Southport
2	Southport Elementary School	Schools	Southport

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Map ID	Facility	Type	Location
3	J. Arthur Doshier Memorial Hospital	Schools	Southport
4	Southport Fire Department	Emergency Services	Southport
5	Southport Police Department	Emergency Services	Southport
6	Southport Rescue Squad	Emergency Services	Southport
7	Southport City Hall	Government	Southport
MAP 14 - SUNSET BEACH			
1	Sunset Beach Fire Department	Emergency Services	Sunset Beach
2	Sunset Beach Police Department	Emergency Services	Sunset Beach
3	Sunset Beach Town Hall	Government	Sunset Beach

Source: Brunswick County and all participating municipalities.

Table 5-9. New Hanover County Critical Facilities

Map ID	Facility	Type	Location
MAP 16 - UNINCORPORATED NEW HANOVER COUNTY			
1	Castle Hayne Elementary School	Schools	Castle Hayne
2	Charles P Murray Middle School	Schools	Wilmington
3	Dr. Hubert Eaton Sr Elementary School	Schools	Wilmington
4	Edwin A Anderson Elementary School	Schools	Wilmington
5	Emma B Trask Middle School	Schools	Wilmington
6	Emsley A Laney High School	Schools	Wilmington
7	Eugene Ashley High School	Schools	Wilmington
8	H. C. Bellamy Elementary School	Schools	Wilmington
9	Holly Shelter Middle School	Schools	Castle Hayne
10	Mary C Williams Elementary School	Schools	Wilmington
11	Murrayville Elementary School	Schools	Wilmington
12	Myrtle Grove Middle School	Schools	Wilmington
13	Ogden Elementary School	Schools	Wilmington
14	Wilmington Early College High School	Schools	Wilmington
15	Wrightsboro Elementary School	Schools	Wilmington
16	Castle Hayne Volunteer Fire Department	Emergency Services	Castle Hayne
17	New Hanover County Sheriff's Office/Detention Center	Emergency Services	Castle Hayne
18	Federal Point Fire and Rescue	Emergency Services	Wilmington
19	Myrtle Grove Volunteer Fire Department	Emergency Services	Wilmington
20	New Hanover Regional Emergency Medical Services - Airlink Station	Emergency Services	Wilmington
21	New Hanover Regional Emergency Medical Services - Station 1	Emergency Services	Wilmington
22	North Carolina Division of Forest Resources District 8	Emergency Services	Wilmington

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Map ID	Facility	Type	Location
23	Ogden Volunteer Fire Department	Emergency Services	Wilmington
24	Wilmington International Airport Rescue Base/Public Safety	Emergency Services	Wilmington
25	Wrightsboro Volunteer Fire Department	Emergency Services	Wilmington
MAP 17 - CAROLINA BEACH AND KURE BEACH			
1	Carolina Beach Elementary School	Schools	Carolina Beach
2	Carolina Beach Fire Department	Emergency Services	Carolina Beach
3	Carolina Beach Police Department	Emergency Services	Carolina Beach
4	Carolina Beach Town Hall	Government	Carolina Beach
5	Kure Beach Police Department	Emergency Services	Kure Beach
6	Kure Beach Volunteer Fire Department	Emergency Services	Kure Beach
7	Kure Beach Town Hall	Government	Kure Beach
MAP 18 - WILMINGTON			
1	A H Snipes Academy of Arts/Design	Schools	Wilmington
2	Bradley Creek Elementary School	Schools	Wilmington
3	Cape Fear Center for Inquiry	Schools	Wilmington
4	College Park Elementary School	Schools	Wilmington
5	D. C. Virgo Preparatory Academy	Schools	Wilmington
6	Dr John Codrington Elementary School	Schools	Wilmington
7	Edwin A Alderman Elementary School	Schools	Wilmington
8	Forest Hills Elementary School	Schools	Wilmington
9	Gregory Elementary School	Schools	Wilmington
10	Holly Tree Elementary School	Schools	Wilmington
11	Isaac M Bear High School	Schools	Wilmington
12	John J Blair Elementary	Schools	Wilmington
13	John T Hoggard High School	Schools	Wilmington
14	Lake Forest Academy	Schools	Wilmington
15	MCS Noble Middle School	Schools	Wilmington
16	Mary Sidberry Mosley PLC	Schools	Wilmington
17	New Hanover High School	Schools	Wilmington
18	Pine Valley Elementary School	Schools	Wilmington
19	R Freeman School of Engineering	Schools	Wilmington
20	Roland Grise Middle School	Schools	Wilmington
21	Sunset Park Elementary School	Schools	Wilmington
22	Walter L Parsley Elementary School	Schools	Wilmington
23	Williston Middle School	Schools	Wilmington
24	Wilmington Preparatory Academy	Schools	Wilmington
25	Winter Park Model Elementary School	Schools	Wilmington

SECTION 5. VULNERABILITY ASSESSMENT

Map ID	Facility	Type	Location
26	Bureau of Alcohol Tobacco Firearms and Explosives	Emergency Services	Wilmington
27	Cape Fear Hospital	Emergency Services	Wilmington
28	New Hanover County Sheriff - Narcotics Vice Squad and Detective Unit	Emergency Services	Wilmington
29	New Hanover County Sheriff's Office - Patrol Division	Emergency Services	Wilmington
30	New Hanover Regional Emergency Medical Services - Station 2	Emergency Services	Wilmington
31	New Hanover Regional Medical Center	Emergency Services	Wilmington
32	North Carolina State Highway Patrol Troop B District VI	Emergency Services	Wilmington
33	North Carolina State Ports Authority - Wilmington Police Dept.	Emergency Services	Wilmington
34	UNCW Police Department	Emergency Services	Wilmington
35	United States Customs and Border Protection - Port of Entry	Emergency Services	Wilmington
36	US DEA & Marshal's Service	Emergency Services	Wilmington
37	Wilmington Fire Department Station 1 - Headquarters	Emergency Services	Wilmington
38	Wilmington Fire Department Station 2	Emergency Services	Wilmington
39	Wilmington Fire Department Station 3	Emergency Services	Wilmington
40	Wilmington Fire Department Station 4	Emergency Services	Wilmington
41	Wilmington Fire Department Station 5	Emergency Services	Wilmington
42	Wilmington Fire Department Station 6	Emergency Services	Wilmington
43	Wilmington Fire Department Station 7	Emergency Services	Wilmington
44	Wilmington Fire Department Station 8	Emergency Services	Wilmington
45	Wilmington Fire Department Station 9	Emergency Services	Wilmington
46	Wilmington Fire Department Station 10	Emergency Services	Wilmington
47	Wilmington Fire Department Station 11	Emergency Services	Wilmington
48	Wilmington Police Department	Emergency Services	Wilmington
49	Wilmington City Hall	Government	Wilmington
50	New Hanover County Emergency Management	Government	Wilmington
MAP 19 - WRIGHTSVILLE BEACH			
1	Wrightsville Beach Elementary School	Schools	Wrightsville Beach
2	Wrightsville Beach Fire Department	Emergency Services	Wrightsville Beach
3	Wrightsville Beach Police Department	Emergency Services	Wrightsville Beach
4	Wrightsville Beach Town Hall	Government	Wrightsville Beach

Source: New Hanover County and all participating municipalities.

Table 5-10. Pender County Critical Facilities

Map ID	Facility	Type	Location
MAP 21 - UNINCORPORATED PENDER COUNTY			
1	Cape Fear Elementary School	Schools	Rocky Point
2	Cape Fear Middle School	Schools	Rocky Point
3	Heide Trask High School	Schools	Rocky Point
4	Malpass Corner Elementary School	Schools	Burgaw
5	North Topsail Elementary	Schools	Hampstead
6	Pender High School	Schools	Burgaw
7	Penderlea Elementary School	Schools	Willard
8	Rocky Point Elementary School	Schools	Rocky Point
9	South Topsail Elementary School	Schools	Hampstead
10	Topsail Elementary School	Schools	Hampstead
11	Topsail High School	Schools	Hampstead
12	Topsail Middle School	Schools	Hampstead
13	West Pender Middle School	Schools	Burgaw
14	North Carolina Division of Forest Resources District 8	Emergency Services	Rocky Point
15	Hampstead Volunteer Fire Department	Emergency Services	Burgaw
16	Pender Volunteer EMS and Rescue - Station 2	Emergency Services	Hampstead
17	Pender Volunteer EMS and Rescue - Station 6	Emergency Services	Watha
18	Sloop Point Fire Department	Emergency Services	Rocky Point
19	Surf City Volunteer Fire Department	Emergency Services	Willard
20	Maple Hill Volunteer Fire Department	Emergency Services	Maple Hill
21	Pender Volunteer EMS and Rescue - Station 8	Emergency Services	Hampstead
22	Long Creek Grady Volunteer Fire Department	Emergency Services	Hampstead
23	Pender Volunteer EMS and Rescue - Station 7 Headquarters	Emergency Services	Willard
24	Rocky Point Volunteer Fire Department Station 22	Emergency Services	Hampstead
25	Shiloh-Columbia Volunteer Fire Department - Station 1900	Emergency Services	Rocky Point
26	Pender Volunteer EMS and Rescue - Station 5	Emergency Services	Hampstead
27	Penderlea Volunteer Fire Department	Emergency Services	Maple Hill
28	Union Rescue Squad	Emergency Services	Willard
MAP 22 - ATKINSON			
1	Atkinson Fire Department	Emergency Services	Atkinson
2	Pender County EMS	Emergency Services	Atkinson
3	Atkinson Town Hall	Government	Atkinson
MAP 23 - BURGAW			
1	Burgaw Elementary School	Schools	Burgaw
2	Burgaw Middle School	Schools	Burgaw

SECTION 5. VULNERABILITY ASSESSMENT

Map ID	Facility	Type	Location
3	Pender Early College High School	Schools	Burgaw
4	Burgaw Fire Department	Emergency Services	Burgaw
5	Burgaw Police Department	Emergency Services	Burgaw
6	NC Highway Patrol	Emergency Services	Burgaw
7	Pender County Sheriff's Office	Emergency Services	Burgaw
8	Pender Memorial Hospital	Emergency Services	Burgaw
9	Pender Volunteer EMS and Rescue - Station 1	Emergency Services	Burgaw
10	Burgaw Town Hall	Government	Burgaw
11	Pender County Emergency Management Operations Center	Government	Burgaw
MAP 24 - SAINT HELENA			
1	Saint Helena Town Hall	Government	Saint Helena
MAP 25 - SURF CITY			
1	Surf City Fire Department	Emergency Services	Surf City
2	Surf City Police Department	Emergency Services	Surf City
3	Surf City Town Hall	Government	Surf City
MAP 26 - TOPSAIL BEACH			
1	Pender Volunteer EMS and Rescue - Station 4	Emergency Services	Topsail Beach
2	Topsail Beach Fire Department	Emergency Services	Topsail Beach
3	Topsail Beach Police Department	Emergency Services	Topsail Beach
4	Topsail Beach Town Hall	Government	Topsail Beach
MAP 27 - WATHA			
1	Watha Town Hall	Government	Watha

Source: Pender County and all participating municipalities.

It should be noted that infrastructure components have not been included within this listing. All infrastructure components associated with the provision of water service and wastewater treatment are considered critical facilities. This information has been withheld from this document due to public safety concerns.

REPETITIVE LOSS STRUCTURES

Repetitive loss structures are those that have suffered damage from repeated hazard events. A Repetitive Loss (RL) property is technically defined as any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP. The only reliable source of information on repetitive loss structures is flood insurance claims data available through the National Flood Insurance Program (NFIP). Table 5-11 provides the RL properties located within Brunswick, New Hanover, and Pender Counties.

County	Non-Residential	Residential	Total
Unincorporated Brunswick County	4	25	29
Bald Head Island	0	0	0
Belville	0	0	0
Boiling Spring Lakes	0	5	5
Bolivia	0	0	0
Calabash	0	0	0
Carolina Shores	0	0	0
Caswell Beach	0	0	0
Holden Beach	1	229	230
Leland	0	0	0
Navassa	0	0	0
Northwest	0	0	0
Oak Island	3	255	258
Ocean Isle Beach	0	113	113
Sandy Creek	0	0	0
Shalotte	0	0	0
Southport	0	1	1
St. James	0	0	0
Sunset Beach	0	3	3
Varnamtown	0	0	0
Unincorporated New Hanover County	0	4	4
Carolina Beach	0	1	1
Kure Beach	0	0	0
Wilmington	8	249	257
Wrightsville Beach	0	0	0
Unincorporated Pender County	2	39	41
Atkinson	0	2	2
Burgaw	1	23	24
Saint Helena	0	0	0
Surf City	0	8	8
Topsail Beach	0	2	2
Watha	0	1	1

*NOTE: Repetitive loss data will be updated prior to plan adoption.
Source: NC Emergency Management.*

KEY ISSUES REGARDING THUNDERSTORMS/WINDSTORMS, LIGHTNING, & HAIL

This section is intended to address the key issues regarding each participating jurisdiction's most vulnerable structures and key infrastructure. These issues and, in turn, strategies (see Section 6) are intended to address the community's vulnerability to thunderstorms/windstorms, lightning, and hail. Implementation strategies addressing each of these issues are defined within Section 6 of the plan. These hazards have been identified as the region's most significant hazard as defined in Table 3-7, page 3-32.

Brunswick County

Efforts to address the following key issues will be overseen by Brunswick County Administration. However, the municipalities of Bald Head Island, Belville, Boiling Spring Lakes, Bolivia, Calabash, Carolina Shores, Caswell Beach, Holden Beach, Leland, Navassa, Northwest, Oak Island, Ocean Isle Beach, Sandy Creek, Shallotte, Southport, St. James, Sunset Beach, and Varnamtown will also benefit from these efforts.

- Brunswick County, in concert with the participating municipalities listed above, will continue to enforce all NC State Building Code regulations in an effort to minimize wind-related damage as well as wind-borne debris.
- Brunswick County and all participating municipalities listed above will continue to work on the implementation and update of this plan in an effort to identify more effective solutions regarding mitigation from severe thunderstorms/windstorms, lightning, and hail.
- Brunswick County and all participating municipalities listed above will continue to pro-actively research and acquire funding to mitigate repetitive loss and/or severe repetitive loss properties.
- Brunswick County will work closely with the Sunset Harbor and Zion Hill Volunteer Fire Department to investigate the potential for relocation of the existing facility outside of the flood hazard area.

New Hanover County

Efforts to address the following key issues will be overseen by New Hanover County Administration. However, the municipalities of Carolina Beach, Kure Beach, Wilmington, and Wrightsville Beach will also benefit from these efforts.

- New Hanover County, in concert with the participating municipalities listed above, will continue to enforce all NC State Building Code regulations in an effort to minimize wind-related damage as well as wind-borne debris.
- New Hanover County and all participating municipalities listed above will continue to work on the implementation and update of this plan in an effort to identify more effective solutions regarding mitigation from severe thunderstorms/windstorms, lightning, and hail.

- New Hanover County and all participating municipalities listed above will continue to pro-actively research and acquire funding to mitigate repetitive loss and/or severe repetitive loss properties.

Pender County

Efforts to address the following key issues will be overseen by Pender County Administration. However, the municipalities of Atkinson, Burgaw, Saint Helena, Surf City, Topsail Beach, and Watha will also benefit from these efforts.

- Pender County, in concert with the participating municipalities listed above, will continue to enforce all NC State Building Code regulations in an effort to minimize wind-related damage as well as wind-borne debris.
- Pender County and all participating municipalities listed above will continue to work on the implementation and update of this plan in an effort to identify more effective solutions regarding mitigation from severe thunderstorms/windstorms, lightning, and hail.
- Pender County and all participating municipalities listed above will continue to pro-actively research and acquire funding to mitigate repetitive loss and/or severe repetitive loss properties.
- Pender County will work closely with the Maple Hill Volunteer Fire Department and the Penderlea Volunteer Fire Department to investigate the potential for relocation of the existing facilities outside of the flood hazard area.

CHANGE IN LAND USE FORM

The economy throughout eastern North Carolina has been hit extremely hard by the recession that began in 2008. One sector of the economy that has been impacted most significantly was the construction and development industry. The recession left many communities with planned subdivisions and commercial ventures that never materialized. In the wake of this recession, limited construction and, in turn, building permits have been issued for development throughout the three-county region.

Due to the limited and sporadic development activity that has occurred over the last five years throughout the Region, a summary of how land use characteristics have shifted is provided in the Table 5-12 below. The results and categories defined in the table are a combination of building permit activity by jurisdiction and discussions with each county Mitigation Advisory Committee. The limited development as outlined in Table 5-12 is also based on the results of the Development Vulnerability discussion presented on page 5-1. This information is presented for both the community at large, as well as portions of each jurisdiction located within the FEMA-defined Flood Hazard Areas. What limited development that has occurred in the floodplain has been subject to each jurisdiction's respective Flood Damage Prevention Ordinance. A summary of communities participating in the National Flood Insurance Program (NFIP), as well as communities maintaining current Flood Damage Prevention Ordinances, is provided in Section 4, Community Capability Assessment.

The following three categories of development activity provide an indicator of shifts in land use characteristics for each community participating in this plan:

- No/Low Growth: Average of less than 50 building permits annually
- Moderate Growth: Average of 51 to 150 building permits annually
- High Growth: Average of more than 150 building permits issued annually

Table 5-12. Southeastern NC Region Development Activity		
County	Non-Specific Hazard Area	Flood Hazard Area
Brunswick County	Moderate	No/Low
Bald Head Island	No/Low	No/Low
Belville	No/Low	No/Low
Boiling Spring Lakes	No/Low	No/Low
Bolivia	No/Low	No/Low
Calabash	No/Low	No/Low
Carolina Shores	No/Low	No/Low
Caswell Beach	No/Low	No/Low
Holden Beach	No/Low	No/Low
Leland	No/Low	No/Low
Navassa	No/Low	No/Low
Northwest	No/Low	No/Low
Oak Island	No/Low	No/Low
Ocean Isle Beach	No/Low	No/Low
Sandy Creek	No/Low	No/Low
Shalotte	No/Low	No/Low
Southport	No/Low	No/Low
St. James	No/Low	No/Low
Sunset Beach	No/Low	No/Low
Varnamtown	No/Low	No/Low
New Hanover County	Moderate	No/Low
Carolina Beach	No/Low	No/Low
Kure Beach	No/Low	No/Low
Wilmington	Moderate	No/Low
Wrightsville Beach	No/Low	No/Low
Pender County	No/Low	No/Low
Atkinson	No/Low	No/Low
Burgaw	No/Low	No/Low
Saint Helena	No/Low	No/Low
Surf City	No/Low	No/Low
Topsail Beach	No/Low	No/Low
Watha	No/Low	No/Low

Source: Regional and County MACs.