*Cape May County*

# Strategic Recovery Planning Report

***DRAFT***

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**Cape May County Board of Chosen Freeholders**

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# PURPOSE

The New Jersey Department of Community Affairs (NJDCA) has established a Post Sandy Planning Assistance Grant Program to support long range planning for community redevelopment in the municipalities and counties sustaining damage from Superstorm Sandy. The Program provides grants to municipalities and counties to retain American Institute of Certified Planners/New Jersey Board of Professional Planners (AICP/PP) licensed planners to address conditions created or exacerbated by the storm, identify approaches to rebuilding that will be more resistant to damage from future storm events, and encourage sustainable economic growth.

The first step in the grant process is the preparation of a Strategic Recovery Planning Report (SRPR). An SRPR must be completed for municipalities and counties to be eligible for additional Post Sandy planning assistance. The purpose of the SRPR is to evaluate the impacts of the disaster on relevant community features. The evaluation can be broad or narrow but should focus on planning goals, strategies, and priorities leading to actions that are most urgently needed for public safety and economic recovery. The SRPR should serve as a guide for actions to not only recover from the effects of Superstorm Sandy but also to reduce vulnerabilities to future disasters. This document serves as the SRPR for the County of Cape May, NJ.

# COUNTY PROFILE

## Overview of County

Cape May County is located at the southernmost tip of New Jersey in the Atlantic Coastal Plain. Comprising the Cape May peninsula, in addition to mainland regions and the barrier islands, Cape May is bounded on the north by Atlantic and Cumberland Counties, on the east by the Atlantic Ocean, and on the west and south by the Delaware Bay (see **Map 1-1: Regional Location**). It has a land area of 257 square miles.

With respect to the United States northeast population centers, Cape May County is approximately 150 miles south of New York City, 80 miles southeast of Philadelphia, and 130 miles due east of Washington, D.C. Its location affords the County many unique environmental ecosystems, including tidal and freshwater wetlands, pine forest and coastal plain regions. These environmental features and geographic location makes the County a popular tourist attraction and are prime factors in the success of the County's resort industry.

The County was first discovered and settled by Dutch explorers in the early 17th century. The region eventually grew as its inhabitants further established its whaling and agricultural industries. By the turn of the 20th century, the

| Table 1: Municipalities |
|---|
| **Mainland** |
| Dennis Township |
| Lower Township |
| Middle Township |
| Upper Township |
| Woodbine Borough |
| **Resort** |
| Avalon Borough |
| Cape May City |
| Cape May Point Borough |
| North Wildwood City |
| Ocean City |
| Sea Isle City |
| Stone Harbor Borough |
| West Cape May Borough |
| West Wildwood Borough |
| Wildwood City |
| Wildwood Crest Borough |

County had morphed itself into one of the most popular seaside summer resort destinations. To this day, the City of Cape May hails itself as "The Nation's Oldest Seashore Resort".

The County is comprised of 16 municipalities which can be further designated into one of two categories: the mainland and the resort municipalities. (See **Table 1: Municipalities**)

## Physical Environment

Cape May County is home to a diverse physical environment with three unique areas: the five barrier islands including the resort municipalities; the wetlands (freshwater and estuarine); and the mainland, which is comprised of woodlands and developments. The County's land use pattern is distinctively molded by the vast array of environmentally sensitive features. Large portions of these critical lands are owned by government entities. The County is located entirely within the New Jersey Coastal Plains Province, one the four physiographic regions of the State. Most of Cape May County is located within New Jersey's Coastal Climate Zone except the northwest corner of the County which is located in the Pine Barrens Climate Zone.

The environmental resources provide invaluable assets to the County. The wealth and diversity of ecological areas within the County help to preserve and support the overall resort character and economy of the region. Municipal, County, State and Federal open space encompass 76,567 acres, or 42 percent of the County. According to NJDEP data, there are 81,668 acres of wetlands, representing 45 percent of the County. It is estimated that only 11.5 percent of the total area in the County remains as unconstrained developable land (also known as "uplands"), the majority of which is active farmland. [1] (See **Map 2: Land Use/Land Cover**).

The overall physiography of Cape May County is a low lying, gently rolling plain. The southernmost part of the county is a low sandy peninsula with elevations ranging from 0 to 27 feet above mean sea level. The Great Cedar Swamp and the Timber and Beaver Swamp are two large wetland areas located in the north-central part of the County.

The streams within the County are predominately tidal in their lower reaches, achieving their head in the fresh water swamps and discharging to saltwater marshes near the shore. Extensive tidal marshes border the lower reaches of the Tuckahoe River in the north and Dennis Creek in the west-central part of the County. There are over 1,574 miles of streams, along with approximately 24,150 acres of ponds, lakes, bays and reservoirs.

The entire eastern part of the County mainland consists of a broad tidal marsh area flanked by the five low-lying barrier islands to the east. These islands contain major resort areas that are the heart of the County's economy. The barrier islands extend 32 miles from Ocean City in the north to Cape May City in the South. They are approximately one mile wide at their widest point with the average width being ¼ to ½ mile.

[1] Cape May County Transfer of Development (TDR) Feasibility Study. July 2009.

The construction of the Cape May Canal during the Second World War separated Cape May City, West Cape May, Cape May Point and a portion of Lower Township at southern tip of the County from the remainder of the mainland. This canal is presently managed as a navigable waterway.[2 3]

Approximately 23,000 acres in the northwest portion of the County are regulated under the jurisdiction of the Pinelands Comprehensive Management Plan. Nearly all of the remaining land within the County falls within the Coastal Management Zone, which is under the jurisdiction of the Coastal Area Facility Review Act ("CAFRA") administered by the NJDEP. The Pinelands National Reserve overlaps a portion of the Coastal Management Zone, west of the Garden State Parkway, within Upper Township, Dennis Township, Woodbine Borough and Middle Township. (See **Map 3: Regional Jurisdiction**.)

## Land Use

The resort municipalities are almost completely developed. They represent the major anchor of the County's tourism resort industry. Redevelopment and revitalization of varying levels has been underway in the resort communities, typically including conversions from smaller seasonal cottages to larger homes or two-family dwellings. Conversion of hotel and seasonal rental units to second home condominiums has also been occurring, as evidenced by the loss of 5,690 hotel/motel rooms in the County between 2000 and 2010[4]. Maintaining commercial uses has been an on-going problem being addressed by some of the resort towns to limit residential conversions and expansions or requiring mixed-use developments in business zones.

The mainland has seen extensive growth in residential development since 1970 compared to the resort municipalities. As land prices have increased on the barrier islands, there has been pressure to develop on the mainland. Much of this development has been small residential projects of 24 units or less to remain beneath the NJDEP CAFRA thresholds.

**Table 2: Existing Land Use**

| Land Use | Acres | Percent |
|---|---|---|
| Commercial | 6,983 | 4.5% |
| Industrial | 411 | 0.3% |
| Residential | 29,011 | 19% |
| Apartment | 151 | 0.1% |
| Mobile Home Park | 362 | 0.2% |
| Campground | 2,106 | 1.3% |
| Farm | 7,521 | 4.8% |
| Preserved Farmland | 3,380 | 2.2% |
| Preserved Open Space | 77,286 | 49% |
| Public Property | 7,193 | 4.6% |
| Vacant | 15,105 | 10% |
| Church | 559 | 0.4% |
| Cemetery | 117 | 0.1% |
| Other Exempt | 1,315 | 0.8% |
| School | 592 | 0.4% |
| **Total** | **156,612** | **100%** |

[2] Cape May County Comprehensive Plan. February 15, 2005.

[3] Cape May County Water Quality Management Plan/ Waste Water Management Plan (208 Plan). September 27, 2007

[4] 2010 U.S. Census

Commercial development has also increased to serve the growing year-round population focused along the Route 9 corridor in Rio Grande, Cape May Court House and Marmora. While the County draws considerable funds from seasonal tourism, little revenue is generated via heavy industry, as environmental concerns have limited the establishment or growth of such industrial uses, although mining/quarry uses are prevalent on the mainland.

Campgrounds are a significant use clustered on the mainland. Approximately 1/3 of the seasonal population growth in the mainland communities is directed into campgrounds. As of 2013, the County contained 47 campgrounds with 17,199 licensed campsites, which is greater than the combined total of campsites throughout the rest of New Jersey[5].

In 2013, the County had a supply of over 18,700 hotel and motel rooms, which is a decrease of over almost 5,300 rooms (or 22%) since 2003[6]. A number of golf courses have been developed and support the resort recreation needs. Newer projects of age-restricted developments and golf course/residential developments reflect the expanding residential market on the mainland.

The existing land use patterns within Cape May County are illustrated on **Map 4: Existing Land Use** based on tax class parcel data.

## Demographics

As of 2010, there were 98,365 total dwelling units in the County, a 7.98% increase since 2000. Of these, only 42% are occupied year-round with the rest serving primarily as second homes and seasonal rentals.

The County experienced a decline of almost 5% in permanent population from 102,326 in 2000 to 97,265 in 2010. The County had experienced continuous population growth up until 2000. Essex County was the only other County in the State to have a decrease in population during the last decade. Overall New Jersey grew in population between 2000 and 2010 by 4.5%. Cape May Point, Middle Township, Upper Township and West Wildwood were the only County municipalities that increased in population by 2010. Cape May County ranked 20th out of 21 New Jersey Counties in total population. (See **Table 3: Permanent Population Trends, 1920-2010**.

[5] Cape May County Planning Board, 2013.

[6] Ibid

| Table 3: Permanent Population Trends, 1920-2010 | | | |
|---|---|---|---|
| | **Mainland Communities** | **Resort Communities** | **County Total** |
| **1920** | 8,183 | 11,277 | 19,460 |
| *1920-1930* | *+2,138 +26%* | *+7,888 +70%* | *+10,026 +52%* |
| **1930** | 10,321 | 19,165 | 29,486 |
| *1930-1940* | *+936 + 9%* | *-1,494 - 8%* | *-558 - 2%* |
| **1940** | 11,257 | 17,671 | 28,928 |
| *1940-1950* | *+2,399 +21%* | *+5,804 +33%* | *+8,203 +28%* |
| **1950** | 13,656 | 23,475 | 37,131 |
| *1950-1960* | *+7,083 +52%* | *+4,341 +18%* | *+11,424 +31%* |
| **1960** | 20,739 | 27,816 | 48,555 |
| *1960-1970* | *+6,813 +33%* | *+4,186 +15%* | *+10,999 +23%* |
| **1970** | 27,552 | 32,002 | 59,554 |
| *1970-1980* | *+14,437 +52%* | *+8,275 +26%* | *+22,712 +38%* |
| **1980** | 41,989 | 40,277 | 82,266 |
| *1980-1990* | *+12,535 +30%* | *+288 + 1%* | *+12,823 +16%* |
| **1990** | 54,524 | 40,565 | 95,089 |
| *1990-2000* | *+6,149 +11%* | *+1,088 + 3%* | *+7,237 + 8%* |
| **2000** | 60,673 | 41,653 | 102,326 |
| *2000-2010* | *+2,416 + 4%* | *-7,477 - 18%* | *-5,061 - 5%* |
| **2010** | 63,089 | 34,176 | 97,265 |
| **1920-2010** | +54,906 +671% | +22,899 +203% | +77,805 +400% |

*Source: Cape May County Data Book, January 2003, US Census 2010*

Seasonal fluctuations occur with the summer population reaching 763,940, according to the 2010 Cape May County Summer Population Estimate[7]. About two-thirds of the summer population resides in the resort municipalities. As shown in **Table 4: Municipal Population**, the population in the resort communities increases from about 34,000 to over 500,000 each summer. Collectively, only 7 percent of the barrier island population is year-round residents with 93 percent only visiting during the summer season. The mainland communities see seasonal growth from about 63,000 to only 264,000 in the summer, a large portion of which is attributed to the campgrounds and mobile home parks. Nearly one-quarter of the mainland population is year-round residents with three-quarters only visiting during the summer season.

Cape May County is a popular area for retirement. In 2010, 21.6% of the year-round population or 20,977 persons were elderly (65+ years), which is a higher percentage than any other County in New Jersey. On the barrier islands, 28 percent of the population is age 65 or older, while only 18 percent of the mainland communities are 65 or older. Cape May Point has the highest percentage of elderly population in the County with 56% of its population over age 65.

[7] Cape May County Planning Board 2013.

Year-round population living below the poverty level was 9.2% or 8,776 persons in the County in 2010. Woodbine at 38% and Wildwood at 24% had the highest concentrations of persons living below poverty level based on a percentage of their municipal population. Lower Township had the highest actual concentration of persons living below poverty at 2,372 persons or 11% of the total year-round population.

**Table 4: Municipal Population, 2010**

| Municipality | Permanent Population | Summer Population | Permanent Population Age 65 or Older | | Permanent Population Below Poverty Level | |
|---|---|---|---|---|---|---|
| **Mainland Communities** | **63,089** | **263,869** | **11,486** | **18%** | **5,347** | **8%** |
| Dennis Township | 6,467 | 37,339 | 968 | 15% | 474 | 7% |
| Lower Township | 22,866 | 99,786 | 4,831 | 21% | 2,372 | 10% |
| Middle Township | 18,911 | 71,321 | 3,595 | 19% | 1,103 | 6% |
| Upper Township | 12,373 | 45,940 | 1,766 | 14% | 488 | 4% |
| Woodbine Borough | 2,472 | 9,483 | 326 | 13% | 910 | 37% |
| **Resort Communities** | **34,176** | **500,071** | **9,491** | **28%** | **3,429** | **10%** |
| Avalon Borough | 1,334 | 35,028 | 540 | 40% | 83 | 6% |
| Cape May City | 3,607 | 45,874 | 997 | 28% | 152 | 4% |
| Cape May Point | 291 | 4,100 | 162 | 56% | 12 | 4% |
| North Wildwood | 4,041 | 70,118 | 1,235 | 31% | 480 | 12% |
| Ocean City | 11,701 | 139,654 | 3,471 | 30% | 772 | 7% |
| Sea Isle City | 2,114 | 44,820 | 683 | 32% | 158 | 7% |
| Stone Harbor | 866 | 22,528 | 360 | 42% | 48 | 6% |
| West Cape May | 1,024 | 8,590 | 292 | 29% | 63 | 6% |
| West Wildwood | 603 | 7,468 | 167 | 28% | 46 | 8% |
| Wildwood City | 5,325 | 67,258 | 720 | 14% | 1,225 | 23% |
| Wildwood Crest | 3,270 | 54,633 | 864 | 26% | 390 | 12% |
| **County Total** | **97,265** | **763,940** | **20,977** | **22%** | **8,776** | **9%** |

## Transportation

From north to south, lying along an axis formed by US Route 9 and the Garden State Parkway, the County is approximately 27 miles long. At its widest point (an east-west line through Eldora), the County measures approximately 15 miles.

Cape May County consists of a chain of developed barrier islands connected to the mainland by a series of causeways. The causeways tie into the north/south Route 9/Garden State Parkway corridor that links the County to the northern part of the State. The Garden State Parkway was opened in 1956 and has served as the major transportation link to and within Cape May County. It passes through the length of the County, from the Great Egg Toll Plaza heading 29 miles south to its terminus at Exit 0.

The "northern bay shore" or western part of the County is mostly rural/agricultural land with limited public water or sewer and is less densely developed. It is served by NJ State Route 47.

Transportation access out of the County is limited to road crossings from the Garden State Parkway at the Great Egg Toll Plaza, Route 52 (from Ocean City), Route 49 (Route 50, Route 550, and Route 557 connections) and Route 347. These limited road connections strongly affect evacuation routes and evacuation times together with road flooding hazards during major storms.

One of the most significant negative impacts of tourism in Cape May County is traffic congestion. The heavy reliance on the automobile and lack of adequate mass transportation in the region has contributed to increasing congestion. Parkway traffic has increased in pace with the overall development of the County.

## *Mass Transit*

Bus transportation in Cape May County is provided by three entities: New Jersey Transit, which provides service from Philadelphia/Camden via Sickerville/Atlantic City to Sea Isle, Avalon, Stone Harbor, Wildwood and Cape May; the Five Mile Beach Electric Railway (a private operator) which operates public passenger service serving the Wildwoods, Cape May City, the Wildwoods and Ocean City; and a Fare Free Transportation system operated by the County.

The Cape May County Transportation Plan cites the need for improved/expanded mass transit services to expand commuting options to Atlantic City and other south Jersey employment centers. The Transportation Plan had also identified needed transit alternatives to serve the large numbers of campers traveling between the mainland and beaches and commercial areas to reduce summer congestion.

There are two active rail lines within the County: a freight line that provides coal and fuel oil to the Electric Generating Station in Beesley's Point, and a tourist/passenger rail service between the Cape May County Zoo, Historic Cold Spring Village and the City of Cape May operated by the Cape May Seashore Lines Railroad. There is also a seasonal excursion train between Tuckahoe Station and Richland.

Air travel within the County is facilitated by three airports: the Cape May Airport located in Erma, in the north-central part of Lower Township, the Ocean City Municipal Airport, and the Woodbine Municipal Airport. The Atlantic City International Airport, located approximately 20 miles north of Cape May County services larger commercial aircraft for business as well as private travel.

The Cape May—Lewes (Delaware) Ferry, owned and operated by the Delaware River and Bay Authority, is the major water transportation facility serving Cape May County. A fleet of five vessels capable of carrying approximately one hundred cars and 800 passengers each make Delaware Bay crossings year-round. Terminals are located at the west end of the Cape May Canal and at Breakwater Harbor, Lewes, Delaware.[8]

[8] Cape May County Transportation Plan, 2006

### Bridges

The County owns and maintains 23 bridges and is responsible for maintenance and engineering for the five bridges owned by the Cape May County Bridge Commission. According to the 2006 Transportation Plan, the majority of the County's bridges are in acceptable condition, but some will need extensive maintenance or even complete reconstruction.[9]

### Fishing Boats

Cape May County has a substantial commercial fishing fleet. In 2009, Cape May County ranked fourth nationally in commercial fishing landings, generating $73.7 million with a market value over $440 million.[10] The City of Cape May is the port authority for Cape May Harbor. It is the East Coast's second busiest port for off-loading seafood. Fisherman's Wharf in Cape May Harbor receives about 11 million pounds of seafood every year[11].

The heavy use of the County's Intracoastal Waterway by this fleet, as well as recreational craft during the summer season requires frequent bridge openings. These openings cause traffic congestion which, in turn, impacts negatively on the County's air quality. Scheduled bridge openings are effective in alleviating this problem, but still cause inconvenience to all involved.[12]

## Economy

### Tourism

Tourism is a significant part of Cape May County's economy. As of 2014, County tourism expenditures were over $5.79B, which was a 5.2% increase over 2010[13]. In 1994, the first year the State provided tourism economic growth numbers, Cape May County generated $2 billion in tourism revenue and has continued to register growth every year since.

[9] Cape May County Transportation Plan, 2006

[10] New Jersey Fishing and Aquaculture: Harvesting the Garden State's Waters, www.jerseyseaford.nj.gov, accessed 2015

[11] www.worldportsource.com/ports/commerce/USA_NJ_Cape_May_Harbor_4857.php, accessed March 2015

[12] Cape May County Transportation Plan 2006.

[13] NJ Division of Travel and Tourism. The Economic Impact of Tourism in NJ, 2014.

In 2014, there were 25,674 direct tourism related employment jobs in the County, which is a 2% increase since 2010. Total tourism employment impact in 2014 was estimated at 36,016 jobs. This is 56.9% of the total County employment.[14].

In 2010, second homes, which are classified as seasonal, recreational or occasional use, totaled 48,350. These second homes are increasingly supporting the tourism season and generate more local visitations of second home owners. [15]

## Fishing Industry

A second important aspect of the Cape May economy is the fishing industry. The Port of Cape May/Wildwood is the largest commercial fishing port in New Jersey and ranks as the fifth largest in the United States. According to the County Comprehensive Farmland Preservation Plan, it has nine major docks, employing between 625 and 720 persons and 50 to 150 vessels at any one time.

According to the 2014 NJ Hazard Mitigation Plan, Superstorm Sandy caused severe flooding that mandated statewide closures of waters where shellfish are produced. This prohibited shellfish growers from harvesting their products. Shellfish hatcheries sustained considerable damage from Sandy, including the destruction of and damage to equipment and the working waterfront, inhibiting them from producing seed for farms around the State. The six hatcheries and nurseries that were impacted supply 90% of the seed to clam farmers. Clam growers with leases in the intertidal areas of Barnegat Bay south through Brigantine and in the Sea Isle area of Cape May County have recorded damage to their predator protection screens and product losses on their leases. Losses totaled $18,000 in property damage and $100,000 in product loss.

## Business Establishments

In 2013, there were 3,869 businesses in the County with an estimated labor force of 57,300. There were 560 year-round restaurants and 700 seasonal restaurants, which reflected a 16% decrease in both restaurant categories in the eight years between 2005 and 2013. However, as noted above, tourism expenditures have continued to increase annually[16].

The three top employers in the County are the Woodbine Developmental Center, County of Cape May, and the Cape May Regional Medical Center[17]. Also, as mentioned previously, the commercial fishing industry is very important in Cape May County.

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[14] NJ Division of Travel and Tourism. The Economic Impact of Tourism in NJ, 2014. "County employment shares are comparisons against total county private employment (BEA)."

[15] U.S. Census 2010

[16] Cape May County Planning Board, 2013

[17] Cape May County Planning Board , 2013

The main industries in the County in terms of employment of civilian employed population estimated at 43,170 persons are educational services (23.2%), arts, entertainment, recreation, accommodation and food services (17.5%), retail trade (13.3%), finance and insurance, real estate (8.7%) and construction (7.7%).[18]

## Strengths, Weaknesses, Opportunities & Threats (SWOT)

The first step in developing a strategic action plan for Post Disaster Recovery is to assess the impact of Superstorm Sandy on Cape May County and to identify specific needs for long-term recovery that can be translated into specific types of projects (planning, infrastructure, mitigation & preparedness). A SWOT (Strengths-Weaknesses-Opportunities-Threats) analysis is a structured planning method used to evaluate the strengths, weaknesses, opportunities and threats involved in a project or entity. A SWOT framework involves composing lists of the internal strengths and weaknesses that are relevant to a certain project and then creating lists of external opportunities and threats that could impact the project.

- Strengths: internal characteristics that give an advantage relative to others.
- Weaknesses: internal characteristics that place at a disadvantage relative to others.
- Opportunities: external elements could be exploited to the entity's advantage.
- Threats: external elements in the environment that could cause trouble for the entity.

The following section analyzes the SWOT of Cape May County as they relate to long-term recovery from the impact of Superstorm Sandy.

### *Strengths*

Cape May County has a number of strengths that set it apart from other counties in New Jersey:

- Cape May County's location and ecological wealth has helped to establish and maintain the region as a popular summer shore resort destination over the course of the past century. Part of this appeal lies in a delicate balance between the built-up and natural environments.
- The naturally occurring ecosystems and environments of Cape May County have led to a wealth of publicly owned and protected lands. Various government agencies (e.g. U.S. Fish & Wildlife Service, NJDEP, and Cape May County Park System) and not-for-profit organizations (e.g. Nature Conservancy) have taken an interest in preserving these unique areas of the County. According to the 2007 Cape May County Open Space & Recreation Plan, over 73,000 acres have been preserved, representing 45% of the total land area in Cape May County.

[18] http://rand.camden.rutgers.edu/files/cape-may-county-profile.pdf, accessed March 2015

- Historic and cultural resources are a prime component of the unique environment of Cape May County. There are currently 111 individual historic resources listed on the New Jersey and National Register of Historic Places, nearly 70 percent of which are eligible but not registered. There are currently 6 designated Historic Districts within Cape May County, with an additional 11 historic districts being eligible for registration and 4 historic districts that have been identified but not deemed eligible. As mapped by the NJDEP, there are 366 historic properties within registered historic districts and 332 historic properties within identified/eligible historic districts.
- Cape May County supports an extensive network of nearly 50 privately owned and operated campgrounds. It is estimated that these campgrounds, the majority of which are located in mainland municipalities, can accommodate 50,000 campers. This is estimated to be more than the sum total capacity of campsites (public and private) in the rest of New Jersey. The campgrounds act as both accommodations and recreation facilities.
- There is a Hurricane Evacuation Plan in place for Cape May County, which includes a contraflow (lane reversal) strategy for NJ Route 47/347 to Cumberland County.
- Cape May County coordinates a Shared Services program to help facilitate inter-local agreements to share resources between municipalities and the County.
- Commercial fishing and shellfish harvesting are important components of the Cape May County economy. The Port of Cape May/Wildwood is the largest commercial fishing port in New Jersey and ranks as the fifth largest in the United States.

### *Weaknesses*

While Cape May County's location and ecological wealth are assets that sustain the region as a popular summer shore resort destination, there are weaknesses that Superstorm Sandy exposed:

- Cape May County is a peninsula bounded to the east, south and west by the Atlantic Ocean and the Delaware Bay. These tidally-influenced coastal and riverine waters, coupled with the low topographic elevations of coastal lands, result in increased susceptibility to storm surge flooding events.
- Coastal development on the barrier islands and along the Delaware Bay is vulnerable to damage due to flooding and erosion.
- There are limited mass transit options in Cape May County, which result in an automobile dependent environment.
- There are limited roads in and out of Cape May County, making evacuations during a coastal storm difficult. Evacuation studies prepared in 2006 [19] and 2007 [20] found that the current evacuation plan is ineffective with

[19] New Jersey Department of Transportation (2006). Analysis and Modeling of Cape May County Roadway Elevations and Evacuation Routes.

total evacuation times for the corridor varying from 16 to 89 hours. The studies recommend that the evacuation plan be revised to extend the lane reversal section further south on NJ Route 47/347 to the intersection with US Route 9.

- With 21.6 percent of its population aged 65 and older, Cape May County has the largest percentage of seniors of all the counties in New Jersey.

## Opportunities

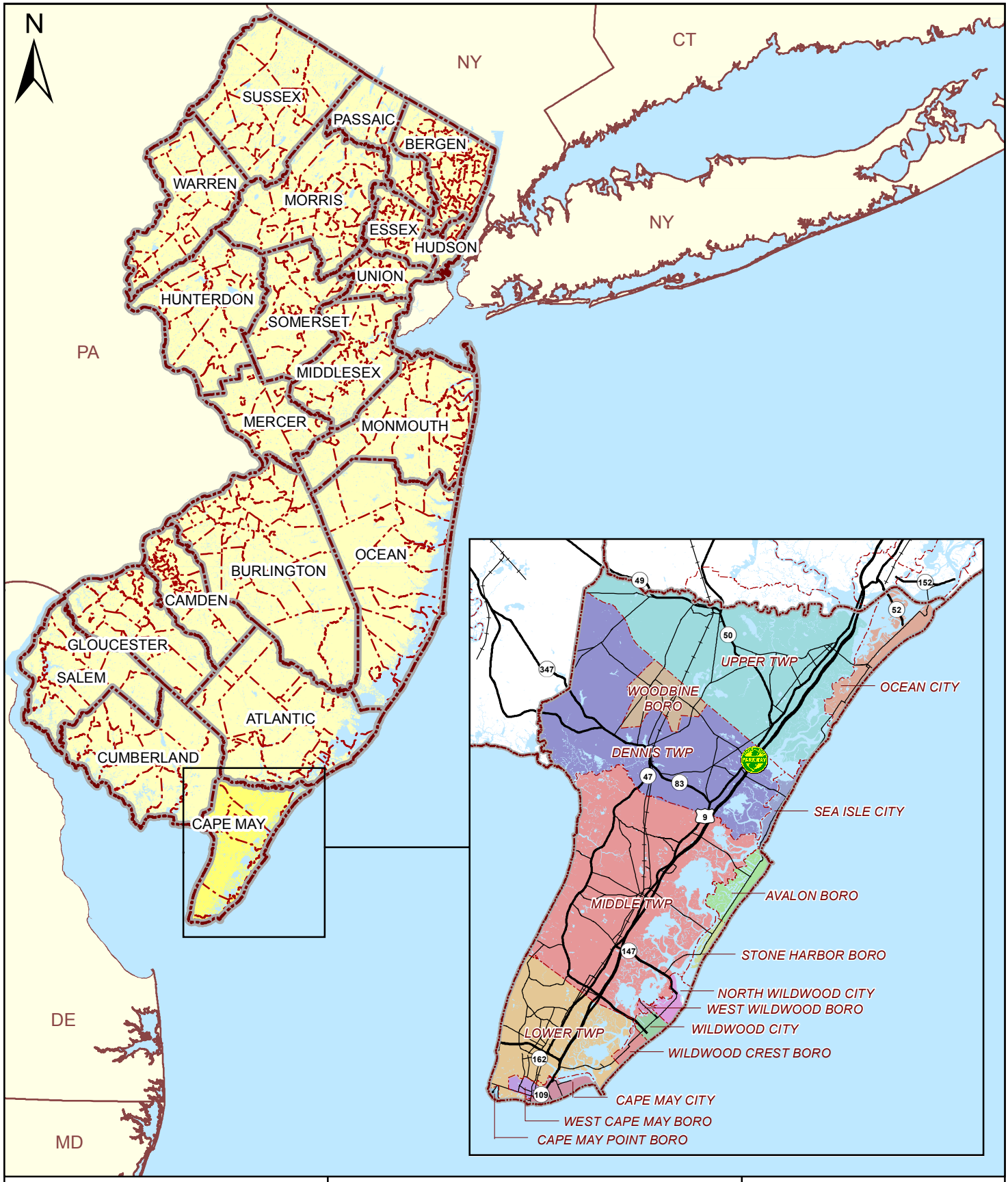
The County has an opportunity to address storm mitigation and resiliency planning. The County should consider the following:

- Recommend development and redevelopment regulations to reduce development in flood prone areas and elevate development above the flood level.
- Conduct engineering studies to evaluate and address flooding conditions on County roadways, especially evacuation routes.
- Increased protection of shore (e.g. dune protection and reconstruction, beach replenishment, etc.).
- Transportation infrastructure improvements to reduce flood constrained road areas through road elevation measures.
- Install bulkheads in back-bay areas.
- Install backup power to stormwater pumps.
- Prepare an updated Hazard Mitigation Plan and follow through with identified strategies.
- Continue to improve on Emergency Management communication and coordination systems.
- Stormwater protection upgrades to reduce flooding and backup.
- Retrofit or replace county communications towers as needed.
- Identify proper locations for and install water draw (siphon) stations to increase fire-fighting capabilities.
- Recommend development or update of local Stormwater Management Plans.
- Strategic replacement of street trees damaged by Sandy to avoid conflict with overhead wires
- Incorporation of new criteria for sites proposed for County facilities that avoids flood prone areas or requires suitable resilient design techniques.
- Develop new criteria for prioritizing improvements to County and State roads, bridges, and other facilities to emphasize evacuation routes and minimize exposure to flood damage.

[20] National Center for Transportation and Industrial Productivity (NCTIP) and New Jersey Institute of Technology (NJIT) (2007). Cape May County Hurricane Evacuation and Elevation Study Extension.

### *Threats*

- With diverse ecosystems—tidal and freshwater wetlands, pine forest and coastal plain regions—occurring in more than half of the County, remaining developable lands are diminishing rapidly. Many of the barrier island resort communities have already built-out the majority of the developable land areas. Pressures to develop the remaining lands threaten the viability of the very resources that make Cape May such a desirable tourist attraction.
- A major hurdle to overcome for any recovery or resiliency project will be costs of such a project. Potential funding sources will need to be identified and pursued.
- Climate change and sea level rise will continue to increase the vulnerability of Cape May County to impacts from future storms.

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# Map 1: Regional Location

## Strategic Recovery Planning Report

County of Cape May, New Jersey

MASER CONSULTING P.A.

October 2015

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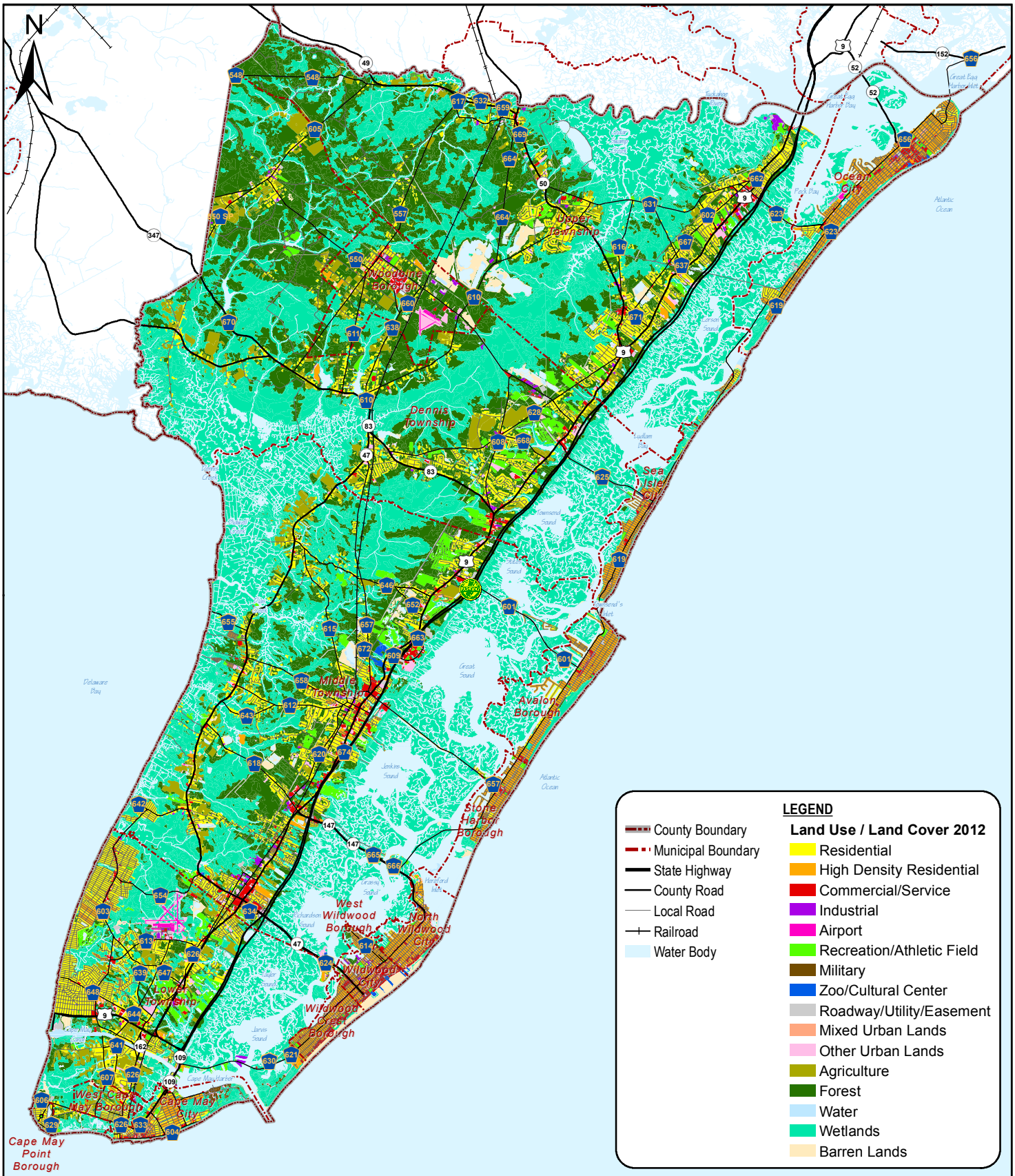


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# Map 2: Land Use / Land Cover

## Strategic Recovery Planning Report

County of Cape May, New Jersey

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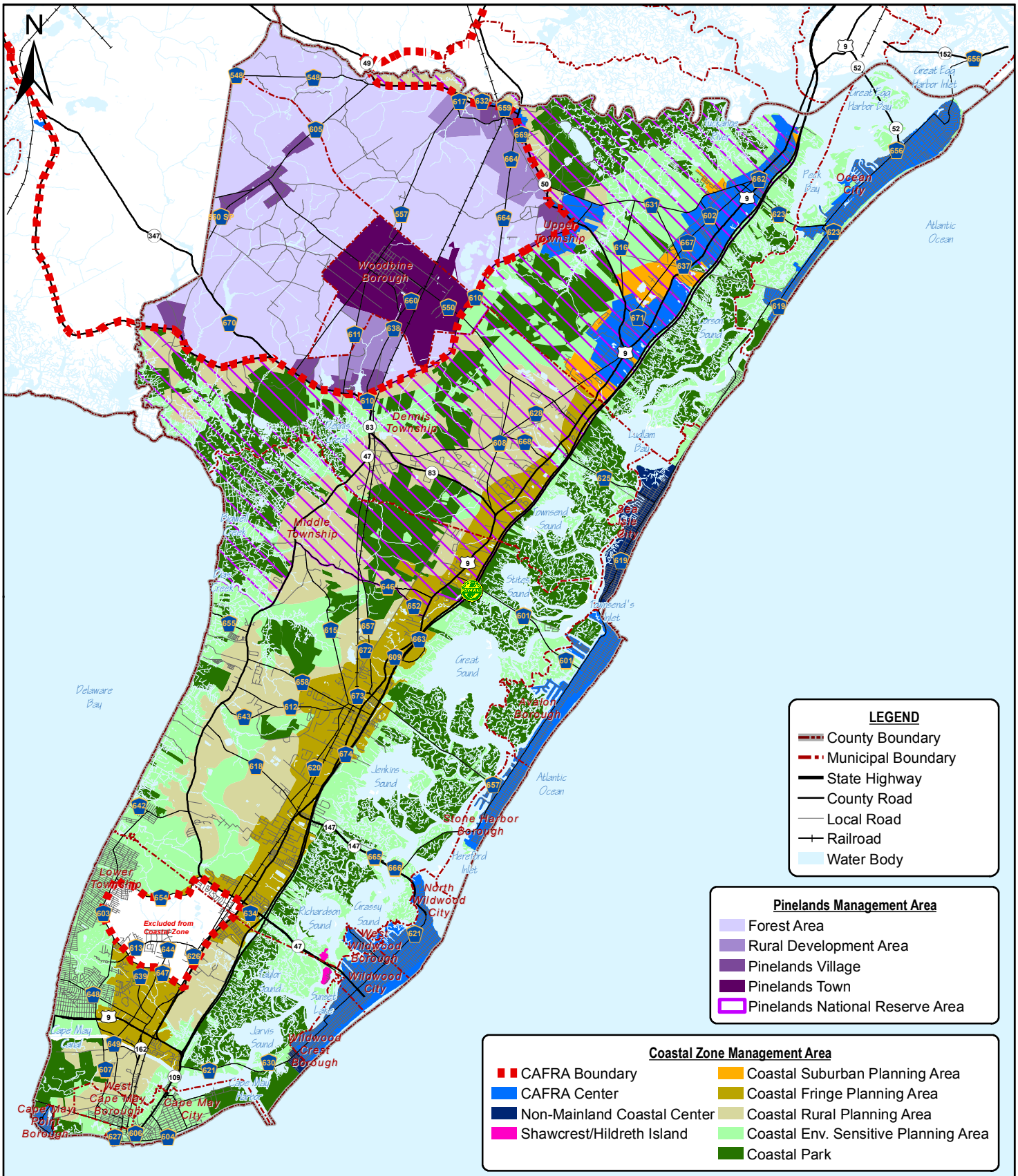


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# Map 3: Regional Jurisdiction

## Strategic Recovery Planning Report

County of Cape May, New Jersey

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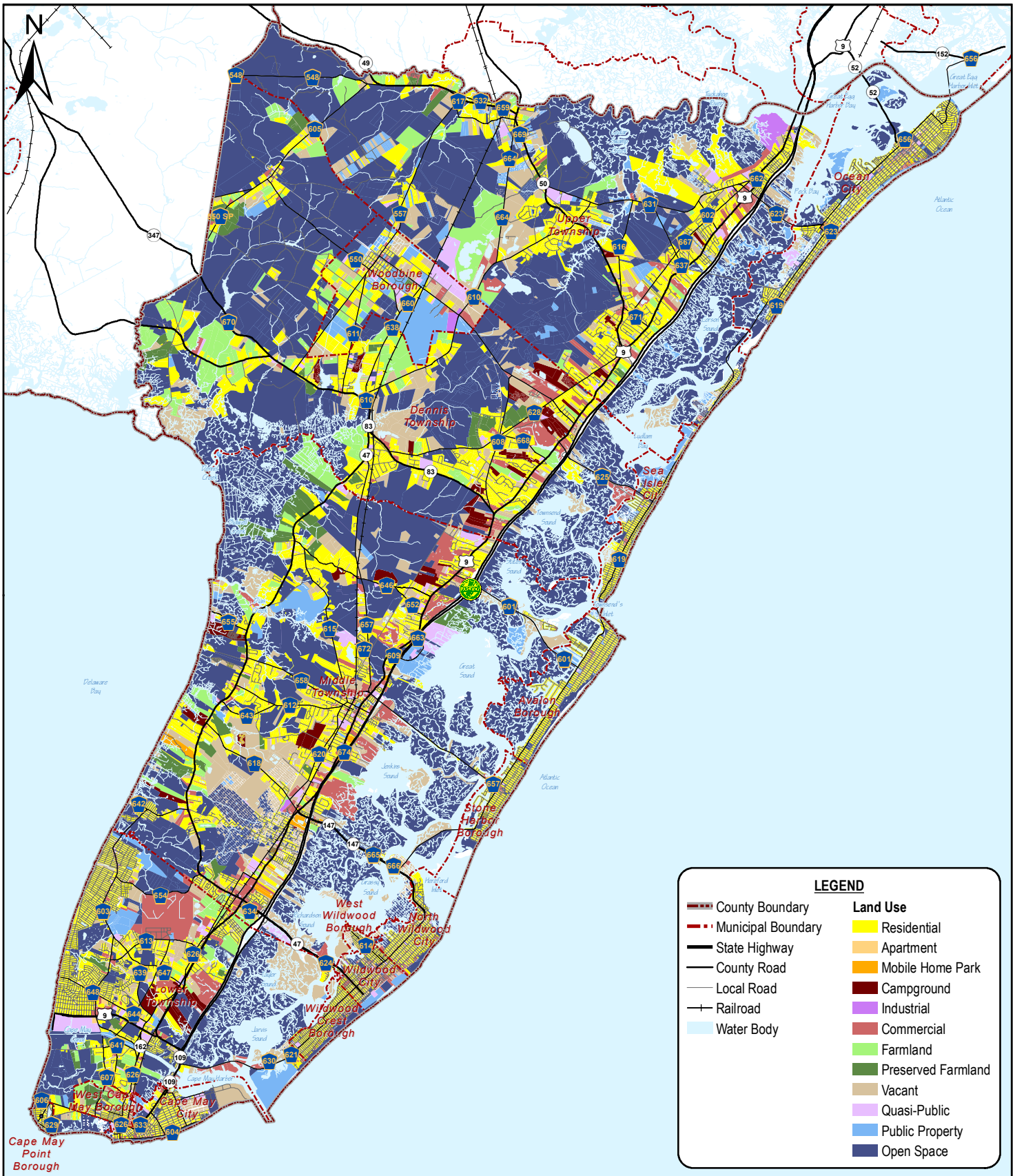


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# Map 4: Existing Land Use

## Strategic Recovery Planning Report

County of Cape May, New Jersey

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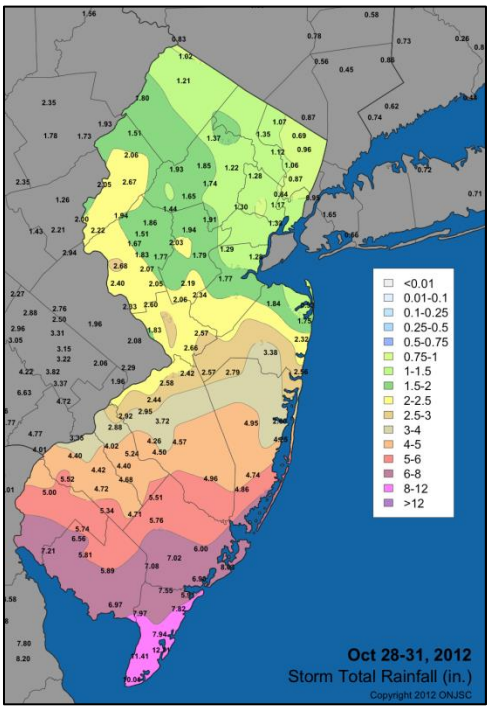
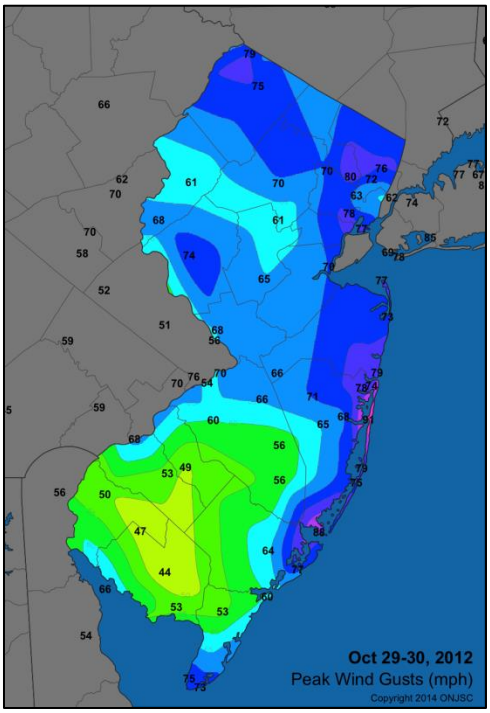
# IMPACT ASSESSMENT

Hurricane Sandy was classified as a Category 1 hurricane as it approached the New Jersey coastline on the morning of October 29, 2012, and was downgraded to a post-tropical cyclone as it came ashore near Atlantic City that evening. The storm produced record-breaking high tides and wave action combined with sustained winds as high as 60 to 70 mph, with wind gusts as high as 80 to 90 mph across the State. With an estimated $29.4 billion in damage, Superstorm Sandy was the costliest natural disaster in the State of New Jersey. Sandy destroyed or significantly damaged 30,000 homes and businesses, affected 42,000 additional structures, and directly or indirectly resulted in 38 deaths throughout the State. Approximately 2.4 million households in the State lost power. New Jersey's shellfish hatcheries were also devastated by the storm, including over $1 million of losses to buildings, equipment and products. [21]




Prior to the storm, on October 26th, Cape May County officials advised residents on barrier islands to evacuate, which became a mandatory evacuation on October 28th. Tolls were suspended northbound on the Garden State Parkway and westbound on the Atlantic City Expressway starting at 6:00 a.m. on October 28th. Evacuation orders were lifted for Cape May County on November 1st.




Cape May County received the highest levels of rainfall in New Jersey between October 28th and October 31st, with 12.7 inches reported in Stone Harbor, 11.7 inches in Wildwood Crest, and 11.4 inches in Middle Township. Peak wind gusts in Cape May County were measured at 73 mph in Cape May, 60 mph in Ocean City, and 53 mph in Woodbine.[22]

[21] State of New Jersey. *State of New Jersey 2014 Hazard Mitigation Plan.*

[22] Office of the New Jersey State Climatologist at Rutgers. *Post Tropical Storm Sandy Event Overview.* http://climate.rutgers.edu/stateclim/?section=njcc&target=sandy

## Repetitive Loss Properties

National Flood Insurance Program data is a useful indicator to assess where damaging flooding happens and how much damage the flooding events cause. According to the *State of New Jersey 2014 Hazard Mitigation Plan* (NJHMP), there are 55,703 active NFIP policies in Cape May County, including 573 within the V-zone (high velocity wave action).

The NJDEP provided a list of residential and non-residential properties in Cape May County with NFIP policies, past claims and multiple claims (RLPs), current as of February 4, 2015. The NFIP Repetitive Loss File contains losses reported from individuals who have flood insurance through the Federal Government. A property is considered a repetitive loss property when there are two or more losses reported which were paid more than $1,000 for each loss. The two losses must be within 10 years of each other and be at least 10 days apart. Only losses since January 1, 1978 that are closed are considered.

According to section 1361A of the National Flood Insurance Act, as amended (NFIA), 42 U.S.C. 4102a, a severe repetitive loss (SRL) property is defined as a property that is covered under an NFIP flood insurance policy and:

- Has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or
- For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.
- For both of the above, at least two of the referenced claims must have occurred within any 10- year period, and must be greater than 10 days apart.

**Tables 5** and **6** summarize the occupancy classes of the FEMA repetitive loss and severe repetitive loss properties in the County. Single-family dwellings make up the majority of repetitive loss (56%) and severe repetitive loss (51%) properties in the County.

The location of the properties with policies, claims and repetitive and severe repetitive flooding were geocoded by FEMA with the understanding that there are varying tolerances between how closely the longitude and latitude coordinates correspond to the location of the property address, or that the indication of some locations are more accurate than others.

**Table 5: Summary of Repetitive Loss Structures in Cape May County**

| Occupancy Class | Repetitive Loss (RL) Properties | Severe Repetitive Loss (SRL) Properties | Total (RL + SRL) |
|---|---|---|---|
| Single Family | 1,018 | 242 | 1,260 |
| Condo | 21 | 15 | 36 |
| 2-4 Family | 483 | 123 | 606 |
| Other Residential | 81 | 19 | 100 |
| Non Residential | 226 | 75 | 301 |
| **Cape May County** | **1,829** | **474** | **2,303** |

| Table 6: Repetitive Loss Structures in Cape May County by Municipality | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Municipality | Repetitive Loss (RL) Properties | | | | | Severe Repetitive Loss (SRL) Properties | | | | |
| | Single Family | 2-4 Family | Condo | Other Residential | Non Residential | Single Family | 2-4 Family | Condo | Other Residential | Non Residential |
| Avalon Borough | 83 | 18 | 2 | 1 | 21 | 16 | 4 | 1 | 1 | 7 |
| Cape May City | 82 | 16 | 4 | 9 | 19 | 5 | 2 | 1 | 0 | 5 |
| Cape May Point Borough | 11 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dennis Township | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lower Township | 6 | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 4 |
| Middle Township | 78 | 2 | 1 | 0 | 3 | 12 | 1 | 1 | 0 | 0 |
| North Wildwood | 154 | 98 | 4 | 9 | 48 | 34 | 26 | 1 | 5 | 17 |
| Ocean City | 211 | 170 | 5 | 37 | 51 | 35 | 14 | 2 | 8 | 10 |
| Sea Isle City | 50 | 71 | 2 | 10 | 18 | 14 | 19 | 4 | 4 | 8 |
| Stone Harbor Borough | 52 | 9 | 0 | 5 | 20 | 12 | 12 | 2 | 1 | 8 |
| Upper Township | 0 | 0 | 0 | 0 | 0 | 27 | 7 | 0 | 0 | 4 |
| West Cape May Borough | 0 | 0 | 0 | 0 | 0 | 10 | 2 | 0 | 0 | 0 |
| West Wildwood Borough | 0 | 0 | 0 | 0 | 0 | 251 | 62 | 1 | 1 | 8 |
| Wildwood City | 0 | 0 | 0 | 0 | 0 | 105 | 67 | 4 | 9 | 44 |
| Wildwood Crest Borough | 0 | 0 | 0 | 0 | 0 | 11 | 3 | 0 | 0 | 4 |
| Woodbine Borough | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Cape May County** | **727** | **387** | **19** | **71** | **182** | **533** | **219** | **17** | **29** | **119** |

Of the 2,303 repetitive loss properties in Cape May County, 848 had claims in October 2012. The total claims for those RL properties after Sandy was $45.6 million, including $39.3 for the buildings and $6.4 million for the contents.

## Ratable Loss

Another indicator of impacts is changes in the assessed property values before and after Superstorm Sandy. This analysis is based on Mod-IV tax parcel data from 2012 (Pre-Sandy) and 2013 (Post-Sandy). Changes in assessed property values were analyzed to identify properties that were damaged by Sandy. Equalization ratios for 2012 and 2013 were utilized to adjust the assessed values for each municipality to approximate market value. It is important to note that while the change in ratables can be used as an indicator or impacts, it cannot be determined from the data available whether the losses were directly or indirectly related to Superstorm Sandy.

As shown in **Table 7**, the analysis of changes in equalized assessed property values reported by the NJ Department of Treasury between 2012 and 2013 indicates a loss of $2 billion in ratable property value, County-wide. The municipalities with the greatest losses were Ocean City, Stone Harbor, Lower Township and Avalon, respectively.

| Table 7: Ratable Loss | | | | |
|---|---|---|---|---|
| **Municipality** | **2012 Equalized Assessed Property Value** *(in billions)* | **2013 Equalized Assessed Property Value** *(in billions)* | **Loss in Equalized Assessed Property Value** *(in billions)* | **Percent Loss** |
| Avalon Borough | $7.771 | $7.638 | $0.133 | 2% |
| Cape May City | $2.885 | $2.799 | $0.087 | 3% |
| Cape May Point Borough | $0.519 | $0.509 | $0.010 | 2% |
| Dennis Township | $0.923 | $0.880 | $0.043 | 5% |
| Lower Township | $4.018 | $3.785 | $0.233 | 6% |
| Middle Township | $2.954 | $2.823 | $0.132 | 4% |
| North Wildwood City | $2.824 | $2.737 | $0.087 | 3% |
| Ocean City | $12.238 | $11.637 | $0.601 | 5% |
| Sea Isle City | $4.472 | $4.352 | $0.120 | 3% |
| Stone Harbor Borough | $4.438 | $4.196 | $0.242 | 5% |
| Upper Township | $2.142 | $2.027 | $0.115 | 5% |
| West Cape May Borough | $0.492 | $0.454 | $0.037 | 8% |
| West Wildwood Borough | $0.254 | $0.241 | $0.013 | 5% |
| Wildwood City | $1.594 | $1.501 | $0.094 | 6% |
| Wildwood Crest Borough | $2.251 | $2.201 | $0.050 | 2% |
| Woodbine Borough | $0.194 | $0.189 | $0.005 | 3% |
| **Total** | **$49.968** | **$47.967** | **$2.001** | 4% |

Source: NJ Department of the Treasury, Table of Equalized Valuations, 2012 & 2013. http://www.state.nj.us/treasury/taxation/lpt/lptvalue.shtml

## Rutgers University Impact Assessment

In October 2013, Rutgers University published a study entitled "The Impact of Superstorm Sandy on New Jersey Towns and Households". The report presents a detailed geographic analysis to determine where New Jersey remains vulnerable. It also provides the first accurate measure of power outages by town across the state and the results of the Rutgers-Newark Sandy Survey of New Jersey municipalities. The report includes a *Sandy Community Hardship Index,* which quantifies the wide range of types and degrees of damage incurred by New Jersey municipalities.

### *Community Hardship Index*

The Community Hardship Index is a standardized way to measure economic and physical damage, controlling for population differences so that the impact can be compared across all of New Jersey's 21 counties and 553 municipalities that lost power or reported damage. The index covers economic and physical impact in the residential, commercial, and municipal sectors. Cape May County scored 47 on the Community Hardship Index, making it the 13th hardest hit county in New Jersey.

Power outages added to economic hardship by closing businesses and slowing disaster mitigation efforts by rendering equipment such as sump pumps inoperable. To compensate for inaccurate and conflicting data available from the power companies, the Index uses a proxy - the number of days public schools were closed - to understand the duration of power loss to each community. Based on this evaluation, power was out 4 days in Cape May County following Sandy.

Residential damage measures scope and severity of damage. Because knowledge of FEMA Individual Assistance (IA) may not have been uniform across the state, the scope and severity are measured by the number and amount of private insurance residential claims as reported by the New Jersey Department of Banking and Insurance (DOBI), as of May 3, 2013. Cape May County had nearly 10,000 claims accounting for 7 percent of the county-wide housing stock. The average residential paid loss was $242 per housing unit in Cape May County.

Commercial damage measures scope and severity of damage, as indicated by the number and amount of private insurance commercial claims. Commercial losses in Cape May County were reported for 1.21 percent of nonresidential properties at an average of $67 per property.

The municipal damage area is measured by the dollar amount of FEMA Public Assistance per capita. Cape May County was the third highest county at $42 per capita.

Shelter services measures the number of people served as of May 2013, as recorded by the Red Cross National Shelter System, controlled by county size. Cape May County had 3 people per 1,000 in temporary shelters.

## Household Hardship Index

While towns and counties were challenged to respond to the damage inflicted by Sandy, households were not spared the storm's wrath. This is especially true for those that earn less than the cost of basic household necessities, defined as the ALICE Threshold. To understand how these fragile households fared in particular in the aftermath of the storm, a new measure has been developed, which evaluates conditions at both the county and municipal level. The Household Hardship Index measures the scope, severity, and resilience of households with income below the ALICE Threshold. Cape May County scored 40 on the Household Hardship Index, ranking 18th of the 21 Counties. Cape May County had nearly $8 million in lost wages, an average of $392 per household, due to Super Storm Sandy. Cape May County has an average FEMA IA assistance of $4,070.

Lack of homeowners insurance threatens one's ability to repair damage or recoup losses. Cape May County had 52 percent of households below the ALICE Threshold with no homeowners insurance.

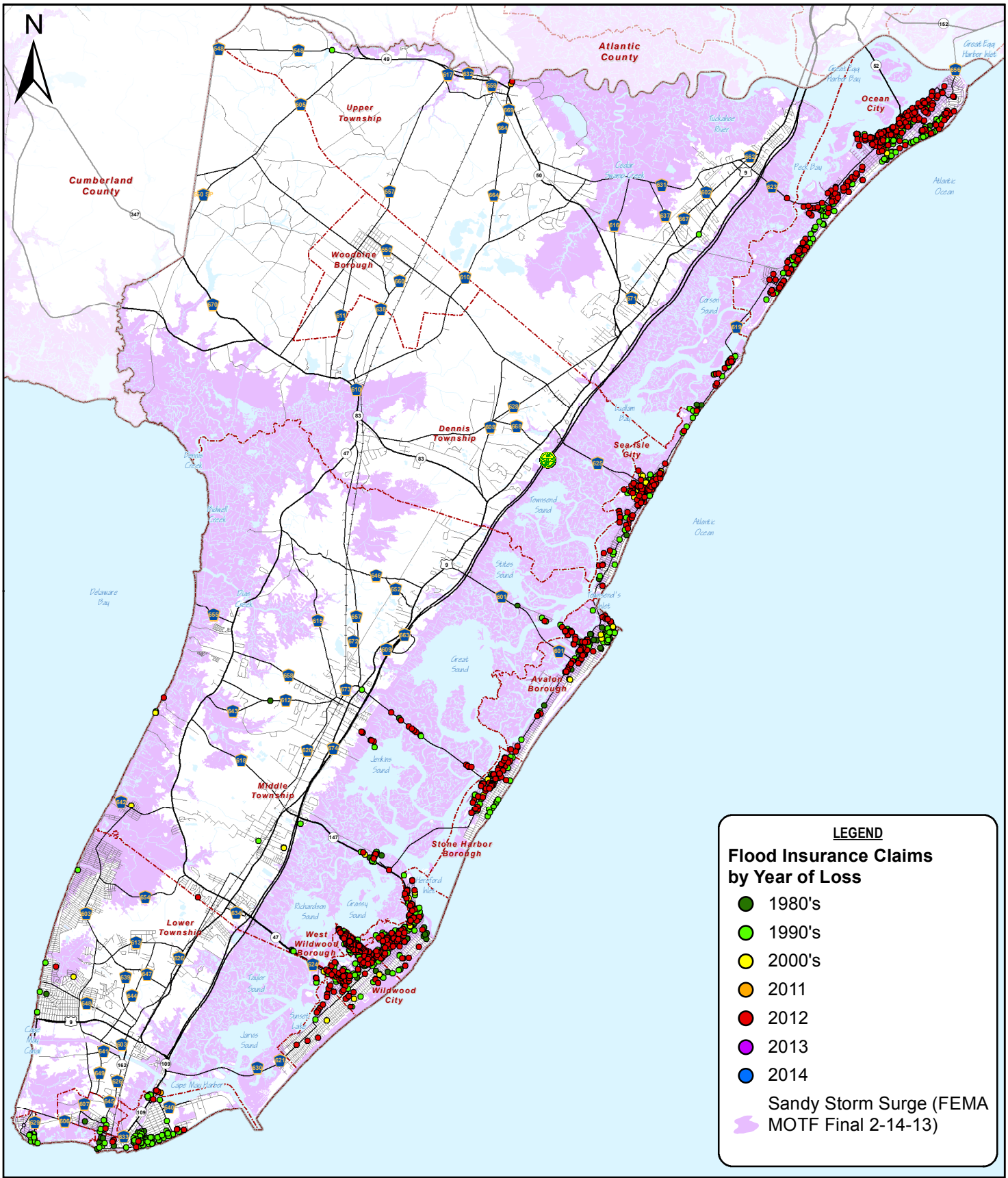
## Municipal Index Scores

The Community and Household Hardship Indexes at the municipal level reveal an even wider range of impact, including pockets of severe hardship across the state that was not visible in the county analysis. According to the Community Index, Stone Harbor was hardest hit municipality in Cape May County with a community index of 62, ranking 54th in the state. With a score of 55, Ocean City had the highest score on the Household Index in Cape May County, ranking 128th in the state. Cape May Point was the least severely impacted in Cape May County and the State of New Jersey. (See **Table 8.**)

| Table 8: Community Index and Household Index | | | | |
|---|---|---|---|---|
| Municipality | Community Hardship | | Household Hardship | |
| | Index | Rank | Index | Rank |
| Avalon | 46 | 327 | 44 | 422 |
| Cape May City | 46 | 343 | 47 | 340 |
| Cape May Point | 40 | 535 | 34 | 550 |
| Dennis Twp. | 54 | 138 | 46 | 379 |
| Lower Twp. | 42 | 470 | 47 | 347 |
| Middle Twp. | 45 | 395 | 50 | 257 |
| North Wildwood | 46 | 361 | 50 | 255 |
| Ocean City | 50 | 227 | 55 | 128 |
| Sea Isle City | 47 | 295 | 46 | 357 |
| Stone Harbor | 62 | 54 | 41 | 477 |
| Upper Twp. | 46 | 104 | 44 | 421 |
| West Cape May | 43 | 447 | 47 | 339 |
| West Wildwood | 45 | 405 | 48 | 314 |
| Wildwood | 44 | 415 | No Data | No Data |
| Wildwood Crest | 44 | 419 | No Data | No Data |
| Woodbine | 45 | 373 | No Data | No Data |

## *Loss of Revenue*

The Press of Atlantic City estimates that total property values in New Jersey dropped by $4.3 billion, and the Star-Ledger estimates they dropped by $5 billion, costing local government more than $77 million in revenue. Cape May County is reported to have lost $26 million from its total ratable base due solely to storm damage. To fill the budget gap from lost revenue, FEMA offers a Community Disaster Loan program for any town with projected revenue shortfall of at least 5 percent (lost tax ratables, as well as parking meters, hotel taxes and beach badges). As of September 2013, 60 loan applications were approved for municipalities and other public entities throughout New Jersey, totaling $174 million. None of the Cape May County municipalities are reported to have received a Community Disaster Loan.

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# Map 5: Repetitive Loss Properties

## Strategic Recovery Planning Report

County of Cape May, New Jersey

MASER CONSULTING P.A.

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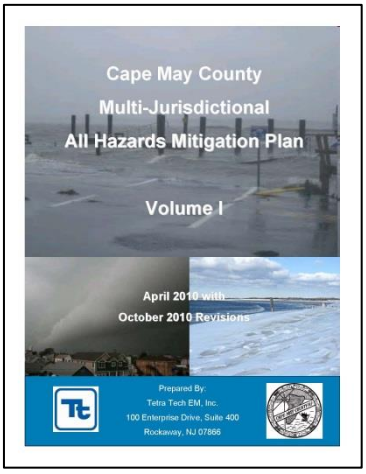
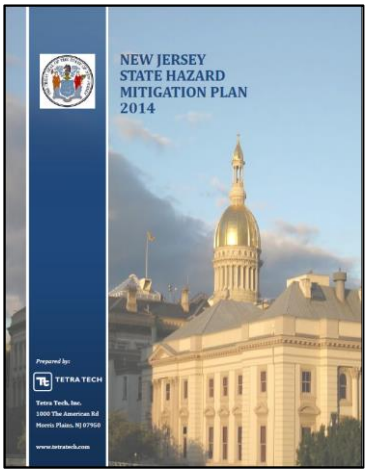
# VULNERABILITY ASSESSMENT

## Hazard Mitigation Plans




The *Cape May County Multi-Jurisdictional All Hazards Mitigation Plan, Volumes I and II* ("CMCHMP") was prepared by TetraTech, Inc. in April 2010, with October 2010 revisions. The CMCHMP was approved by FEMA on January 14, 2011 and expires January 14, 2016. The CMCHMP was prepared in response to the Disaster Mitigation Act of 2000, which requires that states and local governments prepare all-hazard mitigation plans in order to remain eligible to receive mitigation funds that are annually appropriated or made available in the wake of federally-declared disasters. The 2010 CMCHMP contains a thorough analysis of vulnerability in Cape May County and analyzes natural hazards, human-made hazards and climate change hazards.




The *State of New Jersey 2014 Hazard Mitigation Plan* (NJHMP) was prepared by TetraTech, Inc. for the New Jersey Office of Emergency Management (NJOEM) – Recovery Bureau. The 2014 NJHMP is an update to the 2011 NJHMP to provide additional information regarding recent hazard events, such as Superstorm Sandy. The NJHMP outlines a strategy to reduce risks from hazards and serves as the basis for prioritizing future project funding.

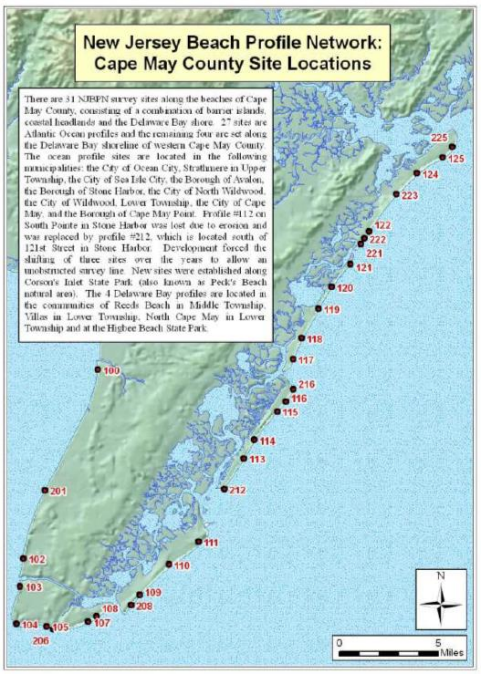
### *Critical Facilities Vulnerability Assessment*

The NJHMP summarizes "critical facilities" (hospitals, shelters, fire departments, schools, ambulance buildings, etc.) that would be vulnerable to various hazards, including wildfire, flooding, sea level rise, etc. Cape May County has 229 critical facilities that were analyzed. Three of the critical facilities are located in an area vulnerable to wildfires. None of the Cape May County critical facilities are within ten miles of a nuclear power plant. There are 75 facilities in the Special Flood Hazard Area, where there is a 1% annual chance of flooding and 87 critical facilities are vulnerable to impacts from two feet of sea level rise. Some facilities may be at risk for more than one incident.

| Table 9: Vulnerability of Critical Facilities | | | | |
|---|---|---|---|---|
| **Facility Type** | **Total Critical Facilities in County** | **Within SFHA 1% Annual Chance Flood Zone** | **Vulnerable to Wildfire** | **Vulnerable to Sea Level Rise SFHA +2.0 feet** |
| Airport | 2 | 1 | | 1 |
| Special needs | 10 | 2 | | 2 |
| Dam | 16 | 9 | 1 | 7 |
| EMS | 32 | 12 | 1 | 16 |
| Emergency Operations | 1 | | | |
| Ferry | 1 | 1 | | |
| Fire Station | 36 | 16 | | 19 |
| Highway Bridge | 2 | 2 | | |
| Medical | 1 | | | |
| Military | 1 | | | 1 |
| Police | 14 | 6 | 1 | 8 |
| Port | 1 | 1 | | 1 |
| Potable Water | 1 | 1 | | |
| School | 42 | 11 | | 15 |
| Shelter | 63 | 12 | | 12 |
| Wastewater | 6 | 1 | | 5 |
| **Total** | **229** | **75** | **3** | **87** |

## Coastal Erosion

Cape May County contains 31 NJBPN (NJ Beach Profile Network) survey sites along the beaches, consisting of barrier islands, coastal headlands, and the Delaware Bay shoreline. Of those 31 survey sites, 27 sites are Atlantic Ocean profiles and 4 sites are set along the Delaware Bay shoreline. The 25-year assessment for Cape May County has shown that the multiple episodes and variety of beach restoration projects significantly improved the quality, shore-protection value, and recreational use of the beaches throughout the County. Multiple beach nourishment projects have given Cape May County a strong, positive change value in both sand volume and shoreline position.




According to the *Assessment of Cape May County Beaches at the NJBPN Sites After Hurricane Sandy* by Richard Stockton College, Cape May County's beaches did not sustain the amount of damage and erosion that similar beaches in the northern Counties experienced. Elevations for wave run-up on dunes were between 13.5 and 14.5 feet (NAVD

88 elevation). This was 10 feet lower than similar measurements made in Long Branch, Monmouth County. In addition, many of the Cape May communities had been participants in the Philadelphia Army Corps Shore Protection projects, starting in 1989 with Cape May City. Wide beaches with in-depth dunes provided the protection needed to prevent wave damage and flooding of the oceanfront streets with sand. A few places suffered mostly due to narrow beaches being unable to limit wave impacts on the dunes. In only a few places were the horizontal erosion rates during Sandy were sufficient to cut through and produce over-wash, including Ocean City, Sea Isle City, and Wildwood.[23]

## *Flooding*

The NJHMP includes an analysis of potential loses based on the preliminary work map flood hazard areas. For Cape May County, the NJHMP estimates that 39,283 people reside in the Special Flood Hazard Area (SFHA), representing 40.4 percent of the total County population. The estimated general building stock exposure within the SFHA is estimated at $15.215 billion, representing 61.7 percent of the County. The plan estimates that there were over 10,000 more NFIP claims after Superstorm Sandy than before. After Sandy, there were 200 additional repetitive loss properties and 57 additional severe repetitive loss properties. Cape May County has the greatest number of repetitive loss properties of all the New Jersey counties.

According to the Flood Insurance Study (FIS) prepared by FEMA on June 30, 2014, "the history of flooding within Cape May County indicates that major floods can occur during any season of the year, particularly in the late summer and fall, when high tides are generated in Delaware Bay and along the Atlantic coastline. Flooding occurs from tropical storms, nor'easters, and severe thunderstorm activity. Most serious tidal flooding problems are attributed to hurricanes, which occur during the late summer and early autumn. In addition to heavy precipitation, hurricanes produce high tides and strong surging waves, which can result in severe damage to coastal areas. Although nor'easters can develop at almost any time of the year, they are more likely to occur during the winter and spring. Thunderstorms are a common occurrence during the summer months".

Prior to Superstorm Sandy, FEMA had begun a coastal flood study to update Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) reports for portions of New Jersey using improved methods and data to better reflect coastal flood risk. After Sandy, FEMA released Advisory Base Flood Elevation (ABFE) maps for certain communities based on the partially completed FIS's, which were designed to help in rebuilding and recovery efforts. For Cape May County, the ABFE maps were released on January 28, 2013. As illustrated in **Map 5: Advisory Base Flood Elevations - Flood Hazard Areas**, FEMA included 41.3 square miles within Zone A (100 Year Flood Plain). Zone V (100 Year Flood Plain with High Velocity Wave Action) included 140.5 square miles and Zone X (500 Year Flood Plain) included 6.6 square miles.

[23] Richard Stockton College of New Jersey. 2012. An Assessment of Cape May County beaches at the New jersey Beach Profile Network (NJBPN) Sites After Hurricane Sandy Related to (DR-NJ 4086).

Subsequently, FEMA released preliminary work maps, which included the full results of the coastal flood study on June 18, 2013. FEMA's preliminary working maps are based on the same underlying data as the ABFE maps, but include the results of a more refined analysis of shoreline conditions, including the effects of erosion and wave run-up. As illustrated in **Map 6: FEMA Preliminary Working Map - Flood Hazard Areas**, Zone V was scaled back significantly, encompassing only 41.17 square miles along the Atlantic Ocean coastline and the shores of the sounds and bays. The FEMA Preliminary Working Map included 114.6 square miles within Zone A and 15.2 square miles within Zone X.

Preliminary FIRMs and FIS reports for Cape May County were released January 30, 2015. The Preliminary Flood Hazard Areas are similar to the Preliminary Working Map. The Preliminary Flood Hazard Areas include 41.3 square miles in Zone V, 116.9 square miles within Zone A, and 14.2 square miles within Zone X (see **Map 7: FEMA Preliminary Flood Hazard Areas**).

While the National Flood Insurance Program (NFIP) floodplain management regulations do not require communities to use flood hazard data from the advisory or preliminary flood data, in cases where BFEs have increased and/or a more restrictive flood zone has been established, communities have the responsibility to ensure that new or improved construction as well as the health and safety of citizens are protected.

#### *Sea, Lake and Overland Surges from Hurricanes (SLOSH)*

The National Weather Service has developed a computer model, known as SLOSH (Sea, Lake and Overland Surges from Hurricanes) to estimate the storm surge heights and winds resulting from hypothetical hurricanes. SLOSH is best used for defining the potential flooding from storm surge for a location from a threatening hurricane, rather than as a predictor of the specific areas that will be inundated during a particular event. **Maps 11-14** show the projected near worst case storm surge flooding (inundation) scenarios using the National Weather Service (NWS) SLOSH model maximum of maximums (MOMs) product for different hurricane wind categories at a high tide. The inundation projected for a Category 1 storm is comparable to the FEMA 100-year flood hazard areas. A Category 4 storm would have catastrophic flood levels throughout the County, with the barrier islands and much of the mainland inundated to a level greater than 9 feet above ground level.

### *High Wind*

High winds associated with a hurricane or coastal storm often result in power outages, disruptions to transportation and evacuation routes, property damage, injuries and loss of life. Substantial damage can occur from trees, branches, and other objects that fall onto power lines, buildings, roads, vehicles, and people.

Due to Cape May County's coastal location, the vulnerability associated with coastal storms is primarily associated with tropical storm/hurricane-related rains, storm surge and severe winds. According to the CMCHMP, the entire inventory of structures in Cape May County is at risk of being damaged or lost due to impacts of coastal storms (severe wind). Certain areas, infrastructure, and types of building are at greater risk than others due to proximity to falling hazards and manner of construction.

The CMCHMP performed a HAZUS-MH MR4 analysis to estimate potential losses associated with hurricane-related winds. Potential losses associated with high wind events were calculated for Cape May County for two probabilistic hurricane events, the 100-year and 500-year MRP hurricane events. The potential impacts on population, existing

structures and critical facilities were analyzed for wind-related damage only scenarios. The results of the HAZUS-MH MR4 analysis, as stated by the CMCHMP, are as follows:

> For the 100-year scenario run for the County as a whole, wind speeds equate to a Category 1 to 2 hurricane (the maximum 3-second gust wind speeds for the County range from 84 to 98 mph). HAZUS-MH MR4 estimates less than one-percent of the general building stock will be completely destroyed due to wind damage alone. Residential buildings comprise the majority of the building inventory and are estimated to experience the majority of building damage. Approximately 10% of the residential building stock is estimated to experience minor-to-moderate damage; however, nearly 90% of the residential building stock does not experience any damage.
>
> The total damage to buildings (structure and contents) for all occupancy types across the County is estimated to be greater than $172 million for the 100-year MRP wind-only event, and nearly $1.7 billion for the 500-year MRP wind-only event. The majority of these losses are to the residential building category.

## NJDCA CDBG Disaster Recovery Action Plan

### *Impact Unmet Need and Assessment*

The New Jersey Department of Community Affairs (NJDCA) has prepared a *Community Development Block Grant (CDBG) Disaster Recovery Action Plan*, which was approved by the US Department of Housing and Urban Development (HUD) on April 29, 2013. The Action Plan provides guidance for the appropriation of monies targeted for disaster recovery from the federal government, in accordance with the Disaster Relief Appropriations Act of 2013 (P.L. 113-2, approved January 29, 2013). The Action Plan includes an assessment of impacts and unmet needs from Superstorm Sandy.

According to the impact assessment, 5 percent of the households in Cape May County had homes that sustained "severe" or "major" damage, totaling 2,446 units. Of those households that sustained severe/major damage, nearly half (46.9 percent) are low and moderate income households. While more than half of the County's 98,400 homes are seasonal vacation homes, the year-long residents who reside in these communities and fuel the local economy can largely be described as working families. More than half the households in all of the impacted communities earn less than the State median income. Within Cape May County, four census tracts had between 25% and 49% of households experience severe or major damage, and another four had between 10% and 24% of households experience such damage. In Cape May County, 13% of the residents report a disability and 10% of the households are over 65 years of age and living alone.

The following table provides demographic information about Cape May County and these impacted census tracts specifically:

**Table 10: Census Tracts with Damaged Homes**

| | Census Tract | % of Households With Major/ Severe Damage | Households | Median HH Income | Percent Households Over 65 Living Alone | Percent Black Households | Percent White Households | Percent Hispanic Households | Percent Owner Occupied Households | Percent Renter Occupied Households |
|---|---|---|---|---|---|---|---|---|---|---|
| County | | 5% | 45,185 | $55,315 | 10% | 4% | 91% | 4% | 74% | 26% |
| **CENSUS TRACTS WITH DAMAGED HOMES** | | | | | | | | | | |
| Ocean City | 34009020206 | 39% | 463 | $71,250 | 9% | 9% | 89% | 3% | 73% | 27% |
| Ocean City | 34009020101 | 27% | 1,641 | $54,089 | 16% | 9% | 87% | 3% | 54% | 46% |
| Ocean City | 34009020102 | 26% | 1,275 | $65,160 | 18% | 1% | 96% | 4% | 61% | 39% |
| Ocean City | 34009020205 | 26% | 637 | $35,542 | 30% | 0% | 100% | 0% | 73% | 27% |
| Ocean City | 34009020203 | 19% | 1,402 | $54,414 | 22% | 1% | 99% | 0% | 65% | 35% |
| Ocean City | 34009020201 | 12% | 719 | $89,018 | 19% | 0% | 100% | 0% | 85% | 15% |
| Sea Isle City | 34009020800 | 20% | 1,106 | $54,419 | 10% | 0% | 94% | 3% | 71% | 29% |
| Wildwood | 34009021400 | 10% | 1,982 | $27,778 | 16% | 5% | 74% | 19% | 46% | 54% |

## Sea Level Rise

According to the USGS, the coastal vulnerability index (CVI) provides a preliminary overview, at a national scale, of the relative susceptibility to sea-level rise of the Nation's coast. The CVI shows the relative vulnerability of the coast to changes due to future rise in sea-level. Areas along the coast are assigned a ranking from low to very high risk, based on the analysis of physical variables that contribute to coastal change, including tidal range, wave height, coastal slope, shoreline erosion rates, geomorphology, and historical rates of sea-level rise. High-vulnerability areas are typically barrier islands having small tidal ranges, large waves, a low coastal slope, and high historical rates of sea-level rise.

As illustrated on **Map 9: Coastal Vulnerability Index**, the majority of the coastline in Cape May County is ranked as High (35%) or Very High Risk (33%). The only Low Risk areas identified are in the back-bay areas of the Wildwoods, including Richardson Sound and Taylor Sound, and a small stretch of coast along the Delaware Bay in Middle Township. Areas ranked as Moderate Risk include the Cape May Harbor, the Wildwoods oceanfront, Strathmere, and portions of Ocean City.

The National Oceanic and Atmospheric Administration (NOAA) created a map service to help communities, residents, and other stakeholders consider risks from future sea level rise in planning for reconstruction following Hurricane Sandy. The map services integrates FEMA's most recent special flood hazard area (SFHA) with four scenarios of sea level rise (referred to as lowest, intermediate-low, intermediate-high, and highest). These scenarios provide estimates of global sea level rise by the year 2050 based on the best available science synthesized by a panel of scientists from multiple federal agencies and academic institutions to provide to the U.S. National Climate Assessment. Projected sea level rise will increase the impact of coastal flooding during storms, even if the current storm pattern remains the same.

**Map 10: Projected 2050 Flood Hazard Areas** depicts potential future impacts of sea level rise on top of the FEMA Base Flood Elevations. The SLR amount is based on the recently released National Climate Assessment, which contains four SLR scenarios for 2050: Lowest (0.3 ft SLR), Intermediate-Low (0.7 ft SLR), Intermediate-High (1.3 ft SLR), and Highest (2.0 ft SLR). This data was created to assist in Hurricane Sandy recovery efforts and is intended for advisory purposes only. The Superstorm Sandy storm surge is shown for reference as well. The map indicates that 2 feet of sea level rise coupled with a 100-year storm would generate a storm surge that would inundate the majority of the barrier islands. Even with just a 0.3 foot rise in sea level, the 100-year flood plain would increase dramatically.

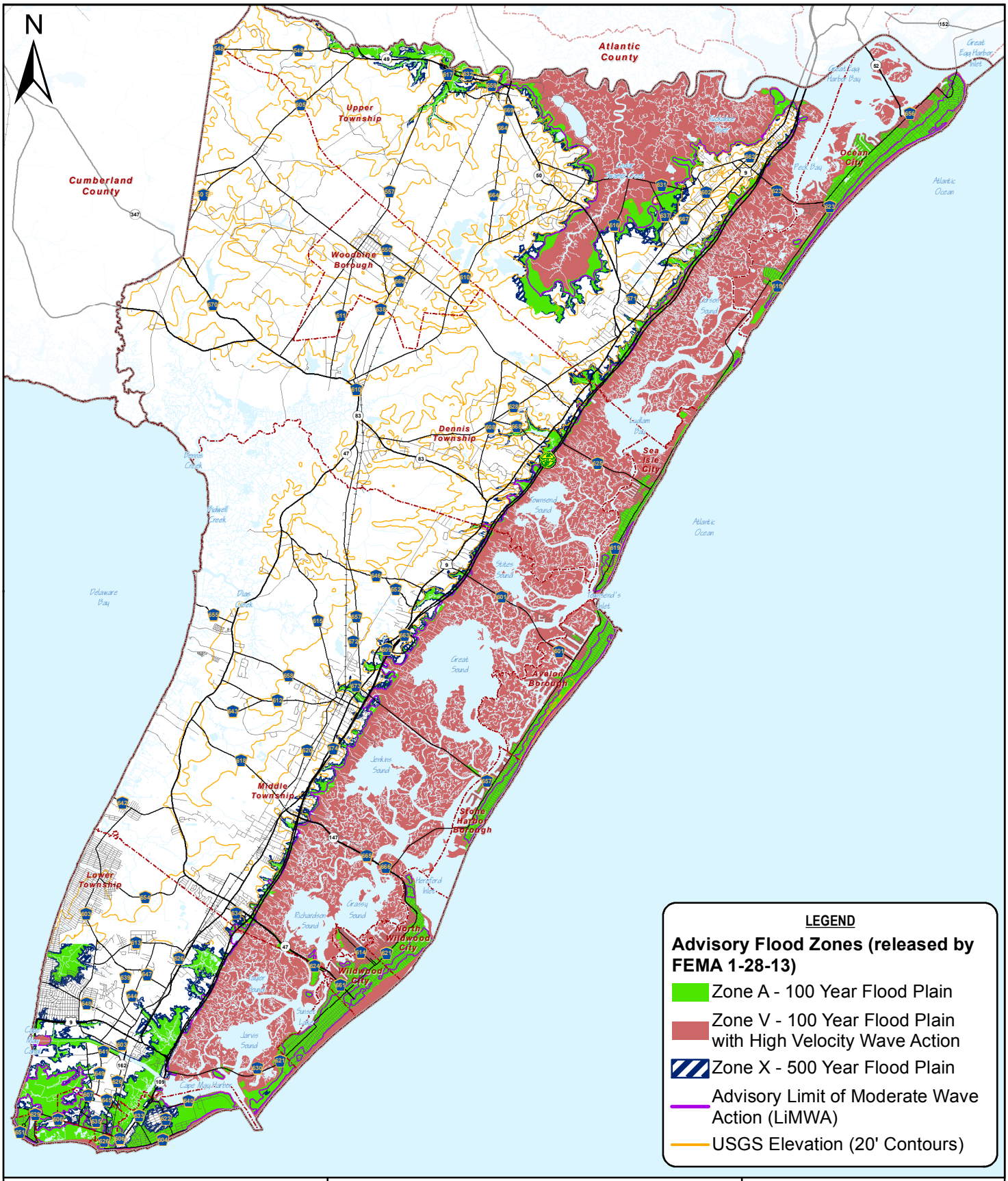
## National Flood Insurance Program – Community Rating System

The Community Rating System (CRS) is a voluntary program for National Flood Insurance Program (NFIP) participating communities. The goals of the CRS are to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management.

The CRS has been developed to provide incentives in the form of premium discounts for communities to go beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding. For a community to be eligible, it must be in full compliance with the NFIP and be in the regular phase of the program. **Table 7** below lists provides the status and rating for all communities in Cape May County.

**Table 11: Community Rating System Eligible Communities**

| Community | CRS Entry Date | Current Effective Date | Current Class | Discount for SFHA | Discount for Non-SFHA | Status |
|---|---|---|---|---|---|---|
| Avalon Borough | 10/1/96 | 10/1/13 | 5 | 25% | 10% | Current |
| Cape May City | 10/1/94 | 10/1/13 | 6 | 20% | 10% | Current |
| Cape May Point Borough | 10/1/93 | 10/1/13 | 6 | 20% | 10% | Current |
| Dennis Township | - | - | - | - | - | Not Eligible |
| Lower Township | - | - | - | - | - | Not Eligible |
| Middle Township | - | - | - | - | - | Not Eligible |
| North Wildwood | - | - | - | - | - | Not Eligible |
| Ocean City | 10/1/92 | 10/1/13 | 6 | 20% | 10% | Current |
| Sea Isle City | 10/1/92 | 10/1/13 | 5 | 25% | 10% | Current |
| Stone Harbor Borough | 10/1/94 | 05/1/14 | 5 | 25% | 10% | Current |
| Upper Township | 10/1/11 | 10/1/13 | 6 | 20% | 10% | Current |
| West Cape May Borough | - | - | - | - | - | Not Eligible |
| West Wildwood Borough | 10/1/93 | 10/1/05 | 10 | 0% | 0% | Rescinded |
| Wildwood City | - | - | - | - | - | Not Eligible |
| Wildwood Crest Borough | 10/1/93 | 05/1/14 | 6 | 20% | 10% | Current |
| Woodbine Borough | - | - | - | - | - | Not Eligible |




0 1 2 3 4 5 Miles

*This map is for demonstration purposes only and was not developed in accordance with National Map Accuracy Standards. Any use of this product with respect to accuracy and precision shall be the sole responsibility of the user. The map was developed, in part, using County, State and Federal Geographic Information System (GIS) digital data, but this secondary product has not been verified and is not state authorized. The geodetic accuracy and precision of the GIS data contained in this map has not been developed nor verified by a professional licensed land surveyor and shall not be nor is intended to be used in matters*

# Map 6: Advisory Base Flood Elevations - Flood Hazard Areas

## Strategic Recovery Planning Report

County of Cape May, New Jersey

MASER CONSULTING P.A.

April 2015

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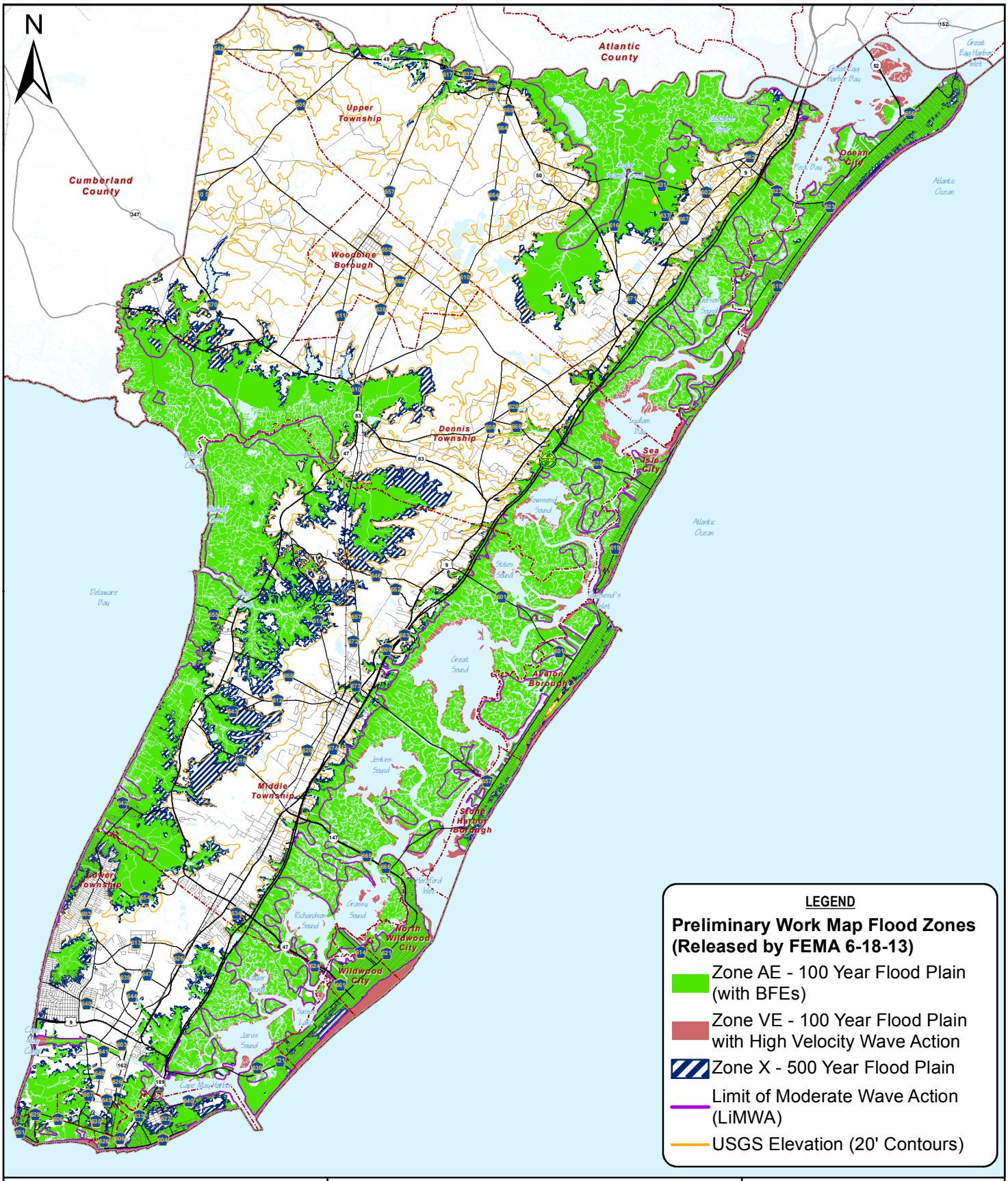


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# Map 7: Preliminary Work Map Flood Hazard Areas

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County of Cape May, New Jersey

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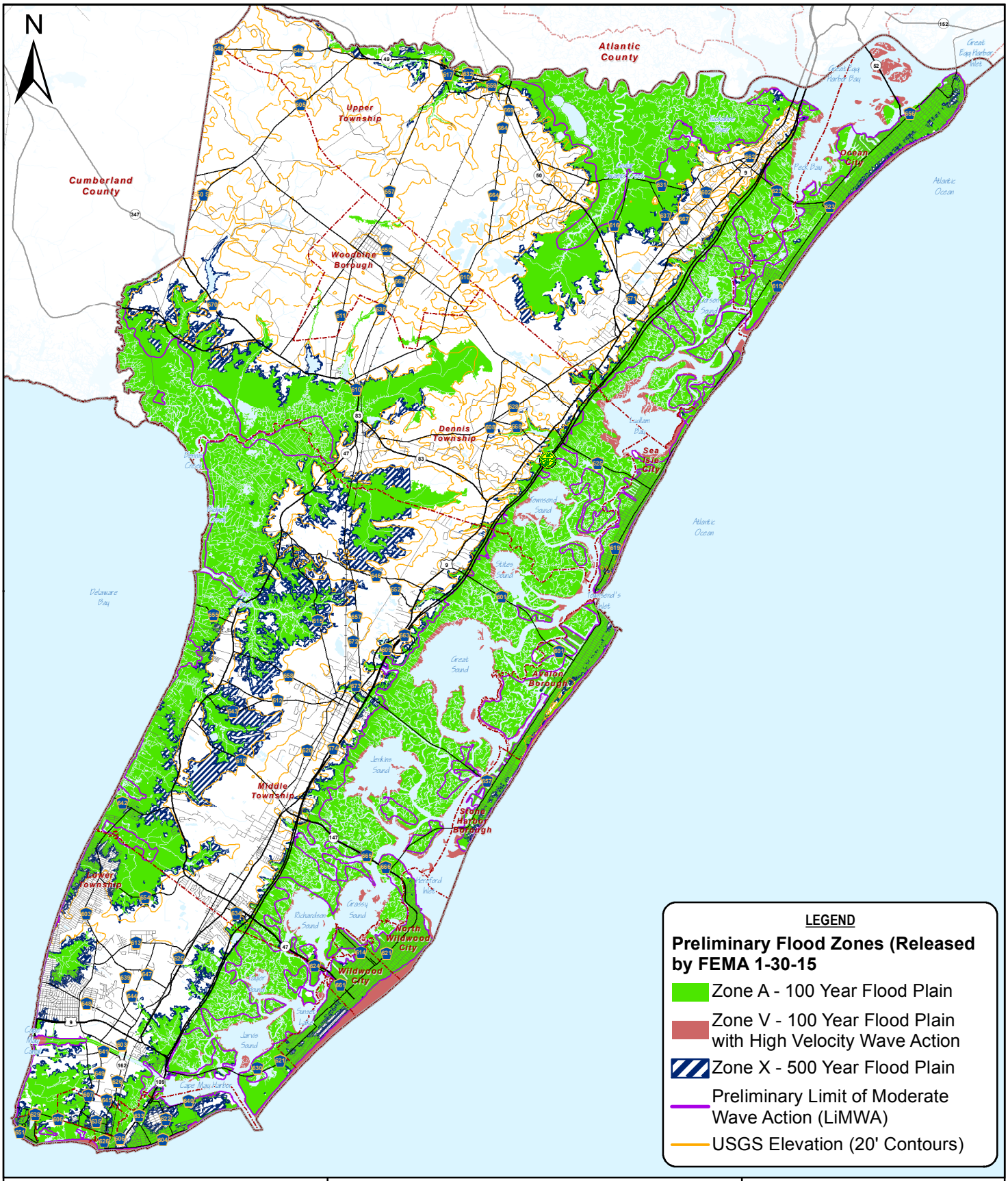


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# Map 8: Preliminary Flood Hazard Areas

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County of Cape May, New Jersey

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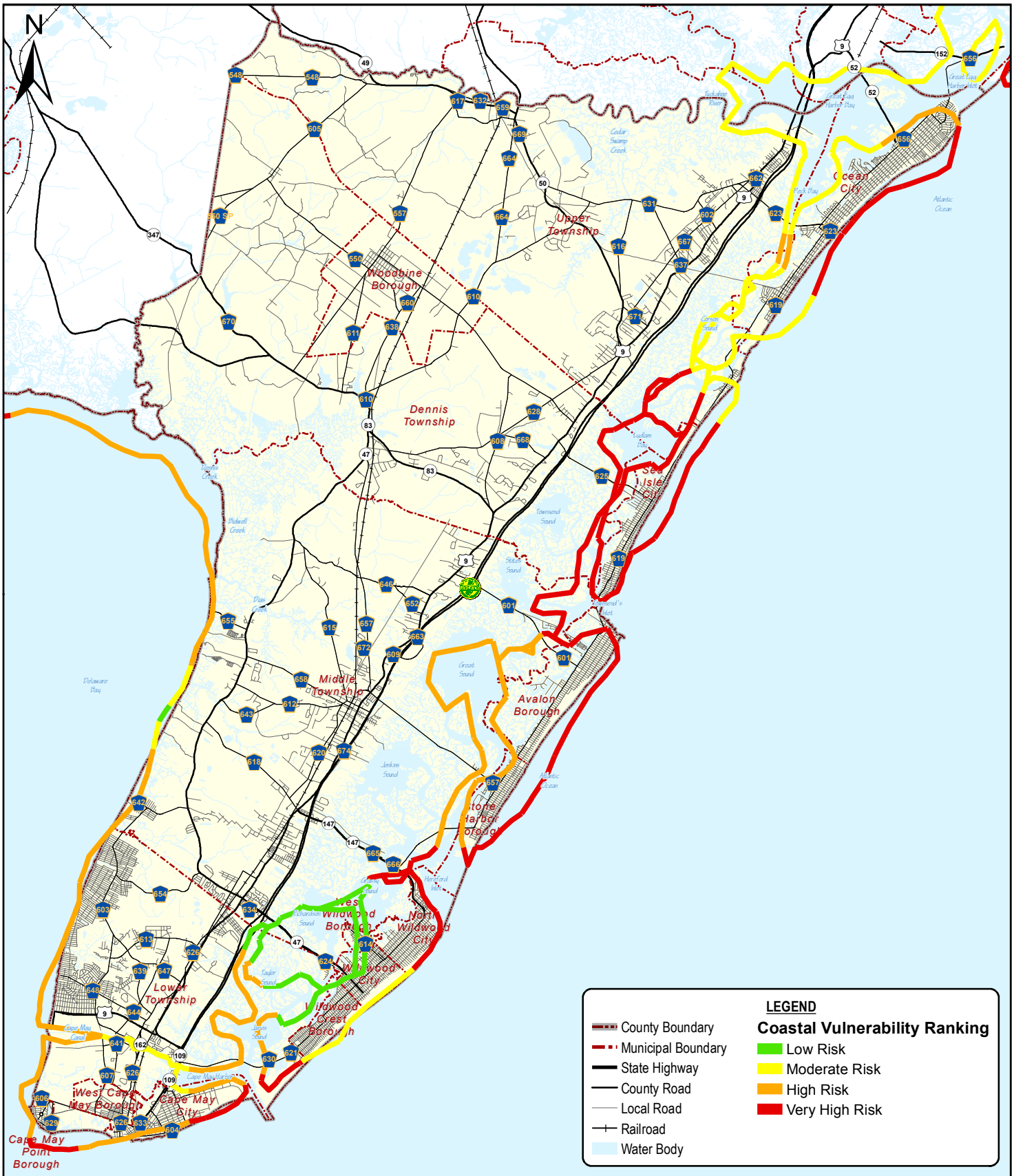


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# Map 9: Coastal Vulnerability Index

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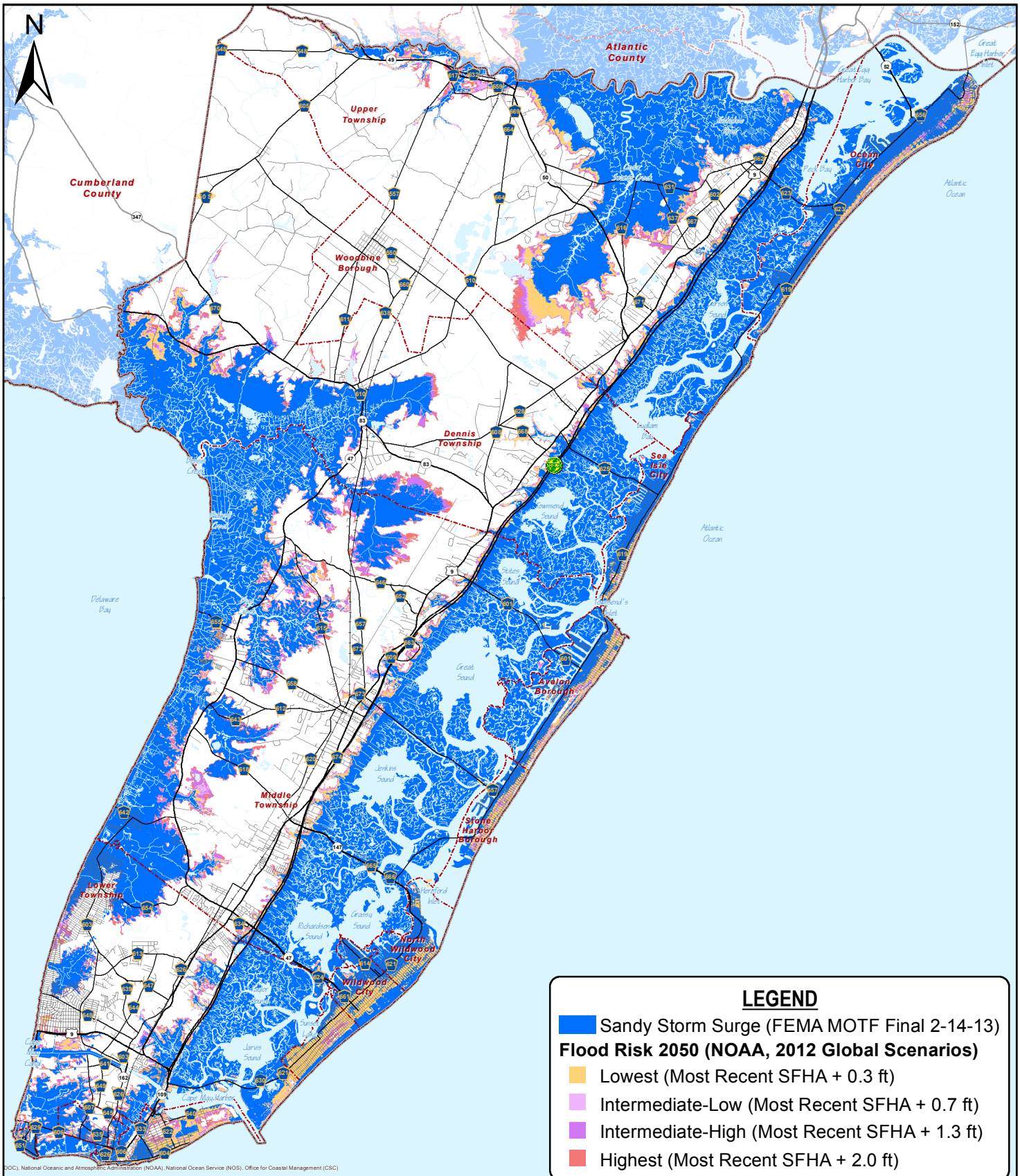


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# Map 10: Projected 2050 Flood Hazard Area

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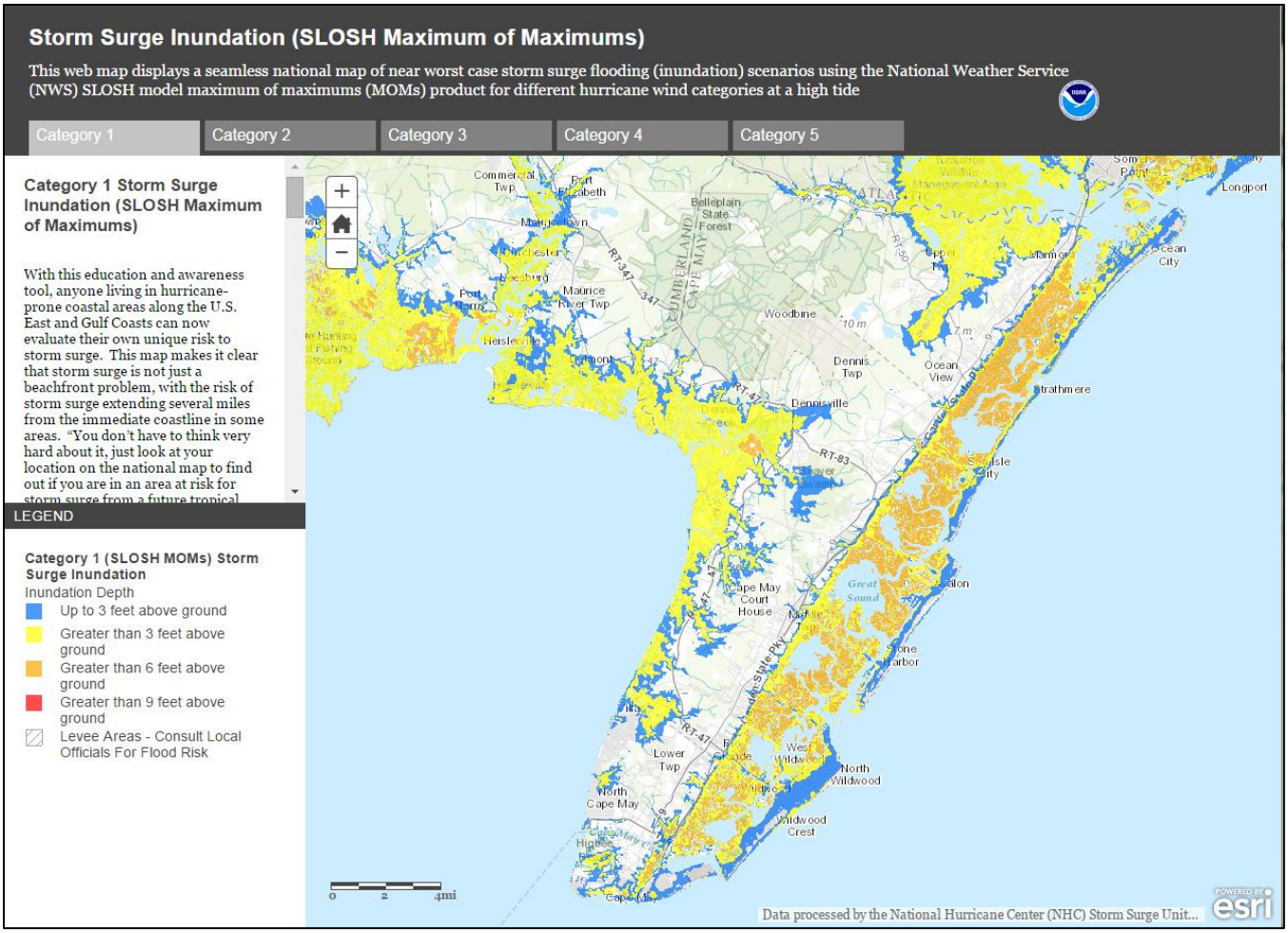
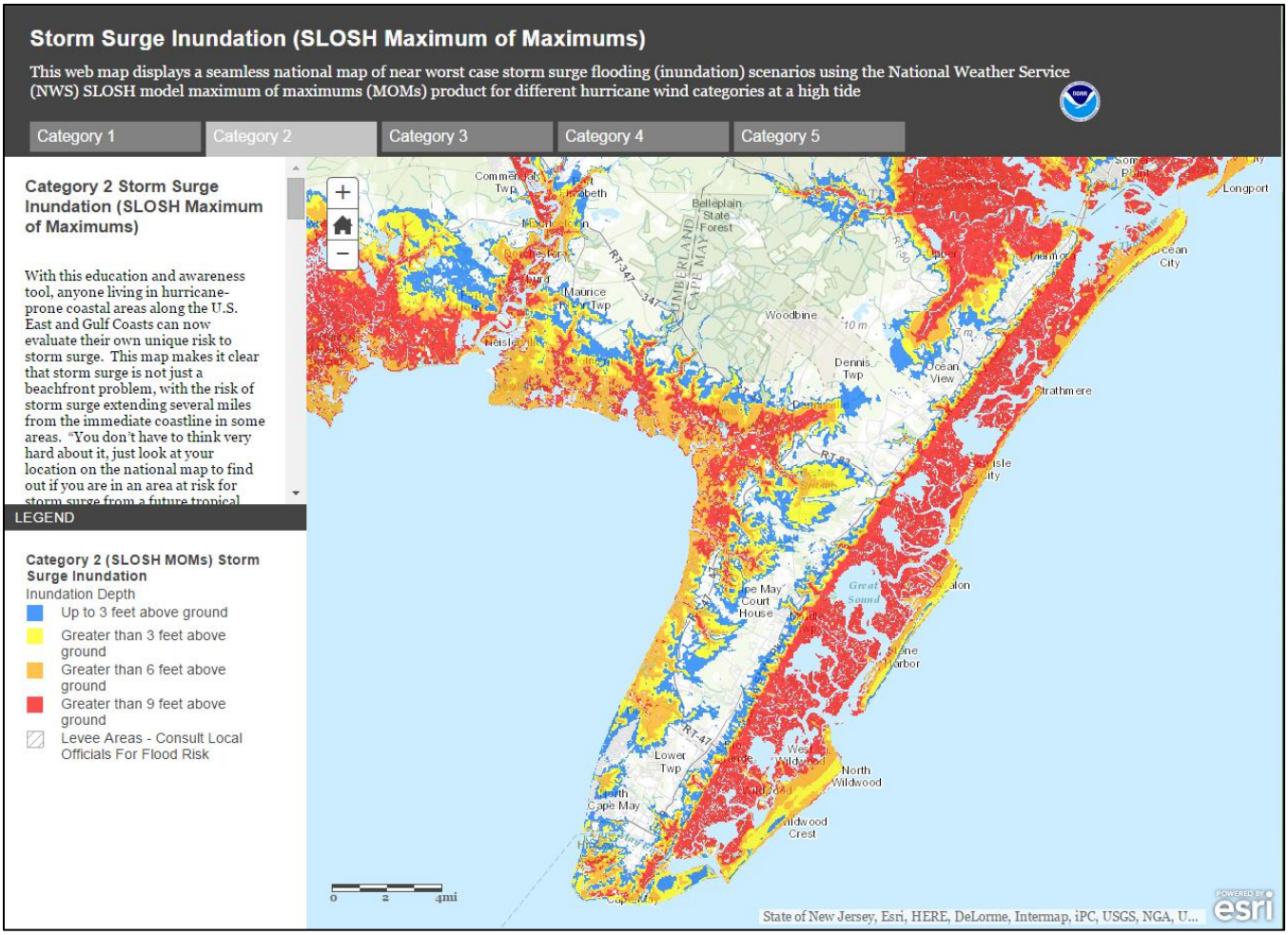
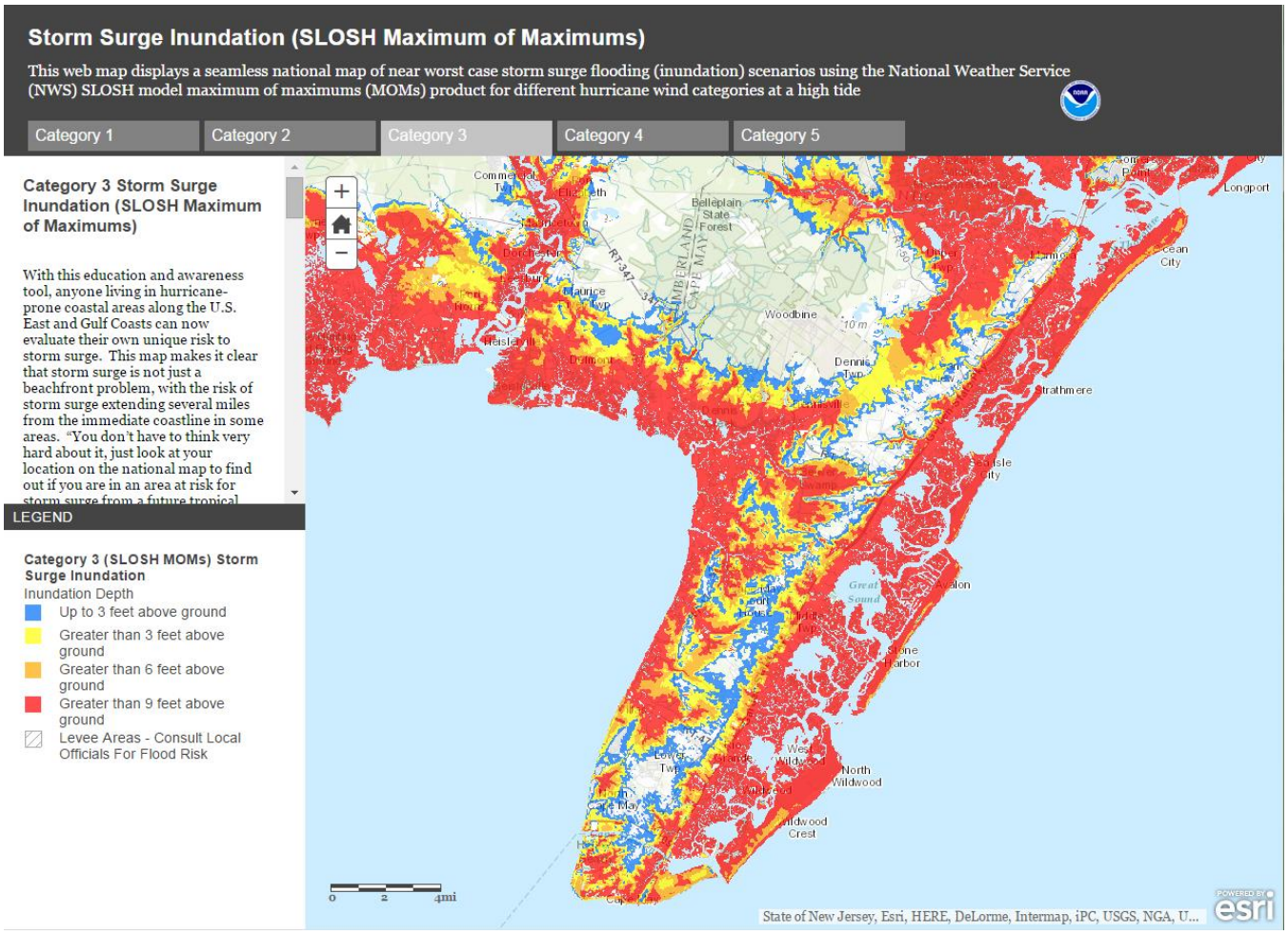
Map 11: Projected Storm Surge Inundation from Category 1 Hurricane



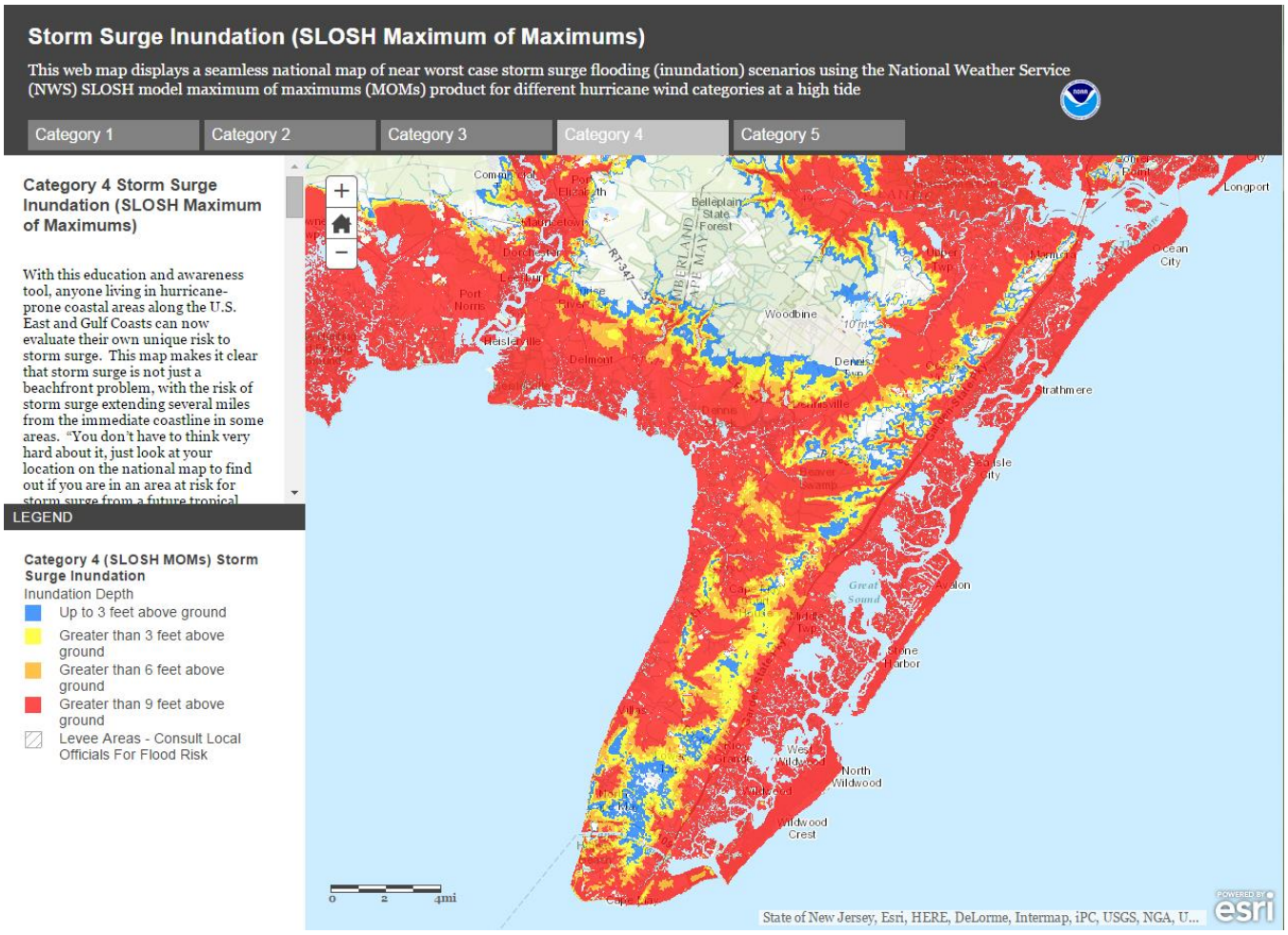
Map 12: Projected Storm Surge Inundation from Category 2 Hurricane



Map 13: Projected Storm Surge Inundation from Category 3 Hurricane



Map 14: Projected Storm Surge Inundation from Category 4 Hurricane



# STRATEGIC RECOVERY ACTION PLAN

## Background Planning Documents

### *Cape May County Park System Master Plan (2004)*

The *Cape May County Park System Master Plan* ("PSMP") was prepared by the Larry Weitzman Group et al. in 2004. The PSMP's purpose was to undertake an assessment of the entire park system and develop a plan to guide future growth or redevelopment opportunities. The key goal was to create a vision of the park system that celebrates the uniqueness of each facility while creating a connection among them.

The County park system includes four unique properties: Cameron Wildlife Sanctuary, Cape May County Park (including the County Zoo), Fishing Creek Conservation Area and the Avalon Fishing Pier. The PSMP recommended enhancing visibility of the entire system and branding each facility. A comprehensive study was made of each facility with recommendations for facilities improvements and management guides.

The Cameron Wildlife Sanctuary consists of 25 acres located in Palermo (Upper Township). Deed restrictions prohibit hunting, trapping and fishing, no vehicular traffic and promote nature/educational or interpretive programs on the site. The PSMP recommended extending and looping the trail system, future acquisition of an adjacent 35 acre land tract and connection with a proposed trail system following an abandoned railroad right-of-way.

Detailed plans were drawn for the County Park focusing on upgrading and expansion of the County Zoo. It is the single most visited facility in the entire system. The facilities were in need of major design upgrades, both to improve the efficiency of its operations and to insure that the Zoo would be able to maintain its accreditation from the American Zoological and Aquarium Association. The plan proposed a phased overhaul of the zoo's site plan, including a reorganization of its collection, improved parking facilities, new vehicular and pedestrian circulation patterns, enhanced opportunities for education and fund-raising and better linkages to other nearby County facilities.

The Avalon Fishing Pier is located along the Intracoastal Waterway. Space for expanded facilities was very limited, but the PSMP recommended a cooperative effort with Middle Township as proposed development on the adjacent marina property moves forward.

The Fishing Creek Conservation Area contained a paved parking lot, play fields and a tot lot. According to the PSMP, its value lies in its unspoiled wetlands and in views of the Delaware Bay. The PSMP recommended creating a kayak launch ramp and expanded trail with an elevated viewing area for birding and marine life viewing opportunities.

The PSMP had limited goals, objectives, or policies that would support County planning needs related to future storm mitigation or post storm recovery. The County Park Zoo chapter of the PSMP analyzed the property hydrology and recommended protecting the wetlands that not only act to filter pollutants, but also act as flood control and contribute to diverse wildlife by providing habitat and food. The PSMP also states that safety and security are important factors for the park system. Key facilities are alarmed and monitored by County security personnel,

with local backups available from township and state agencies. Fire monitoring and motion detectors are recommended for incorporation into the design of all new facilities throughout the park system.

Because of the age of the PSMP, the park system management procedures should be reviewed and updated related to storm mitigation efforts.

## Cape May County Comprehensive Plan (2005)

The *Cape May County Comprehensive Plan* ("CMCCP") was updated from 2002 to February 2005. It is the fifth edition of the CMCCP, which was first adopted in 1962. The current CMCCP addresses new issues and updated County planning policies. The CMCCP evaluates the following areas:

- Economic Development
- Water Supply
- Campgrounds
- Historic Preservation
- Forest Resources
- Energy
- Transportation
- Fishing Industry
- Population
- Soils
- Solid Waste
- Housing
- Agriculture
- Open Space, Conservation and Recreation
- Resort Economy (Tourism)
- State Development and Redevelopment Plan
- Land Use
- Growth and Density

The purpose of the CMCCP is to establish policies to guide future growth so that resources will be used wisely and efficiently. The CMCCP provides specific policy guidelines addressing each of the issue areas; however, the only direct link to storm mitigation policies is the expressed need to protect the causeways from development because this would create traffic hazards and interfere with speedy access to and evacuation from the island communities. In addition, it is noted that development in these areas encroaches on or directly promotes deterioration of the County's valuable wetlands.

The CMCCP does not include any other specific goals, objectives, or policies that would support County planning needs related to future storm mitigation or post storm recovery. These deficiencies should be remedied with updated policies and coordination with other County planning documents, such as the *Multi-Jurisdictional All-Hazard Mitigation Plan*.

## Cape May County Transportation Plan (2006)

The *Cape May County Transportation Plan* ("CMCTP") highlights long and short-term strategies to address various transportation issues affecting the County. The purposes of the CMCTP are:

- To serve as the transportation component of the adopted Cape May County Comprehensive Plan,
- To satisfy Federal requirements of the Subregional Transportation Planning Work Program,
- To identify the adopted transportation policies, issues and objectives of the County Planning Board,

- To identify a plan for proposed County transportation improvements,
- To create and implement projects that will address air quality guidelines, and
- To manage growth by planning and coordinating transportation projects consistent with existing and projected land use.

The basic objectives of the CMCTP are:

- Address traffic safety
- Reduce congestion
- Enhance public transit
- Address air quality

The CMCTP placed particular emphasis on the variety of transportation options available into and within the County. In addition to State, County, local and toll roads, Cape May County also supports three airports located in Woodbine, Ocean City and Lower Township, numerous boating facilities, and the Cape May – Lewes Ferry Terminal. As noted in the CMCTP, the seasonal traffic fluctuations due to tourists and population growth accessing the region by car put a strain on the transportation infrastructure. Issues regarding aging infrastructure and maintenance of evacuation routes were identified.

The CMCTP does not include any goals, objectives, or policies that would support County planning needs related to future storm mitigation or post storm recovery with the exception of maintenance of evacuation routes being directly related to storm mitigation. This document needs to be updated and expanded related to storm mitigation policies and more recent traffic study findings and completed transportation improvements.

## *Cape May County Open Space and Mitigation Plan (2007)*

The Cape May County Open Space and Mitigation Plan ("OSMP") adopted in 2005 was updated and readopted in 2007 as an element of the Cape May County Comprehensive Master Plan.

The OSRP established following goals:

- To provide, on an equal and accessible basis, facilities regional in nature and capable of serving residents and visitors of the entire County,
- To protect and preserve natural and scenic resources,
- To present information on the current supply and demand for open space,
- To implement open space and recreation planning policies consistent with the New Jersey State Development and Redevelopment Plan,
- To encourage coordinated open space and recreation planning, acquisition and development initiatives of State, County, and local governments and conservation organizations, and
- To effectively use funds from the Cape May County Open Space and Farmland Preservation Program and other sources of preservation funding that may become available.

County-owned open space and recreational land is comprised of two main categories: the County Park System and lands purchased by the County Open Space Preservation Program. A third minor category consists of three small fishing piers.

The County has an Open Space Trust Fund. Approved on November 9, 1989, the County trust fund's goal is to preserve open space and agricultural land. It is funded by a County property tax of one cent per $100 of assessed valuation and generates approximately 4.5 million dollars annually.

In 2007, 73,620 acres were identified as open space and recreation lands, which represent approximately 45% of the total land area of the County. The vast majority of these lands were inaccessible wetlands and restricted Federal wildlife lands and not generally thought of as traditional "active" recreational open space. Using the New Jersey Statewide Comprehensive Outdoor Recreation Plan ("SCORP") recommended formula of 7% of the developed and developable area of the County, 4,001 acres of County open space were considered essential. The OSMP identified 2, 864 acres of existing County parkland and preserved open space, resulting in a need for an additional 1,137 acres of County recreation lands.

The OSMP also provided an assessment of those public and private lands and water resources that have potential for providing additional open space and recreational opportunities. These include, but are not limited to:

- County Park System –highest priority to expand land holdings,
- Cox Hall Creek wetlands – high priority acquisition area,
- Lower Township, South of the Cape May Canal - Prime habitat for migrating birds; high priority acquisition area,
- Goshen Cluster (NJSR 47 and CR 646 area) - Farmland and open space acquisition a high priority,
- Pedestrian/Bicycle Trail System -A twenty-six mile bicycle trail/path connecting Cape May Point State Park with Belleplain State Forest,
- Golf Courses - high priority acquisition of existing golf courses for public use if opportunity arises,
- Water Supply Protection – high priority to further efforts to deter saltwater intrusion and offer protection to threatened groundwater supplies,
- Threatened or Endangered Species or Other Wildlife Habitat - Acquire lands delineated as suitable habitat for threatened or endangered species, or other non-threatened wildlife.
- Historic Sites - Acquire parcels having historic significance.

The resultant County Open Space and Recreation Action Plan can be summarized in three tasks:

- Maintain existing County-owned recreational facilities and adhere to current plans for upgrade and expansion to meet current and anticipated need,
- Continue the County's Open Space Preservation Program and continue cooperation with other preservation agencies and organizations, and
- Offer technical or planning assistance to municipalities and other agencies/organizations to assist in the acquisition and preservation of open space lands.

The OSMP does not include any specific goals, objectives, or policies that would support planning needs directly related to future storm mitigation or post storm recovery; but in a general sense it focuses on preservation and acquisition of open space. This plan should be updated to link to other recent planning efforts.

## *Cape May County Hurricane Evacuation and Elevation Study Extension (2007)*

The objective of the Cape May County Hurricane Evacuation and Elevation Study Extension ("HEESE) prepared in 2007 was to expand on the work completed under the previous study, "Analysis and Modeling of Cape May County Roadway Elevations and Evacuation Routes", 2006. This earlier study was sponsored by the New Jersey Department of Transportation and the New Jersey State Police Office of Emergency Management.

This initial study contained two main areas of study as follows:

- Evacuation Simulation Modeling: Simulation analysis of evacuations of Cape May County traffic via the NJ 47/347 corridor was conducted. The research identified higher evacuation demands for the NJ 47/347 corridor which resulted in much higher total evacuation times than the scenarios tested in the initial 2006 study. Three scenarios were studied: no change, original contraflow and extended contraflow. An extension of the lane reversal contraflow section between NJ 83 and NJ 55 to the planned southern terminus of NJ 83 was shown to be highly effective and could potentially shorten the worst case evacuation scenario times from 89 hours to 40 hours.
- Roadway Elevation Surveying: The HEESE surveyed additional County roads to determine their elevation and to assess under what category of storm the roadways would be inundated and impassable by either emergency response vehicles or by evacuees. The survey and analysis revealed that while the majority of the surveyed roadways will remain passable during a category 1 hurricane, there were occasions where each of the roadways would be flooded from a category 1 hurricane strike. The fact that all the surveyed roadways will be at least partially impassable during the peak levels of a storm surge from a category 1 hurricane indicated the importance of having an evacuation plan in place that allows enough time for evacuation before the maximum storm surge levels are reached.

The HEESE evaluated storm surge elevations for different hurricane categories were based on the Hurricane Evacuation Study map (June 2006 version) produced by the Philadelphia District of the U.S. Army Corps of Engineers. This analysis may need to be updated based upon more current data, if available. Also the results of this analysis should be coordinated with road improvement project planning on affected low-lying road corridors.

## *Cape May County Smart Growth Strategic Plan Transfer of Development Rights Feasibility Study (2009)*

The *Cape May County Smart Growth Strategic Plan Transfer of Development Rights Feasibility Study* ("TDRFS") was prepared by Maser Consulting, P.A. for the Cape May County Board of Chosen Freeholders. The purpose was to evaluate, through a cooperative planning process with the 16 Cape May County municipalities, the feasibility of using transfer of development rights ("TDR") tools to provide for smart growth. The goals were:

- To assess development strategies that would preserve the unique ecosystems of the county,

- To evaluate the potential of establishing a TDR program either countywide, inter-municipal or intra-municipal,
- To identify special resource areas in the need of preservation and assess their feasibility as TDR sending areas,
- To identify vacant or underutilized properties and assess their suitability for added density, and
- To provide valuable information for use in the preparation of other county and local planning studies.

An Issues Profile provided a summary of thirteen planning factors to be considered in evaluating and ranking lands for preservation and protection. These included: population, employment, land use, housing, environmental resources, conservation, open space and recreation, economic development, historic properties, transportation, infrastructure, other planning considerations and inter-municipal cooperation. Specifically directed to future storm mitigation efforts, the environmental resources and conservation, open space and recreation sections provided timely baseline data. The infrastructure section also identified the need to tie future development to water and wastewater infrastructure system capacities. The TDRFS noted that drainage and flooding issues will be exacerbated by global warming and that protection of the most flood prone areas should be considered.

Profiles were prepared for each Cape May County municipality which included detailed maps of man-made and natural resources and infrastructure. A list of potential TDR sending and receiving areas was compiled. Related to future storm mitigation the use of high velocity flood areas and extant environmental resources along the coast were identified as possible sending areas.

The TDRFS provided comprehensive resources to begin an evaluation of environmental conditions related to future storm mitigation and post storm relief. Because the TDRFS was prepared in 2009, it should be updated especially with amended FEMA and storm surge data.

### *Nor'easter Inundation Models for the Barrier Islands (2009)*

Cape May County experienced a severe Nor'easter November 11th through November 14th 2009. Severe back bay flooding occurred on all the barrier islands. Inundation models, prepared by the Cape May County Planning Department, used recent 2008 LIDAR data which provided detailed elevations throughout Cape May County. By using the predicted tides from the tide station at Cape May Harbor in Cape May City, the back bay flooding inundation levels for the barrier islands were modeled and maps illustrated the results. The back bay tidal flooding data used was verified by the offices of emergency management in each of the barrier islands.

Regarding the data accuracy, the inundation calculations were based upon still water elevations and did not account for local variation due to wave action, winds and physical barriers such as bulkheads, storm drains, pumped areas, etc. Also, the flood elevations assumed all low areas are directly connected to the tidal source and not protected by dunes, bulkheads, tide gates, and pumped storm water systems. The study was prepared for 'planning purposes only'.

### *Cape May County Multijurisdictional All Hazards Mitigation Plan, Volumes I & II (2010)*

The *Cape May County Multi-Jurisdictional All Hazards Mitigation Plan, Volumes I and II* ("HMP") was prepared by TetraTech, Inc. in April 2010 with October 2010 revisions. The CMCHMP was prepared in response to the

Disaster Mitigation Act of 2000 which requires that states and local governments prepare all- hazard mitigation plans in order to remain eligible to receive mitigation funds that are annually appropriated or made available in the wake of federally-declared disasters.

Cape May County along with all sixteen municipalities developed the CMCHMP. The process and accomplishments can be summarized as follows:

- Developed a Steering Committee and Planning Committee,
- Engaged the participation of State, regional and local stakeholders and the public,
- Identified hazards of concern,
- Profiled and prioritized these hazards,
- Estimated inventory at risk and potential losses associated with the selected hazards of concern,
- Developed mitigation goals, objectives and actions that address the hazards that impact the area, and
- Developed mitigation plan maintenance procedures.

A key component of the CMCHMP was the County risk assessment which considered a full range of natural hazards. Seven hazards of concern, in order of hazard ranking were identified:

1. Coastal Storm
2. Coastal Erosion
3. Flood (coastal, riverine, flash, ice jam, dam/beaver dam)
4. Severe Storm (windstorms, thunderstorms, hail, tornadoes and hurricanes/tropical storms)
5. Severe Winter Storm (heavy snow, blizzards, ice storms, Nor'easters) / extreme cold
6. Tsunami
7. Wildfire

A hazard profile was prepared. This profile, combined with data on population, demographics, general building stock, and critical facilities at risk was used to develop risk scenarios and estimate potential damages and losses for each hazard. Potential loss and exposure estimates were calculated relying on the best available data and methodologies. These estimates were used to characterize risk and assign priorities for mitigation efforts.

Goals, along with their corresponding objectives, were defined that guided the development and evaluation of specific mitigation actions. A capability assessment was prepared by Cape May County and each participating jurisdiction. These capability assessments were an inventory of each jurisdiction's missions, programs and policies and an analysis of its capacity to implement them. The County and each participating jurisdiction identified appropriate local mitigation actions, along with the goals and objectives met, lead agency, estimated cost, potential funding sources and the proposed timeline. These actions were identified in Volume II.

A qualitative benefit/cost review was performed on the identified mitigation actions that weighed the estimated benefits of a project versus the estimated costs. This analysis was used to prioritize each project.

The CMCHMP also presented procedures for plan maintenance and updates which included an annual summary plan status report. In addition, the mitigation plan is required to be updated within five years.

The CMCHMP is an important comprehensive document that supports County planning needs related to future storm mitigation and post storm recovery. Annual review of the CMCHMP and the five year update is critical to maintain the CMCHMP effectiveness.

### *Site Plan and Subdivision Resolution of Cape May County New Jersey (June 2011)*

This Resolution provides procedures, rules, regulations, and standards for review and approval of site plans and subdivisions for land development in Cape May County to promote the public health, safety, convenience, and general welfare of the County. The County legal control is limited to all subdivisions and to site plans involving commercial, industrial, multi-family structures containing five or more units, any land development requiring off-street parking areas or off-street standing areas for an excess of five vehicles or any property having frontage on a County road. The County review focuses on drainage, storm water management, traffic and access related to the County road network.

Directly affecting storm mitigation information would be storm water management design criteria in the Regulations. The design criteria should be reviewed and updated to ensure that the most current storm data (FEMA elevations, storm surge data and climate impact elevation data) are included and addressed in all development applications.

### *Continuity of Operations Plan (COOP)*

Continuity of Operations (COOP) planning is essential to ensure that the County can continue to function and provide services to its citizens following an emergency, disaster, or incident that disrupts the County's normal operations. Cape May County is in need of the development of a single, County-level COOP Plan that prioritizes the County's critical functions and provides strategies for carrying these out during periods of disruption. While individual departments have identified some level of planning, the county as a whole has not coordinated any of their plan development horizontally or vertically to ensure compliance with supporting agencies.

### *Disaster Debris Management Plan (DDMP)*

Cape May County is currently in need of an update to the County's existing Disaster Debris Management Plan (DDMP) to ensure the County can continue to function and provide services to its citizens following a debris generating event that disrupts the County's normal operations. The county will need to develop a County-specific DDMP update that provides a coordinated response blueprint for debris removal management and processing following a disaster. A well-developed, County-specific DDMP update will provide the framework for streamlining public health and safety efforts following a disaster and prioritizes debris removal management operations to make the County less vulnerable to the effects of a disaster.

## Identification of Projects

| | Recovery Project | Responsible Entity | Funding | Duration | Recovery Value | | |
|---|---|---|---|---|---|---|---|
| | | | | Type | Need | Feasible | Sustainable |
| 1. | Develop a five year Post Disaster Recovery Capital Improvement Plan for capital projects directly linked to recovery, mitigation or preparedness | CMC Planning | NJDCA Grant | Short Term Preparedness | High | High | Mod |
| 2. | Update the County Master Plan with a Community Resiliency Element that reviews the Land Use Plan Element and development standards against the vulnerability issues outlined in this SRPR and adopt as a Master Plan Element. | CMC Planning Department | NJDCA Grant | Short Term Preparedness | High | High | High |
| 3. | Review zoning and land use regulations against the vulnerability issues outlined in this SRPR and develop amendments to anticipate necessary changes to height, bulk and setback requirements needed to improve resiliency based on recommendations in the Community Resiliency Element | CMC Planning Department | NJDCA Grant | Short Term Preparedness | High | High | High |
| 4. | Prepare, modify or replace plans for Local Neighborhoods or specific areas that were impacted by Sandy (i.e. Redevelopment or Rehabilitation Plans, Economic Development Plans and Strategies, Historic District Plans and Open Space/Recreation Plans) | CMC Planning with Municipalities | NJDCA Grant | Short Term Preparedness | High | High | High |
| 5. | Review existing Permitting procedures to determine improvements for fast-tracking/streamlining for expediting projects directly related to recovery or mitigation and that are consistent with adopted Design Standards | CMC Planning | NJDCA Grant | Short Term Preparedness | Mod | High | Mod |
| 6. | Develop design standards to address the visual impact of mitigation measures such as elevating bulkheads, elevating buildings on foundations or pilings, etc. Such design standards might include requirements for skirting exposed pilings, parking under the lowest habitable floor, using exterior decking to stagger stairways to elevated first floor levels, etc. | CMC Planning | NJDCA Grant | Short Term Preparedness | Mod | High | High |
| 7. | Identify County roads and facilities that are vulnerable to flooding and either raise equipment above the flood levels or harden to protect against future flood events. | County, FEMA | County; FEMA | Short Term Preparedness | High | High | High |
| 8. | The long term impacts of Future Sea Level Rise should be projected and studied for Cape May County. | NOAA/Rutgers | NOAA/Rutgers | Long Term Preparedness | Mod | High | High |

| | Recovery Project | Responsible Entity | Funding | Duration | Recovery Value | | |
|---|---|---|---|---|---|---|---|
| | | | | Type | Need | Feasible | Sustainable |
| 9. | Where appropriate, support retrofitting or relocation of structures located in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority. Identify facilities that are viable candidates for retrofitting based on cost-effectiveness versus relocation. Where retrofitting is determined to be a viable option, consider implementation of that action based on available funding. | Municipality (likely through NFIP Floodplain Administrator) | FEMA Mitigation Grant Programs and local budget (or property owner) for cost share | Long Term Mitigation | High | High | High |
| 10. | Promote municipal participation in incentive-based programs, such as NFIP CRS and NFPA Firewise Program. | CMC Engineering and Emergency Management | Local Budget | Short Term Preparedness | High | High | High |
| 11. | Continue to support the implementation, monitoring, maintenance, and updating of the *CMC Multijurisdictional All Hazards Mitigation Plan* | CMC (through mitigation planning point of contacts) | FEMA Mitigation Grant Funding | Short Term Preparedness | High | High | High |
| 12. | Continue to develop, enhance, and implement existing emergency plans. | County OEM and NJOEM | County Budget | Short Term Preparedness | High | High | High |
| 13. | Create/enhance/ maintain mutual aid agreements with neighboring Counties, law enforcement, municipal public works and County public works departments. | CMC | County Budget | Short Term Preparedness | High | High | High |
| 14. | Address flooding issues on County roadways. Identify and rehabilitate/replace vulnerable bridges and elevate County Roadways as necessary. Update stormwater drainage as necessary. | CMC Engineering | Federal funding sources | Long Term Mitigation | High | High | High |
| 15. | Address flooding issues on State roadways. Elevate State roadways as necessary. | NJDOT & NJ Turnpike Authority | State / Tolls | Long Term Mitigation | High | High | High |
| 16. | Beach & Dune replenishment | USACE | Federal funding | Short Term Mitigation | High | High | Low |
| 17. | Obtain backup power to ensure continuity of operations for stormwater, wastewater, public potable water, pumping stations, etc. | CMC Engineering with Municipalities | TBD | Short Term Preparedness | High | High | High |
| 18. | Ensure adequate communication systems and emergency alert systems are available and reliable. Provide redundant methods for Voice/Data transmissions 4G wireless broadband at critical public facilities. | CMC OEM | County Budget | Short Term Preparedness | High | High | High |
| 19. | Prepare a Continuity of Operations Plan (COOP) to ensure that the County can continue to function and provide services to its citizens following an emergency, disaster, or incident that disrupts the County's normal operations. | CMC OEM | NJDCA; County | Short Term Preparedness | High | High | High |

| | Recovery Project | Responsible Entity | Funding | Duration | Recovery Value | | |
|---|---|---|---|---|---|---|---|
| | | | | Type | Need | Feasible | Sustainable |
| 20. | Update the Disaster Debris Management Plan (DDMP) to ensure the County can continue to function and provide services to its citizens following a debris generating event that disrupts the County's normal operations. | CMC OEM | NJDCA; County | Short Term Preparedness | High | High | High |
| 21. | Update evacuation plan. | NJDOT; CMC OEM | State Funding | Short Term Preparedness | High | High | High |
| 22. | Retrofit or replace county communications towers, which are currently rated for winds less than Cat-1 strength. These towers are used for emergency communications as well as electronic document archiving | CMC OEM & Engineering | County; Grant | Short Term Preparedness | High | High | High |
| 23. | Work with municipalities and property owners to assess vulnerability to wind damage for water towers, wireless communications towers, etc. | CMC OEM | County; Local | Short Term Preparedness | High | High | High |
| 24. | Support municipalities with the development or update of local stormwater master plans | CMC Engineering with Municipalities | County; Local | Short Term Preparedness | High | High | High |
| 25. | Encourage communities to participate in the Getting To Resilience community planning evaluation tool from the Jacques Cousteau National Estuarine Research Reserve. | CMC Planning with Municipalities | County; Local | Short Term Preparedness | High | High | High |