SECTION 3:
VULNERABILITY ASSESSMENT

This section provides an assessment of the potential impact of the various hazards to which Manatee County is vulnerable. The first objective of this section is to identify the natural hazards that could impact the County. The second objective is to identify and analyze those elements within the County that are particularly vulnerable to the identified natural hazards that could impact the breadth and speed of recovery following a disaster. By completing these objectives, Manatee County officials may be better prepared to evaluate and prioritize specific post disaster recovery and redevelopment actions. This section contains the following subsections:

- Hazard Risk Overview
- Assessment Methodology
    - GIS-Based Approach
    - HAZUS-MH
- Asset Inventory
    - Improved Property
    - Emergency Facilities, Critical Infrastructure, Utilities and Facilities and Other Essential Facilities
- GIS Analysis Results
    - Vulnerability of Emergency Facilities, Critical Public Infrastructure, Utilities and Facilities and Other Essential Facilities
    - Building Vulnerability
    - Economic Vulnerability
    - Social Vulnerability
    - HAZUS-MH Scenarios
- Development Trends and Implications

The vulnerability assessment was conducted using best available data and technology and it includes a quantitative summary of current exposure to known hazards, such as the number, type and value of existing buildings and critical facilities throughout the County. It also includes the estimation of potential losses for varying magnitudes of the known hazard events. The section concludes with a general summary of assessment findings for further review and consideration in the development of Manatee County's post disaster redevelopment goals, objectives and actions.

Hazard Risk Overview

Manatee County is vulnerable to a variety of natural hazards. The county's proximity to the Gulf of Mexico and abundance of rivers, streams, and creeks within the County all contribute to the County's overall hazard risk. Manatee County staff has conducted detailed risk assessments as part of the Comprehensive Emergency Management Plan (CEMP) and the Local Mitigation Strategy (LMS) that officially identify and evaluate the County's risk to natural hazards. The most recent risk assessment (Hazard Vulnerability Assessment) conducted for the CEMP was completed in 2004 and the risk assessment conducted for the LMS was last updated in 2004. The CEMP and the LMS are currently being revised and updated in 2009.

The Hazard Vulnerability Assessment found in the CEMP identifies **flooding (short duration, freshwater, drainage, and coastal/tidal), hurricanes, lightning, severe weather/storms and tropical storms** as "Medium Risk" hazards to the County. The CEMP does not identify any natural hazards as being "High Risk" for the County. The Hazards Analysis section of the LMS identifies **hurricane/coastal storm, severe storms, floods/severe rain events, and wildfires** as "High" risk hazards for the County. The difference in rankings is a result of the different methodologies and priorities used to determine the rankings. The analysis conducted for the CEMP was to determine the hazards that would require response from local emergency management staff and which of those hazards might overwhelm local capabilities. The analysis for the LMS was conducted to determine what hazards may impact the County and which hazards may be able to be mitigated most effectively.

Since 1965, Manatee County has been impacted by fifteen hazard events that were designated as Presidential Disaster Declarations. Presidential Disaster Declarations are requested by state governments on behalf of local governments when disasters overwhelm local resources. Once the declaration has been made, several different forms of federal assistance, such as the Hazard Mitigation Grant Program, Public Assistance Program and Individual Assistance Program, become available from the federal government. The Federal Emergency Management Agency (FEMA), now part of the Emergency Preparedness and Response Directorate of the Department of Homeland Security, is the federal agency tasked with coordinating the federal assistance. **Table 3.1** provides a listing of the Presidential Disaster Declarations received by Manatee County.

Table 3.1: Presidential Disaster Declarations for Manatee County

DATE	EVENT
11/07/1968	Hurricane Gladys
06/24/1972	Tropical Storm Agnes
07/07/1982	Severe storms and flooding
09/12/1985	Hurricane Elena
08/14/1992	Severe storms and flooding
03/13/1993	Tornadoes, flooding, high winds & tides, freezing
10/15/1996	Tropical Storm Josephine
03/05/1998	Severe storms, high winds, tornadoes and flooding
06/19/1998	Extreme fire hazard
09/28/2001	Severe storms, tornadoes and flooding associated with Tropical Storm Gabrielle
07/29/2003	Severe storms and flooding
08/13/2004	Hurricane Charley and Tropical Storm Bonnie
09/04/2004	Hurricane Frances
09/16/2004	Hurricane Ivan
09/26/2004	Hurricane Jeanne

Source: Federal Emergency Management Agency

Recent scientific studies have indicated that coastal communities can anticipate a slow onset of rise in sea level that will increase the risk of damage and losses due to future coastal flooding and storm surge events. Rising sea level over time will shorten the return period (increasing the frequency) of significant flood events. For example, sea level rise of 1 foot over a typical project analysis period (50 years) may cause a flood event currently of annual probability 2 percent (50-year flood) to become an event of 10 percent annual probability (10-year flood). This increased probability will have an exacerbating effect on the extent of flood zones, exposure to flood hazards and the estimation of potential damages and

losses. In 2006, the Tampa Bay Regional Planning Council conducted a study of the impacts of sea level rise on Manatee County[1] that indicates that the sea level could rise 10 feet in the next 200 years. This estimate is based on recent research estimates of sea level rise in the next 200 years.

Based upon the risk assessments completed for the CEMP and the LMS, and on the history of hazards, partially evidenced above by the list of Presidential Disaster Declarations, the hazards that will be evaluated in this assessment will be: **hurricanes and tropical storms, flooding, and wildfire**. **Figures 3.1 – 3.3** show the mapped hazard zones in Manatee County for the flood, storm surge and wildfire hazards.

Assessment Methodology

GIS-Based Approach

This vulnerability assessment was conducted utilizing a Geographic Information Systems (GIS) analysis. GIS can be defined as a collection of computer hardware and software tools used to enter, edit, store, analyze and display geographically referenced information. GIS tools allow users to conduct interactive queries, analyze spatial information, edit data, create maps and present the results of all these operations in a consolidated report.

The GIS-based parcel analysis approach provides estimates for the potential impact of hazards by using a common, systematic framework for evaluation. To perform the assessment, digital data was collected from the Manatee County GIS Department and regional, state and national sources as needed. ESRI® ArcGIS™ 9.2 was used to assess vulnerability utilizing digital data including local tax records for individual parcels, georeferenced point locations for critical facilities and historic properties, as well as georeferenced polygons for land use classifications and environmentally sensitive areas. Using these data layers, vulnerability was assessed by estimating the assessed building value associated with parcels determined to be located in identified hazard areas with delineable geographic boundaries. Vulnerability was further assessed by identifying the number of critical facilities and historic properties located in hazard areas

FEMA's HAZUS-MH software (further described below) was also used to model and generate estimated potential losses for hurricane winds. To estimate vulnerable populations in hazard areas, digital Census 2000 data by census block was obtained and census blocks intersecting with hazard areas were used to determine vulnerable population concentrations.

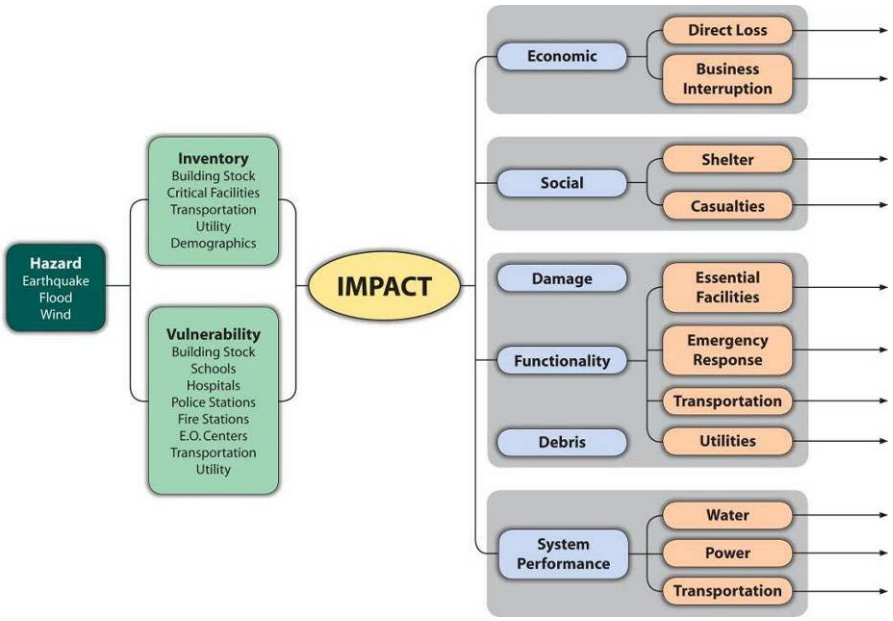
HAZUS-MH

HAZUS-MH is FEMA's standardized loss estimation software program built upon an integrated GIS platform to conduct analysis at a regional level (i.e., not on a structure-by-structure basis). The HAZUS-MH risk assessment methodology is parametric, in that distinct hazard and inventory parameters (e.g., wind speed and building types) can be modeled using the software to determine the impact (i.e., damages and losses) on the built environment. While HAZUS-MH can be used to model the expected impacts from earthquakes, wind and flood events, it was only used in this vulnerability assessment to estimate losses for the hurricane wind hazard.

[1] "Sea Level Rise in the Tampa Bay Region," Tampa Bay Regional Planning Council, August 14, 2006.

It is important to note that HAZUS-MH is a loss estimation tool for planning purposes only. Uncertainties are inherent in any loss estimation methodology and arise in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from (1) approximations and simplifications necessary to conduct such a study; (2) incomplete or outdated data on inventory, demographic, or economic parameters; (3) the unique nature and severity of each hazard when it occurs; and (4) the amount of advance notice that residents have to prepare for the event. As a result, potential exposure and loss estimates are approximate. Results should not be interpreted or used as precise results from a hazard event and should be used only to understand relative risk. More detailed information on HAZUS-MH and its default national inventory data is available through FEMA at: www.fema.gov/plan/prevent/hazus/. **Figure 3.4** illustrates the conceptual model of the HAZUS-MH methodology as applied to Manatee County.

Figure 3.4: Conceptual Model of HAZUS-MH Methodology



Asset Inventory

An inventory of Manatee County's georeferenced assets[2] was created in order to identify and characterize those properties potentially at risk to natural hazards. By understanding the type and number of assets that exist and where they are located in relation to known hazard areas, the relative risk and vulnerability for such assets can be assessed. Under this assessment, four categories of assets were created and then further assessed through geographic information systems (GIS) analysis. The four categories of assets include:

2 While potentially not all-inclusive for Manatee County, "georeferenced" assets include those assets for which specific location data is readily available for connecting the asset to a specific geographic location for purposes of GIS analysis. Primary data sources included Manatee County GIS, Florida Geographic Data Library (FGDL), and the Federal Emergency Management Agency.

1. Improved Property: Includes all improved properties in Manatee County according to local parcel data provided by the County. The information has been expressed in terms of the number of parcels, number of buildings, and total assessed value of improvements (buildings and accessory structures) that may be exposed to the identified hazards.

2. Emergency Facilities: Includes Manatee County's emergency operations center, fire stations, police stations and hospitals.

3. Critical Infrastructure, Utilities and Facilities: Includes primary roads, active railroads, airports, electrical power facilities and transmission lines, wastewater treatment plants and oil and gas facilities located throughout Manatee County.

4. Other Essential Facilities: Includes non-emergency facilities that still provide critical services and functions for vulnerable sectors of the county's population. This includes schools, child care facilities and senior care facilities, etc.

Improved Property

Table 3.2 lists the number of parcels, the estimated number of buildings and the total assessed value of improvements[3] for all of Manatee County in addition to those located in the unincorporated areas.

Table 3.2: Improved Property in Manatee County

Jurisdiction	Number of Parcels	Estimated Number of Buildings	Total Assessed Value of Improvements
Manatee County (All)	141,143	164,479	$22,271,301,615
Unincorporated Areas	114,133	132,185	$18,170,029,272

Source: Manatee County GIS; FEMA

Emergency Facilities, Critical Infrastructure, Utilities and Facilities and Other Essential Facilities

Due to the sensitive nature of the data, the complete listing of all emergency facilities, critical infrastructure, utilities and facilities and other essential facilities that are located in Manatee County have not been included in this plan, but can be obtained by contacting Manatee County Emergency Management.

GIS Analysis Results

Vulnerability of Emergency Facilities, Critical Public Infrastructure, Utilities and Facilities and Other Essential Facilities

In order to complete the vulnerability assessment for Manatee County's critical infrastructure, public utilities and facilities, geospatial databases were made available through the Manatee County GIS Department. These databases included georeferenced point locations for the following facilities: roads; bridges; fire stations; hospitals; law enforcement facilities, schools and sewer lift stations.

3 Total assessed values for improvements is based on 2007 tax assessor records. This data does not include dollar figures for tax-exempt improvements such as publicly-owned buildings and facilities.

To determine the vulnerability of infrastructure and public utilities to hazards, an overlay analysis was conducted utilizing a GIS. Storm surge, flood and high potential wildfire hazard zones were overlayed with roads, bridges and critical public infrastructure, utilities and facilities. **Table 3.3** provides a list of the infrastructure and public utilities that are located in identified hazard zone.

Table 3.3: Critical Facilities Located in Known Hazard Zones							
Facility	Hazard Zones						
	Flood (Zones A/AE/VE)	Storm Surge – Category 1	Storm Surge – Category 2	Storm Surge – Category 3	Storm Surge – Category 4	Storm Surge – Category 5	High Wildfire Potential
Emergency Medical Service Facilities							
Manatee County EMS 3						■	
Manatee County EMS 5							■
Manatee County EMS 10	AE			■	■	■	
Manatee County EMS 13	AE					■	
Manatee County EMS 16	AE			■	■	■	
Fire Departments							
East Manatee Fire Department #1							■
East Manatee Fire Department #2					■	■	
East Manatee Fire Department #3							■
East Manatee Fire Department #4							■
Myakka City Prop. 3							■
Myakka City Prop. 4							■
Myakka City Fire Department #2							■
West Manatee Fire Department #1	AE	■	■	■	■	■	
West Manatee Fire Department #2	AE		■	■	■	■	■
West Manatee Fire Department #3	AE	■	■	■	■	■	
Southern Manatee Fire Department #1	AE					■	
Southern Manatee Fire Department #3							■
Southern Manatee Fire Department #4						■	
Cedar Hammock Fire Department #2	AE					■	
Cedar Hammock Fire Department #3						■	
North River Fire Department #1					■	■	
North River Fire Department #3				■	■	■	
North River Fire Department #4						■	■
Longboat Key Fire Department	AE	■	■	■	■	■	
Parrish Fire Control District							■
Trailer Estates Fire Department	AE	■	■	■	■	■	

Table 3.3: Critical Facilities Located in Known Hazard Zones

Facility	Hazard Zones						
	Flood (Zones A/AE/VE)	Storm Surge – Category 1	Storm Surge – Category 2	Storm Surge – Category 3	Storm Surge – Category 4	Storm Surge – Category 5	High Wildfire Potential
Law Enforcement Facilities							
Manatee County Sheriff's Office							
Anna Maria Police Department	AE		■	■	■	■	
Bradenton Police Department			■	■	■	■	
Bradenton Beach Police Department	AE	■	■	■	■	■	
Holmes Beach Police Department	AE	■	■	■	■	■	
Palmetto Police Department					■	■	
Other Essential Facilities							
Manatee County Administration Building					■	■	
Manatee County Public Safety							■
Manatee Memorial Hospital	AE				■	■	
Port Manatee	AE, VE	■	■	■	■	■	■
Sarasota Bradenton International Airport							■
US Coast Guard - Cortez	VE	■	■	■	■	■	
Schools							
Manatee School for the Arts	AE		■	■	■	■	
Community Christian School	AE						
Ballard Elementary School	AE				■	■	
Manatee County Juvenile Justice	AE		■	■	■	■	
Anna Maria Elementary School	AE	■	■	■	■	■	
Marjorie J. Kinnan Elementary School	A					■	
Bradenton Academy	AE			■	■	■	
Palmetto Christian School			■	■	■	■	
Palma Sola Elementary School					■	■	
Bashaw Elementary School						■	■
Palmetto High School				■	■	■	
Stewart Elementary School						■	
King Middle School					■	■	■

Table 3.3: Critical Facilities Located in Known Hazard Zones							
Facility	**Hazard Zones**						
	Flood (Zones A/AE/VE)	**Storm Surge – Category 1**	**Storm Surge – Category 2**	**Storm Surge – Category 3**	**Storm Surge – Category 4**	**Storm Surge – Category 5**	**High Wildfire Potential**
Lincoln Middle School					■	■	
Palmetto Elementary School					■	■	
Palm View Elementary School						■	
Johnson Middle School						■	
Tara Elementary School						■	■
McNeal Elementary School							■
Sea Breeze Elementary School							■
Freedom Elementary School							■
Haile Elementary School							■
Blackburn Elementary School							■
Sewer Lift Stations							
Number of lift stations per hazard area =							

The Manatee County Public Safety Department has created a database of roads that have flooded frequently in the past. This database has been converted to a GIS layer and **Figure 3.5** is a map of the data contained in the database. These problem areas could provide challenges and/or opportunities for improvement following a major disaster.

Building Vulnerability

The building vulnerability assessment was conducted using a GIS analysis process in which hazards with a spatial delineation (flood, storm surge and wildfire) were overlayed with local parcel and building footprint data to determine the number of structures and parcels located in these hazard zones. 2007 tax assessment data was then used to determine the assessed value of these at-risk buildings. **Tables 3.4** through **3.10** provide an overview of the numbers and values of structures located in identified hazard zones for each jurisdiction.

Table 3.4: Hazard Zone Vulnerability – Unincorporated Manatee County

Hazard Zone	Total Number of Buildings	Total Number of Parcels	Total Number of Parcels with At-Risk Buildings	Total Assessed Building Value (2007) of At-Risk Buildings	Total Number of Parcels with At-Risk Buildings (Pre-FIRM Only)	Total Assessed Building Value (2007) of At-Risk Buildings (Pre-FIRM Only)
25-year flood zone	1,686	3,193	1,092	$348,375,991	208	$46,931,660
1% ACF*	26,009	24,890	17,034	$3,207,800,784	8,340	$1,072,486,277
.2% ACF*	11,434	12,798	8,422	$1,642,235,909	2,638	$328,070,363
Coastal VE Zone	910	1,261	678	$197,078,806	412	$57,856,252
Cat 1 Storm Surge	6,423	7,207	4,347	$1,008,666,528	2,431	$430,255,820
Cat 2 Storm Surge	13,839	13,268	9,492	$2,008,479,987	4,401	$693,095,409
Cat 3 Storm Surge	20,051	18,157	13,376	$2,694,553,001	5,919	$867,825,297
Cat 4 Storm Surge	28,302	25,184	19,352	$3,616,542,080	7,938	$1,028,121,929
Cat 5 Storm Surge	43,211	37,216	29,796	$5,521,300,943	10,977	$1,385,788,062
High Wildfire Potential	37,818	44,530	28,050	$8,008,738,508	N/A	N/A
Medium Wildfire Potential	11,911	16,837	9,185	$3,297,999,695	N/A	N/A

* ACF – Annual Chance Flood

Table 3.5: Hazard Zone Vulnerability – Anna Maria

Hazard Zone	Total Number of Buildings	Total Number of Parcels	Total Number of Parcels with At-Risk Buildings	Total Assessed Building Value (2007) of At-Risk Buildings	Total Number of Parcels with At-Risk Buildings (Pre-FIRM Only)	Total Assessed Building Value (2007) of At-Risk Buildings (Pre-FIRM Only)
1% ACF*	1,524	1,468	1,329	$192,287,505	794	$87,705,222
.2% ACF*	0	0	0	$0	0	$0
Coastal VE Zone	135	194	123	$28,416,207	87	$15,155,233
Cat 1 Storm Surge	1,213	1,256	1,077	$149,086,006	614	$65,745,955
Cat 2 Storm Surge	1,639	1,571	1,425	$211,445,656	862	$98,314,529
Cat 3 Storm Surge	1,639	1,571	1,425	$211,445,656	862	$98,314,529
Cat 4 Storm Surge	1,639	1,571	1,425	$211,445,656	862	$98,314,529
Cat 5 Storm Surge	1,639	1,571	1,425	$211,445,656	862	$98,314,529
High Wildfire Potential	102	135	92	$18,073,057	N/A	N/A
Medium Wildfire Potential	52	73	53	$8,947,491	N/A	N/A

* ACF – Annual Chance Flood

Table 3.6: Hazard Zone Vulnerability – Bradenton

Hazard Zone	Total Number of Buildings	Total Number of Parcels	Total Number of Parcels with At-Risk Buildings	Total Assessed Building Value (2007) of At-Risk Buildings	Total Number of Parcels with At-Risk Buildings (Pre-FIRM Only)	Total Assessed Building Value (2007) of At-Risk Buildings (Pre-FIRM Only)
1% ACF*	4,246	4,404	3,439	$660,751,370	2,408	$327,456,370
.2% ACF*	1,971	2,243	1,674	$429,146,240	771	$120,117,093
Coastal VE Zone	8	33	11	$1,076,236	6	$6,000
Cat 1 Storm Surge	1,059	1,206	841	$259,203,117	422	$86,416,227
Cat 2 Storm Surge	2,424	2,494	1,895	$451,590,066	1,175	$171,076,523
Cat 3 Storm Surge	3,130	3,210	2,433	$542,556,443	1,509	$206,883,033
Cat 4 Storm Surge	5,045	4,852	3,930	$899,960,012	2,253	$335,377,901
Cat 5 Storm Surge	6,650	6,021	6,955	$1,374,373,158	4,456	$557,141,756
High Wildfire Potential	2,000	2,148	1,543	$563,144,457	N/A	N/A
Medium Wildfire Potential	802	1,023	703	$342,668,364	N/A	N/A

* ACF – Annual Chance Flood

Table 3.7: Hazard Zone Vulnerability – Bradenton Beach

Hazard Zone	Total Number of Buildings	Total Number of Parcels	Total Number of Parcels with At-Risk Buildings	Total Assessed Building Value (2007) of At-Risk Buildings	Total Number of Parcels with At-Risk Buildings (Pre-FIRM Only)	Total Assessed Building Value (2007) of At-Risk Buildings (Pre-FIRM Only)
1% ACF*	996	926	804	$77,156,940	615	$42,926,139
.2% ACF*	0	0	0	$0	0	$0
Coastal VE Zone	106	187	187	$22,570,034	170	$18,406,353
Cat 1 Storm Surge	669	676	534	$56,560,413	394	$28,507,452
Cat 2 Storm Surge	1,068	1,003	859	$86,155,098	662	$49,651,350
Cat 3 Storm Surge	1,069	1,003	859	$86,155,098	662	$49,651,350
Cat 4 Storm Surge	1,069	1,003	859	$86,155,098	662	$49,651,350
Cat 5 Storm Surge	1,069	1,003	859	$86,155,098	662	$49,651,350
High Wildfire Potential	6	2	1	$71,850	N/A	N/A
Medium Wildfire Potential	48	46	43	$4,910,312	N/A	N/A

* ACF – Annual Chance Flood

Table 3.8: Hazard Zone Vulnerability – Holmes Beach

Hazard Zone	Total Number of Buildings	Total Number of Parcels	Total Number of Parcels with At-Risk Buildings	Total Assessed Building Value (2007) of At-Risk Buildings	Total Number of Parcels with At-Risk Buildings (Pre-FIRM Only)	Total Assessed Building Value (2007) of At-Risk Buildings (Pre-FIRM Only)
1% ACF*	2,677	2,590	2,374	$347,949,711	1,762	$214,474,108
.2% ACF*	0	0	0	$0	0	$0
Coastal VE Zone	201	292	162	$41,724,160	122	$24,869,089
Cat 1 Storm Surge	2,124	2,174	1,935	$287,055,415	1,457	$175,410,028
Cat 2 Storm Surge	2,811	2,684	2,467	$372,721,477	1,828	$226,598,038
Cat 3 Storm Surge	2,811	2,684	2,467	$372,721,477	1,828	$226,598,038
Cat 4 Storm Surge	2,811	2,684	2,467	$372,721,477	1,828	$226,598,038
Cat 5 Storm Surge	2,811	2,684	2,467	$372,721,477	1,828	$226,598,038
High Wildfire Potential	152	202	136	$24,812,495	N/A	N/A
Medium Wildfire Potential	197	215	183	$30,189,502	N/A	N/A

* ACF – Annual Chance Flood

Table 3.9: Hazard Zone Vulnerability – Longboat Key (Manatee County Portion)

Hazard Zone	Total Number of Buildings	Total Number of Parcels	Total Number of Parcels with At-Risk Buildings	Total Assessed Building Value (2007) of At-Risk Buildings	Total Number of Parcels with At-Risk Buildings (Pre-FIRM Only)	Total Assessed Building Value (2007) of At-Risk Buildings (Pre-FIRM Only)
1% ACF*	1,603	1,239	959	$273,755,411	627	$120,304,912
.2% ACF*	0	0	0	0	0	0
Coastal VE Zone	100	187	55	$10,017,643	35	$2,951,003
Cat 1 Storm Surge	1,276	1,166	816	$210,990,965	532	$87,716,433
Cat 2 Storm Surge	1,665	1,285	989	$278,421,298	648	$122,007,580
Cat 3 Storm Surge	1,668	1,285	989	$278,421,298	648	$122,007,580
Cat 4 Storm Surge	1,668	1,285	989	$278,421,298	648	$122,007,580
Cat 5 Storm Surge	1,668	1,285	989	$278,421,298	648	$122,007,580
High Wildfire Potential	160	193	93	$30,007,202	N/A	N/A
Medium Wildfire Potential	78	100	50	$25,583,470	N/A	N/A

* ACF – Annual Chance Flood

Table 3.10: Hazard Zone Vulnerability – Palmetto						
Hazard Zone	**Total Number of Buildings**	**Total Number of Parcels**	**Total Number of Parcels with At-Risk Buildings**	**Total Assessed Building Value (2007) of At-Risk Buildings**	**Total Number of Parcels with At-Risk Buildings (Pre-FIRM Only)**	**Total Assessed Building Value (2007) of At-Risk Buildings (Pre-FIRM Only)**
1% ACF*	3,412	3,091	2,548	$407,310,150	1,460	$119,441,378
.2% ACF*	1,352	1,094	818	$173,384,174	501	$69,998,244
Coastal VE Zone	18	89	23	$11,731,229	14	$2,509,073
Cat 1 Storm Surge	632	900	693	$135,677,768	338	$21,793,208
Cat 2 Storm Surge	3,351	2,973	2,548	$400,401,496	1,473	$124,892,854
Cat 3 Storm Surge	4,224	3,586	3,048	$475,592,303	1,745	$149,174,360
Cat 4 Storm Surge	6,010	4,642	3,908	$660,041,347	2,322	$249,770,453
Cat 5 Storm Surge	6,275	4,876	4,114	$697,337,242	2,453	$267,122,935
High Wildfire Potential	522	650	421	$161,428,018	N/A	N/A
Medium Wildfire Potential	283	318	217	$94,540,945	N/A	N/A

* ACF – Annual Chance Flood

Repetitive Loss Structures

FEMA defines a repetitive loss property as any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978. A repetitive loss property may or may not be currently insured by the NFIP. Currently there are over 122,000 repetitive loss properties nationwide.

According to FEMA repetitive loss property records (as of June 2008), there are 362 "non-mitigated" repetitive loss properties located in Manatee County, including all incorporated areas. These properties have accounted for a total of 1,125 losses and more than $13.5 million in claims payments under the NFIP. The average claim amount for these properties is $12,051. Without mitigation, these properties will likely continue to experience flood losses.

Figures 3.6 and **3.7** provide the general areas of repetitive loss structures in the Manatee County.

Mobile Home Vulnerability

There are several mobile homes and mobile home parks in Manatee County that are located in identified hazard areas. Some of the parks are owned by a single owner that rent spaces to multiple tenants and other are subdivided into several different small lots which are owned by individual owners.

Mobile homes are often considered to be more at risk to natural hazards (namely hurricane, thunderstorm and tornado winds). Especially at risk are those mobile homes built before 1994 when the wind safety provisions of the Housing and Urban Development (HUD) Code were upgraded as a result of Hurricane Andrew.

In Manatee County, there are many mobile homes located in hazard zones. In a post disaster environment, Manatee County, should try to take advantage of this unique opportunity to reduce the

number of mobile homes in hazard zones. This can be done through a variety of post disaster redevelopment policies that can be considered as part of the County's Post Disaster Recovery and Redevelopment Strategy.

To determine the number of mobile homes that are vulnerable to natural hazards, an overlay analysis was conducted utilizing a GIS. Storm surge and flood hazard areas overlayed with a mobile home building footprint layer. **Table 3.11** provides an overview of the number of mobile homes, by jurisdiction, that are at risk to storm surge and flooding. There are no mobile homes in Anna Maria, Holmes Beach or Longboat Key.

Table 3.11: Mobile Homes Located in Known Flood Hazard Zones

Jurisdiction	Total Number of Mobile Homes	Number of Mobile Homes in Hazard Zones								
		25 year floodplain	1 Percent Annual Chance	0.2 Percent Annual Chance	Coastal VE Zone	Category 1 Storm Surge	Category 2 Storm Surge	Category 3 Storm Surge	Category 4 Storm Surge	Category 5 Storm Surge
Unincorporated Manatee County	27,096	232	7,707	2,711	193	2,588	4,583	6,314	8,722	12,459
Bradenton	1,455	NA	901	87	0	221	413	417	514	868
Bradenton Beach	283	NA	283	0	0	160	305	305	305	305
Palmetto	2,121	NA	1253	428	0	307	1,319	1,542	2,226	2,255

Historic Properties Vulnerability

Historic properties are defined, for the purposes of this study, as any historic district, site, building, structure or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior or any such property recognized by the State Historic Preservation Office (SHPO) as being historically significant. This term may also include artifacts, records and remains that are related to and located within such properties. This section provides a summary of the detailed results of this assessment, which have been included as **Appendix B** of this plan.

According to the National Register Information System[4] and data provided by the SHPO, there are 17 individual national register entrees for Manatee County plus two historic districts. There are also 862 properties recognized by the State Historic Preservation Office that includes NRHP properties and other properties of possible historic significance dating from c1845 to c1958.

According to GIS analysis, there is a total of approximately $45,543,827 in property value associated with historic buildings that intersect with the 1 percent annual chance flood hazard and approximately $54,427,446 in property value associated with historic buildings that intersect with storm surge inundation areas. (These loss estimates are mutually exclusive, as many of the properties exposed to the riverine flood hazard are also exposed to coastal storm surge.)

4 The National Register Information System (NRIS) is a computerized database accessible via the National Park Service Web site (www.nps.gov) that contains information on every property in the National Register of Historic Places.

The local desire to preserve and protect Manatee County's heritage is a significant consideration in analyzing vulnerability and in determining historic properties' place in a redevelopment strategy. There is a high level of community value placed on historic properties and cultural resources in Florida, at the state, regional and local levels. This extends to historical, archaeological, museum and folk culture resources, as well as other aspects of historic assets. The state's Bureau of Historic Preservation, for example, invests in and provides architectural preservation, compliance review, survey and registration, master site file, Florida Folklife Program and grant services. There is a widespread feeling that Florida's many historic resources, including those in Manatee County, contribute significantly to the state's character and economic base and reflect each community's distinct heritage.

Economic Vulnerability

Restoring the economic engine of the County is essential to the successful redevelopment of the community. It is estimated that anywhere from 25 to 40% of small businesses impacted by a disaster, never reopen. If this were to occur in Manatee County, it could have a major impact on Manatee County Government and the services it provides its citizens.

Large businesses are often better prepared to recover from a disaster because of the larger network of resources available to the business and the preparation put into planning for a disaster. This planning is often put in writing in the form of a disaster recovery plan for the business. However, large businesses are not completely immune to the impacts of a catastrophic disaster.

Table 3.12 contains a listing of the fifteen largest employers in the county, including the number of employees, as identified by the Manatee County Economic Development Council.

Table 3.12: Major Employers in Manatee County	
Company/Organization Name	**Number of Employees**
Manatee County School Board	7,000
Beall's Inc.	2,100
Manatee County Government	1,950
Tropicana Products, Inc.	1,600
Manatee Memorial Hospital	1,500
Manatee County Sherriff's Department	1,079
Blake Medical Center	1,050
Hoveround Corp.	670
City of Bradenton	550
Gevity HR	500
SYSCO Food Services	450
Manatee Community College	437
Pierce Manufacturing, Inc.	400
IMG Academies/Bollettieri	350
Eaton Corporation	300

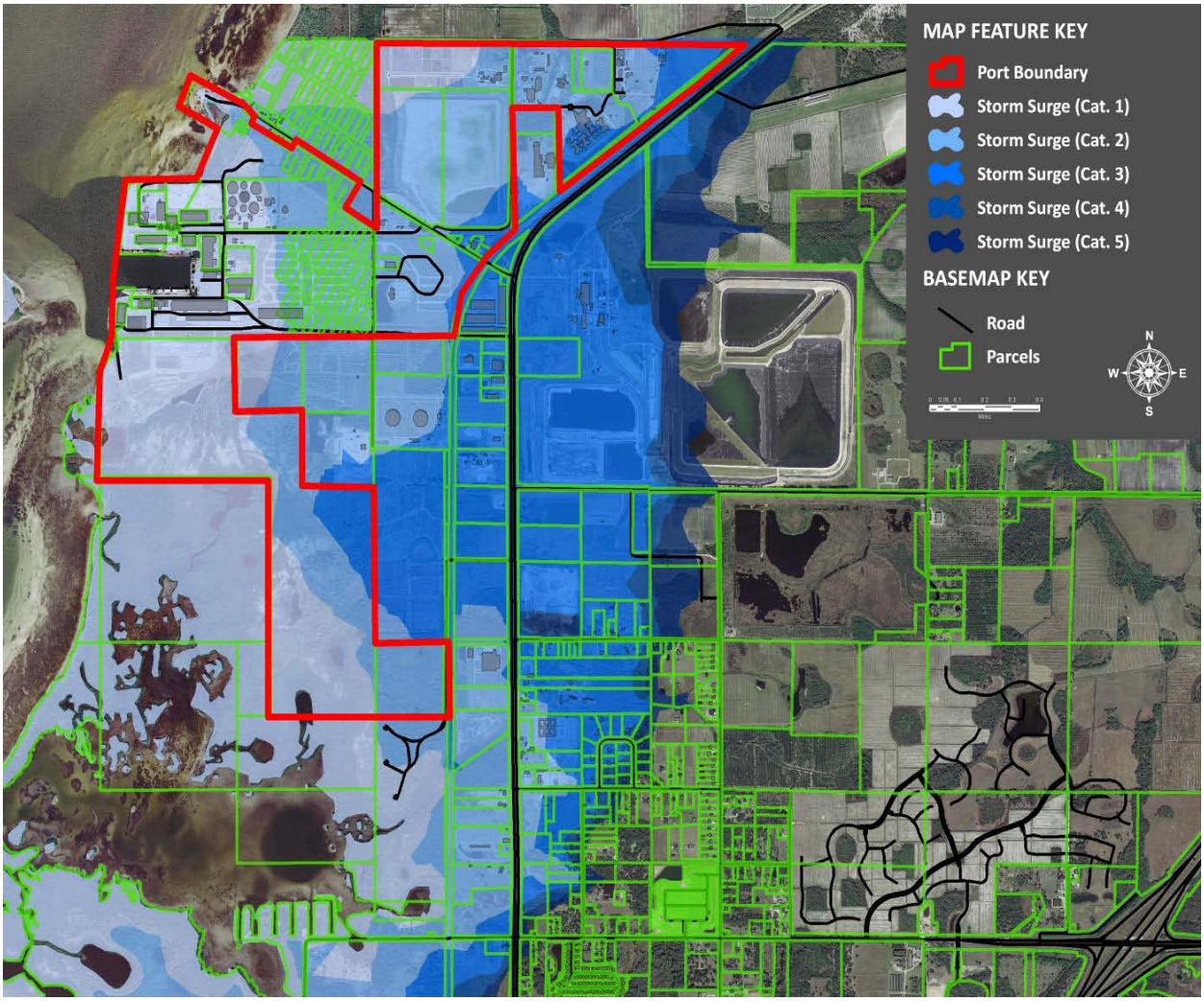
Source: Manatee County Economic Development Council (July 2008)

Figure 3.8 depicts areas of the County that have been designated as Major Employment Areas. These areas serve a vital role in the economic engine of the County. In a post disaster environment, it will be critical for Manatee County staff to work with the businesses in these areas to restore the buildings, services and infrastructure that enable these businesses to function.

Port Manatee

In addition to the businesses listed above, Port Manatee plays a significant role in the economic health of Manatee County. With an estimated 1,100 employees working at the port, the facility is the closest U.S. deepwater seaport to the Panama Canal, providing shippers with access to Pacific Rim markets. **Figure 3.9** is an aerial view of the Port with the storm surge hazard zones overlayed on the map to show how vulnerable the facility is to hazards.

Figure 3.9
Port Manatee



Social Vulnerability

The U.S. Census Bureau has estimated that the 2007 population for Manatee County was 315,108 which is an increase of almost 20 percent over the 2000 population of 264,002. According to 2006 data from the U.S. Census Bureau, the median age in Manatee County is 42.9 years, which is considerably higher than the national average of 36.4 years. The average household size is 2.28 persons. In terms of population segments that may potentially be at higher risk in the event of a disaster, in general, 5.9 percent of the total population is under the age of five (a total of 18,507 persons) and 22.1 percent is age 65 years and over (a total of 69,094 persons). Approximately 25 percent of households have incomes of $25,000 or less (33,936 households), and 15.3 percent (44,414 persons age five and up) hold disability status. The US Census Bureau defines disability as "A long-lasting physical, mental, or emotional condition. This condition can make it difficult for a person to do activities such as walking, climbing stairs, dressing, bathing, learning, or remembering. This condition can also impede a person from being able to go outside the home alone or to work at a job or business." **Table 3.13** provides an overview of the social vulnerability in Manatee County.

Table 3.13: Social Vulnerability		
Social Vulnerability Category	**Number of Persons**	**% of Population**
Over 85 years old (2008)	26,533	8.4%
Over 65 years old	42,561	13.7%
Under 18 years old	65,195	20.8%
Under 5 years old	18,507	5.9%
English not spoken at home	43,548	14.8%
Disabled	44,414	15.3%

Source: US Census Bureau

The social vulnerability categories provided in **Table 3.13** were also used in the analysis to create social vulnerability maps found in **Figures 3.10** and **3.11**. Using GIS shapefiles that contain data from the 2000 Census at the Census block level, a percentage for each social vulnerability category per Census block was determined by dividing the number of each social vulnerability variable in the block (e.g. number of persons over 65 years old, under 18 years old, etc) by the total number of that variable for the entire county. The percentage was then normalized by dividing the percentage determined for that block by the maximum percentage found in all blocks countywide. This is done in order to rank the values on the same scale as the other social variables.

Migrant Workers

According to the Florida Department of Health, there are between 150,000 to 200,000 migrant and seasonal farm workers and their families who travel and work in Florida. Because of the number of farms and other forms of employment that rely heavily on migrant workers, many of these migrant workers can be found in Manatee County during different times of the year. **Figure 3.12** is a map depicting the locations of migrant farm camps in Manatee County. These populations can provide unique challenges to Manatee County in a post disaster environment because of language, cultural and economic barriers.

HAZUS-MH Scenarios

HAZUS-MH was used to determine the amount of damages that could be incurred in the County as a result of two different hurricane modeling scenarios. First, Manatee County conducted a probabilistic analysis that produces loss estimates for the most likely types of storms that could impact the area. The County also used HAZUS-MH to model what might occur in the County if a "user-defined" Category 5 storm were to make landfall in Manatee County. These scenarios were conducted so that Manatee County staff and their stakeholders can better understand and plan for the challenges that will be facing the County following a disaster.

For the probabilistic scenario, default HAZUS-MH wind speed data and damage functions, and methodology were used to determine the potential estimated losses for 50-, 100-, 200-, 500-, and 1000-year frequency events and annual expected loss at the census tract level. **Table 3.14** shows estimated potential losses to improved properties in unincorporated Manatee County for 50-, 100-, 200-, 500- and 1000-year hurricane wind event scenarios.

Table 3.14 Potential Capital Stock Losses from Hurricane and Tropical Storm Winds (by Return Period)		
Return Period	**Peak Wind Gust**	**Estimated Potential Losses (Countywide)**
10-year	71 mph	$15,545,000
20-year	86 mph	$87,921,000
50-year	105 mph	$443,210,000
100-year	117 mph	$1,349,292,000
200-year	128 mph	$3,529,050,000
500-year	145 mph	$8,706,591,000
1000-year	155 mph	$13,257,022,000

HAZUS-MH was also used to model a "user-defined" Category 5 storm to help illustrate the potential impacts of a catastrophic hurricane making a direct hit on the county. **Table 3.15** provides a summary of the results from this modeled scenario. **Table 3.16** provides the number of buildings expected to be damaged by occupancy class as a result of the modeled storm. The modeled storm had maximum peak gusts of 224 mph. and the storm track is shown in **Figure 3.13**.

Table 3.15: Results from Category 5 HAZUS-MH Scenario								
Category	**Capital Stock Losses**			**Business Interruption Losses**				**Total Loss**
	Total Building Damage	**Total Contents Damage**	**Inventory Loss**	**Income**	**Relocation**	**Rental**	**Wage**	
Residential	$15,440,764,000	$7,630,860,000	NA	$25,288,000	$1,675,503,000	$696,833,000	$59,576,000	**$25,528,828,000**
Commercial	$2,674,046,000	$2,919,204,000	$66,459,000	$556,509,000	$365,232,000	$252,874,000	$600,437,000	**$7,434,763,000**
Industrial	$741,953,000	$1,015,644,000	$184,409,000	$14,342,000	$32,082,000	$8,396,000	$24,005,000	**$78,827,000**
Other	$652,958,000	$670,840,000	$14,812,000	$12,048,000	$96,959,000	$13,122,000	$28,229,000	**$712,249,000**
Total	$19,509,721,000	$12,236.548,000	$265,680,000	$608,187,000	$2,169,776,000	$971,225,000	$712,247,000	**$33,754,647,000**

Table 3.16: Expected Building Damage by Occupancy (Category 5 HAZUS-MH Scenario)				
Occupancy	**Minor Damage**	**Moderate Damage**	**Severe Damage**	**Totally Destroyed**
Agricultural	0	1	92	448
Commercial	2	26	1,985	4,497
Education	0	1	54	86
Government	0	1	53	76
Industrial	1	10	794	1,332
Religion	0	3	171	458
Residential	13	480	11,704	110,928
Total	**16**	**522**	**14,855**	**117,824**

The scenario estimates that:

- 11,264,348 tons of debris would be generated by a storm with the modeled characteristics
- 107,401 households would be displaced as a result of the storm
- 27,080 would seek temporary shelter in public shelters.

It is evident that if a storm of this intensity were to actually occur in Manatee County, it would present significant post disaster redevelopment challenges and opportunities for the County.

Because of their location on a barrier island, the municipalities of Anna Maria, Bradenton Beach, Holmes Beach, and Longboat Key could suffer substantial loss in tax revenue in the event of a major hurricane (Category 3 or larger) making landfall in Manatee County. As presented in the Building Vulnerability discussion in this section, most of the structures on island are located in the Category 1 and 2 storm surge zones. The loss of revenue generated by these properties could mean significant and potentially insurmountable challenges for these municipalities.

Development Trends and Implications

As Manatee County's population continues to increase, development pressure will also continue to increase. Manatee County has strong planning policies in place to regulate development including, most notably, those policies found in the comprehensive plan, and will continue to effectively enforce those policies; however, increased development in hazard areas will mean increased vulnerability in Manatee County.

In an effort to improve development regulation in the vulnerable coastal areas of the county, Manatee County adopted an amendment to the comprehensive plan regarding the Coastal High Hazard Area (CHHA). The County's previous version of the comprehensive plan referred to this area as the Coastal Storm Vulnerability Area (CSVA) which was mapped as the land below the 5 foot contour line. The State required all jurisdictions to define the CHHA as the Category 1 storm surge zone; therefore, Manatee County made this area even larger by defining the CHHA as both the area of the Category 1 storm surge zone and the land below with 5 foot contour. In most of the county these areas are relatively the same, but that is not the case in all areas.

Growth in the unincorporated areas of the county continues to take place in the county consistent with the comprehensive plan. Most of the growth is occurring in areas that are located outside of hazard areas.

List of Tables and Figures

Tables

Figures