

Executive Summary

The experiences of the 2004 Hurricane Season epitomize the importance of better integrating hazard mitigation activities into local comprehensive planning. Last fall, residents from all over the state experienced significant damages from Hurricanes Charley, Frances, Jeanne, and Ivan by either winds, tornadoes, surge, or flooding. But this was not the only time that we have experienced natural disaster, nor will it be the last. In 1992, Hurricane Andrew devastated South Florida. In 1998 and 1999, most counties in Florida experienced wildfires. In some cases, despite fire fighters' best efforts, the fires advanced through neighborhoods and homes were lost. Every year in Central Florida, new sinkholes emerge swallowing homes and damaging infrastructure. The cost of recovery for these various disasters ranges from hundreds of thousands to billions of dollars, significantly taxing local, state, and federal financial sources. Losses covered through federal funding as a result of the 2004 hurricanes alone could reach as high as \$7 billion. Worst of all, however, are the many lives that, directly or indirectly, are lost due to natural disasters. It is imperative that we reduce the human and financial costs of natural disasters. Through better integration of natural hazard considerations into local comprehensive planning, we can build safer communities.

This profile of Lee County has been prepared as part of a statewide effort by the Florida Department of Community Affairs (DCA) to guide local governments on integrating hazard mitigation principles into local comprehensive plans. Through the process outlined in this profile, planners will be able to (1) convey Lee County's existing and potential risk to identified hazards; (2) assess how well local hazard mitigation principles have been incorporated into the County's Comprehensive Plan; (3) provide recommendations on how hazard mitigation can better be integrated into the Comprehensive Plan; and (4) determine if any enhancements could be made to the LMS to better support comprehensive planning. Best available statewide level data is provided to convey exposure and risk as well as to illustrate the vulnerability assessment component of the integration process.

Summary of Preliminary Recommendations

Lee County's Comprehensive Plan has a good integration of hazard mitigation principles and its LMS has adequate data and goals to support comprehensive planning. However, there are always ways to strengthen such plans, and the following is a summary of options for the County to do so.

Comprehensive Plan Preliminary Recommendations

The following recommendations include hazard mitigation measures in which Lee County can continue to reduce or eliminate risks to storm surge, flood, and wildfire. These recommendations pertain to the use of vacant lands and/or redevelopment practices. Based on the land use tabulations, most of the vacant acreage is susceptible to flood, tropical cyclone generated storm surge, and wildfire. For more information about the methodology and data used for the land use tabulations, please refer to Section 2. Hazard Vulnerability in this hazards profile.

Of the vacant lands, 26,904 acres are susceptible to Category 1 storm surge (CHZ), 104,953 acres are susceptible to Category 1 – 3 storm surge (HVZ), 38,849 are susceptible to 100-year flood, 39,535 acres are susceptible to wildfire, and 515 acres are susceptible to sinkholes. Susceptibility for surge, flood and wildfire are based on risk, whereas susceptibility for sinkhole is based on exposure. Therefore, further analysis is needed to determine the level of risk associated with sinkhole hazards.

Storm Surge

Nearly 75% of the 26,904 vacant acres in the Coastal Hazard Zone and 81% of the 104,953 vacant acres in the Hurricane Vulnerability Zone are to be developed for residential, commercial, industrial uses or public facilities, indicating that these risk reduction strategies should be considered prior to development of this vacant land.

- The Comprehensive Plan should continue to maintain low density residential development in the CHHA, prohibit new or expanded mobile home or recreational vehicle developments on barrier islands or V-Zones, protect the coastline naturally, and other existing measures to minimize risk.
- The Comprehensive Plan should consider transfer of development rights to from areas within the CHHA to outside the CHHA, as another measure to reduce density in the CHHA.
- The County should consider retrofitting essential public facilities that exist in the CHHA to mitigate impacts from surge.
- The County should consider prohibiting septic tanks in the CHHA except in cases of excessive hardship where (1) no reasonable alternative exists, (2) a discharge from a septic tank will not adversely affect public health and will not degrade surface or ground water and (3) where the Health Department determines that soil conditions, water table elevation and setback provisions are adequate to meet state requirements.
- The County should consider prohibiting new schools in the CHHA and retrofitting new schools as shelters outside the HVZ, where possible.
- The County should consider only allowing new on-site shelters outside the HVZ, where possible.
- The Comprehensive Plan should consider prohibiting the development of nursing homes, adult congregate living facilities, and hospitals inside the Coastal High Hazard Area and other high-risk developments, similar to how most county funded facilities have been regulated. Building these facilities out of harm's way reduces evacuation needs of the special needs population. In addition, the number of evacuees is reduced who are under medical supervision or need medical staff chaperones, potentially reducing hurricane evacuation clearance times.

Flood

About 76% of the 38,849 vacant acres in the 100-year floodplain are to be developed for residential, commercial, industrial uses or public facilities, indicating that these risk reduction strategies should be considered prior to development of this vacant land.

- The Comprehensive Plan should continue the implementation of policies for stormwater management, repetitive loss repair and modification requirements, transfer of development rights in wetlands, and other measures to reduce the risk from flood.
- The County should consider requiring the installation back-flow preventers on new septic tanks that exist in the 100-year floodplain to mitigate impacts from flood, or create incentives and disincentives to reduce the desirability of septic installation within the 100-year floodplain.
- The County should consider building shelters and essential public facilities outside of the 100-year floodplain.
- The County should consider requiring that all structures built in the 100-year floodplain include at least 1 foot freeboard. Many post-disaster building performance/damage assessments have shown that it is advisable to include freeboard to reduce future flood damages. Okaloosa and Brevard Counties, City of Jacksonville and the Santa Rosa Island Authority are example communities that have adopted freeboard requirements.
- The County should consider requiring areas that have not established base flood elevations to be studied prior to development.
- The County should consider calling for compensating storage calculations in all non coastal flood hazard areas.

Wildfire

About 86% of the 39,535 vacant acres that are susceptible to wildfire are to be developed for residential, commercial, industrial uses or public facilities, indicating that these risk reduction strategies should be considered prior to development of this vacant land.

- The County should continue to implement practices to reduce risk from wildfire, such as directing developers to manage natural areas around private recreational facilities with Best Management Practices (including prescribed burning), and using a natural resources management plan to acquire sensitive lands for which fire management planning is to occur.
- The County should consider participating in the Firewise Medal Community program to reduce risks within the wildland urban interface.
- Where reasonable, consideration should be made to design structures and sites within the County to minimize potential for loss of life and property (e.g., outdoor sprinkler systems, fire-resistant building materials or treatments, and landscaping and site design practices); review proposals for subdivisions, lot splits, and other developments for fire protection needs during site plan review process; coordinate with fire protection service or agencies to determine guidelines for use and development in wildfire-prone areas.
- The County should consider requirement for all new development to include & implement a wildfire mitigation plan specific to that development, subject to review & approval by the County Fire Rescue Department.
- The County should consider increasing public awareness of prescribed burning and require management plans for conservation easements that address reduction in wildfire fuels.

Sinkhole

Sinkhole hazard was not discussed in the hazards analysis in the latest version of the Lee County LMS.

- Sinkhole hazards could be evaluated further in the next update of the hazards analysis of the LMS to determine the risk. However, based on available data, it appears that sinkhole risk is very low.

General

- Include each hazard layer on the existing and future land use maps to determine where risks are possible to target hazard mitigation strategies.
- Continue educating the public, especially those at high risk from hurricanes, floods, and wildfires, and inform them of proactive steps they can take to mitigate damage.

Local Mitigation Strategy Preliminary Recommendations

The following data and information could be included in an update of the LMS. This information could help convey how and where disasters impact the population and the built environment to support comprehensive planning.

- Develop Guiding Principles.
- Provide data for population and property exposure to hazards.
- Include a clear description of geographic areas exposed to each of the hazards.
- Provide a quantitative risk assessment for future development (i.e., loss estimates) or specific critical facilities.

- Provide hazard maps that include data layers to illustrate population (i.e., density) and/or property (i.e., value) exposure.
- Provide future land use maps that include hazard data layers to illustrate which future land use categories are susceptible to each hazard.
- Provide loss estimates by land use in relation to the hazard.
- Provide a map of repetitive losses.
- Use consistent data in plans such as the LMS, CEMP, and Comprehensive Plan.

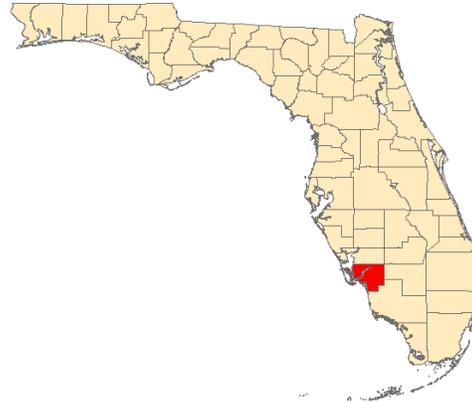
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1. County Overview

Geography and Jurisdictions

Lee County is located along the Gulf of Mexico in Southwest Florida. It covers a total of 1,211.9 square miles, of which 803.6 square miles are land and 153.6 square miles are water. There are five incorporated municipalities within Lee County, as shown in **Table 1.1**. The City of Fort Myers serves as the county seat.



Population and Demographics

According to the April 1, 2004 population estimate by the University of Florida's Bureau of Economic and Business Research (BEBR), population estimates for all jurisdictions within Lee County and the percent change from the 2000 U.S. Census are presented in **Table 1.1**. While many residents live in incorporated jurisdictions, approximately 53% live in unincorporated areas. Lee County has experienced rapid population growth in recent years, a trend that is expected to continue. Between 1990 and 2000, Lee County had a growth rate of 31.6%, which was over one third higher than the statewide average of 23.5% for the same time period.

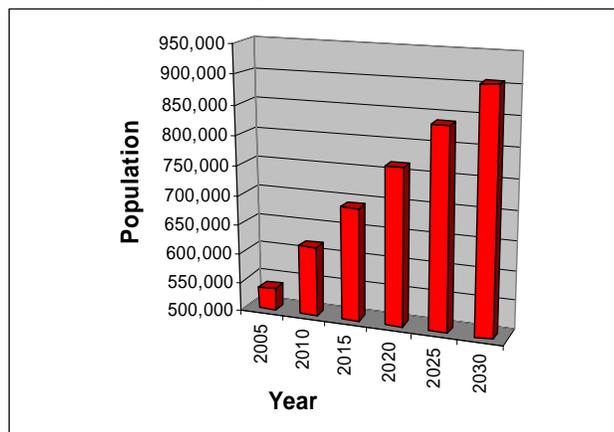
Table 1.1 Population Estimates by Jurisdiction

Jurisdiction	Population (Census 2000)	Population (Estimate 2004)	Percent Change 2000-2004	Percent of Total Population (2004)
Unincorporated	244,972	276,939	13.05%	53.13%
Bonita Springs	32,797	41,070	25.22%	7.88%
Cape Coral	102,286	132,379	29.42%	25.40%
Fort Myers	48,208	57,585	19.45%	11.05%
Fort Myers Beach	6,561	6,945	5.85%	1.33%
Sanibel	6,064	6,335	4.47%	1.22%
Total	440,888	521,253	18.23%	100.00%

Source: University of Florida, Bureau of Economic and Business Research, 2004

According to BEBR (2004), Lee County's population is projected to grow steadily and reach an estimated 905,400 by the year 2030, increasing the average population density of 649 to 1,127 persons per square mile. **Figure 1.1** illustrates medium growth population projections for Lee County based on 2004 calculations.

Figure 1.1 Population Projections for Lee County, 2005–2030



Source: University of Florida, Bureau of Economic and Business Research, 2004

Of particular concern within Lee County’s population are those persons with special needs or perhaps limited resources such as the elderly, disabled, low-income or language isolated residents. According to the 2000 Census, of the 325,961 persons residing in Lee County 25.4% are listed as 65 years old or over, 22% are listed as having a disability, 9.7% are listed as below poverty, and 13.5% live in a home where the primary language is other than English.

2. Hazard Vulnerability

Hazards Identification

The highest risk hazards for Lee County as identified in the County’s Local Mitigation Strategy (LMS) are tropical cyclone generated storm surge and high winds, floods, and wildfires. Sinkholes were not discussed in the LMS.

Hazards Analysis

The following analysis examines four hazard types: surge from tropical cyclones, flood, wildfire and sinkholes. All of the information in this section was obtained through the online Mapping for Emergency Management, Parallel Hazard Information System (MEMPHIS). MEMPHIS was designed to provide a variety of hazard related data in support of the Florida Local Mitigation Strategy DMA 2K project, and was created by Kinetic Analysis Corporation (KAC) under contract with the Florida Department of Community Affairs (DCA). Estimated exposure values were determined using the Category 3 Maxima Scenario for storm surge; FEMA’s designated 100-year flood zones (i.e., A, AE, V, VE, AO, 100 IC, IN, AH) for flood; all medium-to-high risk zones from MEMPHIS for wildfire (Level 5 through Level 9); and the combined high, very high, extreme and adjacent zones for sinkhole based on the KAC analysis. Storm surge exposure data is a subset of flood exposure; therefore, the storm surge results are also included in the flood results. For more details on a particular hazard or an explanation of the MEMPHIS methodology, consult the MEMPHIS Web site (<http://lmsmaps.methaz.org/lmsmaps/index.html>).

Existing Population Exposure

Table 2.1 presents the population currently exposed to each hazard throughout Lee County. Of the 440,888 (U.S. Census 2000) people that reside in Lee County, xx% are exposed to storm surge, xx% are exposed to 100-year flooding, and xx% are exposed to wildfire. No persons are exposed to sinkholes. Of the xxx people exposed to flood, xx% are over age 65 and xx% are disabled.

Table 2.1 Estimated Number of Persons Exposed to Selected Hazards

Segment of Population	Storm Surge	Flood	Wildfire
Total (all persons)*	234,775	215,635	244,159
Minority	13,962	16,517	39,096
Over 65	67,011	65,574	56,474
Disabled	77,215	78,871	86,695
Poverty	16,020	17,003	27,451
Lang Isolated	1,951	2,189	2,050
Single Parent	10,004	9,656	13,679

Source: Mapping for Emergency Management, Parallel Hazard Information System

Note: checking on whether the storm surge and flood numbers are accurate, as the surge numbers should be less than flood.

*Note: The “Total” amount does not equal the sum of all segments of the population, but indicates the total population at risk to the selected hazards.

** Note: Storm surge related flooding population exposure results are a subset of the flood results.

Evacuation and Shelters

As discussed in the previous sections, population growth in Lee County has been steady, and the trend is projected to continue. Additionally, storm events requiring evacuation typically impact large areas, often forcing multiple counties to issue evacuation orders simultaneously and placing a greater cumulative number of evacuees on the roadways which may slow evacuation time further. Thus, it is important to not only consider evacuation times for Lee County, but also for other counties in the region as shown in **Table 2.2**. Also, population that will reside in new housing stock might not be required to evacuate as new construction will be built to higher codes and standards.

Table 2.2 County Clearance Times per Hurricane Category (Hours)
(High Tourist Occupancy, Medium Response)

County	Category 1 Hurricane	Category 2 Hurricane	Category 3 Hurricane	Category 4 Hurricane	Category 5 Hurricane
Charlotte	11	14	17	22	22
Collier	6.6	16.4	27.1	40.2	50.9
Lee	9.5	16.5	24.5	27	27
Sarasota	10.5	10.5	11.5	15	15

Source: DCA, DEM Hurricane Evacuation Study Database, 2005

As the population increases in the future, the demand for shelter space and the length of time to evacuate will increase, unless measures are taken now. Currently, it is expected to take between 9.5 and 27 hours to safely evacuate Lee County depending on the corresponding magnitude of the storm, as shown in **Table 2.2**. This data was derived from eleven regional Hurricane Evacuation Studies that have been produced by FEMA, the United States Army Corps of Engineers and Regional Planning Councils in Florida. The study dates range from 1995 to 2004. These regional studies are updated on a rotating basis.

Similar to most of Florida’s coastal counties, Lee County currently has a significant shelter deficit. According to Florida’s Statewide Emergency Shelter Plan, Lee County has an existing shelter capacity of 17,768 people. The 2004 shelter demand for a Category 4 or Category 5 hurricane is 105,134 people, leaving an existing shelter deficit of 87,366. In 2009, the projected shelter demand is 119,866, leaving an anticipated shelter deficit of 102,098. The opportunity exists to construct new facilities to standards that will allow them to serve as shelters, and to construct future public facilities outside of floodplain areas.

Per an objective in the Coastal Element (9J-5.012(3)(b)7.), counties must maintain or reduce hurricane evacuation times. This could be accomplished by using better topographical data to determine the surge risk to populations to evaluate which areas to evacuate, and increasing the ability to shelter in place to decrease the number of evacuees. Lee County could encourage new homes to be built with saferooms, community centers in mobile home parks or developments to be built to shelter standards (outside of the hurricane vulnerability zones), or require that new schools be built or existing schools be retrofitted to shelter standards; which would be based on FEMA saferoom and American Red Cross shelter standards. Additionally, the county could establish level of service (LOS) standards that are tied to development.

Existing Built Environment Exposure

While the concern for human life is always highest in preparing for a natural disaster, there are also substantial economic impacts to local communities, regions, and even the state when property damages are incurred. To be truly sustainable in the face of natural hazards, we must work to protect the residents and also to limit, as much as possible, property losses that slow down a community’s ability to bounce back from a disaster. **Table 2.3** presents estimates of the

number of structures in Lee County by occupancy type that are exposed to each of the four hazards being analyzed. Exposure refers to the number of people or structures that are susceptible to loss of life, property damage and economic impact due to a particular hazard. The estimated exposure of Lee County’s existing structures to the storm surge, flood, wildfire, and sinkhole hazards was determined through MEMPHIS.

Table 2.3 Estimated Number of Structures Exposed to Selected Hazards

Occupancy Type	Storm Surge	Flood	Wildfire	Sinkhole
Single Family	66,142	110,638	61,450	39
Mobile Home	9,523	60,783	13,503	0
Multi-Family	43,547	46,982	31,595	6
Commercial	4,334	10,200	4,755	0
Agriculture	873	4,197	2,309	0
Gov. / Institutional	1,190	1,728	2,466	1
Total	125,609	234,528	116,078	46

Source: Mapping for Emergency Management, Parallel Hazard Information System

* Note: Storm surge related flooding building exposure results are a subset of the flood results.

There are 350,652 structures exposed to at least one of the four hazards, of which most are single-family homes in subdivisions. Of these structures, 66.9% are exposed to flood. Over 234,000 structures are located within the 100-year floodplain, of which 53.6% are exposed to storm surge induced flooding. Nearly 53% of the structures exposed to surge are single-family homes, and 34.7% are multi-family homes. Typically, structures exposed to surge are high-value real estate due to their proximity to the ocean or tidally influenced water bodies such as the Caloosahatchee River. According to the latest National Flood Insurance Program Repetitive Loss Properties list, as of March 2005, there are 466 repetitive loss properties in Lee County. Under the National Flood Insurance Program (NFIP), repetitive loss properties are defined as “any NFIP-insured property that, since 1978 and regardless of any change(s) of ownership during that period, has experienced: a) four or more paid flood losses; or b) two paid flood losses within a 10-year period that equal or exceed the current value of the insured property; or c) three or more paid losses that equal or exceed the current value of the insured property.”

Slightly over 33 percent or 116,078 structures exposed to wildfire, of which 52.9% are single-family homes. Less than one percent or 46 structures are located within sinkholes susceptible areas, of which nearly 85% are single-family homes.

In addition to understanding exposure, risk assessment results must also be considered for prioritizing and implementing hazard mitigation measures. The risk assessment takes into account the probability (how often) and severity (e.g., flood depth, storm surge velocity, wildfire duration) of the hazard as it impacts people and property. Risk can be described qualitatively, using terms like high, medium or low; or quantitatively by estimating the losses to be expected from a specific hazard event expressed in dollars of future expected losses. Although people and property are exposed to hazards, losses can be greatly reduced through building practices, land use, and structural hazard mitigation measures. The next section of this report examines the existing and future land use acreage in hazard areas. This information can be useful to consider where to implement risk reducing comprehensive planning measures.

Analysis of Current and Future Vulnerability Based on Land Use

The previous hazards analysis section discussed population and existing structures exposed to surge, flood, sinkholes, and wildfire according to MEMPHIS estimates. This section is used to demonstrate the County’s vulnerabilities to these hazards in both tabular format and spatially, in relation to existing and future land uses. Existing land use data was acquired from County Property Appraisers and the Florida Department of Revenue in 2004 for tabulation of the total

amount of acres and percentage of land in identified hazard areas, sorted by existing land use category for the unincorporated areas. The total amount of acres and percentage of land in the identified hazards areas was tabulated and sorted by future land use category according to the local Future Land Use Map (FLUM), as well as the amount of these lands listed as vacant according to existing land use. Lee County future land use data was acquired in September 2002 from Lee County and might not reflect changes per recent future land use amendments. Maps of existing land use within hazard areas are based on the 2004 County Property Appraiser geographic information system (GIS) shapefiles. Maps of future land uses in hazard areas were developed using the Lee County future land use map dated September 2002. A series of maps were created as part of the analysis and are available as attachments to the county profile. All maps are for general planning purposes only.

For the purposes of this profile, the identified hazard areas include the coastal hazards zone in relation to storm surge, hurricane vulnerability zones in relation to evacuation clearance times, flood zones in relation to the 100-year flood, wildfire susceptible areas, and sinkhole susceptible areas.

In **Attachment A**, two maps present the existing and future land uses within the Coastal Hazards Zone (CHZ), which represents the Category 1 Hurricane Evacuation Zone joined with the Category 1 Storm Surge Zone. The areas that are most susceptible to storm surge are located in the coastal communities of Cape Coral, Sanibel, Fort Myers Beach, and Bonita Springs, as well as along water bodies in the north-central and southwestern portions of the County. The total amount of land in the CHZ is 112,709.5 acres. As shown in **Table 2.4**, 35.8% are parks, conservation areas and golf courses; 23.9% are currently undeveloped; 13.5% are used for residential single-family homes; and 9.8% are used for agriculture. **Table 2.5** shows that of the 26,904.1 undeveloped acres, 25% are designated as wetlands.

In **Attachment B**, two maps present the existing and future land uses within the Hurricane Vulnerability Zone (HVZ), which represents Category 1 to 3 Hurricane Evacuation Zones. The areas that are most susceptible located predominately in the western, southern, and north-central portions of the County, including the coastal communities of Cape Coral, Sanibel, Fort Myers Beach, and Bonita Springs, as well as Fort Myers. The total amount of land in the HVZ is 367,947 acres. As shown in **Table 2.4**, 28.5% are currently undeveloped; 22.6% are in agricultural use; 20.2% are parks, conservation areas and golf courses; and 12.2% are residential single-family homes. **Table 2.5** shows that of the 104,953.4 undeveloped acres, 22.1% are designated as outlying suburban areas

In **Attachment C**, two maps present the existing and future land uses within a 100-year flood zone. There are flood-prone areas scattered across the County, especially along the Gulf Coast and in the north-central and western portions of the County, including the communities of Cape Coral, Bonita Springs, and Sanibel. The total amount of land in the special flood hazard area is 152,742.5 acres. As shown in **Table 2.4**, 30.8% are parks, conservation areas and golf courses; 25.4% are currently undeveloped; 15.7% are used for residential single-family homes; and 11.8% are used for agriculture. **Table 2.5** shows that of the 38,848.7 undeveloped acres, 24.3% are designated as outlying suburban areas.

In **Attachment D**, two maps present the existing and future land uses within wildfire susceptible areas. These areas are scattered across the County, including the communities of Fort Myers, Bonita Springs, and Cape Coral. The total amount of land in the wildfire susceptible areas is 100,288.1 acres. As shown in **Table 2.4**, 39.4% are currently undeveloped; 21.1% are in agricultural use; 13.4% are residential single-family homes; and 12.7% are parks, conservation areas and golf courses. **Table 2.5** shows that of the 39,534.9 undeveloped acres, 46.3% are designated for urban community use. The County should continue to take measures to reduce wildfire risk within the urban/rural interface.

In **Attachment E**, two maps present the existing and future land uses within sinkhole susceptible areas. These areas are predominately located in the central portion of the County. The total amount of land in the sinkhole susceptible areas is 851.2 acres. As shown in **Table 2.4**, 60.4%

are currently undeveloped; 21.8% are used for government, institutional, hospitals and education; 13.5% are used for agricultural purposes; and 2.5% are used for residential single-family homes. **Table 2.5** shows that of the 514.5 undeveloped acres, 49% are designated as wetlands.

Table 2.4 Total Unincorporated Acres in Hazard Areas by Existing Land Use Category

Existing Land Use Category		Coastal Hazard Zone	Hurricane Vulnerability Zone	Flood Zones	Wildfire Susceptible Areas	Sinkhole Susceptible Areas
Agriculture	Acres	11,080.3	83,260.8	17,954.1	21,172.1	114.6
	%	9.8	22.6	11.8	21.1	13.5
Attractions, Stadiums, Lodging	Acres	451.4	772.2	539.0	195.3	0.0
	%	0.4	0.2	0.4	0.2	0.0
Places of Worship	Acres	442.5	1,555.6	536.1	350.7	0.0
	%	0.4	0.4	0.4	0.3	0.0
Commercial	Acres	2,322.9	6,386.1	2,860.9	379.9	0.0
	%	2.1	1.7	1.9	0.4	0.0
Government, Institutional, Hospitals, Education	Acres	6,766.4	24,826.2	8,012.5	7,350.4	185.9
	%	6.0	6.7	5.2	7.3	21.8
Industrial	Acres	454.6	4,476.4	774.2	150.5	2.9
	%	0.4	1.2	0.5	0.2	0.3
Parks, Conservation Areas, Golf Courses	Acres	40,305.7	74,239.5	47,005.5	12,700.3	6.9
	%	35.8	20.2	30.8	12.7	0.8
Residential Group Quarters, Nursing Homes	Acres	398.2	861.6	479.7	188.8	0.0
	%	0.4	0.2	0.3	0.2	0.0
Residential Multi-Family	Acres	2,064.8	4,267.8	2,337.9	610.6	0.9
	%	1.8	1.2	1.5	0.6	0.1
Residential Mobile Home, or Commercial Parking Lot	Acres	2,288.4	9,270.1	4,863.7	2,649.1	0.0
	%	2.0	2.5	3.2	2.6	0.0
Residential Single-Family	Acres	15,169.7	44,906.3	24,052.6	13,487.5	21.0
	%	13.5	12.2	15.7	13.4	2.5
Submerged Land (Water Bodies)	Acres	727.4	1,325.3	721.0	107.9	0.0
	%	0.6	0.4	0.5	0.1	0.0
Transportation, Communication, Rights-Of-Way	Acres	761.8	1,713.2	834.2	221.4	4.5
	%	0.7	0.5	0.5	0.2	0.5
Utility Plants and Lines, Solid Waste Disposal	Acres	2,571.3	5,132.5	2,922.4	1,188.7	0.0
	%	2.3	1.4	1.9	1.2	0.0
Vacant	Acres	26,904.1	104,953.4	38,848.7	39,534.9	514.5
	%	23.9	28.5	25.4	39.4	60.4
Total Acres	Acres	112,709.5	367,947.0	152,742.5	100,288.1	851.2
	%	100.0	100.0	100.0	100.0	100.0

Source: Department of Community Affairs

INTEGRATION OF THE LOCAL MITIGATION STRATEGY INTO THE LOCAL COMPREHENSIVE PLAN
LEE COUNTY PROFILE

Table 2.5 Total Unincorporated Acres in Hazard Areas by Future Land Use Category

Future Land Use Category		Coastal Hazard Zone		Hurricane Vulnerability Zone		Flood Zones		Wildfire Susceptible Areas		Sinkhole Susceptible Areas	
		Total	Vacant	Total	Vacant	Total	Vacant	Total	Vacant	Total	Vacant
Airport	Acres	0.0	0.0	2,828.1	2,044.5	0.0	0.0	761.1	663.9	300.7	173.0
	%	0.0	0.0	0.8	1.9	0.0	0.0	0.8	1.7	35.3	33.6
Airport Commerce	Acres	0.0	0.0	4,036.8	1,053.3	0.0	0.0	953.5	229.2	0.0	0.0
	%	0.0	0.0	1.1	1.0	0.0	0.0	1.0	0.6	0.0	0.0
Central Urban	Acres	6,708.2	2,396.3	27,523.6	10,174.3	13,859.1	3,914.4	9,769.0	5,769.9	0.0	0.0
	%	6.0	8.9	7.5	9.7	9.1	10.1	9.7	14.6	0.0	0.0
Conservation Lands Upland	Acres	3,638.4	17.6	6,479.2	89.2	4,049.5	19.6	1,618.0	11.1	0.0	0.0
	%	3.2	0.1	1.8	0.1	2.7	0.1	1.6	0.0	0.0	0.0
Conservation Lands Wetland	Acres	23,763.4	35.0	32,173.7	90.5	26,557.4	35.2	2,764.1	8.0	5.6	0.0
	%	21.1	0.1	8.7	0.1	17.4	0.1	2.8	0.0	0.7	0.0
Density Reduction / Groundwater Resource	Acres	0.0	0.0	38,014.9	4,886.8	3,120.8	459.9	7,523.7	1,386.0	122.2	73.6
	%	0.0	0.0	10.3	4.7	2.0	1.2	7.5	3.5	14.4	14.3
General Commercial Interchange	Acres	38.1	2.7	35.4	4.2	21.0	0.7	6.9	2.7	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
General Interchange	Acres	128.9	46.4	1,084.1	455.0	167.0	66.4	323.9	149.6	0.0	0.0
	%	0.1	0.2	0.3	0.4	0.1	0.2	0.3	0.4	0.0	0.0
Industrial Commercial Interchange	Acres	0.0	0.0	236.3	3.8	0.0	0.0	46.4	0.2	0.0	0.0
	%	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Industrial Development	Acres	413.3	160.7	8,102.6	3,340.4	754.4	277.8	1,687.8	994.9	0.0	0.0
	%	0.4	0.6	2.2	3.2	0.5	0.7	1.7	2.5	0.0	0.0
Industrial Interchange	Acres	0.0	0.0	200.4	63.8	0.0	0.0	104.3	16.1	0.0	0.0
	%	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0
Intensive Development	Acres	2,665.8	808.6	15,024.1	5,997.7	4,516.6	1,544.7	2,868.2	1,494.3	0.0	0.0
	%	2.4	3.0	4.1	5.7	3.0	4.0	2.9	3.8	0.0	0.0
Mixed Use Interchange	Acres	0.0	0.0	130.0	34.6	0.0	0.0	15.8	0.4	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New Community	Acres	0.0	0.0	4,618.9	1,351.8	0.0	0.0	1,255.5	268.6	0.0	0.0
	%	0.0	0.0	1.3	1.3	0.0	0.0	1.3	0.7	0.0	0.0
Open Lands	Acres	0.0	0.0	16,146.6	2,088.6	3,982.9	372.1	4,376.1	442.5	0.0	0.0
	%	0.0	0.0	4.4	2.0	2.6	1.0	4.4	1.1	0.0	0.0
Outer Island	Acres	553.3	205.5	527.5	175.4	410.2	112.4	72.7	12.3	0.0	0.0
	%	0.5	0.8	0.1	0.2	0.3	0.3	0.1	0.0	0.0	0.0
Outlying Suburban	Acres	9,475.4	3,160.7	39,981.2	23,171.3	18,831.6	9,425.9	4,310.8	1,600.4	0.0	0.0
	%	8.4	11.7	10.9	22.1	12.3	24.3	4.3	4.0	0.0	0.0
Public Facilities	Acres	1,630.7	25.9	7,654.5	1,042.4	2,779.0	334.4	1,996.3	25.9	0.0	0.0
	%	1.4	0.1	2.1	1.0	1.8	0.9	2.0	0.1	0.0	0.0
Rural	Acres	12,497.0	3,347.5	34,064.6	8,888.2	16,216.2	3,977.5	9,763.4	2,295.3	0.0	0.0
	%	11.1	12.4	9.3	8.5	10.6	10.2	9.7	5.8	0.0	0.0
Rural Community Preserve	Acres	1,646.6	163.6	9,287.9	909.1	2,571.5	238.8	5,018.6	503.2	0.0	0.0
	%	1.5	0.6	2.5	0.9	1.7	0.6	5.0	1.3	0.0	0.0
Suburban	Acres	17,204.6	5,320.2	37,863.3	11,841.6	20,167.8	6,047.9	7,360.7	2,083.1	40.6	15.8
	%	15.3	19.8	10.3	11.3	13.2	15.6	7.3	5.3	4.8	3.1
University Community	Acres	0.0	0.0	2,406.1	428.9	0.0	0.0	154.7	9.4	0.0	0.0
	%	0.0	0.0	0.7	0.4	0.0	0.0	0.2	0.0	0.0	0.0

INTEGRATION OF THE LOCAL MITIGATION STRATEGY INTO THE LOCAL COMPREHENSIVE PLAN
LEE COUNTY PROFILE

Future Land Use Category		Coastal Hazard Zone		Hurricane Vulnerability Zone		Flood Zones		Wildfire Susceptible Areas		Sinkhole Susceptible Areas	
		Total	Vacant	Total	Vacant	Total	Vacant	Total	Vacant	Total	Vacant
University Village Interchange	Acres	0.0	0.0	32.5	4.9	0.0	0.0	12.0	1.1	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Urban Community	Acres	11,134.2	4,474.2	27,237.6	14,338.0	10,699.7	4,346.2	23,065.9	18,293.6	0.0	0.0
	%	9.9	16.6	7.4	13.7	7.0	11.2	23.0	46.3	0.0	0.0
Wetlands	Acres	21,211.3	6,739.2	52,257.0	12,474.9	24,037.9	7,674.8	14,458.3	3,273.3	382.1	252.1
	%	18.8	25.0	14.2	11.9	15.7	19.8	14.4	8.3	44.9	49.0
Total Acres	Acres	112,709.4	26,904.1	367,947.1	104,953.4	152,742.5	38,848.7	100,288.0	39,534.9	851.1	514.5
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Department of Community Affairs

The amount of total land and existing vacant land in identified hazard areas was also tabulated for each of Lee County’s five incorporated municipalities. These amounts are listed in **Table 2.6**. The intent of this table is to show the vacant acreage in hazard zones in each municipality, and to show the percentage of vacant acreage in each hazard zone for each municipality. In the total column for each hazard, the percentage for each municipality is the hazard zone acreage as a percent of total hazard acreage for all municipalities. In the vacant column for each hazard, the percentage for each municipality is the percent of area in the hazard zone for the respective municipality. The total municipal percent of vacant acreage is the percent of acreage in the hazard zones for all municipalities.

Cape Coral has the most vacant acres in the Coastal Hazards Zone, but Bonita Springs has the largest proportion of surge prone acres out of its vacant land area. Cape Coral has the most vacant acres in the HVZ, but Bonita Springs has the largest proportion of HVZ acres out of its vacant land area. Cape Coral has the most acres in the flood zone as well as the largest proportion of flood zone acres out of its vacant land area. Fort Myers has the most acres in the wildfire susceptible areas, but Bonita Springs has the largest proportion of wildfire susceptible acres out of its vacant land area. No sinkhole susceptible areas were detected in any municipality in Lee County.

Vacant land is often destined to be developed. It is prudent to conduct further analyses of what the vacant lands will be used for, to determine whether they will be populated, and at what level of intensity/density, to ensure that hazard risks are minimized or eliminated. Each of the municipalities in Lee County has vacant lands that are in hazard areas. Since hazards cross jurisdictional boundaries, it is important to consider all hazard areas to collaboratively formulate hazard mitigation strategies and policies throughout the county.

Table 2.6 Total Land and Existing Vacant Land in Hazard Areas by Municipal Jurisdiction

Jurisdiction		Coastal Hazard Zone		Hurricane Vulnerability Zone		Flood Zones		Wildfire Susceptible Areas	
		Total	Vacant	Total	Vacant	Total	Vacant	Total	Vacant
Bonita Springs	Acres	7,866.8	2,358.4	7,866.8	2,358.4	8,095.7	2,290.8	4,677.7	1,703.2
	%	100.0	30.0	100.0	30.0	100.0	28.3	100.0	36.4
Cape Coral	Acres	10,330.6	1,123.6	10,330.6	1,123.6	29,210.7	9,584.0	2,519.8	1,371.2
	%	100.0	10.9	100.0	10.9	100.0	32.8	100.0	54.4
Fort Myers	Acres	1,062.9	149.6	1,062.9	149.6	989.4	236.8	5,705.2	1,348.7
	%	100.0	14.1	100.0	14.1	100.0	23.9	100.0	23.6
Fort Myers Beach	Acres	1,169.0	316.8	1,169.0	316.8	1,489.2	394.6	10.3	1.3
	%	100.0	27.1	100.0	27.1	100.0	26.5	100.0	13.0
Sanibel	Acres	9,023.8	1,095.5	9,023.8	1,095.5	9,814.9	1,181.8	491.3	82.7
	%	100.0	12.1	100.0	12.1	100.0	12.0	100.0	16.8
Total Municipal Acres	Acres	29,453.1	5,043.8	29,453.1	5,043.8	49,599.9	13,687.9	13,404.3	4,507.2
	%	100.0	17.1	100.0	17.1	100.0	27.6	100.0	33.6

Source: Department of Community Affairs

3. Existing Mitigation Measures

Local Mitigation Strategy (LMS) Assessment

The Local Mitigation Strategy is suited to be a repository for all hazard mitigation analyses (i.e., vulnerability and risk assessment), programs, policies and projects for the county and municipalities. The LMS identifies hazard mitigation needs in a community and alternative structural and nonstructural initiatives that can be employed to reduce community vulnerability to natural hazards. The LMS is multi-jurisdictional and intergovernmental in nature. Communities can reduce their vulnerability to natural hazards by integrating the LMS analyses and mitigation priorities into the local government comprehensive plan.

As noted in DCA's *Protecting Florida's Communities* Guide, one significant strategy for reducing community vulnerability is to manage the development and redevelopment of land exposed to natural hazards. Where vacant land is exposed to hazard forces, local government decisions about allowable land uses, and the provision of public facilities and infrastructure to support those uses, can have major impacts on the extent to which the community makes itself vulnerable to natural hazards. Where communities are already established and land is predominately "built out," local governments can take initiatives to reduce existing levels of vulnerability by altering current land uses both in the aftermath of disasters, when opportunities for redevelopment may arise, and under "blue sky" conditions as part of planned redevelopment initiatives.

Per the *DCA's Protecting Florida's Communities* Guide, LMSes prepared pursuant to the state's guidelines (Florida Department of Community Affairs, 1998) have three substantive components:

Hazard Identification and Vulnerability Assessment. This section identifies a community's vulnerability to natural hazards. Under Florida rules, the HIVA is required to include, at a minimum, an evaluation of the vulnerability of structures, infrastructure, special risk populations, environmental resources, and the economy to any hazard to which the community is susceptible. According to FEMA, LMSes revised pursuant to the Disaster Mitigation Act of 2000 (DMA 2000) criteria must include maps and descriptions of the areas that would be affected by each hazard to which the jurisdiction is exposed, information on previous events, and estimates of future probabilities. Vulnerability should be assessed for the types and numbers of exposed buildings, infrastructure, and critical

facilities with estimates of potential dollar losses. Plan updates will be required to assess the vulnerability of future growth and development.

Guiding Principles. This section lists and assesses the community's existing hazard mitigation policies and programs and their impacts on community vulnerability. This section typically contains a list of existing policies from the community's Comprehensive Plan and local ordinances that govern or are related to hazard mitigation. Coastal counties frequently include policies from their PDRPs.

Mitigation Initiatives. This component identifies and prioritizes structural and non-structural initiatives that can reduce hazards vulnerability. Proposals for amendments to Comprehensive Plans, land development regulations, and building codes are often included. Structural projects typically address public facilities and infrastructure, and buy-outs of private structures that are repetitively damaged by flood. Many of these qualify as capital improvement projects based on the magnitude of their costs and may also be included in the capital improvements elements of the counties' and cities' Comprehensive Plans.

The Lee County LMS (adopted in 1999) was assessed to determine if the hazard analysis and vulnerability assessment (i.e., surge, flood, wildfire, and sinkhole) data can support comprehensive planning, whether the guiding principles include a comprehensive list of policies for the county and municipalities, and whether the LMS goals and objectives support comprehensive planning goals, objectives, and policies (GOP).

Hazard Analysis and Vulnerability Assessment (LMS pp.6-10)

The strengths and weaknesses of the Hazard Analysis and Vulnerability Assessment are as follows:

Strengths:

- Includes maps for the storm surge, hurricane wind, flood and wildfire hazards. Maps include critical facility locations.

Weaknesses:

- Does not include data for population and property exposure to hazards.
- Hazard maps do not include data layers to illustrate population (i.e., density) or property (i.e., value) exposure.
- Does not include a clear description of geographic areas exposed to each of the hazards.
- Does not include future land use maps that include hazard data layers to illustrate which future land use categories are susceptible to each hazard.
- Does not include loss estimates by land use in relation to the hazard.
- Does not include a list or a map of repetitive losses.
- Does not include a quantitative risk assessment for existing and future development (i.e., loss estimates) or specific critical facilities.

Incorporating land use and population data into the risk assessment of the LMS provides a better source of data for planners to use in policy making and policy evaluation of the local comprehensive plan. The LMS also sets a standard for the quality of data that should be used in determining risk and thereby used to determine mitigation policies.

Guiding Principles

The Lee County LMS does not include a Guiding Principles section for the county nor each municipality. The Guiding Principles contain a list of regulations, policies, and documents pertaining to local hazard mitigation measures that are being implemented by the county and municipalities within the county. The Guiding Principles section is found in most counties' LMSes

and is useful in providing the different jurisdictions ideas for enhancing their own plans or providing the LMS committee an analysis of where there may be weaknesses in implementing mitigation strategies. It is recommended that Lee County's next LMS update include a Guiding Principles section.

LMS Goals and Objectives

The Lee County LMS has goals and objectives that support mitigation principles that are found in the comprehensive plan. A list of the LMS goals and objectives pertaining to comprehensive planning can be found in **Attachment F**. The following is a summary of the LMS goals and objectives that support comprehensive plan GOPs.

The overall goal of the Lee County LMS is to develop and maintain a disaster resistant community through application of hazard mitigation policies and identification, prioritization and achievement of cost-effective mitigation projects.

Goal 1 supports prevention activities and projects that reduce the risk of life and damage to property from identified hazards. Objective 1.1 states that preventive activities that are addressed in various comprehensive planning and land document regulations shall be governed by the appropriate goals, objectives and policies contained in the City of Cape Coral Comprehensive Plan Coastal Management Element, Goal 4; the City of Fort Myers Comprehensive Plan; the City of Sanibel Section 3.1.1 Hurricane Safety (Objectives 2, 5 and 6); Section 3.2.1 Coastal Zone Protection (Objectives 3 and 6); Section 3.3.3 Transportation (Policy 5.4); Section 3.4.1 Intergovernmental Coordination (Policy 1.4); Section 3.5.1 Capital Improvements (Objective 2); Section 3.6.2 Future Land Use (Objective 81) the Town of Fort Myers Beach Comprehensive Plan Sections 4 Future Land Use Element, 5 Coastal Management Element, 6 Conservation Element, 9 Stormwater Management Element and 11 Capital Improvements Element as well as the Town's Land Development Code; and the Lee County Comprehensive Plan and Land Development Code.

Objectives under Goal 1 also strive to support efforts to purchase environmentally sensitive areas to promote the preservation of open space in specified hazard areas and enforce floodplain regulations that provide greater flood protection than required under current National Flood Insurance Program standards. Objectives support the South Florida Water Management District's efforts to increase the storage capacity to retain stormwater in the Estero Watershed, and gives high priority to projects that improve the ability of current drainage systems to convey or divert stormwater flooding from areas of the county and the component municipalities that have suffered repeated flooding events. Objectives states that beach and dune maintenance projects designed to maintain and preserve the private and public investment of coastal areas shall be funded according to the county's, the component municipalities', and the Captiva Erosion Prevention District's ten-year beach erosion control plans.

Goal 2 supports activities and projects that reduce or overt property damage on properties that have suffered repeated damage from identified hazards. Objectives aim to obtain funding for projects to acquire, relocate, elevate or otherwise retrofit repetitive loss properties. Objectives seek to examine the feasibility of enacting development standards in urban/wild land interface areas to mitigate future fire losses, which will include vegetative buffers, fire-resistant roofing materials, screened gable and roof openings, and minimum driveway width requirements for fire response vehicles; and strive to improve the county and the component municipalities Building Code Effectiveness Rating System ratings to reduce homeowner insurance policy rates on new construction.

Goal 3 encourages natural resource protection activities that preserve or maintain natural areas. Objectives seek to continue current wetland coordinating/evaluation programs with state and water management agencies, and continue enforcing erosion sedimentation and control regulations that reduce how much sediment enters natural areas when development takes place. Objectives support the continued purchase of lands through several local, state and federal

programs that promote the preservation of natural areas, and to preserve, restore and renourish the beach front and other natural resource areas.

Goal 4 supports the achievement of emergency services activities taken during a disaster incident to reduce the hazard's impact. Objectives continue efforts to gain a better understanding of the community's vulnerability to flood, wind and wildfire impacts through hazard identification and vulnerability assessment studies. Objectives strive to continue the program to place additional water gauging stations equipped with telemetry access to monitor water levels in coastal and stormwater areas, and support projects that fund building or retrofit projects that reduce the community's hurricane shelter space deficit. Objectives support efforts to fund improvements to critical roadway links causing congestion on evacuation routes for Category 1 through 3 hurricanes, and continue efforts to identify critical facilities that need mitigation protection due to their importance in helping the community respond to and recover from identified hazards. Objectives support floodproofing critical facilities and those within the CHHA shall receive priority for grant funding requests. Objectives examine the feasibility of designing water, sewer, and power infrastructure facilities so that they can function during a 500-year flood event, and state that each component municipality will either prepare a comprehensive emergency management plan (CEMP) or adopt the County's CEMP. Objectives aims to identify and encourage incorporation of emergency power supplies to critical facilities and other public and private facilities integral to the operation, particularly with respect to health and safety support functions, and seek to evaluate the effectiveness of existing emergency power supplies to critical facilities and implement enhancements as needed to provide three to five days of functional operation.

Goal 5 supports efforts to obtain funding for engineered projects that help keep the hazard's impact away from identified vulnerable areas. Objectives seek federal and state funding to complete capital improvements to improve stormwater flow. Objectives supports the current policy of discouraging the use of Diversions to restore historical water flows and basin boundaries altered due to development, road construction or post agricultural practices and patterns; and also support efforts to fund channel modifications contained in Lee County's Non-Regulatory Surface Water Management Plan.

Goal 6 encourages public support and commitment to local hazard mitigation efforts by showing its benefits through public information activities that advise property owners, potential property owners, and visitors about hazards and ways to protect people and property from these hazards and the benefits of protecting our natural resources. Objectives aim to continue to work with community realty associations to improve participation in the voluntary real estate disclosure program for flood hazards, and strive to continue efforts to support funding programs that provide assistance to property owners on ways to mitigate property from identified hazards.

Goal 7 seeks to maintain current pre and post disaster redevelopment and mitigation policies and procedures designed to reduce or avert the community's future disaster potential. Objectives state that post disaster redevelopment and hazard mitigation policies and procedures shall be governed by goals, objectives and policies contained in all existing and developing Post Disaster Redevelopment Plans, and that Objectives and policies contained in all existing and developing Post Disaster Redevelopment Plans shall be carried out through the appropriately adopted Post Disaster Ordinances following a major or catastrophic disaster.

Maintaining consistent language for outlining goals and objectives in both the LMS and comprehensive plan presents a united front on decreasing risk in the county. While the LMS may not be able to regulate land use as the comprehensive plan does, having these common goals and objectives increases the likelihood of the jurisdictions of Lee County adopting and implementing corresponding policies that are legally enforceable.

Comprehensive Emergency Operations Plan (CEMP)

The Lee County CEMP references the LMS in Section 12: Mitigation Functions. The CEMP notes that all pre-disaster mitigation priorities and projects are generated through the LMS. Post-

disaster mitigation priorities consider the LMS analyses and project lists, in addition to damage assessment reports and evaluation by the Post Disaster Recovery Task Force. The CEMP discusses hazard mitigation in the context of standard operating procedures, activities, responsibilities and available programs. This includes the post-disaster implementation of the Hazard Mitigation Grant Program and related disaster mitigation, response and recovery assistance programs, as well as pre-disaster mitigation programs such as the National Flood Insurance Program, Community Rating System and Flood Mitigation Assistance Program.

Though the identification of mitigation opportunities lies predominately with the Lee County Disaster Advisory Council, the document lists numerous activities and supporting agencies to assist in supporting mitigation in the County. In addition to various county departments providing management and assistance in managing plans and strategies for pre-and post-disaster mitigation, municipal departments also support these efforts. The CEMP indicates that the Disaster Advisory Council will coordinate the short and long term recovery in the event of a disaster. Municipal organizations may also be used to assist in these efforts, including such organizations as the Cape Coral Chamber of Commerce, Cape Coral Construction Industry Association, the Fort Myers Downtown Merchant's Association, and the Fort Myers Beach Public Safety Task Force. The volunteer organization called The Business Organization Active in Response to Disasters (BOARD) has also been established to promote awareness of businesses to hazards.

As such, the CEMP is a good tool for planners, which includes collaborative procedures for working with emergency managers to reduce vulnerability from hazards.

Post-Disaster Redevelopment Plan (PDRP)

The Lee County PDRP was not available for review at the time that this profile was developed.

National Flood Insurance Program/Community Rating System

Lee County (unincorporated areas) and all of its municipalities participate in the National Flood Insurance Program (NFIP). Lee County (unincorporated areas) as well as the municipalities of Cape Coral, Fort Myers, Fort Myers Beach, and Sanibel also participate in the NFIP Community Rating System (CRS). In the CRS program, Sanibel currently has a rating of five; Lee County (unincorporated areas) has a rating of six; Cape Coral and Fort Myers Beach have a rating of seven; and Fort Myers has a rating of eight. The municipality of Bonita Springs does not participate in the CRS program.

4. Comprehensive Plan Review

Purpose and Intent

The Lee County Comprehensive Plan (adopted in 2004, as amended through December 2004) was reviewed for the purpose of developing this profile. This review was undertaken in order to assess what steps Lee County has taken to integrate hazard mitigation initiatives from their Local Mitigation Strategy (LMS) and hazard mitigation initiatives in general, into the local planning process. Each Element of the Plan was evaluated to establish the extent to which the principles from the LMS were incorporated into the objectives and policies of the existing Comprehensive Plan.

Approach

This review includes an assessment of tropical cyclone generated storm surge, flooding, and wildfire hazards. A preliminary list of objectives and policies currently contained in the Plan that pertain to hazard mitigation and any policies related to these hazards is found in **Attachment G**. The following is a discussion of the extent to which the Plan appears to address each of the hazards. Recent policy amendments may not have been available for review, or proposed

policies might be in the process of creation, which address these hazards. As a result, this assessment is considered preliminary and subject to input from the local government.

Summary of Findings

The highest risk hazards for Lee County as identified in the County's Local Mitigation Strategy (LMS) are flooding, storm surge, and wildfires. Sinkhole hazard was not discussed in the hazards analysis in the latest version of the Lee County LMS. Therefore, sinkhole hazard is not addressed in this summary. Lee County is a coastal county, so many policies are geared toward coastal management and coastal resource protection. Policies relating to hazard mitigation within the Plan include those relating to flooding, stormwater control and protection, and surge mitigation. There are limited policies in the Plan focused on wildfire mitigation and protection measures.

The Lee County Comprehensive Plan also focuses on the protection of natural features such as floodplains, wetlands, and dune systems through development controls and stormwater management. The Plan supports a surface management strategy that relies on natural features and natural systems to receive and otherwise manage storm and surface waters.

Flooding

Flooding is addressed from two vantage points, the protection of natural drainage features, and protection of properties through development standards and stormwater abatement. There are several policies directed at minimizing flooding and stormwater runoff, and protecting flood prone areas from potential development impacts. The Plan incorporates development controls in place to minimize the impact of new development within the 100-year floodplain which include: the preparation and adoption of a flood plain management plan (Policy 110.1.5), the preservation of natural flow ways (Policy 60.5.3), and upholding standards of the National Flood Insurance Program (NFIP) (Policy 110.1.6).

The mitigation of flood waters through stormwater quantity levels are addressed in the Community Facilities and Services Element and Capital Improvements Element. These elements stress the importance of protecting natural drainage features including the prevention of obstructing flood ways, as well as maintaining stormwater discharge rates to an adopted level of service. Additionally, the Plan proactively addresses desired future level-of-service standards for a community goal of higher levels of public service and facility provision than can be achieved with current resources (Policy 95.1.4).

Storm Surge

Similar to most of Florida's coastal counties, Lee County currently has a significant shelter deficit. According to Florida's Statewide Emergency Shelter Plan, Lee County has an existing shelter capacity of 17,768 people. The 2004 shelter demand for a Category 4 or Category 5 hurricane is 105,134 people, leaving an existing shelter deficit of 87,366. In 2009, the projected shelter demand is 119,866, leaving an anticipated shelter deficit of 102,098. The opportunity exists to construct new facilities to standards that will allow them to serve as shelters, and to construct future public facilities outside of floodplain areas.

Lee County has several policies dedicated to sheltering. Policy 109.2.2 of the Conservation and Coastal Management Element creates a program to meet the level of service standard for sheltering a percentage of the population within the Hurricane Vulnerability Zone (HVZ). This policy additionally recommends the program to include mandatory on-site shelters outside the Category 1 Evacuation Zone for new residential development over a specified size threshold as a component of the plan. Policy 109.2.3 describes the standards required to be met when constructing on-site shelters, and Policy 109.2.4 prohibits on-site shelters from being located on a carrier or coastal island.

Additional storm surge mitigation measures include: undeveloped coastal barrier islands are protected from future development (Policy 113.1.4); residential developments over 100 units must prepare an emergency hurricane preparedness plan (Policy 110.1.4); and limitations of public expenditures in Coastal High Hazard Areas (CHHA) (Objective 106.1 and policies following).

Wildfire

The Lee County Comprehensive Plan is limited in wildfire mitigation and management practices goals, objectives and policies. The Future Land Use Element Policy 16.6.1 directs the developer to perpetually manage natural areas with Best Management Practices including a natural area management plan which must include prescribed fires. However helpful, this policy only applies to private recreational facilities located within the County. The Conservation and Coastal Management Element directs the County to implement a natural resources management program to conduct an acquisition program for sensitive lands which then must initiate a management plan including fire management.

5. Municipal Case Study – City of Fort Myers

As part of this study, a similar analysis was completed for a statewide sample of 14 Florida municipalities, including Fort Myers in Lee County. The results of this analysis are provided within this section.

Hazards Analysis

The following analysis examines three hazard types: surge from tropical cyclones, flood, and wildfire. No population or structures were determined to be exposed to sinkholes. All of the information in this section was obtained through the online Mapping for Emergency Management, Parallel Hazard Information System (MEMPHIS).

Existing Population Exposure

Table 6.1 presents the population of Fort Myers that is exposed to each hazard, as well as a breakdown of the sensitive needs population exposure.

Of the 48,208 (U.S. Census 2000) people that reside in the City of Fort Myers, 2.9% are exposed to storm surge, 25.2% are exposed to 100-year flooding, and 82.1% are exposed to wildfire. Of the 1,390 people exposed to surge, 33.9% are disabled. Of the 12,126 people exposed to flood, 41.3% are disabled and 34.3% are minorities. Of the 39,587 people exposed to wildfire, 45.5% are minorities and 39.2% are disabled.

Table 6.1 Estimated Number of Persons Exposed to Hazards in Fort Myers

Segment of Population	Storm Surge	Flood	Wildfire
Total (all persons)*	1,390	12,126	39,587
Minority	94	4,150	18,007
Over 65	78	2,196	4,975
Disabled	471	5,012	15,528
Poverty	73	1,679	8,423
Language-Isolated	0	52	35
Single Parent	101	802	3,843

Source: Mapping for Emergency Management, Parallel Hazard Information System

*Note: The "Total" amount does not equal the sum of all segments of the population, but indicates the total population at risk to the selected hazards.

** Note: Storm surge related flooding population exposure results are a subset of the flood results.

While the concern for human life is always highest in preparing for a natural disaster, there are also substantial economic impacts to local communities, regions, and even the state when property damages are incurred. To be truly sustainable in the face of natural hazards, we must work to protect the residents and also to limit, as much as possible, property losses that slow down a community's ability to bounce back from a disaster. **Table 6.2** presents estimates of the number of structures in Fort Myers by occupancy type that are exposed to each of the four hazards being analyzed. The estimated exposure of Fort Myers existing structures to the storm surge, flood, wildfire, and sinkhole hazards was determined through MEMPHIS.

There are 20,532 structures exposed to at least one of the three hazards, of which most are single-family homes in subdivisions. Of these structures, 44.8% are exposed to flood. Nearly 9,200 structures are located within the 100-year floodplain, of which 9% are exposed to storm surge induced flooding. As of March 2005, there are six repetitive loss properties in Fort Myers.

Table 6.2 also indicates that there are 11,333 structures exposed to wildfire, of which 59.6% are single-family homes.

Table 6.2 Estimated Number of Structures Exposed to Hazards in Fort Myers

Occupancy Type	Storm Surge	Flood	Wildfire
Single Family	517	4,364	6,758
Mobile Home	1	1,568	142
Multi-Family	236	1,829	2,442
Commercial	50	920	1,238
Agriculture	8	405	524
Gov. / Institutional	14	113	229
Total	826	9,199	11,333

Source: Mapping for Emergency Management, Parallel Hazard Information System

* Note: Storm surge related flooding building exposure results are a subset of the flood results.

In addition to understanding exposure, risk assessment results must also be considered for prioritizing and implementing hazard mitigation measures. The risk assessment takes into account the probability (how often) and severity (e.g., flood depth, storm surge velocity, wildfire duration) of the hazard as it impacts people and property. Risk can be described qualitatively, using terms like high, medium or low; or quantitatively by estimating the losses to be expected from a specific hazard event expressed in dollars of future expected losses. Although people and property are exposed to hazards, losses can be greatly reduced through building practices, land use, and structural hazard mitigation measures. The next section of this report examines the existing and future land use acreage in hazard areas. This information can be useful to consider where to implement risk reducing comprehensive planning measures.

Analysis of Current and Future Vulnerability Based on Land Use

The previous hazards analysis section discussed population and existing structures exposed to surge, flood, sinkholes, and wildfire according to MEMPHIS estimates. This section is used to demonstrate the City's vulnerabilities to these hazards in both tabular format and spatially, in relation to existing and future land uses. Existing land use data was acquired from County Property Appraisers and the Florida Department of Revenue in 2004 for tabulation of the total amount of acres and percentage of land in identified hazard areas, sorted by existing land use category for the unincorporated areas. The total amount of acres and percentage of land in the identified hazards areas was tabulated and sorted by future land use category according to the local Future Land Use Map (FLUM), as well as the amount of these lands listed as vacant according to existing land use. Fort Myers' future land use data was acquired in September 2002 from Lee County (which uses generalized future land use classification on Lee County countywide FLUM) and might not reflect changes per recent future land use amendments. Maps

of existing land use within hazard areas are based on the 2004 County Property Appraiser geographic information system (GIS) shapefiles. Maps of future land uses in hazard areas were developed using the City of Fort Myers future land use map dated September 2002. A series of maps were created as part of the analysis and are available as attachments to the county profile. All maps are for general planning purposes only.

For the purposes of this profile, the identified hazard areas include the coastal hazards zone in relation to storm surge, hurricane vulnerability zones in relation to evacuation clearance times, flood zones in relation to the 100-year flood, wildfire susceptible areas, and sinkhole susceptible areas.

In **Attachment A**, two maps present the existing and future land uses within the Coastal Hazards Zone (CHZ), which represents the Category 1 Hurricane Evacuation Zone joined with the Category 1 Storm Surge Zone. The areas that are most susceptible to storm surge are located along the Caloosahatchee River. The total amount of land in the CHZ is 1,060.7 acres. As shown in **Table 6.2**, 55.8% are used for residential single-family homes; 14.1% are currently undeveloped; 9.2% are used for commercial purposes; and 7.6% are used for government, institutional, hospitals or education purposes. **Table 6.3** shows that of the 149.6 undeveloped acres, 63.8% are designated for commercial use.

In **Attachment B**, two maps present the existing and future land uses within the Hurricane Vulnerability Zone (HVZ), which represents Category 1 to 3 Hurricane Evacuation Zones. About 40% of the City of Fort Myers is located within the HVZ, predominantly along the Caloosahatchee River and its tributaries. The total amount of land in the HVZ is 8,286.1 acres. As shown in **Table 6.2**, 20.5% are used for residential single-family homes; 18% are used for agricultural purposes; 17.8% are currently undeveloped and 16.8% are used for government, institutional, hospitals or education purposes. **Table 6.3** shows that of the 1,471.1 undeveloped acres, 49.3% are designated for commercial use.

In **Attachment C**, two maps present the existing and future land uses within a 100-year flood zone. There are flood-prone areas scattered across the City. However, a majority of the large swaths surround the many creeks, streams and tidal wetlands along the coastline and Caloosahatchee River and its tributaries. The total amount of land in the special flood hazard area is 978.9 acres. As shown in **Table 6.2**, 38% are used for residential single-family homes; 24.3% are currently undeveloped; 15.6% are used for government, institutional, hospitals or education purposes; and 3.9% are residential group quarters and nursing homes. **Table 6.3** shows that of the 237.4 undeveloped acres, 56.7% are designated for residential multi-family dwellings.

In **Attachment D**, two maps present the existing and future land uses within wildfire susceptible areas. These areas are scattered across the City. The total amount of land in the wildfire susceptible areas is 15,718.4 acres. As shown in **Table 6.2**, 33.2% are used for agriculture; 23.9% are used for government, institutional, hospitals or education purposes; 23.7% are currently undeveloped; and 6.8% are parks, conservation areas and golf courses. **Table 6.3** shows that of the 1,353.2 undeveloped acres, 42.5% are designated for commercial use.

According to the land use analysis, no acreage was identified as being within a sinkhole susceptible area.

**Table 6.2 Total Incorporated Fort Myers Acres in Hazard Areas
 by Existing Land Use Category**

Existing Land Use Category		Coastal Hazard Zone	Hurricane Vulnerability Zone	Flood Zones	Wildfire Susceptible Areas
Agriculture	Acres	0.0	1,493.9	0.0	1,897.6
	%	0.0	18.0	0.0	33.2
Attractions, Stadiums, Lodging	Acres	20.3	43.2	22.7	1.8
	%	1.9	0.5	2.3	0.0
Places of Worship	Acres	14.7	261.1	7.6	67.3
	%	1.4	3.2	0.8	1.2
Commercial	Acres	97.6	886.4	65.3	84.5
	%	9.2	10.7	6.7	1.5
Government, Institutional, Hospitals, Education	Acres	81.1	1,390.4	152.3	1,365.0
	%	7.6	16.8	15.6	23.9
Industrial	Acres	21.2	152.9	15.8	18.9
	%	2.0	1.8	1.6	0.3
Parks, Conservation Areas, Golf Courses	Acres	0.4	286.9	1.6	388.6
	%	0.0	3.5	0.2	6.8
Residential Group Quarters, Nursing Homes	Acres	19.8	136.0	38.6	52.4
	%	1.9	1.6	3.9	0.9
Residential Multi-Family	Acres	51.5	349.3	38.1	85.2
	%	4.9	4.2	3.9	1.5
Residential Mobile Home, or Commercial Parking Lot	Acres	11.8	78.0	26.8	21.4
	%	1.1	0.9	2.7	0.4
Residential Single-Family	Acres	591.9	1,702.5	371.8	371.4
	%	55.8	20.5	38.0	6.5
Submerged Land (Water Bodies)	Acres	0.0	10.3	0.0	4.7
	%	0.0	0.1	0.0	0.1
Transportation, Communication, Rights-Of-Way	Acres	0.4	11.8	0.7	5.1
	%	0.0	0.1	0.1	0.1
Utility Plants and Lines, Solid Waste Disposal	Acres	0.4	12.3	0.2	1.3
	%	0.0	0.1	0.0	0.0
Vacant	Acres	149.6	1,471.1	237.4	1,353.2
	%	14.1	17.8	24.3	23.7
Total Acres	Acres	1,060.7	8,286.1	978.9	5,718.4
	%	100.0	100.0	100.0	100.0

Source: Department of Community Affairs

Table 6.3 Total Incorporated Fort Myers Acres in Hazard Areas by Future Land Use Category

Future Land Use Category		Coastal Hazard Zone		Hurricane Vulnerability Zone		Flood Zones		Wildfire Susceptible Areas	
		Total	Vacant	Total	Vacant	Total	Vacant	Total	Vacant
Commercial	Acres	463.7	95.4	4,196.0	725.0	335.1	80.0	1,480.9	574.9
	%	43.7	63.8	50.6	49.3	34.2	33.7	25.9	42.5
Estate	Acres	0.0	0.0	11.8	6.5	0.0	0.0	937.0	79.4
	%	0.0	0.0	0.1	0.4	0.0	0.0	16.4	5.9
Industrial	Acres	0.0	0.0	396.6	195.3	0.0	0.0	622.6	466.1
	%	0.0	0.0	4.8	13.3	0.0	0.0	10.9	34.4
Multi-Family	Acres	1.1	0.4	1,145.6	236.8	380.3	134.7	367.4	93.6
	%	0.1	0.3	13.8	16.1	38.8	56.7	6.4	6.9
Preserve	Acres	0.0	0.0	153.8	4.7	0.0	0.0	1,066.3	32.3
	%	0.0	0.0	1.9	0.3	0.0	0.0	18.6	2.4
Single-Family	Acres	596.1	53.7	2,382.2	303.0	263.5	22.7	1,244.2	106.8
	%	56.2	35.9	28.7	20.6	26.9	9.6	21.8	7.9
Total Acres	Acres	1,060.9	149.6	8,286.1	1,471.1	978.9	237.4	5,718.4	1,353.2
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Department of Community Affairs

Municipal Hazard Mitigation Goals and Objectives Related to Comprehensive Planning

The Lee County LMS contains a list of “Mitigation Initiatives” that pertain directly to the City of Fort Myers. Each of these initiatives also references the countywide goals and/or objectives that each suffices. The mitigation initiatives specifically mentioned for the City of Fort Myers include citywide intersection improvements, engineering studies for Dean Park and critical facilities; improvements on First Street at Billy’s Creek and S.R. 80; Dean Park Neighborhood flooding correction; installation of a generator at City Hall; improvements for L-3 Galloway Canal; drainage pipe and box culvert replacements on Lee Street; establishing a floodplain outreach program; and establishing a citywide property protection retrofit program.

Comprehensive Plan Review

Purpose and Intent

The City of Fort Myers Comprehensive Plan (adopted March 21, 2005) was reviewed for the purpose of developing this profile. This review was undertaken in order to assess what steps the City of Fort Myers has taken to integrate hazard mitigation initiatives from the Lee County Local Mitigation Strategy (LMS) and hazard mitigation initiatives in general, into the local planning process. Each Element of the Plan was evaluated to establish the extent to which the principles from the LMS were incorporated into the objectives and policies of the existing Comprehensive Plan.

Approach

This review includes an assessment of tropical cyclone generated storm surge, flooding, and wildfire hazards. A preliminary list of objectives and policies currently contained in the Plan that pertain to hazard mitigation and any policies related to these hazards is found in **Attachment H**. The following is a discussion of the extent to which the Plan appears to address each of the hazards. Recent policy amendments may not have been available for review, or proposed policies might be in the process of creation, which address these hazards. As a result, this assessment is considered preliminary and subject to input from the local government.

Summary of Findings

The highest risk hazards for Lee County as identified in the County's Local Mitigation Strategy (LMS) are flooding, storm surge, and wildfires. Sinkhole hazard was not discussed in the hazards analysis in the latest version of the Lee County LMS. Therefore, sinkhole hazard is not addressed in this summary. The City of Fort Myers is a coastal county, so policies are incorporated that are geared toward coastal management and coastal resource protection. Policies relating to hazard mitigation within the Plan include those relating to flooding, stormwater control and protection, and sheltering. There are no known policies in the Plan focused on wildfire mitigation and protection measures.

The City of Fort Myers Comprehensive Plan also focuses on the protection of natural features such as floodplains, wetlands, and dune systems through development controls and stormwater management. The Plan supports a surface management strategy that relies on natural features and natural systems to receive and otherwise manage storm and surface waters.

Flooding

Flooding is addressed from two vantage points, the protection of natural drainage features through surface water management, and protection of properties through development standards and stormwater abatement. There are several policies directed at minimizing flooding and stormwater runoff, and protecting flood prone areas from potential development impacts. The Plan incorporates development controls in place to minimize the impact of new development within the 100-year floodplain which include: guiding development in flood plains in a manner consistent with their natural functions (Objective 1, Municipal Services Element) and regulating development in floodplains (Policy 1.2 MSE);

The mitigation of flood waters through stormwater quantity levels are addressed in the Municipal Services Element, Surface Water Sub-element. This element stresses the importance of protecting natural drainage features including the maintenance of storm sewers, ditches and primary channels (Policy 2.3 actions MSE), as well as impervious surface ratios for vegetated buffer zones (Policy 2.4, Action 2.4.2 MSE). Additionally, the Plan addresses levels of service for surface water levels within channels (Policy 2.7 MSE).

Storm Surge

Similar to most of Florida's coastal communities, Lee County currently has a significant shelter deficit. According to Florida's Statewide Emergency Shelter Plan, the Lee County has an existing shelter capacity of 17,768 people. The 2004 shelter demand for a Category 4 or Category 5 hurricane is 105,134 people, leaving an existing shelter deficit of 87,366. In 2009, the projected shelter demand is 119,866, leaving an anticipated shelter deficit of 102,098. The opportunity exists to construct new facilities to standards that will allow them to serve as shelters, and to construct future public facilities outside of floodplain areas.

The City of Fort Myers has several policies dedicated to sheltering. Policy 10.3 of the Conservation and Coastal Zone Management Element requires the City to participate in a private employer hurricane shelter development program with the Southwest Florida Regional Planning Council. Actions and Standards which apply to this policy include minimum building standards for the shelters, and location criteria outside of a Category 2 Hurricane Evacuation Zone. Policy 10.4 of the same element encourages the School Board to construct or rehabilitate schools that can be used for emergency shelters in Evacuation Zones 4 and 5. Additionally, Policy 3.4 of the Public Safety Element directs the City to participate in any county-sponsored hurricane shelter program for on-site shelters and for fee-in-lieu of provisions for off-site shelter construction or remodeling.

Additional storm surge mitigation measures include: locating critical facilities such as hospitals, at-risk group housing, and fire and police facilities outside of the Coastal High Hazard Area (Policy 9.1, Standard 9.1.1.1 CCZME); residential developments over 100 units must prepare an

emergency hurricane preparedness plan (Policy 10.6 CCZME); and limitations of public expenditures in Coastal High Hazard Areas (CHHA) (Policy 9.1, Action 9.1.1 CCZME).

Wildfire

The City of Fort Myers Comprehensive Plan does not contain wildfire mitigation and management practices goals, objectives or policies.

Summary of Preliminary Recommendations

The City of Fort Myers Comprehensive Plan has a good integration of hazard mitigation principles and its LMS has adequate data and goals to support comprehensive planning. However, there are always ways to strengthen such plans, and the following is a summary of options for the County to do so.

Comprehensive Plan Preliminary Recommendations

The following recommendations include hazard mitigation measures in which the City of Fort Myers can continue to reduce or eliminate risks to storm surge, flood, and wildfire. These recommendations pertain to the use of vacant lands and/or redevelopment practices. Based on the land use tabulations, most of the vacant acreage is susceptible to flood, tropical cyclone generated storm surge, and wildfire. No acres were determined to be in sinkhole susceptible areas. For more information about the methodology and data used for the land use tabulations, please refer to the “Analysis of Current and Future Vulnerability Based on Land Use” section of the Municipal Case Study in this hazards profile.

Of the vacant lands, 150 acres are susceptible to Category 1 storm surge (CHZ), 1,471 acres are susceptible to Category 1 – 3 storm surge (HVZ), 237 are susceptible to 100-year flood, and 1,353 acres are susceptible to wildfire.

Storm Surge

All 150 vacant acres in the Coastal Hazard Zone and 99.7% of the 1,471 vacant acres in the Hurricane Vulnerability Zone are to be developed for residential, commercial, industrial uses or public facilities, indicating that these risk reduction strategies should be considered prior to development of this vacant land.

- The City should continue to decrease or maintain permitted residential density development in the CHHA, limit many types of development in the CHHA, and other existing measures to minimize risk.
- The Comprehensive Plan should consider transfer of development rights to from areas within the CHHA to outside the CHHA, as another measure to reduce density in the CHHA.
- Comprehensive Plan policies should consider retrofitting essential public facilities that exist in the CHHA to mitigate impacts from surge.
- The City should consider coordinating with Lee County to only allow new shelters (including on-site shelters) outside of the HVZ.
- The City should consider prohibiting septic tanks in the CHHA except in cases of excessive hardship where (1) no reasonable alternative exists, (2) a discharge from a septic tank will not adversely affect public health and will not degrade surface or ground water and (3) where the Health Department determines that soil conditions, water table elevation and setback provisions are adequate to meet state requirements.
- The Comprehensive Plan should include a policy to maintain or reduce the hurricane evacuation clearance time published in the FDEM Hurricane Evacuation Study, institute a level of service (LOS) standard that is tied to levels of development or

population and/or institute an impact fee in the CHHA or HVZ to help pay for additional road capacity, retrofits required for evacuations, and shelter space.

Flood

All 237 vacant acres in the 100-year floodplain are to be developed for residential, commercial, industrial uses or public facilities, indicating that these risk reduction strategies should be considered prior to development of this vacant land.

- The City should continue the implementation of policies for stormwater management, repetitive loss repair and modification requirements, transfer of development rights in wetlands, and other measures to reduce the risk from flood.
- The City should consider coordinating with Lee County to build shelters and essential public facilities outside of the 100-year floodplain.
- The City should consider requiring that all structures built in the 100-year floodplain include at least 1 foot freeboard. Many post-disaster building performance/damage assessments have shown that it is advisable to include freeboard to reduce future flood damages. Okaloosa and Brevard Counties, City of Jacksonville and the Santa Rosa Island Authority are example communities that have adopted freeboard requirements.
- The City should consider requiring areas that have not established flood elevations to be studied prior to development.
- The City should consider calling for compensating storage calculations in all non coastal flood hazard areas.

Wildfire

About 98% of the 1,353 vacant acres that are susceptible to wildfire are to be developed for residential, commercial, industrial uses or public facilities, indicating that these risk reduction strategies should be considered prior to development of this vacant land.

- The City should consider participating in the Firewise Medal Community program to reduce risks within the wildland urban interface.
- Where reasonable, consideration should be made to design structures and sites within the City to minimize potential for loss of life and property (e.g., outdoor sprinkler systems, fire-resistant building materials or treatments, and landscaping and site design practices); review proposals for subdivisions, lot splits, and other developments for fire protection needs during site plan review process; coordinate with fire protection service or agencies to determine guidelines for use and development in wildfire-prone areas.
- The City should consider requirement for all new development to include & implement a wildfire mitigation plan specific to that development, subject to review & approval by the Local Fire Rescue Department.
- The City should consider increasing public awareness of prescribed burning and require management plans for conservation easements that address reduction in wildfire fuels.

Sinkhole

No areas were determined to be susceptible to sinkholes according to the data used for the hazards analysis in this profile. Sinkhole hazard was not discussed in the hazards analysis in the latest version of the Lee County LMS. Therefore, no recommendations are provided.

General

- Include each hazard layer on the existing and future land use maps to determine where risks are possible to target hazard mitigation strategies.
- Continue educating the public, especially those at high risk from hurricanes, floods, and wildfires, and inform them of proactive steps they can take to mitigate damage.

6. Data Sources

County Overview:

Florida Statistical Abstract – 2004 (38th Edition). Bureau of Economic and Business Research, Warrington College of Business, University of Florida. Gainesville, Florida.

State and County QuickFacts. U.S. Census Bureau. Data derived from 2000 Census of Population and Housing.

Hazard Vulnerability:

Florida Repetitive Loss List March 05. Florida Department of Community Affairs, Division of Emergency Management, Flood Mitigation Assistance Office. March 2005.

Mapping for Emergency Management, Parallel Hazard Information System (MEMPHIS). Florida Department of Community Affairs, Division of Emergency Management.
<http://lmsmaps.methaz.org/lmsmaps/>

Protecting Florida's Communities – Land Use Planning Strategies and Best Development Practices for Minimizing Vulnerability to Flooding and Coastal Storms. Florida Department of Community Affairs, Division of Community Planning and Division of Emergency Management. September 2004.

State of Florida 2004 Statewide Emergency Shelter Plan. Florida Department of Community Affairs, Division of Emergency Management.

State of Florida. 2005 Hurricane Evacuation Study Database. Florida Department of Community Affairs, Division of Emergency Management.

GIS Data:

Flood Zone GIS Data

Source: FEMA FIRM GIS coverages (1996), supplied by University of Florida GeoPlan Center Florida Geographic Data Library Version 3.0.

- Areas with an "A_", "V_", "FPQ", "D", "100IC", or "FWIC" value in the "Zone" field in these coverages were considered to be in the 100-year flood zone, and were used in the mapping/analysis.

Hurricane Evacuation Zone/Coastal High-Hazard Area (Category 1 Hurricane Evacuation Zone) GIS Data

Source: GIS coverage of hurricane zones compiled by Florida Department of Community Affairs/Division of Emergency Management (2003), from GIS data collected from county emergency management agencies in the State of Florida.

- Areas shown/analyzed are those areas in the above-referenced GIS coverage where the value in the field "Evacuation Category" is equal to "Zone TS", "Zone A/1", "Zone B/2", or "Zone C/3", in the maps/tables for the Hurricane Vulnerability Zone.
- Areas shown/analyzed are those areas in the above-referenced GIS coverage where the value in the field "Evacuation Category" is equal to "Zone TS", "Zone A/1" in the maps/tables for the Coastal Hazards Zone.

Hurricane Storm Surge Zone GIS Data

Source: GIS coverage of storm surge zones compiled by Florida Department of Community Affairs/Division of Emergency Management (2004), from various storm surge studies performed by regional planning councils and the U.S. Army Corps of Engineers.

- Areas shown/analyzed are those areas in the above-referenced GIS coverage where the value in the field "Category" is equal to "Tropical Storm" or "Category 1".

Sinkhole Hazard GIS Data

Source: Kinetic Analysis Corporation web site (2005),
at: http://lmsmaps.methaz.org/lmsmaps/final_cty/

- Areas shown/analyzed are those areas in the "Rawsink1.shp" GIS coverage supplied by KAC, where the value in the field "Gridcode" is 3 to 6, representing "High", or Very High", "Extremely High", or "Adjacent", based on the classification system used in the sinkhole hazard maps found on the above website.

Wildfire Susceptibility GIS Data

Source: Florida Department of Agriculture and Consumer Services/Division of Forestry, Florida Fire Risk Assessment System (FRAS) data, 2004.

- Areas shown as "wildfire susceptible areas" and that were analyzed are those areas with a "Wildfire Susceptibility Index" value of greater than 10,000 (in north Florida counties) or greater than 0.1 (in south Florida counties)*, based on the FRAS model, and that are also within areas of forest or shrub vegetation or "low impact urban" land cover, based on the Florida Fish and Wildlife Conservation Commission "Florida Vegetation and Land Cover - 2003" GIS data.

Municipal Boundaries

Source: Boundaries of municipalities were extracted from the U.S. Census 2000 "Places" GIS coverage for the State of Florida.

**ATTACHMENT A
Maps of the Existing and Future Land Uses within Coastal Hazards Zone**

ATTACHMENT B
Maps of the Existing and Future Land Uses within Hurricane Vulnerability Zone

**ATTACHMENT C
Maps of the Existing and Future Land Uses within the 100-year Floodplain**

ATTACHMENT D
Maps of the Existing and Future Land Uses within Wildfire Susceptible Areas

ATTACHMENT E
Maps of the Existing and Future Land Uses within the Sinkhole Susceptible Areas

ATTACHMENT F

Local Mitigation Strategy Goals and Objectives Pertaining to Comprehensive Planning

Lee County's LMS includes the following goals and objectives that are directly related to local comprehensive planning and growth management:

Overall Goal: Develop and Maintain a Disaster Resistant Community through application of hazard mitigation policies and identification, prioritization and achievement of cost-effective mitigation projects.

Goal 1: Support prevention activities and projects that reduce the risk of life and damage to property from identified hazards.

Objective 1.1: Preventive activities that are addressed in various comprehensive planning and land document regulations shall be governed by the appropriate goals, objectives and policies contained in the following documents:

- Cape Coral: City of Cape Coral Comprehensive Plan Coastal Management Element, Goal 4
- City of Fort Myers: The City of Fort Myers Comprehensive Plan; including Section 1: Future Land Use, Section 4: Municipal Services, Section 5: Conservation and Coastal Management, Section 6: Recreation and Open Space, and Section 7: Public Safety; as well as the City of Fort Myers Growth Management Code.
- City of Sanibel: Section 3.1.1. Hurricane Safety (Objectives 2, 5 and 6); Section 3.2.1. Coastal Zone Protection (Objectives 3 and 6); Section 3.3.3. Transportation (Policy 5.4); Section 3.4.1. Intergovernmental Coordination (Policy 1.4); Section 3.5.1. Capital Improvements (Objective 2); Section 3.6.2. Future Land Use (Objective 81)
- Town of Fort Myers Beach: The Beach Comprehensive Plan Sections 4 Future Land Use Element, 5 Coastal Management Element, 6 Conservation Element, 9 Stormwater Management Element and 11 Capital Improvements Element as well as the Town's Land Development Code."
- Unincorporated Lee County: Lee Comprehensive Plan and Lee County Land Development Code.

Objective 1.2: Continue to support the efforts to purchase environmentally sensitive areas, according to the ranking criteria set forth by the CLASAC committee, that promote the preservation of open space in specified hazard areas using Conservation 2020 funds, and to leverage other funding sources by working with state land acquisition and land management agencies.

Objective 1.3: Continue to enforce floodplain regulations that provide greater flood protection than required under current National Flood Insurance Program standards.

Objective 1.4: Continue to support the South Florida Water Management District's efforts to increase the storage capacity to retain stormwater in the Estero Watershed.

Objective 1.5: Give high priority to projects that improve the ability of current drainage systems to convey or divert stormwater flooding from areas of the county and the component municipalities that have suffered repeated flooding events.

Objective 1.6: Beach and dune maintenance projects designed to maintain and preserve the private and public investment of coastal areas shall be funded according to the county's, the component municipalities', and the Captiva Erosion Prevention District's ten-year beach erosion control plans.

Goal 2: Support activities and projects that reduce or overt property damage on properties that have suffered repeated damage from identified hazards.

Objective 2.1: Obtain funding for projects to acquire and/or relocate repetitive loss properties, as defined by the Federal Emergency Management Agency, that have a benefit to cost ratio of 1.0 or better.

Objective 2.2: Obtain funding to elevate, or otherwise retrofit, repetitive loss properties, as defined by the Federal Emergency Management Agency, that have a benefit to cost ratio of 1.0 or better.

Objective 2.3: Examine the feasibility of enacting development standards in urban/wild land interface areas to mitigate future fire losses, which will include vegetative buffers, fire-resistant roofing materials, screened gable and roof openings, and minimum driveway width requirements for fire response vehicles.

Objective 2.4: Attempt to improve the county and the component municipalities Building Code Effectiveness Rating System ratings to reduce homeowner insurance policy rates on new construction.

Goal 3: Support natural resource protection activities that preserve or maintain natural areas.

Objective 3.1: Continue current wetland coordinating/evaluation programs with state and water management agencies.

Objective 3.2: Continue enforcing erosion sedimentation and control regulations that reduce how much sediment enters natural areas when development takes place.

Objective 3.3: Support the continued purchase of lands through several local, state and federal programs that promote the preservation of natural areas.

Objective 3.4: Support the continued efforts to preserve, restore and renourish the beach front and other natural resource areas.

Goal 4: Support the achievement of emergency services activities taken during a disaster incident to reduce the hazard's impact.

Objective 4.1: Continue efforts to gain a better understanding of the community's vulnerability to flood, wind and wildfire impacts through hazard identification and vulnerability assessment studies.

Objective 4.2: Continue the program to place additional water gauging stations equipped with telemetry access to monitor water levels in coastal and stormwater areas.

Objective 4.3: Continue to support projects that fund building or retrofit projects that reduce the community's hurricane shelter space deficit.

Objective 4.4: Support efforts to fund improvements to critical roadway links causing congestion on evacuation routes for Category 1 through 3 hurricanes.

Objective 4.5: Continue efforts to identify critical facilities that need mitigation protection due to their importance in helping the community respond to and recover from identified hazards.

Objective 4.6: Floodproofing of critical facilities within the defined Coastal High Hazard Area shall receive priority for grant funding requests.

Objective 4.7: Examine the feasibility of designing water, sewer, and power infrastructure facilities so that they can function during a 500-year flood event.

Objective 4.8: Each component municipality will either prepare a comprehensive emergency management plan (CEMP) or adopt the County's CEMP.

Objective 4.9: Identify and encourage incorporation of emergency power supplies to critical facilities and other public and private facilities integral to the operation, particularly with respect to health and safety support functions.

Objective 4.10: Evaluate the effectiveness of existing emergency power supplies to critical facilities and implement enhancements as needed to provide three to five days of functional operation.

Goal 5: Support efforts to obtain funding for engineered projects that help keep the hazard's impact away from identified vulnerable areas.

Objective 5.1: Seek federal and state funding to complete capital improvements to improve stormwater flow.

Objective 5.2: Support the current policy of discouraging the use of Diversions to restore historical water flows and basin boundaries altered due to development, road construction or post agricultural practices and patterns.

Objective 5.3: Support efforts to fund channel modifications contained in Lee County's Non-Regulatory Surface Water Management Plan.

Goal 6: Encourage public support and commitment to local hazard mitigation efforts by showing its benefits through public information activities that advise property owners, potential property owners, and visitors about hazards and ways to protect people and property from these hazards and the benefits of protecting our natural resources.

Objective 6.3: Continue to work with community realty associations to improve participation in the voluntary real estate disclosure program for flood hazards.

Objective 6.4: Continue efforts to support funding programs that provide assistance to property owners on ways to mitigate property from identified hazards.

Goal 7: Maintain current pre and post disaster redevelopment and mitigation policies and procedures designed to reduce or avert the community's future disaster potential.

Objective 7.1: Post disaster redevelopment and hazard mitigation policies and procedures shall be governed by goals, objectives and policies contained in all existing and developing Post Disaster Redevelopment Plans.

Objective 7.2: Objectives and policies contained in all existing and developing Post Disaster Redevelopment Plans shall be carried out through the appropriately adopted Post Disaster Ordinances following a major or catastrophic disaster.

ATTACHMENT G
Lee County Comprehensive Plan Excerpts Pertaining to Hazard Mitigation

From the 2004 Lee County Plan (as amended through Dec. 2004):

FUTURE LAND USE ELEMENT

Policy 5.1.2: Prohibit residential development where physical constraints or hazards exist, or require the density and design to be adjusted accordingly. Such constraints or hazards include but are not limited to flood, storm, or hurricane hazards; unstable soil or geologic conditions; environmental limitations; aircraft noise; or other characteristics that may endanger the residential community.

Policy 16.6.1: All retained onsite natural areas, must be perpetually managed by the owner(s), or their assignees, with accepted Best Management Practices. The type of management techniques will be determined by the specific plant community. A natural area land management plan must be submitted to the Lee County Division of Planning prior to the approval of a final local development order. Management techniques addressed in the plan must include, but not be limited to the following:

- Prescribed fire; (Added by Ordinance No. 99-16)

Policy 19.4.1: By the end of 2003, Lee County will review, amend or adopt Lee Plan or Land Development Code regulations to provide the following:

- All future development proposals adjacent to the Estero River or its tributaries must include floodplain protection plans prior to zoning approval.

COMMUNITY FACILITIES AND SERVICES ELEMENT

Policy 55.1.1: Lee County Utilities and Lee County Division of Natural Resources will plan and coordinate with other government agencies in the development of comprehensive plans as they relate to well field protection, aquifer recharge, water supply, and related capital facilities. (Added by Ordinance No. 00-22, Amended and Relocated by Ordinance No. 03-04).

Goal 59: PROTECTION OF LIFE AND PROPERTY. To reduce the hazards to life, health, and property created by flooding due to rainfall in a manner consistent with the community's criteria for the preservation of environmental values and the conservation of natural resources.

OBJECTIVE 59.1: Lee County will continue its efforts in developing a surface water management planning process designed to produce and maintain an up-to-date body of technical information, and, based on that information, the necessary surface water management plans, regulatory mechanisms, and facility proposals that will improve the protection of present and future uses of real property from stormwater flooding, while preserving or enhancing the environmental and natural resource values of both land and water. (Amended by Ordinance No. 94-30, 00-22)

Policy 59.1.2: From technical data underlying the surface water management plan, criteria will be established and utilized to identify floodways and other areas of special flood risk not already identified by the Federal Flood Hazard Map and Flood Insurance Study. (Amended by Ordinance No. 00-22)

Policy 59.1.3: By 1995, Lee County will update its flood plain regulations in accordance with the 1984 Flood Plain Management Study and other available sources. (Amended by Ordinance No. 94-30)

Policy 59.1.4: Continue to develop, update, and improve technical information, with the assistance of the U.S.D.A. Natural Resources Conservation Service, United States Geological Survey, Federal Emergency Management Agency, South Florida Water Management District,

and other agencies, in order to better determine the current flooding risks associated with severe rainfall events. (Amended by Ordinance 91-19, 94-30, 99-15, 02-02)

Policy 59.1.5: The county will, through appropriate land use and engineering regulations, continue to control the introduction of obstructions or impediments within floodways. (Amended by Ordinance No. 94-30, 00-22)

Policy 59.1.6: The county will, through appropriate regulations, continue to provide standards for construction of artificial drainageways compatible with natural flow ways and otherwise provide for the reduction of the risk of flood damage to new development. (Amended by Ordinance No. 94-30, 00-22)

Policy 59.1.7: Priorities in public investment in surface water management facilities will be limited to new or expanded facilities serving the future urban areas, existing development, public facilities, and the maintenance of existing infrastructure; and outside the future urban areas, only to the prevention or reversal of environmental degradation, or the alleviation of bona fide health and safety emergencies. (Amended by Ordinance No. 00-22)

Goal 60: COORDINATED SURFACE WATER MANAGEMENT AND LAND USE PLANNING ON A WATERSHED BASIS. To protect or improve the quality of receiving waters and surrounding natural areas and the functions of natural groundwater aquifer recharge areas while also providing flood protection for existing and future development.

OBJECTIVE 60.1: COUNTY-WIDE PROGRAM. Lee County will continue its efforts in developing a surface water management program that is multi-objective in scope and is geographically based on basin boundaries. (Amended by Ordinance No. 94-30, 00-22)

Policy 60.1.1: The detailed Surface Water Management Master Plan that was initiated in 1989 to identify the existing watershed basin boundaries within Lee County, to evaluate the storm capacity and establish design criteria, and to determine costs for surface water management within each basin to meet applicable design storm standards will be completed by 2005. (Amended by Ordinance No. 98-09)

Policy 60.1.4: The county will examine steps necessary to restore principal flow-way systems, if feasible, to assure the continued environmental function, value, and use of natural surface water flow-ways and associated wetland systems. (Amended by Ordinance No. 00-22)

Policy 60.1.6: Lee County will maintain in its land development regulations requirements that proper stormwater management systems be installed when land is being redeveloped. Appropriate exemptions will be provided to this requirement for individual residential structures and for historic districts. The regulations may also provide modified stormwater management standards for publicly sponsored projects within community redevelopment areas (as defined by Chapter 163, Part III, Florida Statutes). However, this policy will not be interpreted so as to waive any concurrency level-of-service standards. (Amended by Ordinance No. 94-30, 00-22)

Policy 60.2.1: The Surface Water Management Master Plan will identify those basins (or subbasins) which may be most suitable for basin-wide surface water management, based on:

- natural flow ways and drainage patterns;
- existing development patterns;
- land ownership patterns; and
- development potential based on the Future Land Use element of this plan. (Amended by Ordinance No. 00-22)

OBJECTIVE 60.3: LEVEL-OF-SERVICE STANDARDS. Revise by 1996 the surface water management level-of-service standards for basins and sub-basins identified in the Surface Water Management Master Plan. These future service standards can only be finalized upon the completion of the basin studies and will be based upon providing a defined level of flood

protection, balanced with the protection of natural flow ways and associated wetland systems. (Amended by Ordinance No. 94-30)

Policy 60.3.1: The following surface water management standards are adopted as minimum acceptable levels of service for unincorporated Lee County (see Policy 95.1.3).

A. Existing Infrastructure/Interim Standard. The existing surface water management system in the unincorporated areas of the county will be sufficient to prevent the flooding of designated evacuation routes (see Map 15) from the 25-year, 3-day storm event (rainfall) for more than 24 hours.

B. Six Mile Cypress Watershed (see Map 18). The level-of-service standard for the Six Mile Cypress Watershed will be that public infrastructure remains adequate such that floor slabs for all new private and public structures which are constructed a minimum of one (1) foot above the 100-year, 3-day storm event flood plain level for Six Mile Cypress Watershed will be safe from flooding from a 100-year, 3-day storm event (rainfall). The 100-year level and watershed boundaries are as established in Volume IV of the Six Mile Cypress Watershed Plan.

The following additional standards are hereby established as desired future level-of-service standards, to be achieved by September 30, 1994:

1. The Six Mile Cypress Slough and its major tributaries as identified in the Six Mile Cypress Watershed Plan (February 1990) must accommodate the associated discharge from the 25 year, 3-day storm event (rainfall). [Ref: Six Mile Cypress Watershed Plan (February 1990) -Volume II, Pages 10-5.]

C. Other Watersheds (see Map 18): Gator Slough, Yellow Fever Creek, Yellow Fever Creek-East Branch, Powell Creek, Billy Creek, Whiskey Creek, Deep Lagoon, Cow Creek, Hendry Creek, Ten Mile Canal, and Imperial River Watersheds.

The level-of-service standard for the above watersheds will be that all arterial roads at their crossing of the trunk conveyances, as referenced in the Lee County Surface Water Management Master Plan, will be free of flooding from the 25-year, 3-day storm event (rainfall). This standard will not apply to Chiquita Boulevard because it is located within the City of Cape Coral.

The following additional standards are hereby established as desired future level-of-service standards to be achieved by September 30, 1994:

1. Floor slabs for all new private and public structures which are constructed a minimum of one (1) foot above the 100-year, 3-day storm event flood plain level will be safe from flooding from a 100-year, 3-day storm event (rainfall).

D. Regulation of Private and Public Development

Surface water management systems in new private and public developments (excluding widening of existing roads) must be designed to SFWMD standards (to detain or retain excess stormwater to match the predevelopment discharge rate for the 25-year, 3-day storm event [rainfall]). Stormwater discharges from development must meet relevant water quality and surface water management standards as set forth in Chapters 17-3, 17-40, and 17-302, and rule 40E-4, F.A.C. New developments must be designed to avoid increased flooding of surrounding areas. Development must be designed to minimize increases of discharge to public water management infrastructure (or to evapotranspiration) that exceed historic rates, to approximate the natural surface water systems in terms of rate, hydroperiod, basin and quality, and to eliminate the disruption of wetlands and flow-ways, whose preservation is deemed in the public interest. (Amended by Ordinance No. 92-35, 94-29, 00-22)

Policy 60.3.2: The county will continue to maintain and update annually the CIP to provide for the needs of the surface water management program. (Amended by Ordinance No. 94-30)

Policy 60.3.3: The revised levels of service required to guide future investments in surface water management facilities will be based on the recommendations of the Surface Water Management Master Plan, as updated, and procedures will be established to keep current the levels of service, remaining capacity of existing facilities, and demand for new facilities.

Policy 60.3.4: Water management projects will be evaluated and ranked according to the priorities adopted into this plan. Major emphasis will be given to improving existing drainage facilities in and around future urban areas as shown on the Future Land Use Map, and to enhancing or restoring environmental quality. (Amended by Ordinance No. 00-22)

Policy 60.3.5: By 1996, complete the preliminary design of storm water management systems for each basin identified in the Surface Water Management Master Plan and develop a capital facility improvement schedule. (Amended by Ordinance No. 94-30)

OBJECTIVE 60.5: INCORPORATION OF GREEN INFRASTRUCTURE INTO THE SURFACE WATER MANAGEMENT SYSTEM. The long-term benefits of incorporating green infrastructure as part of the surface water management system include improved water quality, improved air quality, improved water recharge/infiltration, water storage, wildlife habitat, recreational opportunities, and visual relief within the urban environment. (Added by Ordinance No. 03-06).

Policy 60.5.2: The County encourages new developments to design their surface water management system to incorporate existing wetland systems. (Added by Ordinance No. 03-06)

Policy 60.5.3: The County encourages the preservation of existing natural flow-ways and the restoration of historic natural flow-ways. (Added by Ordinance No. 03-06)

Policy 60.5.4: The County will continue to identify and map flow-ways as part of the Lee County Surface Water Management Plan. The Plan provides a general depiction of watersheds and their trunk and major tributaries and has been expanded to some degree in the DRGR area. As new information is assembled, the Plan will be updated for public use. Due to its magnitude and need for site specific information, not all flow-ways will be shown. (Added by Ordinance No. 03-06)

Policy 60.5.5: The County will continue to coordinate the review of flow-ways with the other regulatory agencies and assist in the development of incentives and /or credits for implementation of regional surface water management systems that address flood protection, water quality/ environmental enhancement and water conservation. (Added by Ordinance No. 03-06)

Policy 61.1.4: The county's Surface Water Management Master Plan will place particular emphasis on 1) routing surface water runoff from areas of excess to areas where additional subsurface storage is available; and 2) maintaining and increasing historic surface and groundwater levels in the Density Reduction/Groundwater Resource land use category. (Amended by Ordinance No. 00-22)

OBJECTIVE 61.2: MIMICKING THE FUNCTIONS OF NATURAL SYSTEM. Support a surface water management strategy that relies on natural features (flow ways, sloughs, strands, etc.) and natural systems to receive and otherwise manage storm and surface water.

Policy 61.2.1: All development proposals outside the future urban areas must recognize areas where soils, vegetation, hydrogeology, topography, and other factors indicate that water flows or ponds; and require that these areas be utilized to the maximum extent possible, without significant structural alteration, for on-site stormwater management; and require that these areas be integrated into area-wide coordinated stormwater management schemes. (Amended by Ordinance No. 00-22)

Policy 61.2.2: Where no natural features of flow or ponding exist on a site outside the future urban areas, the county will require that water management structures be designed and constructed in such a manner as to mimic the functions of natural systems. Special engineering and design standards for such structures will be incorporated into revised development regulations. (Amended by Ordinance No. 00-22)

Policy 61.2.4: Where feasible within future urban areas, surface water management plans are encouraged that mimic the functions of natural systems, notwithstanding the type or intensity of development permitted.

OBJECTIVE 61.3: GENERAL SURFACE WATER MANAGEMENT STANDARDS. Lee County will continue to provide sufficient performance and/or design standards for development protective of the function of natural drainage systems. (Amended by Ordinance No. 94-30, 00-22)

Policy 61.3.1: Provide sufficient performance and design standards to require post-development runoff to approximate the total characteristics of the natural flow prior to development.

Policy 61.3.2: Floodplains must be managed to minimize the potential loss of life and damage to property by flooding. (Amended by Ordinance No. 00-22)

Policy 61.3.3: Floodways should be kept as unobstructed as possible.

Policy 61.3.4: Natural flow patterns will be publicly restored where such action is of significant public or environmental benefit, and feasible. (Amended by Ordinance No. 00-22)

Policy 61.3.5: The county will maintain regulations which provide for the management and protection of floodplains, consistent with state and federal regulations. (Amended by Ordinance No. 00-22)

Policy 61.3.6: Developments must have and maintain an adequate surface water management system, provision for acceptable programs for operation and maintenance, and post-development runoff conditions which reflect the natural surface water flow in terms of rate, direction, quality, hydroperiod, and drainage basin. Detailed regulations will continue to be integrated with other county development regulations. (Amended by Ordinance No. 00-22)

Policy 61.3.7: Channelization of natural streams and rivers is prohibited; channelization of other natural watercourses is discouraged. (Amended by Ordinance No. 00-22)

Policy 61.3.10: New artificial drainage systems must not channel runoff directly into natural waterbodies. (Amended by Ordinance No. 00-22)

Policy 61.3.11: Runoff must be routed through retention or detention areas and vegetated swales in order to reduce flow velocity, allow for percolation, and trap and remove suspended solids and pollutants. (Amended by Ordinance No. 00-22)

CAPITAL IMPROVEMENTS ELEMENT

Policy 95.1.3: MINIMUM ACCEPTABLE LEVEL-OF-SERVICE STANDARDS. REGULATORY STANDARDS

4. Stormwater Management Facilities:

Minimum Acceptable Level of Service: INTERIM

(a) Existing Infrastructure/Interim Standard: The existing surface water management system in the unincorporated areas of the county will be sufficient to prevent the flooding of designated evacuation routes (see Map 15) from the 25-year, 3-day storm event (rainfall) for more than 24 hours.

(b) Six Mile Cypress Watershed: The level-of-service standard for the Six Mile Cypress Watershed will be that public infrastructure remains adequate such that floor slabs for all new private and public structures which are constructed a minimum of one (1) foot above the 100-year, 3-day storm event flood plain level for Six Mile Cypress Watershed will be safe from flooding from a 100-year, 3-day storm event (rainfall). The 100-year level and watershed boundaries are as established in Volume IV of the Six Mile Cypress Watershed Plan.

(c) Regulation of Private and Public Development: Surface water management systems in new private and public developments (excluding widening of existing roads) will be designed

to SFWMD standards (to detain or retain excess stormwater to match the predevelopment discharge rate for the 25-year, 3-day storm event [rainfall]). Stormwater discharges from development must meet relevant water quality and surface water management standards as set forth in Chapters 17-3, 17-40, and 17-302, and Rule 40E-4, F.A.C. New developments will be designed to avoid increased flooding of surrounding areas. These standards are designed to minimize increases of discharge to public water management infrastructure (or to evapotranspiration) that exceed historic rates, to minimize change to the historic hydroperiod of receiving waters, to maintain the quality of receiving waters, and to eliminate the disruption of wetlands and flow-ways, whose preservation is deemed in the public interest.

Policy 95.1.4: DESIRED FUTURE LEVEL-OF-SERVICE STANDARDS. For certain facilities, a second LOS standard, a "Desired Future Level of Service," is set forth.

1. Stormwater Management Facilities: To be established basin by basin subsequent to the county-wide surface water management master plan. Future service standards can only be finalized upon the completion of the basin studies and will be based upon providing a defined level of flood protection, balanced with the protection of natural flow ways and associated wetland systems.

The following additional standards are hereby established for the Six Mile Cypress Watershed: The Six Mile Cypress Slough and its major tributaries as identified in the Six Mile Cypress Watershed Plan (February 1990) must accommodate the associated discharge from the 25-year, 3-day storm event (rainfall). (Ref: Six Mile Cypress Watershed Plan (February 1990) - Volume II, page 10-5.)

CONSERVATION AND COASTAL MANAGEMENT ELEMENT

Policy 103.1.7: The county will review disaster preparedness plans for all petroleum storage facilities including any petroleum port or storage facility. This review will also include an assessment of the engineering specifications of the containment dikes at the site in a 100-year storm surge. (Amended by Ordinance No. 99-15)

Goal 105: PROTECTION OF LIFE AND PROPERTY IN COASTAL HIGH HAZARD AREAS. To protect human life and developed property from natural disasters. (See also Goal 110.) (Amended by Ordinance No. 94-30)

OBJECTIVE 105.1: DEVELOPMENT IN COASTAL HIGH HAZARD AREAS. Development seaward of the 1991 Coastal Construction Control Line will require applicable State of Florida approval; new development on barrier islands will be limited to densities that meet required evacuation standards; new development requiring seawalls for protection from coastal erosion will not be permitted; and allowable densities for undeveloped areas within coastal high hazard areas will be considered for reduction. (Amended by Ordinance No. 92-35, 93-25, 94-30, 00-22)

Policy 105.1.1: County policy regarding development seaward of the updated 1991 Coastal Construction Control Line will be re-evaluated approximately every five years beginning in 1995 to assess the adequacy of policies and practices developed by the Department of Environmental Protection. (Amended by Ordinance No. 92-35, 94-30, 00-22)

Policy 105.1.2: Rezoning to allow higher densities will not be permitted on barrier and coastal islands if the capacity of critical evacuation routes would thereby be exceeded (see Objective 109.1). (Amended by Ordinance No. 92-35, 00-22)

Policy 105.1.3: Shoreline development in V Zones will be protected from coastal erosion, wave action, and storms by vegetation, setbacks, and/or beach renourishment, rather than by seawalls or other hardened structures which tend to hasten beach erosion (see also policies under Objective 113.2). Repairs of lawfully constructed, functional, hardened structures as defined in F.S. Chapter 161 may be allowed subject to applicable state and local review and approval. (Amended by Ordinance No. 92-35, 00-22)

Policy 105.1.4: Through the Lee Plan amendment process, land use designations of undeveloped areas within coastal high hazard areas will be considered for reduced density categories (or assignment of minimum allowable densities where density ranges are permitted) in order to limit the future population exposed to coastal flooding. (Amended by Ordinance No. 92-35, 94-30, 00-22)

Goal 106: LIMITATION OF PUBLIC EXPENDITURES IN COASTAL HIGH HAZARD AREAS.

To restrict public expenditures in areas particularly subject to repeated destruction by hurricanes, except to maintain required service levels, to protect existing residents, and to provide for recreation and open space uses. (Amended by Ordinance No. 94-30)

OBJECTIVE 106.1: COASTAL HIGH HAZARD AREA EXPENDITURES. Public expenditures in areas particularly subject to repeated destruction by hurricanes will be limited to necessary repairs, public safety needs, services to existing residents, and recreation and open space uses. (Amended by Ordinance No. 94-30, 00-22)

Policy 106.1.1: All further public expenditures made for new facilities on undeveloped barrier islands or within V zones will require a finding by the county commission that such expenditures are necessary to maintain required service levels, to protect existing residents, or to provide for recreation and open space needs. (Amended by Ordinance No. 00-22)

Policy 106.1.2: No new causeways (public or private) will be constructed to any islands. (Amended by Ordinance No. 00-22)

Policy 106.1.3: No new bridges will be constructed to undeveloped barrier islands except where needed to achieve evacuation clearance time objectives on adjoining islands connected by existing bridges. In such a case, this plan will be amended to insure that the ultimate development of all areas served by the new bridge is limited to levels which can safely be served by the new and existing bridges. (Amended by Ordinance No. 00-22)

Policy 106.1.4: When state funding is required for the relocation or replacement of infrastructure currently within the Coastal Building Zone, the capacity of the replacement structure will be limited to maintaining required service levels, protecting existing residents, and providing for recreation and open space needs. (Added by Ordinance No. 94-30, Amended by Ordinance No. 00-22)

Goal: RESOURCE PROTECTION.

OBJECTIVE 107.1: RESOURCE MANAGEMENT PLAN.

Policy 107.1.1: County agencies implementing the natural resources management program will be responsible for the following:

4. Conducting a sensitive lands acquisition program, which will consist of the following elements (see also Policy 107.2.8):
 - c. Beginning in 1997, the county will adopt and implement a program to acquire and manage lands critical to water supply, flood protection, wildlife habitat, and passive recreation. The program will be funded by an ad valorem tax of up to 0.50 (1/2) mil annually for a period not to exceed seven years. A fifteen member advisory group to be called the Conservation Lands Acquisition and Stewardship Advisory Committee
6. Compiling, maintaining and regularly updating county mapping of vegetation communities; listed species habitat and sitings; and water resources including watersheds, floodplains, wetlands, aquifers, and surface water features.
7. Preparing recommendations for maintaining or restoring the desired seasonal base flows and water quality after reviewing monitoring data.
8. Coordinating in the preparation of plans with the municipalities, South Florida Water Management District, and Southwest Florida Water Management District to better control flows of freshwater and reduce pollutant discharges into the Lee County coastal waters.

OBJECTIVE 109.2: SHELTER. By 2010, adequate shelter space will be available for the population in the Hurricane Vulnerability Zone at risk under a Category 3 storm.

Policy 109.2.1: The percentage rate of the evacuation population to be used as the basis for in-county and on-site shelter demand will be twenty-one (21) percent of the population at risk in the Hurricane Vulnerability Zone under a Category 3 storm hazard scenario except for those developments with Lee County approved Hurricane Management Plans. This rate will also be the target shelter capacity for a program to provide an emergency shelter supply within Lee County by the year 2010. (Amended by Ordinance No. 92-35, 00-22)

Policy 109.2.2: By 1995, the county will implement a program designed to meet the level of service in Policy 109.2.1 by 2010. Components of this program may include:

1. Funding of the All-Hazards MSTU;
2. An impact fee or fee in lieu for new residential developments, with appropriate credits for the construction of on-site shelters outside of category 1 areas;
3. Mandatory on-site shelters for new residential developments (including mobile home and recreational vehicle parks) over a specified size threshold and outside Category 1 areas of the Hurricane Vulnerability Zone; and
4. Any available state funds. (Added by Ordinance No. 94-30)

Policy 109.2.3: By 1995, on-site shelters will be required to meet standards established by the county, including provision of adequate shelter space, elevation above Category 3 hurricane storm surge flooding levels, adequate windproofing, glass protection, emergency power where needed, water supplies, and other basic needs. (Amended by Ordinance No. 94-30, 00-22)

Policy 109.2.4: On-site shelters for the general public must not be built on barrier or coastal islands. (Amended by Ordinance No. 00-22)

Policy 109.2.5: By 1995, the county will determine the feasibility of evacuating residents from the Category 1 area to vertical shelters within residential, commercial, and industrial sites in the Category 2, 3, 4, and 5 areas of the Hurricane Vulnerability Zone. (Amended by Ordinance No. 94-30, 00-22)

Goal 110: HAZARD MITIGATION. To provide through county plans, programs, and regulations means to minimize future property losses from natural disasters such as flooding, tropical storms and hurricanes. (See also Goal 105.) (Amended by Ordinance No. 94-30)

OBJECTIVE 110.1: DEVELOPMENT REGULATIONS. By 1995, all development regulations will be reviewed and revised to require that the vulnerability of future development in the A-Zone (as defined by the Federal Emergency Management Agency) be reduced. (Amended by Ordinance No. 94-30, 00-22)

Policy 110.1.1: Regulations and incentives will be examined for additional setbacks in critical erosion areas, conservation and enhancement of dunes and vegetation, floodproofing of utilities, and appropriate requirements for structural wind resistance and floodplain management.

Policy 110.1.2: The county will not permit new or expanded mobile home or recreational vehicle development on barrier islands or in V-Zones as defined by the Federal Emergency Management Agency. (Amended by Ordinance No. 94-30, 00-22)

Policy 110.1.3: By 1995, all new residential development of more than 50 units will be required to provide continuing information to residents concerning hurricane evacuation and shelters, through the establishment of a homeowners' or residents' association. (Amended by Ordinance No. 94-30, 00-22)

Policy 110.1.4: By 1995, all new residential development of more than 100 units will be required to formulate an emergency hurricane preparedness plan; this plan is subject to the approval of the Lee County Division of Public Safety. (Amended by Ordinance No. 94-30, 00-22)

Policy 110.1.5: By 1995, the county will prepare and adopt a flood plain management plan. The plan will analyze the flooding problem of the unincorporated areas of Lee County, inventory the flood hazard area, review possible activities to remedy identified flooding problems, select appropriate alternatives, and formulate a schedule for implementation. (Amended by Ordinance No. 92-35, 94-30, 00-22)

Policy 110.1.6: Maintain the provisions of the Flood Plain Management Ordinance that interpret the 50% improvement threshold as cumulative for any improvement, modification, addition or reconstruction project to an existing building or structure identified as part of a repetitive loss property by the Federal Emergency Management Agency (FEMA). A repetitive loss property is defined as one for which two or more National Flood Insurance Program (NFIP) losses of at least \$1,000.00 each have been paid since 1978. (Amended by Ordinance No. 92-35, 94-30)

Policy 110.1.7: Maintain the current county development regulations requiring that any building that is improved, modified, added on to, or reconstructed by more than twenty five (25) percent of its replacement value and which has recorded a repetitive loss as defined by the Federal Emergency Management Agency will be brought into compliance with current regulatory standards for new construction. (Amended by Ordinance No. 92-35, 94-30, 00-22, 03-04)

Goal 111: POST-DISASTER REDEVELOPMENT. To provide for planning and decision-making to guide redevelopment during the response and recovery period following major emergencies, such as tropical storms and hurricanes.

OBJECTIVE 111.1: POST-DISASTER STRATEGIC PLAN. By 1995, the county will formally establish post-disaster institutions and procedures to guide county actions following a natural or technological disaster. (Amended by Ordinance No. 94-30, 00-22)

Policy 111.1.1: The plan will maintain a Recovery Task Force to work with state and federal emergency officials, assess damage, review emergency actions, prepare a redevelopment plan, and recommend needed changes to the Strategic Plan and to this comprehensive plan. (Amended by Ordinance No. 94-30, 00-22)

Policy 111.1.2: The plan will maintain guidelines for determining priorities for the acquisition of storm-damaged property in hazard-prone areas. (Amended by Ordinance No. 94-30, 00-22)

Policy 111.1.3: The plan will establish principles for repairing, replacing, modifying, or relocating public facilities in hazard-prone areas. (Amended by Ordinance No. 00-22)

Policy 111.1.4: The applicable portions of the Comprehensive Emergency Management Plan will be modified to comply with these policies, and will contain step-by-step details for postdisaster recovery operations. (Amended by Ordinance No. 00-22)

OBJECTIVE 111.2: POST-DISASTER ORDINANCE. Maintain an ordinance that implements (where necessary) the Post-Disaster Strategic Plan, and provides regulations that may be needed following a natural or technological disaster. By 1995, the Recovery Task Force will recommend amendments to the Post-Disaster Strategic Plan. (Amended by Ordinance No. 94-30, 00-22)

Policy 111.2.1: The ordinance will continue to provide for enactment of a temporary moratorium on rebuilding not immediately needed for the public health, safety, and welfare (e.g., to allow repairs to water, power, fire, police, and medical facilities; debris removal; stabilization or removal of structures in danger of collapsing; and minimal repairs to make dwellings habitable). (Amended by Ordinance No. 94-30, 00-22)

Policy 111.2.2: The ordinance may incorporate a redevelopment plan for hazard-prone areas where such a plan would minimize repeated exposures to life-threatening situations.

Policy 111.2.3: The ordinance will implement the county buildback policy (see Procedures and Administration Section). (Amended by Ordinance No. 94-30, 00-22)

Policy 112.1.1: The county will continue to participate in an intergovernmental task force consisting of representatives from Lee County and incorporated municipalities to develop a permanent intergovernmental resource protection organization to deal with stormwater runoff, wastewater discharge, and development management policies aimed at protecting and enhancing estuarine water quality and unusual vegetative communities. (Amended by Ordinance No. 94-30, 00-22)

Goal 113: COASTAL PLANNING AREAS. To conserve, maintain, and enhance the natural balance of ecological functions in the coastal planning area, with particular emphasis on the protection of beach and dune systems so as to retain their contribution to storm protection, natural resources, and economic development. (Amended by Ordinance No. 94-30)

OBJECTIVE 113.1: COASTAL PLANNING AREA IN GENERAL. Lee County will manage the coastal planning area to provide a balance among conservation of resources, public safety capabilities, and development. (Amended by Ordinance No. 94-30, 00-22)

Policy 113.1.4: Undeveloped barrier islands will be maintained predominantly in their natural state. Public expenditures for infrastructure will be limited to public parks in such areas. (Amended by Ordinance No. 94-30, 00-22)

Policy 114.1.1: Development in wetlands is limited to very low density residential uses and uses of a recreational, open space, or conservation nature that are compatible with wetland functions. The maximum density in the Wetlands category is one unit per 20 acres, except that one single family residence will be permitted on lots meeting the standards in Chapter XIII of this plan, and except that owners of wetlands adjacent to Intensive Development, Central Urban, Urban Community, Suburban, and Outlying Suburban areas may transfer densities to developable contiguous uplands under common ownership in accordance with Footnotes 9b and 9c of Table 1(a), Summary of Residential Densities. (Amended by Ordinance No. 94-30, 00-22)

Policy 117.1.8: The county will support the acquisition and protection of the Flint Pen Strand as a major water retention and aquifer recharge area. (See also Policy 107.11.4.) (Amended by Ordinance No. 94-30, 00-22)

ATTACHMENT H
City of Fort Myers Comprehensive Plan Excerpts Related to Hazard Mitigation

CONSERVATION AND COASTAL ZONE MANAGEMENT ELEMENT

GOAL: Maintain, increase, and manage natural and coastal resources to preserve their quality and ability for use in the future while protecting human life and limiting public expenditures in areas subject to destruction by natural disasters.

OBJECTIVE 3: Maximize public accessibility to, and the use of natural resources without unacceptable adverse impact on them with appropriate development, public expenditures, and hazard mitigation planning.

Policy 3.4: Level of service requirements for all community facilities shall be the same in the coastal zone as in other areas with emphasis to maintain or reduce hurricane evacuation times.

Action 3.4.1: Priority should be given to community facility projects that complement the Southwest Florida Regional Planning Council Hurricane Evacuation Study, and maintain or improve hurricane evacuation times.

Policy 3.5: The City shall coordinate land uses and post disaster redevelopment with Interagency Hazard Mitigation Reports in the event of a natural disaster.

OBJECTIVE 9: Designate a coastal high hazard zone.

Policy 9.1: The City shall designate a coastal high hazard zone to include all parcels within the evacuation zone for a tropical storm and category 1 hurricane as established in the Southwest Florida Regional Planning Council Hurricane Evacuation Study of Southwest Florida, as demonstrated on map L-2.

Action 9.1.1: Limit public expenditures that subsidize development permitted in coastal high-hazard areas except for restoration or enhancement of natural resources.

Standard 9.1.1.1: Critical facilities including sewage treatment plants, electrical power plants, police and fire protection facilities, hospitals, housing for special needs groups (including elderly, physically and mentally handicapped, and any other at-risk needs group) and shelters shall be located outside the coastal high hazard zone.

Standard 9.1.1.2: Amend or maintain the Future Land Use Map to decrease or maintain permitted residential densities within the coastal high hazard zone outside the Downtown Redevelopment Area.

OBJECTIVE 10: Designate a hurricane vulnerability zone.

Policy 10.1: The City shall designate a hurricane vulnerability zone to include all parcels within the evacuation zone for a tropical storm and category 1, 2, and 3 hurricane as established in the Southwest Florida Regional Planning Council Hurricane Evacuation Study of Southwest Florida, as demonstrated on map L-3.

Action 10.1.1: All further public expenditures made for new facilities in the CHHZ will require a finding by the City Council that such expenditures are necessary to maintain required service levels, protect existing residents or to provide for recreation and open space needs.

Action 10.1.2: Public investments within the hurricane vulnerability zone shall be designed to withstand expected storm intensities as required by the Land Development Regulations (Standard Building Code reference).

Standard 10.1.2.1: Engineering designs should certify that facility designs will withstand category three hurricanes.

Action 10.1.3: when state funding is required for the relocation or replacement of infrastructure currently within the CHHZ, the capacity of the replacement structure will be limited to maintaining required service levels, protecting existing residents, and providing for recreation and open space needs.

Policy 10.2: Develop and maintain an interlocal agreement adopting provisions of Lee County Ordinance Number 95-14, between the City of Fort Myers and Lee County regarding managing recovery, reconstruction, and mitigation activities following a major or catastrophic disaster within the City of Fort Myers.

Policy 10.3: Participate in a private employer hurricane shelter development program with the Southwest Florida Regional Planning Council.

Action 10.3.1: Encourage employers outside a category 2 hurricane evacuation zone to develop a program of employee and family sheltering in the event of a hurricane.

Standard 10.3.1.1: The Police Department and Building and Zoning Department shall develop minimum building standards which employer buildings must meet to participate in the program.

Policy 10.4: Encourage the Lee County School Board to construct or rehabilitate schools that can be used for emergency shelter within hurricane evacuation zones 4 and 5.

Policy 10.5: All new residential development of more than fifty (50) and less than a hundred (100) dwelling units will be required to provide continuing information to residents concerning hurricane evacuation and shelters through a homeowners' or residents' association. To be submitted prior to building permit issuance

Policy 10.6: All new residential developments of more than one hundred (100) dwelling units will be required to formulate an emergency hurricane preparedness plan; this plan is subject to the approval of the Lee County Division of Public Safety and will be submitted prior to building permit issuance.

OBJECTIVE 12: The city will coordinate with the South Florida Water Management District in its review of Environmental Resource Permits for Development within the City. The South Florida Water Management District has adopted basin studies for various basins, including the Six Mile Cypress Basin. Development within any basin where a study has been adopted by the South Florida Water Management District must be consistent with the basin study.

Policy 12.1: The City shall coordinate with the South Florida Water Management District regarding appropriate setbacks and/or structural barriers from regionally significant wetlands. The setbacks and barriers shall be designed and required to prevent adverse impacts on water quality, wildlife habitat, and wetland function. The determination of the need, design, and appropriateness of the setback or structural barrier shall be done on a case-by-case basis.

FUTURE LAND USE ELEMENT

Policy 1.7: Consideration should be given to the design and construction of new schools to serve as hurricane evacuation and emergency shelters.

Action 1.7.1: Schools should not be permitted in Coastal High Hazard Zone.

Policy 5.2: pertains to the Downtown Redevelopment Area

Action 5.2.3: For the Downtown Redevelopment Area shown on Map E-2 (including the Coastal High Hazard Zone), until the City has completed its Evaluation and Appraisal Report and adopted strategies as set forth in this Action step, the City will not issue permits for development that will exceed the total of 10,187 residential units permitted under the Comprehensive Plan as of February 20, 2004. During the Evaluation and Appraisal Report, the City will include hurricane preparedness as a major issue and will analyze the impact its plan has had on maintaining or reducing clearance times and providing adequate shelter space. Based on the evaluation and appraisal report, the City will initiate appropriate strategies to improve hurricane preparedness. Potential strategies may include future land use map changes to reduce densities in targeted areas, working with the Lee County Emergency Management Office, Lee County, the MPO and FDOT to increase the capacity of evaluation routes through structural and non-structural improvements so that they meet recommended evacuation clearance times, and producing sufficient shelter space to meet the projected need. Once these strategies are adopted and implemented the City may consider further adjustments to the residential units in Action 5.2.2 and 5.2.3 to be permitted in the Downtown Area provided that the residential units cap does not exceed evacuation and shelter capacity. Any future increases in the residential units cap must be accomplished by amendment to the comprehensive plan.

Action 3.4.1: The Land Development Regulations shall be maintained to ensure that development adjacent to the River and its estuaries are consistent with other objectives, such as protection of water quality, environmental integrity, public access, hurricane contingency planning, and the availability of community facilities and services.

MUNICIPAL SERVICES ELEMENT

Surface Water Sub-element

GOAL: Minimize the hazardous and adverse effects of surface water and tidal surge flooding while maintaining the physical and environmental integrity of the City.

OBJECTIVE 1: Guide development in flood plains in a manner consistent with their natural functions, to minimize risks of property damage and loss of life.

Policy 1.1: The City of Fort Myers subscribes to the findings of the Lee County Disaster Preparedness Plan and maintains a City of Fort Myers Disaster Preparedness Plan consistent with the Lee County Disaster Preparedness Plan. The City of Fort Myers Disaster Preparedness Plan will be updated annually.

Policy 1.2: The City shall regulate development in floodplains and flood prone area, identified by the federal emergency management agency in its flood insurance study of the City of Fort Myers, dated October 17, 1984.

Action 1.2.1: Any structure erected or substantially improved (regardless of use) shall be built according to the flood hazard reduction standards, which may include: construction of structures by methods and practices that minimize flood damage; the regulation of materials used for construction; anchoring techniques to prevent flotation, collapse or lateral movement of the structure; and the regulation of construction to minimize the accumulation of flood waters.

Policy 2.3: Surface Water Management facilities will be maintained in a fully functioning condition.

Action 2.3.1: Storm sewers will be inspected every five years and maintained or cleaned as needed. Silt basins will be cleaned annually.

Action 2.3.2: All primary channels will be annually inspected and maintained, dredged, or cleaned as needed.

Action 2.3.3: Public Works will continue its periodic maintenance program for ditches.

Standard 2.3.3.1: Ditches shall be periodically deepened to a depth of 6" below culvert inverts, and re-sodded.

Policy 2.4: Present and future Right-of-Ways for surface water management will be protected from encroachment.

Action 2.4.2: Surface water management facilities, including drainage facilities and vegetated buffer zones shall not include parking facilities and shall be buffered from building development or other encroachment. Vegetated buffer zones shall not include more than twenty-five percent (25%) impervious surface. Drainage easements shall be dedicated when appropriate.

Policy 2.5: Surface Water Management systems will minimize pollutant loads of run-off as well as managing volume and hydroperiod.

Action 2.5.1: Surface Water Management regulations, consistent with South Florida Water Management District Rules and the Department of Environmental Protection Rules, will be incorporated into the City's development regulations.

Standard 2.5.1.1: Post-Development run-off shall not exceed pre-development run-off in rate or quantity, based on a twenty-five year, three-day storm event.

Standard 2.5.1.2: Run-off shall not be channeled directly into natural water bodies or primary channels, but shall be routed through swales, settling basins, surface skimmers, or other devices intended to improve water quality.

Standard 2.5.1.3: Natural watercourses will not be altered unless it can be shown that the watercourse's natural features and functions will be improved by said alterations.

Policy 2.6: Physical Improvements to land (e.g., roads, culverts, utilities, structures, etc.) shall be designed with consideration of Surface Water Management facilities.

Action 2.6.1: The development regulations of the City shall include this consideration.

Standard 2.6.1.1: No physical alteration may be made within an existing or future surface water management right-of-way which would be inconsistent with this plan or the Johnson Study.

Standard 2.6.1.2: Minimum road crown elevation for new or rebuilt roads must be at or above the flood elevation resulting from a 5-year, 24-hour storm on local streets.

Standard 2.6.1.3: The center two lanes of new or rebuilt roads must be at or above flood levels resulting from a ten year, three day storm on arterial and collector streets.

Standard 2.6.1.4: New or rebuilt structures crossing any primary channel will meet or exceed the specifications of the Johnson Study.

Policy 2.7: The City's Surface Water Management system will maintain adequate levels of service.

Standard 2.7.1.1: Water levels in primary channels will not be allowed over bank levels in a 25-year, 3-day storm event.

Standard 2.7.1.2: Water levels in minor channels will not be allowed over bank levels in a 25-year, 3-day storm event.

Standard 2.7.1.3: A primary channel is any drainage channel included in the Surface Water Management Plan and/or maintained by the City. A minor channel is any drainage channel

maintained in a drainage easement or as part of a development's on-site water management system.

Policy 2.8: The City will encourage centralized detention and joint recreational use of surface water management facilities.

Action 2.8.1: Off-site drainage communal facilities will be allowed provided all federal and state regulations are followed.

Action 2.8.2: The City's proposed drainage channel in the south Colonial basin will implement these concepts.

Sanitary Sewer Sub-element

OBJECTIVE 2: Increase the environmental acceptability of the overall impacts of the sanitary sewer system.

Policy 2.1: The Sanitary Sewer will be built in such a way as to minimize damage to the system and environmental damage in the event of a flood.

Action 2.1.1: Manholes in high hazard flood zones will be replaced with pre-cast manholes coated to eliminate deterioration as part of the sewer line replacement program.

Action 2.1.2: Maintain Pumping station in high hazard flood zones to be as safe in flood conditions as feasible.

PUBLIC SAFETY ELEMENT

OBJECTIVE 3: Minimize the threat to life and property caused by natural disasters.

Policy 3.1: The City shall adopt and maintain "The City of Fort Myers Emergency Plan" which is consistent with and promotes the use of The Lee County Disaster Preparedness Plan and additionally meets specific needs of the citizens of Fort Myers.

Action 3.2.2: Conduct annual City hurricane drills and reviews with City staff.

Policy 3.3: New developments and substantial improvements of any structure shall be required to be built or renovated in a manner which will: prevent flotation, collapse, or lateral movement of the structure; prevent or minimize flood damage; prevent water from entering or accumulating within the components of electrical heating, ventilation, plumbing, air conditioning, etc; eliminate infiltration of floodwaters into the sanitary sewer systems; and avoid impairment to on-site waste disposal systems.

Action 3.3.1: Maintain Land Development Regulations to include all provisions of the flood hazard protection ordinance.

Policy 3.4: The City shall participate in any County-sponsored Hurricane Shelter program for on-site shelters and for fee-in-lieu-of provisions for off-site shelter construction or retrofitting.

Policy 3.5: The City will investigate the possibility of obtaining Red Cross Certification for City-owned structures suitable for use as public shelters in a category three storm.

Policy 3.6: The City shall coordinate with the Lee County Division of Emergency Management to minimize the City's evacuation times.

Action 3.6.1: The City shall give critical roadway links causing congestion on evacuation routes for Category 1 through 3 hurricanes high priority for capital improvement expenditures.

Policy 3.7: The City shall coordinate population densities in the Coastal Area with the Southwest Florida Regional Planning Council Hurricane Evacuation Study and the concurrent provision of infrastructure to serve the densities.

Action 3.7.1: The Future Land Use Map shall not locate high density residential districts in the Coastal Zone unless adequate evacuation facilities are in close proximity and appropriate community facilities are available.

TRANSPORTATION ELEMENT

Action 2.3.1: The City will include road construction costs within its five-year Capital Improvements Plan.

Standard 2.3.1.1: (in part) In ranking projects for inclusion in the capital improvements program, the following factors will be considered:

- (f) Network Importance, based on Functional Classification and Hurricane Evacuation;