

Integrating Hazard Mitigation into Comprehensive Planning

Palm Beach County Profile

Florida Department of Community Affairs

Executive Summary

The experiences of the 2005 hurricane season epitomize the importance of better integrating hazard mitigation activities into local comprehensive planning. In the fall of 2005, residents all over the state experienced significant damages from Hurricanes Dennis, Katrina, Rita, and Wilma as a result of winds, tornadoes, surge, and/or flooding. But these were not the only times we have experienced natural disasters, nor will they be the last. In 1992, Hurricane Andrew devastated South Florida. In 1998 and 1999, most counties in Florida experienced wildfires. In some cases, despite firefighters' best efforts, 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 Palm Beach County Profile has been prepared as part of a statewide effort by the Florida Department of Community Affairs to guide local governments in integrating hazard mitigation principles into local Comprehensive Plans. Information provided in this profile will enable planners to (1) convey Palm Beach 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 be better integrated into the Comprehensive Plan; and (4) determine if any enhancements could be made to the Palm Beach County Unified Local Mitigation Strategy (LMS) to better support comprehensive planning. Best available statewide level data are provided to convey exposure and risk as well as illustrate the vulnerability assessment component of the integration process.

In this profile, we present an argument for why hazard mitigation needs to be a part of comprehensive planning through an examination of population growth, the hazards that put the County at risk, the special needs population and structures that could be affected by these hazards, and the distribution of existing and future land uses in different hazard areas. We hope that this analysis will serve as an example of the issues each jurisdiction should consider as they update their plans to include hazard mitigation. The profile also contains a review of the LMS and the Comprehensive Plan. Based on the analysis and review, we were able to develop specific options for the County on how to incorporate more hazard mitigation into the Comprehensive Plan and how to enhance the LMS so that it is also a better tool for local planners.

During our review, we found that Palm Beach County had many strengths regarding hazard mitigation in both its LMS and Comprehensive Plan, and these are outlined in the profile. There are always ways to further strengthen such plans, however, and the following is a summary of some of the options that would enable the County to do so.

PALM BEACH COUNTY GENERAL RECOMMENDATIONS

- The County can include a Comprehensive Plan policy that establishes an evacuation clearance time level of service (LOS). Currently, evacuation clearance times for Category 3, 4, and 5 hurricanes are 15.25 hours, as shown in **Table 2.2** of this report. As development is likely to continue to occur in Palm Beach County, evacuation route demand will increase. An evacuation clearance time level of service could act as a quantitative benchmark with which the County could use to ensure evacuation route capacity is met through land development regulations, a schedule of evacuation route improvements, or any mechanism the County can employ to reach the LOS.

- In conjunction with the above recommendation, the LMS could include a goal or an objective that aims to maintain or improve hurricane evacuation times in coordination with the MPO and with neighboring jurisdictions, much like the policies found in the Comprehensive Plan. Evacuation route demand will increase with development and maintaining capacity may be an ongoing challenge for the County and local municipalities. Having a goal in the LMS can keep this challenge in the forefront of mitigation activities. Evacuation route capacity and clearance times are regional concerns and apply to all jurisdictions in the County, much like the other existing goals in the LMS.
- The Comprehensive Plan and the LMS can include goals or policies that aim to meet shelter demand in accordance with the State Shelter Plan. As suggested in this report, the regional population is likely to increase and shelter demand will rise. Creating a policy in the Comprehensive Plan to meet existing and future shelter demand may help to ensure the safety of residents in the event of a hurricane.
- The County can include policies in the LMS and the Comprehensive Plan that promote ongoing dissemination of hazard mitigation and emergency preparedness information to the public and to local government employees. While the LMS discusses existing programs and initiatives that educate citizens and government officials on natural hazards and emergency preparedness, policies in the LMS and the Comprehensive Plan could ensure that education is a part of the long-term hazard mitigation strategy and information will be available to existing as well as future residents. Also, ensuring the training of public officials including engineers, building inspectors, and site plan reviewers on the hazards associated with natural disasters can continue to help the County take mitigative actions before development occurs.
- This analysis, as well as LMS Section 3.2.1.4, shows that wildfire areas are located adjacent to residential neighborhoods and that future development is likely to occur in wildfire susceptible areas. The County could explore incorporating mitigative measures into the Comprehensive Plan to reduce wildfire risk including that suggested in the LMS: "clearing of vacant lots, periodic removal of accumulated leaf litter, maintained fire breaks, and controlled burns in the undeveloped or rangeland areas of the county are the best mitigative measures that can be applied for this hazard (Palm Beach County, 2004)."
- The County can update existing Comprehensive Plan goals or objectives that protect natural resources to include hazard mitigation as a benefit. The County has many existing policies that mitigate the impacts of hazards but that purpose isn't mentioned. Current growth management techniques such as land conservation, buffering, and the clustering of development protect and conserve natural resources but also provide the major benefit of protecting development from natural disasters.
- The County can include a Comprehensive Plan policy and an LMS objective that aim to retrofit or relocate public structures in hazard areas. Policies can ensure that public and private structures with deficiencies are retrofitted to warrant structural integrity, or be relocated out of hazard areas to maintain the continuance of county services after a natural disaster.
- The County can include a Comprehensive Plan policy that aims to reduce the number of repetitive loss properties in the County, much like Goal 3 of the LMS. Including a policy in the Comprehensive Plan can reinforce the County's commitment to reducing repetitive loss structures and reduce the costs associated with natural disasters in the future.
- Since the LMS applies to all jurisdictions in Palm Beach County, a goal to limit populations within the CHHA could potentially reduce the number of people and the amount of property at risk from coastal hazards. The Palm Beach County Comprehensive

Plan has an objective and several policies that aim to limit densities within the CHHA. By including such a goal in the LMS, a more unified countywide hazard mitigation may be achieved.

- The County can encourage safe rooms outside of flood zones and in structures able to withstand 130 mph winds. The promotion of safe rooms in new structures outside hazard zones may provide a safe alternative to evacuation shelters and reduce the number of evacuees in the event of an emergency.
- The County can include an LMS evaluation of historic sites and structures. Current Comprehensive Plan policies support conservation, protection, and enhancement of natural and historic resources through the ULDC. A proactive approach to protecting historic structures from natural hazards may include the inspection of structures to identify needed enhancements that could help a building withstand the effects of a hurricane or a flood. Also, an inventory of historical sites and historical structures could be added to the HIVA section of the LMS in order to analyze the potential risks to these resources. Mitigation initiatives that address historic needs could be added to the LMS.
- Currently, there are no policies that directly address wildfire in the Comprehensive Plan. As more development is likely to occur in Palm Beach County, it may encroach on wildfire prone lands, as shown on the maps in **Appendix C**. The County could add policies in the Comprehensive Plan that address this hazard prior to development. The County could explore hazard mitigation resources provided by the Florida Division of Forestry and develop a relationship to use their services to carry out a prescribed burning program. The County can create an educational program that provides information about wildfire mitigation strategies and Firewise Communities to the public. Finally, the County could explore the adoption of a firewise building code that may reduce wildfire risk to structures and persons.

As part of this study, a similar analysis to that of the County profile was completed for a statewide sample of 14 Florida municipalities, including Riviera Beach in Palm Beach County. Some options for the integration of hazard mitigation into the City's comprehensive plan are as follows:

RIVIERA BEACH GENERAL RECOMMENDATIONS

- The City can create a Comprehensive Plan policy that promotes educational programs to inform the public and city officials about hazard mitigation techniques. Currently, Public School Facilities Element Policy 2.2g supports “enhancing public awareness of evacuation zones, shelter locations and evacuations routes,” but does not address flood hazards, mitigation homeowners can do, programs to aid in the retrofit of private structures, or the training of public officials. Including a policy that expands educational programs for the public may help ensure citizens receive adequate information to protect themselves and their property prior to a natural disaster. Also, a policy that promotes the education of public officials (including site plan reviewers, city engineers, public works officials, and building inspectors) in hazard mitigation matters may help the city address hazard mitigation issues prior to development as well as provide insight to the strengths and weaknesses of the City’s current strategy.
- The Comprehensive Plan can include a policy that aims to meet shelter demand in accordance with the State Shelter Plan and in cooperation with Palm Beach County Emergency Management. As the city redevelops and population increases in the Category 1 evacuation zone, creating a policy in the Comprehensive Plan to provide shelter space for existing and future demand as development occurs, may help ensure the safety of residents in the event of a hurricane. These efforts should be in conjunction

with a regional effort to meet existing and future shelter demand, since the city may not be able to safely shelter all residents within its boundaries.

- The City can update existing Comprehensive Plan polices that protect natural resources to include hazard mitigation as a benefit. There are many policies that mitigate the impacts of hazards involving natural resources. These policies do not identify hazard mitigation as a benefit to these efforts. Policies that aim to restore and protect natural resources such as beaches and dunes, native vegetation, wetlands, and barrier islands also preserve their natural functions that buffer and absorb the impacts of waves and flood waters. Adding language into these policies can help ensure hazard mitigation remains at the forefront of City policy.
- In conjunction with Coastal Management Element Policy 2.4.3 that enforces city code and regulations that provide for hazard mitigation, the City can incorporate a program to promote the retrofit or relocation of substandard structures and repetitive loss structures. There are many policies that focus on the redevelopment of the city and the removal of substandard structures. Instituting a program to rehabilitate housing focused on structural measures that mitigate natural hazards, particularly for low income housing, may help ensure an adequate supply of safe dwelling units. Also the City could explore the use of an acquisition program to relocate the housing supply outside of high-risk hazard areas.
- Currently, Future Land Use Element Objective 1.7 shows that the City employs “innovative land development regulations and zoning districts”. The subsequent policies mention the use of crime preventive design, the intensity of land uses that allow timeshare development, and the promotion of PUD districts. The City could also explore other techniques such as the clustering of development away from hazard areas as shown in the attached maps. Transfer of Development Rights or Purchase of Development Rights could also be used to promote development away from hazard areas and concentrate development and redevelopment in areas with existing infrastructure including evacuation routes and stormwater facilities.

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1. County Overview

Geography and Jurisdictions

Palm Beach County is located along the eastern coast of South Florida. It covers a total of 1,974 square miles with an average population density of 573 people per square mile (U.S. Census, 2000).

There are 37 incorporated municipalities within the County, and these are listed in **Table 1.1**.



Population and Demographics

Official 2004 population estimates for all jurisdictions within Palm Beach County as well as the percent change in population from the 2000 U.S. Census are presented in **Table 1.1**. The most current estimated countywide population of Palm Beach County is 1,242,270 people (University of Florida, Bureau of Economic and Business Research, 2004). The most populated city in Palm Beach County is West Palm Beach with an estimated population of 97,708 residents. Still, 44.9% of the countywide population lives in the unincorporated portion of the County. Between 1990 and 2000, Palm Beach County as a whole had a growth rate of 31.0%, which was greater than the statewide growth rate of 23.5% in those 10 years.

Table 1.1 Population Estimates by Jurisdiction

Jurisdiction	Population, Census 2000	Population Estimate, 2004	% Change, 2000-2004	% of Total Population (2004)
Unincorporated	521,447	557,228	6.9%	44.9%
Atlantis	2,005	2,151	7.3%	0.2%
Belle Glade	14,906	14,956	0.3%	1.2%
Boca Raton	74,764	79,838	6.8%	6.4%
Boynton Beach	60,389	65,208	8.0%	5.2%
Briny Breezes	411	412	0.2%	0.0%
Cloud Lake	167	170	1.8%	0.0%
Delray Beach	60,020	63,439	5.7%	5.1%
Glen Ridge	276	276	0.0%	0.0%
Golf Village	230	228	-0.9%	0.0%
Greenacres City	27,569	30,533	10.8%	2.5%
Gulf Stream	716	717	0.1%	0.1%
Haverhill	1,454	1,516	4.3%	0.1%
Highland Beach	3,775	4,019	6.5%	0.3%
Hypoluxo	2,015	2,472	22.7%	0.2%
Juno Beach	3,262	3,591	10.1%	0.3%
Jupiter	39,328	46,072	17.1%	3.7%
Jupiter Inlet Colony	368	378	2.7%	0.0%
Lake Clarke Shores	3,451	3,473	0.6%	0.3%
Lake Park	8,721	9,105	4.4%	0.7%
Lake Worth	35,133	35,574	1.3%	2.9%
Lantana	9,404	9,526	1.3%	0.8%
Manalapan	321	339	5.6%	0.0%
Mangonia Park	1,283	2,519	96.3%	0.2%
North Palm Beach	12,064	12,535	3.9%	1.0%

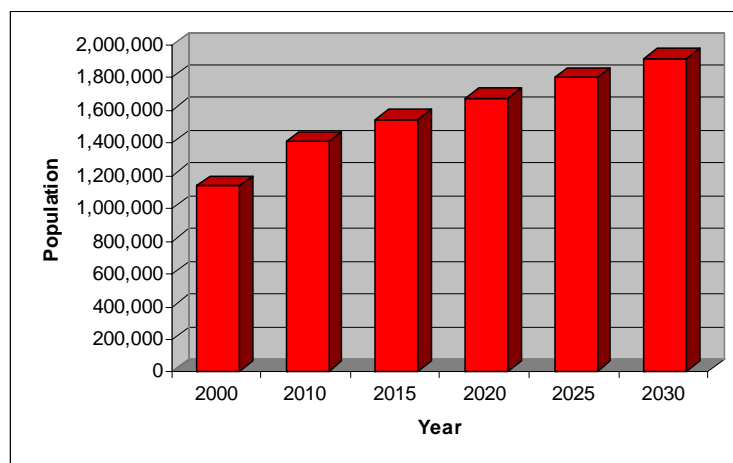
Table 1.1 Population Estimates by Jurisdiction

Jurisdiction	Population, Census 2000	Population Estimate, 2004	% Change, 2000-2004	% of Total Population (2004)
Ocean Ridge	1,636	1,657	1.3%	0.1%
Pahokee	5,985	6,240	4.3%	0.5%
Palm Beach	9,676	9,662	-0.1%	0.8%
Palm Beach Gardens	35,058	42,384	20.9%	3.4%
Palm Beach Shores	1,269	1,474	16.2%	0.1%
Palm Springs	11,699	13,853	18.4%	1.1%
Riviera Beach	29,884	32,916	10.1%	2.6%
Royal Palm Beach	21,523	29,261	36.0%	2.4%
South Bay	3,859	4,079	5.7%	0.3%
South Palm Beach	1,531	1,531	0.0%	0.1%
Tequesta Village	5,273	5,648	7.1%	0.5%
Wellington	38,216	49,582	29.7%	4.0%
West Palm Beach	82,103	97,708	19.0%	7.9%
Countywide Total	1,131,191	1,242,270	9.8%	100.0%

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

According to the University of Florida, Bureau of Economic and Business Research (2004), Palm Beach County’s population is projected to grow considerably over the next 25 years, reaching 1,908,500 people by the year 2030. **Figure 1.1** illustrates medium population projections for Palm Beach County based on 2004 calculations.

Figure 1.1 Medium Population Projections for Palm Beach County, 2010-2030



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

Of particular concern within Palm Beach County’s population are those persons with special needs and/or limited resources such as the elderly, disabled, low-income, or language-isolated residents. According to the 2000 U.S. Census, 23.2% of Palm Beach County residents are listed as 65 years old or over, 19.8% are listed as having a disability, 9.9% are listed as below poverty, and 21.7% live in a home with a primary language other than English.

2. Hazard Vulnerability

Hazards Identification

The following are natural hazards that pose a risk for the County as identified in the County's Local Mitigation Strategy (LMS): hurricane/tropical storm, flooding, severe thunderstorm/lightning, wildfire, muck fire, tornado, extreme temperatures, soil collapse and beach erosion, agricultural pest and disease, drought, epidemic, and seismic hazards. These hazards are analyzed in Section 3.2 of the LMS. Also, Appendix A of the LMS lists specific hazards for the county and each jurisdiction, and incorporates a risk, exposure, vulnerability, and frequency rating into the analysis. The LMS states flooding and hurricanes as high-risk threats, wildfire as a moderate threat, and soil erosion as a low threat. (Palm Beach County, 2004)

Section 3 of the LMS includes a list of historical flooding and hurricane/tropical storm events. It states that in 2002, the county received 37 consecutive days of rain causing Lake Okeechobee to rise 13.57 feet. Luckily, flooding was localized due to a previous dry season. The recent 2004 and 2005 hurricane seasons had major impacts on Palm Beach County. (Palm Beach County, 2004)

Hazards Analysis

The following analysis looks at four major hazard types: hurricanes and tropical storms (specifically surge), flooding, sinkholes, and wildfire. All of the information in this section, except the evacuation and shelter estimates, 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 DMA2K revision project. It was created by Kinetic Analysis Corporation under contract with the Florida Department of Community Affairs (FDCA). Estimated exposure values were determined using the Category 3 Maxima Scenario for storm surge, the Federal Emergency Management Agency's (FEMA's) designated 100-year flood zones (A, AE, V, VE, AO, 100 IC, IN, AH), levels of concern 5 through 9 for wildfire and high through adjacent risk zones for sinkholes. Storm surge exposure data are 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>) or your countywide LMS.

Existing Population at Risk

Table 2.1 presents the estimated countywide population at risk from hazards, as well as a breakdown of the sensitive needs populations at risk. The largest risks for Palm Beach County's residents are flooding and surge, with 176,178 and 54,204 people at risk respectively. While this is a large number of people at risk and should be a major concern for the County, those at risk from flooding only account for 15.6% of the countywide population while surge is only 4.8% of the population. Flooding in Palm Beach County is likely to affect more persons with special needs than sinkholes, wildfires, and storm surge combined. There are 53,775 people over the age of 65 and 65,526 people with a disability that live within the 100-year floodplain in the county. Many of these residents may need special-needs sheltering in the event of a hurricane or flood event.

While those at risk from sinkholes and wildfire are a very small percentage of the population, attention still must be paid to those areas susceptible to these hazards. There are 1,683 people living in a high to adjacent risk zone for sinkholes and 8,996 people living within a medium to high risk zone for wildfire. **Table 2.1** also shows that there are 5,145 people with disabilities living within an area susceptible to wildfire. Some of these people may be much more vulnerable since a quick evacuation may be more difficult for them in the event of a wildfire moving toward their neighborhood.

Table 2.1 Estimated Number of Persons at Risk from Selected Hazards

Population	Flood	Sinkhole (high-adjacent risk)	Wildfire (medium-high risk)	Surge
Minority	25,146	49	752	4,571
Over 65	53,775	737	1,486	18,652
Disabled	65,526	615	5,145	18,807
Poverty	13,484	154	1,046	3,936
Language Isolated	8,487	0	82	6,420
Single Parent	9,760	128	485	1,818
Countywide Total	176,178	1,683	8,996	54,204

Source: Florida Department of Community Affairs, 2005a.

Evacuation and Shelters

As discussed in the previous sections, population growth in Palm Beach County has been rapid, and this trend is projected to continue. As the population increases in the future, the demand for shelter space and the length of time it takes to evacuate the County is only going to increase. Currently, evacuation clearance times for Palm Beach County are estimated to be 15.25 hours for Category 3, 4, and 5 hurricanes, as shown in **Table 2.2**. These data were derived from 11 regional Hurricane Evacuation Studies that have been produced by FEMA, the U.S. Army Corps of Engineers, and Florida Regional Planning Councils. The study dates range from 1995 to 2004 and are updated on a rotating basis. According to Rule 9J-5, counties must maintain or reduce hurricane evacuation times. Some experts have suggested that counties should try to achieve 12 hours or less clearance time for a Category 3 hurricane. This is due to the limited amount of time between the National Hurricane Center issuing a hurricane warning and when the tropical storm-force winds make landfall. Palm Beach County has already exceeded this recommendation and with continued growth, it will be difficult to maintain this evacuation time. Additionally, storm events requiring evacuation typically impact larger areas, often forcing multiple counties to issue evacuation orders and placing a greater number of evacuees on the major roadways, further hindering evacuation progress. Thus, it is important to not only consider evacuation times for Palm Beach County, but also for other counties in the region as shown in **Table 2.2**. Since a major evacuation route for this region is Interstate 95, most of the evacuees from Monroe, Miami-Dade, and Broward will be traveling north through Palm Beach County if there is a hurricane headed for Southeast Florida. This makes evacuation for Palm Beach County residents much more complicated.

Table 2.2 County Evacuation Clearance Times in Hours (High Tourist Occupancy, Medium Response)

County	Hurricane Category				
	1	2	3	4	5
Broward	10.75	10.75	13.75	13.75	13.75
Miami-Dade	14	17.5	17.5	17.5	17.5
Monroe	18	18	36	36	36
Palm Beach	10.25	10.25	15.25	15.25	15.25

Note: Best available data as of 7/05

Source: State of Florida, 2005

(some counties may be in the process of determining new clearance times)

Coupled with evacuation is the need to provide shelters. If adequate space can be provided in safe shelters for Palm Beach County residents, then this could be a partial solution to the ever-

increasing clearance times for evacuation. Currently, the State Shelter Plan reports that there is space for 38,065 people in the County’s shelters, and there are 3,949 more people that will need sheltering in the case of a Category 5 hurricane. It is projected that by 2009 the deficit will increase to 10,266 people in need of space (FDCA, 2004). The County will need to address this deficiency but might also try to decrease the demand for public shelters by encouraging new homes to be built with safe rooms if they are outside of flood and surge zones. Residents who are further inland in the County and not in a flood zone could shelter in place if they had a safe room that could withstand hurricane-force winds. Safe rooms could at least be a last option for residents who cannot evacuate in time, especially in the case of a tornado.

Existing Built Environment

While the concern for human life is always of utmost importance in preparing for a natural disaster, there also are large 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 recover from a disaster. **Table 2.3** presents estimates of the number of buildings in Palm Beach County by structure type that are at risk from each of the four hazards being analyzed.

As with the population at risk, flooding by far puts the most structures at risk as well. **Table 2.3** shows that there are more structures in the 100-year floodplain, 245,104, than those at risk from sinkhole hazards, wildfire, and storm surge combined. Of these structures in the floodplain, 234,113, or 95.5%, are residential structures. There are also 40,437 structures at risk from storm surge, 67.4% of which are multi-family homes, most likely high-priced ocean condominiums..

Table 2.3 also shows that there are 11,945 structures within medium to high wildfire risk zones and 931 structures susceptible to sinkholes. Of the structures at risk from wildfire, 68% are single-family homes or mobile homes since this type of development is typically found in the wildland-urban interface zone where sprawl meets undeveloped, forested tracks. Low-density development usually associated with these risk zones is more vulnerable since there is often enough wildfire fuel surrounding these homes to allow a wildfire to spread into a neighborhood. Of the 931 structures potentially at risk from sinkholes, 66.8% are multi-family homes possibly making an economic impact if a sinkhole should make one of these structures unstable.

Table 2.3 Estimated Number of Structures at Risk from Selected Hazards

Structure Type	Flood	Sinkhole (high-adjacent risk)	Wildfire (medium-high risk)	Surge
Single-Family Homes	73,900	276	5,006	10,998
Mobile Homes	88,267	0	3,117	137
Multi-Family Homes	71,946	622	2,531	27,266
Commercial	6,964	29	1,119	1,489
Agriculture	2,552	4	171	136
Gov./Institutional	1,475	0	1	411
Total	245,104	931	11,945	40,437

Source: Florida Department of Community Affairs, 2005a.

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 not only the people and property in a hazard area, but also the probability of occurrence that is necessary to understand the impacts to people and property. 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 in considering where to implement risk reducing comprehensive planning measures.

Analysis of Current and Future Vulnerability

The previous hazards analysis section discussed population and existing structures at risk from flooding, sinkholes, wildfire, and surge according to MEMPHIS estimates. This section demonstrates the County's vulnerability to these hazards spatially and in relation to existing and future land uses. The following maps and tabulations of existing land use within hazard areas are based on the 2004 Palm Beach County Property Appraiser's Office / Florida Department of Revenue data and the 1995 Florida Department of Environmental Protection and South Florida Water Management District shapefiles. Maps and tabulations of future land uses in hazard areas were developed using the Palm Beach County future land use map obtained May 2004.

In **Attachment A**, four maps show the existing and future land uses within the coastal hazard zone (Category 1 storm surge zone) and the hurricane vulnerability zone (Category 1 evacuation zone). Only a limited amount of unincorporated acreage falls within the coastal hazard zone (CHZ) since nearly all of the land along the coast in Palm Beach County is urban and incorporated into one of the numerous municipalities within the County. The hurricane vulnerability zone (HVZ) extends a little farther inland in the northern part of the county to land on either side of the Intracoastal Waterway. For both the CHZ and HVZ, the largest existing land use in these zones is single-family residential making up 46.7% and 49.8% respectively of the total unincorporated acres within these zones (**Table 2.4**). This means that there are currently many homes within surge and Category 1 evacuation zones even in the unincorporated County. A majority of the rest of the acreage in these zones, however, is either used for parks, conservation, and golf courses or has not yet been developed. The County has done a good job to prevent development on some of this valuable property and hopefully can continue to limit densities in these hazardous coastal areas. In **Table 2.5**, the largest designated future use of currently undeveloped lands in the CHZ and HVZ is residential. While ideally it would be best if no new homes were built in these zones, the County has limited densities by designating a majority of the undeveloped portions as only 2 or 3 dwelling units per acre.

In **Attachment B**, two maps present the existing and future land uses within the 100-year floodplain. There are several large swaths of flood-prone land in the interior of the County where the natural drainage has not been altered. These large areas are almost entirely conservation lands. Other smaller flood-prone areas are found throughout the urban areas of the County, mostly along the Intracoastal Waterway and other water bodies. **Table 2.4** shows that of the 267,753 acres within a flood zone, 86.4% are currently used for parks, conservation areas, and golf courses. Of the 6,292 vacant acres within a flood zone, 91.4% of these lands are designated for residential use on the Future Land Use Map. While a majority of these acres are designated for rural or low-density residential, 654 acres are set aside for up to 8 dwelling units per acre. Development regulations for new development in flood-prone areas should keep these new structures from being vulnerable, however, the more development that occurs in the floodplain, the more the natural drainage of the land is altered. Often, piecemeal hydrology alterations can create new flood areas as more storm water is forced into limited drainage pathways.

In **Attachment C**, maps present the land uses associated with high-risk wildfire zones. Most of the areas susceptible to wildfire are scattered in the interior of the County, north of Wellington. **Table 2.4** indicates that there are 49,390 acres within a wildfire susceptible area in Palm Beach County. Forty-five percent of the wildfire hazard areas are currently used for parks and conservation, while another 16.4% are vacant. While the lack of development in a majority of the risk area is good, there is still 21.2%, or 10,762 acres, in single-family residential use. Residential development is also located adjacent to many of these wildfire hazard areas. **Table 2.5** shows that 70.2% of the 8,091 undeveloped acres susceptible to wildfire are designated for future rural residential use and another 14% of those acres are designated for low-density residential. Large-

lot residential development is the most at risk since these homes typically are surrounded by wooded lots and often do not have enough defensible space to stop a wildfire from spreading throughout the neighborhood.

Attachment D includes maps of potential sinkhole areas in the County. The presence of potential sinkhole areas is limited in Palm Beach County with only one area near Boca Raton next to the Turnpike and Glades Road. Only 648 acres are within the hazard area. Currently 34.3% are used for agriculture, 18.7% are commercial, and 14.4% are vacant. Of the 93 vacant acres, all are designated for future residential use. Before development occurs, the property owners should be notified of the possible risk so that they can choose to have their land tested since it is such a limited area of concern.

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	Potential Sinkhole Areas
Agriculture	Acres	2.7	4.5	16,297.3	3,191.0	222.0
	%	0.1	0.2	6.1	6.5	34.3
Attractions, Stadiums, Lodging	Acres	0.2	0.0	3.6	597.2	0.0
	%	0.0	0.0	0.0	1.2	0.0
Places of Worship	Acres	15.8	23.2	182.8	20.3	4.0
	%	0.9	1.0	0.1	0.0	0.6
Commercial	Acres	25.6	45.0	400.8	19.2	121.3
	%	1.4	2.0	0.1	0.0	18.7
Government, Institutional, Hospitals, Education	Acres	83.6	103.4	4,396.0	1,934.6	49.5
	%	4.6	4.6	1.6	3.9	7.6
Industrial	Acres	0.0	0.0	292.3	2,089.3	1.3
	%	0.0	0.0	0.1	4.2	0.2
Parks, Conservation Areas, Golf Courses	Acres	267.7	303.4	231,288.1	22,233.5	4.7
	%	14.8	13.6	86.4	45.0	0.7
Residential Group Quarters, Nursing Homes	Acres	0.0	0.0	124.2	2.7	6.2
	%	0.0	0.0	0.0	0.0	1.0
Residential Multi-Family	Acres	99.2	124.0	1,742.2	154.3	52.8
	%	5.5	5.5	0.7	0.3	8.1
Residential Mobile Home, or Commercial Parking Lot	Acres	0.0	0.0	388.1	129.1	0.0
	%	0.0	0.0	0.1	0.3	0.0
Residential Single-Family	Acres	845.1	1,113.1	5,253.1	10,475.9	63.3
	%	46.7	49.8	2.0	21.2	9.8
Submerged Lands (Water Bodies)	Acres	11.8	7.8	795.6	246.8	18.5
	%	0.7	0.3	0.3	0.5	2.9
Transportation, Communication, Rights-of-Way	Acres	12.3	10.9	163.4	57.3	6.7
	%	0.7	0.5	0.1	0.1	1.0
Utility Plants and Lines, Solid Waste Disposal	Acres	0.0	0.9	133.1	148.5	4.5
	%	0.0	0.0	0.0	0.3	0.7
Vacant	Acres	446.5	498.7	6,292.0	8,090.6	93.2
	%	24.7	22.3	2.3	16.4	14.4
Total Acres	Acres	1,810.5	2,234.9	267,752.6	49,390.3	648.0
	%	100.0	100.0	100.0	100.0	100.0

Table 2.5 Total and Undeveloped Acres in Hazard Areas by Future Land Use Category for the Unincorporated County

Future Land Use Category		Coastal Hazard Zone		Hurricane Vulnerability Zone		Flood Zones		Wildfire Susceptible Areas		Potential Sinkhole Areas	
		Total	Undev.	Total	Undev.	Total	Undev.	Total	Undev.	Total	Undev.
Agricultural Production	Acres	0.0	0.0	0.0	0.0	0.0	0.0	3,164.3	445.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	6.4	5.5	0.0	0.0
Agricultural Reserve	Acres	0.0	0.0	0.0	0.0	0.0	0.0	47.9	0.9	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Agricultural Production	Acres	0.0	0.0	0.0	0.0	15,104.0	84.3	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	5.6	1.3	0.0	0.0	0.0	0.0
Agricultural Reserve	Acres	0.0	0.0	0.0	0.0	2,226.6	20.5	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.8	0.3	0.0	0.0	0.0	0.0
Commercial	Acres	0.0	0.0	0.0	0.0	0.0	0.0	169.4	25.6	140.2	10.3
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	21.6	11.1
Commercial High	Acres	0.0	0.0	0.0	0.0	18.3	6.9	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Commercial High Office, with an Underlying HR-8	Acres	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial High Office, with an Underlying MR-5	Acres	0.0	0.0	0.0	0.0	0.9	0.9	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial High, with Cross-Hatching	Acres	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial High, with Cross-Hatching, with an underlying HR-8	Acres	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial High, with Cross-Hatching, with an underlying MR-5	Acres	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial High, with an Underlying HR-12	Acres	0.0	0.0	0.0	0.0	2.9	0.7	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial High, with an Underlying HR-8	Acres	4.7	0.0	6.7	0.0	218.5	34.3	0.0	0.0	0.0	0.0
	%	0.3	0.0	0.3	0.0	0.1	0.5	0.0	0.0	0.0	0.0
Commercial High, with an Underlying Industrial	Acres	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial High, with an Underlying LR-3	Acres	0.0	0.0	0.0	0.0	30.8	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial High, with an Underlying MR-5	Acres	4.7	0.7	5.1	1.6	83.8	0.2	0.0	0.0	0.0	0.0
	%	0.3	0.2	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Low Office, with an Underlying MR-5	Acres	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Low with Cross-Hatching	Acres	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Low, with an Underlying HR-8	Acres	0.0	0.0	0.0	0.0	4.5	1.8	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Low, with an Underlying LR-3	Acres	0.0	0.0	0.0	0.0	11.1	1.8	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 2.5 Total and Undeveloped Acres in Hazard Areas by Future Land Use Category for the Unincorporated County

Future Land Use Category		Coastal Hazard Zone		Hurricane Vulnerability Zone		Flood Zones		Wildfire Susceptible Areas		Potential Sinkhole Areas	
		Total	Undev.	Total	Undev.	Total	Undev.	Total	Undev.	Total	Undev.
Commercial Low, with an Underlying MR-5	Acres	0.0	0.0	0.0	0.0	8.9	2.2	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Low, with an Underlying RR-10	Acres	0.0	0.0	0.0	0.0	5.8	3.8	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Commercial Recreation, with an Underlying HR-8	Acres	0.0	0.0	0.0	0.0	45.9	17.6	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Commercial Recreation, with an Underlying LR-2	Acres	0.0	0.0	0.4	0.2	1.8	1.8	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Recreation, with an Underlying MR-5	Acres	0.0	0.0	0.0	0.0	200.9	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Commercial Recreation, with an Underlying RR-10	Acres	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial, with an Underlying HR-8	Acres	0.0	0.0	0.0	0.0	11.6	3.3	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Commercial, with an Underlying Ind	Acres	0.0	0.0	0.0	0.0	2.2	0.2	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial, with an Underlying LR-3	Acres	0.0	0.0	0.0	0.0	17.6	6.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Commercial, with an Underlying MR-5	Acres	0.0	0.0	0.0	0.0	3.3	0.9	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Conservation	Acres	0.0	0.0	0.0	0.0	216,109.5	0.0	14,982.2	100.1	0.0	0.0
	%	0.0	0.0	0.0	0.0	80.7	0.0	30.3	1.2	0.0	0.0
Economic Development Center	Acres	0.0	0.0	0.0	0.0	17.6	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
High Residential, 12 Units per Acre	Acres	0.2	0.2	4.0	1.3	325.7	72.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.2	0.3	0.1	1.1	0.0	0.0	0.0	0.0
High Residential, 18 Units per Acre	Acres	0.0	0.0	0.0	0.0	86.7	15.6	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
High Residential, 8 Units per Acre	Acres	6.0	0.2	4.5	0.2	2,920.8	653.6	0.0	0.0	0.0	0.0
	%	0.3	0.0	0.2	0.0	1.1	10.4	0.0	0.0	0.0	0.0
Industrial	Acres	10.0	0.7	11.8	1.1	276.2	18.9	2,741.1	156.7	0.0	0.0
	%	0.6	0.2	0.5	0.2	0.1	0.3	5.5	1.9	0.0	0.0
Industrial, with an Underlying MR-5	Acres	0.0	0.0	0.0	0.0	187.9	71.3	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.1	1.1	0.0	0.0	0.0	0.0
Institutional	Acres	0.0	0.0	0.0	0.0	0.0	0.0	274.9	60.9	16.3	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.8	2.5	0.0
Institutional,	Acres	7.4	0.0	8.5	0.0	307.0	7.6	0.0	0.0	0.0	0.0
	%	0.4	0.0	0.4	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Institutional, with an Underlying LR-1	Acres	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lake Okeechobee	Acres	0.0	0.0	0.0	0.0	249.7	0.0	30.8	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0

Table 2.5 Total and Undeveloped Acres in Hazard Areas by Future Land Use Category for the Unincorporated County

Future Land Use Category		Coastal Hazard Zone		Hurricane Vulnerability Zone		Flood Zones		Wildfire Susceptible Areas		Potential Sinkhole Areas	
		Total	Undev.	Total	Undev.	Total	Undev.	Total	Undev.	Total	Undev.
Low Residential, 1 Unit per Acre	Acres	175.2	30.3	249.9	38.3	2,120.5	688.9	0.0	0.0	0.0	0.0
	%	9.7	6.8	11.2	7.7	0.8	10.9	0.0	0.0	0.0	0.0
Low Residential, 2 Units per Acre	Acres	736.1	134.9	893.1	156.9	1,799.5	648.1	0.0	0.0	0.0	0.0
	%	40.7	30.2	40.0	31.5	0.7	10.3	0.0	0.0	0.0	0.0
Low Residential, 3 Units per Acre	Acres	588.8	196.2	683.7	199.1	2,263.4	581.6	0.0	0.0	0.0	0.0
	%	32.5	43.9	30.6	39.9	0.8	9.2	0.0	0.0	0.0	0.0
Medium Residential, 5 Units per Acre	Acres	208.0	83.4	279.3	97.9	3,043.9	929.8	0.0	0.0	0.0	0.0
	%	11.5	18.7	12.5	19.6	1.1	14.8	0.0	0.0	0.0	0.0
Multiple Land Use	Acres	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Park	Acres	55.3	0.0	70.2	2.0	1,205.6	0.9	0.0	0.0	0.0	0.0
	%	3.1	0.0	3.1	0.4	0.5	0.0	0.0	0.0	0.0	0.0
Recreation	Acres	0.0	0.0	0.0	0.0	0.0	0.0	2,293.5	189.3	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	4.6	2.3	0.0	0.0
Residential High Density	Acres	0.0	0.0	0.0	0.0	0.0	0.0	442.3	67.8	38.6	2.2
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.8	6.0	2.4
Residential Low Density	Acres	0.0	0.0	0.0	0.0	0.0	0.0	3,847.3	1,133.8	315.2	37.7
	%	0.0	0.0	0.0	0.0	0.0	0.0	7.8	14.0	48.6	40.5
Residential Medium Density	Acres	0.0	0.0	0.0	0.0	0.0	0.0	460.4	228.5	133.3	43.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.9	2.8	20.6	46.1
Rural Residential	Acres	0.0	0.0	0.0	0.0	0.0	0.0	20,123.4	5,681.8	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	40.7	70.2	0.0	0.0
Rural Residential, 1 Unit per 10 Acres	Acres	0.0	0.0	0.0	0.0	16,121.0	1,587.5	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	6.0	25.2	0.0	0.0	0.0	0.0
Rural Residential, 1 Unit per 2.5 Acres	Acres	0.0	0.0	0.0	0.0	555.5	159.2	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.2	2.5	0.0	0.0	0.0	0.0
Rural Residential, 1 Unit per 5 Acres	Acres	0.0	0.0	0.0	0.0	2,009.0	668.8	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.8	10.6	0.0	0.0	0.0	0.0
Spoil	Acres	14.3	0.0	17.6	0.0	43.0	0.0	0.0	0.0	0.0	0.0
	%	0.8	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Utilities and Transportation	Acres	0.0	0.0	0.0	0.0	95.4	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Utility/Transportation	Acres	0.0	0.0	0.0	0.0	0.0	0.0	812.6	0.2	4.5	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.7	0.0
Total	Acres	1,810.6	446.5	2,234.9	498.7	267,752.5	6,292.0	49,390.1	8,090.6	648.1	93.2
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 2.6 presents the total numbers of acres in each hazard zone in Palm Beach County's incorporated areas and how many of those acres are currently undeveloped. None of the incorporated area is considered to have a high risk for sinkholes. Most of the CHZ and the HVZ fall within incorporated areas. **Table 2.6** shows that there are 6,874 acres of incorporated land within the CHZ/HVZ and 1,163 acres are still undeveloped. The City of Jupiter accounts for 1,903 of these acres, or 27.7% of the zone. It also has 521 vacant acres in the zone where development can be limited or mitigation required. Boca Raton, North Palm Beach, and Palm Beach all have over 600 acres of land within the CHZ/HVZ while the remaining communities have smaller amounts or are outside the zones and should also be cognizant of how development occurs in these areas. Flooding affects every community in Palm Beach County, except for Pahokee. **Table 2.6** shows that West Palm Beach has the most flood-prone acres with 17,962 acres. Wellington, Royal Palm, Jupiter, Boynton Beach, and Boca Raton all have over 2,000 acres within a flood zone. Vacant municipal acreage within a flood zone totals 8,440 acres, leaving each jurisdiction an opportunity to take action to protect future persons and property against the effects of flooding. **Table 2.6** also shows that there are 16,564 acres of wildfire susceptible land within incorporated areas. Palm Beach Gardens contains 6,963 acres of land susceptible to wildfires. Wellington, West Palm Beach, Royal Palm Beach, and Jupiter all have significant amounts of land that is subject of wildfire as well. The Town of Wellington has already taken steps to reduce its vulnerability to wildfire by preparing a wildfire mitigation plan.

Table 2.6 Total and Vacant Incorporated Acres in Hazard Areas

Jurisdiction		Coastal Hazard Zone		Hurricane Vulnerability Zone		Flood Zones		Wildfire Susceptible Areas	
		Total	Vacant	Total	Vacant	Total	Vacant	Total	Vacant
Atlantis	Acres	0.0	0.0	0.0	0.0	101.9	1.1	61.5	0.4
	%	0.0	0.0	0.0	0.0	100.0	1.1	100.0	0.7
Belle Glade	Acres	0.0	0.0	0.0	0.0	32.3	0.0	368.3	31.0
	%	0.0	0.0	0.0	0.0	100.0	0.0	100.0	8.4
Boca Raton	Acres	601.9	125.5	600.1	125.5	2,908.8	509.8	247.7	17.2
	%	100.0	20.9	100.0	20.9	100.0	17.5	100.0	6.9
Boynton Beach	Acres	235.2	50.2	235.4	50.2	2,578.9	774.5	183.0	80.0
	%	100.0	21.3	100.0	21.3	100.0	30.0	100.0	43.7
Briny Breezes	Acres	2.5	0.4	2.5	0.4	3.1	1.6	0.0	0.0
	%	100.0	18.2	100.0	18.2	100.0	50.0	0.0	0.0
Cloud Lake	Acres	0.0	0.0	0.0	0.0	12.7	0.4	0.0	0.0
	%	0.0	0.0	0.0	0.0	100.0	3.5	0.0	0.0
Delray Beach	Acres	347.3	40.8	347.1	40.8	1,844.1	337.7	263.3	14.0
	%	100.0	11.7	100.0	11.8	100.0	18.3	100.0	5.3
Glen Ridge	Acres	0.0	0.0	0.0	0.0	42.8	4.5	0.0	0.0
	%	0.0	0.0	0.0	0.0	100.0	10.4	0.0	0.0
Golf	Acres	0.0	0.0	0.0	0.0	439.2	19.6	93.2	0.9
	%	0.0	0.0	0.0	0.0	100.0	4.5	100.0	1.0
Greenacres	Acres	0.0	0.0	0.0	0.0	1,572.5	438.1	92.3	12.9
	%	0.0	0.0	0.0	0.0	100.0	27.9	100.0	14.0
Gulf Stream	Acres	178.8	3.8	178.8	3.8	261.7	5.8	62.6	0.0
	%	100.0	2.1	100.0	2.1	100.0	2.2	100.0	0.0
Haverhill	Acres	0.0	0.0	0.0	0.0	258.8	22.1	23.9	1.8
	%	0.0	0.0	0.0	0.0	100.0	8.5	100.0	7.5
Highland Beach	Acres	86.7	41.5	86.7	41.5	120.6	49.9	0.7	0.2
	%	100.0	47.8	100.0	47.8	100.0	41.4	100.0	33.3
Hypoluxo	Acres	104.3	22.5	104.3	22.5	114.6	26.1	0.0	0.0
	%	100.0	21.6	100.0	21.6	100.0	22.8	0.0	0.0
Juno Beach	Acres	264.6	20.3	264.6	20.3	182.1	6.9	79.4	0.2
	%	100.0	7.7	100.0	7.7	100.0	3.8	100.0	0.3
Jupiter	Acres	1,902.7	521.4	1,902.7	521.4	2,080.6	531.5	1,920.8	592.8
	%	100.0	27.4	100.0	27.4	100.0	25.5	100.0	30.9
Jupiter Inlet Colony	Acres	24.7	0.4	24.7	0.4	14.9	0.0	0.2	0.0
	%	100.0	1.8	100.0	1.8	100.0	0.0	100.0	0.0
Lake Clarke Shores	Acres	0.0	0.0	0.0	0.0	56.0	2.2	0.0	0.0
	%	0.0	0.0	0.0	0.0	100.0	4.0	0.0	0.0
Lake Park	Acres	56.6	2.5	56.6	2.5	247.5	152.3	17.6	14.7
	%	100.0	4.3	100.0	4.3	100.0	61.5	100.0	83.5
Lake Worth	Acres	197.1	6.2	197.1	6.2	480.4	29.0	29.4	0.0
	%	100.0	3.2	100.0	3.2	100.0	6.0	100.0	0.0
Lantana	Acres	166.8	16.5	166.8	16.5	192.2	19.4	0.0	0.0
	%	100.0	9.9	100.0	9.9	100.0	10.1	0.0	0.0

Table 2.6 Total and Vacant Incorporated Acres in Hazard Areas

Jurisdiction		Coastal Hazard Zone		Hurricane Vulnerability Zone		Flood Zones		Wildfire Susceptible Areas	
		Total	Vacant	Total	Vacant	Total	Vacant	Total	Vacant
Manalapan	Acres	131.3	23.9	131.3	23.9	185.7	34.6	0.2	0.0
	%	100.0	18.2	100.0	18.2	100.0	18.6	100.0	0.0
Mangonia Park	Acres	0.0	0.0	0.0	0.0	50.6	16.5	10.7	9.1
	%	0.0	0.0	0.0	0.0	100.0	32.6	100.0	85.4
North Palm Beach	Acres	682.4	39.9	682.4	39.9	592.5	49.5	22.7	0.0
	%	100.0	5.8	100.0	5.8	100.0	8.4	100.0	0.0
Ocean Ridge	Acres	209.1	77.6	209.1	77.6	303.9	106.1	0.9	0.0
	%	100.0	37.1	100.0	37.1	100.0	34.9	100.0	0.0
Pahokee	Acres	0.0	0.0	0.0	0.0	0.0	0.0	143.8	9.4
	%	0.0	0.0	0.0	0.0	0.0	0.0	100.0	6.5
Palm Beach	Acres	774.2	67.1	774.2	67.1	1,160.4	152.5	113.9	0.7
	%	100.0	8.7	100.0	8.7	100.0	13.1	100.0	0.6
Palm Beach Gardens	Acres	142.9	36.3	142.9	36.3	1,492.7	360.3	6,962.8	1,148.3
	%	100.0	25.4	100.0	25.4	100.0	24.1	100.0	16.5
Palm Beach Shores	Acres	28.8	6.5	28.8	6.5	53.1	12.9	0.0	0.0
	%	100.0	22.5	100.0	22.5	100.0	24.4	0.0	0.0
Palm Springs	Acres	0.0	0.0	0.0	0.0	351.8	68.9	0.0	0.0
	%	0.0	0.0	0.0	0.0	100.0	19.6	0.0	0.0
Riviera Beach	Acres	276.4	24.5	276.4	24.5	1,085.9	187.5	208.9	56.4
	%	100.0	8.9	100.0	8.9	100.0	17.3	100.0	27.0
Royal Palm Beach	Acres	0.0	0.0	0.0	0.0	3,398.6	446.5	845.1	128.0
	%	0.0	0.0	0.0	0.0	100.0	13.1	100.0	15.1
South Bay	Acres	0.0	0.0	0.0	0.0	797.6	56.2	17.4	0.0
	%	0.0	0.0	0.0	0.0	100.0	7.0	100.0	0.0
South Palm Beach	Acres	3.8	1.6	3.8	1.6	4.2	1.8	0.0	0.0
	%	100.0	41.2	100.0	41.2	100.0	42.1	0.0	0.0
Tequesta	Acres	211.8	16.7	211.8	16.7	106.6	14.3	47.5	0.0
	%	100.0	7.9	100.0	7.9	100.0	13.4	100.0	0.0
Wellington	Acres	0.0	0.0	0.0	0.0	6,826.6	2,433.9	2,522.2	512.7
	%	0.0	0.0	0.0	0.0	100.0	35.7	100.0	20.3
West Palm Beach	Acres	243.9	16.7	243.9	16.7	17,961.7	1,565.9	2,224.4	150.0
	%	100.0	6.9	100.0	6.9	100.0	8.7	100.0	6.7
Total Acres	Acres	6,873.8	1,162.8	6,872.0	1,162.8	47,917.5	8,439.7	16,564.4	2,780.8
	%	100.0	16.9	100.0	16.9	100.0	17.6	100.0	16.8

3. Existing Mitigation Measures

Local Mitigation Strategy

The LMS is an ideal repository for all hazard mitigation analyses, policies, programs, and projects for the County and its municipalities due to its multi-jurisdictional and intergovernmental nature. The LMS identifies hazard mitigation needs in a community and structural or non-structural initiatives that can be employed to reduce community vulnerability. Communities can further reduce their vulnerability to natural hazards by integrating the LMS analyses and mitigation objectives into their Comprehensive Plans.

An LMS prepared pursuant to the State's 1998 guidelines has three substantive components (FDCA, 2005b):

Hazard Identification and Vulnerability Assessment (HIVA). 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 the community is susceptible to. According to FEMA, LMSs 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, 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 monetary 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. The Guiding Principles typically contain 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 Post-Disaster Redevelopment Plans (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 LMS Goals and Objectives will guide the priority of the mitigation initiatives.

The Palm Beach County LMS (revised in 2004) was used as a source of information in developing this profile and was also reviewed for any enhancements that could be made to allow better integration with other plans, particularly the local Comprehensive Plans.

Hazard Identification and Vulnerability Assessment

The LMS was briefly reviewed for its ability to provide hazard data that can support comprehensive planning. Overall, the document provides a wealth of information that can be a useful tool for planning initiatives. The LMS uses detailed data on structures at risk for major hazards discussed in this profile. It discusses populations at risk and future land use issues. The maps in the LMS show hazard areas and correlate this with population centers or land uses. Appendix C of the LMS contains an analysis of potential monetary losses for specific natural disasters for the County and for each municipality. 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.

Guiding Principles

In the Palm Beach County LMS, the term “guiding principles” actually refers to the section that outlines the LMS goals and objectives. The guiding principle section as described in this document is actually found in Section 4 of the LMS. This section inventories all levels of government policy that relates to hazard mitigation including federal, state, regional (Treasure Coast Regional Planning Council and South Florida Water Management District), and all local plans and ordinances. All County plans’ relation to hazard mitigation is summarized in this section and the municipality plans are discussed in general. In the Appendices, the LMS lists all County and municipal Comprehensive Plan policies relevant to hazard mitigation. Different department’s responsibilities to mitigation are discussed as well as partnerships with the private sector. Overall, this section provides a very good background for integration of hazard mitigation into all plans by inventorying existing policy and even recommending ways to strengthen mitigation countywide.

LMS Goals and Objectives

The LMS Goals and Objectives can be found in **Attachment E**. The following is a summary of how well the LMS has addressed mitigation issues that coincide with planning concerns.

Section 2.4 of the LMS explains that the mitigation goals and objectives must be consistent with the goals of the County and municipal comprehensive plans, codes and ordinances, and other documents that are used to realize each jurisdiction’s vision of their community. It states that the overall objective of the LMS is to reduce the vulnerabilities to hazards which directly affect Palm Beach County. (Palm Beach County, 2004)

The LMS goals and objectives aim to reduce loss of life, property, and repetitive damage due to natural disasters. Goal 2 calls for sound fiscal policy through long range planning. Repetitive loss properties and involvement in the Community Rating System are addressed in Goals 3 and 4. Goals 5, 7, and 9 all call for coordination and a commitment to hazard mitigation across jurisdictions and between the public and private sectors. Redevelopment and public education are also addressed in the LMS goals. The five objectives shadow the LMS goals in that they aim to protect the community, support hazard mitigation functions, encourage cooperation, aim to reduce costs associated with disasters, and promote efficient disaster recovery. (Palm Beach County, 2004)

Comprehensive Emergency Management Plan

The Mitigation Annex of the Palm Beach County CEMP (2000) was reviewed for consistency with the other plans and evaluated in its effectiveness as a tool for planners. The Annex does a good job of summarizing the responsibilities of hazard mitigation among the different agencies and organizations within the County. The CEMP states that the Senior Mitigation Planner is responsible for the coordination of mitigation activities. In fact, the CEMP references the Comprehensive Plan and the LMS in many regards, and ties the documents together by outlining their role in pre and post-disaster mitigation activities. Also, it states that the LMS Steering Committee has a key role in post-disaster mitigation assessment. This is a strong approach to hazard mitigation because it allows policy-makers a first look at disaster conditions, on-the-ground operations, areas that need improvement, and the strengths of the existing policies and response. The document is a useful hazard mitigation tool for County officials, planners, and emergency managers. (Palm Beach County, 2000)

Post-Disaster Redevelopment Plan

Palm Beach County adopted a Post-Disaster Redevelopment Plan (PDRP) in 1996 and has updated the plan several times since. Currently the County is working to enhance and reorganize the PDRP so that it will be easily implemented in the aftermath of a disaster. The existing PDRP has goals, objectives, policies, and actions that cover topics from disaster assessment and inspections to reconstruction policies and economic recovery. This PDRP could be improved, however, by excluding hazard mitigation topics that are now covered in the LMS. There are also many general actions that should be implemented before a disaster occurs that could be made more specific and assigned to a responsible party. While the plan covers a wide spectrum of disaster recovery and long-term redevelopment issues, it could be strengthened through better organization and references to other plans that also address these issues. During the rushed and stressful recovery phase after a disaster, it is important that the staff and elected officials have a plan that clearly lays out and what should be done and when it needs to be done.

National Flood Insurance Program/Community Rating System

Palm Beach County and all of the incorporated municipalities participate in the National Flood Insurance Program (NFIP). Palm Beach County also participates in the Community Rating System (CRS) and has a rating of class 7. Twenty-eight of the 37 municipalities participate in the CRS as well, and most hold class ratings between 7 and 9.

4. Comprehensive Plan Review

Palm Beach County's Comprehensive Plan (revised in 2005) was reviewed in order to see what the County has already done to integrate their LMS policies, and hazard mitigation in general, into their planning process. A list of the goals, objectives, and policies currently in the plan that contribute to hazard mitigation is found in **Attachment F**. The following is a summary of how well the plan addressed the four hazards of this analysis.

Coastal Hazards

There are many policies that protect coastal resources such as coastal and estuarine wetlands, coastal barriers, vegetation, natural reefs, beaches, and dunes in the Palm Beach County Comprehensive Plan. The County protects these resources through policies that support cooperation with State regulations, enforcement of the Unified Land Development Code (ULDC), regulation of development on and near resources, acquisition of coastal and wetland properties, and restoration projects. Protection and conservation of coastal resources is a strong mitigation strategy because this can preserve natural barriers that absorb surge and flood impacts caused by hurricanes and tropical storms as well as limit development in hazard areas. The County also limits infrastructure expansion and public subsidization of development in coastal areas, which can limit populations in coastal hazard areas.

The Plan also includes four policies that consider evacuation capacity and procedures, which are vital to coastal communities in the event of a hurricane. A policy includes evacuation capacity as criteria for development review. Also, policies aim to coordinate evacuations with emergency managers across jurisdictions as well as coordinate applicable emergency management plans.

Flood Hazards

There are many policies that encourage the protection of wetlands. The policy framework creates a strategy that employs Transfer of Development Rights, land acquisition, conservation, restoration of wetlands, mitigation measures for wetland losses, and regulation of development through the ULDC. Protection of wetlands can preserve natural drainage functions as well as limit development in flood-prone areas.

Wildfire Hazards

There were no policies found during this review that directly relate to wildfire hazards. There is a goal to provide effective emergency fire and rescue services with a comprehensive fire prevention program but it does not specifically mention wildfire. There are policies that aim to eradicate invasive, non-native vegetation, which could reduce the amount of wildfire fuel in a high-risk area. The eradication of invasive non-native vegetation is part of the criteria for the issuance of a development order and enforced through the ULDC. Also, policies support water conservation, a good strategy for reducing the severity of a drought and for maintaining water supplies which are needed for wildfire suppression.

Sinkhole Hazards

There were no policies found during this review that directly relate to sinkhole hazards.

Other Policies that Address Hazard Mitigation

Overall, the Comprehensive Plan does a good job at addressing hazard mitigation issues outside of those directly associated with natural resources. The Comprehensive Plan references other governing documents such as the ULDC and development ordinances that contain measures that directly affect development. It also ties in pre and post disaster mitigation by referencing the LMS, the CEMP, and the PDRP. There are many policies that aim to provide good coordination between departments and agencies dealing with hazard mitigation and response. The Comprehensive Plan also limits public spending in hazard areas and prioritizes hazard mitigation projects in its capital improvements program.

5. Recommendations

For the LMS to be effective in the decision-making process of growth management, its objectives and policies must be integrated into the Comprehensive Plan. The Plan is the legal basis for all local land use decisions made. If hazard mitigation is to be accomplished beyond the occasional drainage project, these hazards must be addressed in comprehensive planning, where development can be limited or regulated in high-risk hazard areas just as sensitive environments are routinely protected through growth management policies. Mitigation of hazards is considerably easier and less expensive if done when raw land is being converted into development. Retrofitting structure and public facilities after they have been built is significantly more expensive. However, if older neighborhoods or communities are scheduled to be revitalized or redeveloped, hazard mitigation needs to be an aspect considered and integrated into the project prior to the time of development approval.

Palm Beach County has begun this process of integrating hazard mitigation throughout its Plan's elements. The prior section summarized how the major hazards for the County have been for the most part well-addressed. There is, however, still some disconnection between the LMS objectives and initiatives, and the policies in the Comprehensive Plan. By tightening the connection between these documents, the County will find it easier to implement hazard mitigation, and there will be higher awareness of these issues within more departments of the County government. **Table 5.1** presents options for further integration as well as the basis for these recommendations.

NOTE: The recommendations set out in this section are only suggestions. Through the workshop process and contact with the local governments, the goal of this project is to result in specific recommendations tailored and acceptable to each county. While the profile addresses hurricanes, flooding, wildfire, and sinkholes, the County should consider other hazards, if appropriate, such as tornadoes and soil subsidence, during the update of the local Comprehensive Plan.

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Palm Beach County's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current LMS Information, Goals, or Objectives	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Options for Enhancement of the LMS	Basis For Suggested Options
Strategy 1 - Collaboration, coordination, and education					
<p>a) Is there information sharing &/or involvement in plan development between planners & emergency managers?</p>		<p>P 1.4-d Coordinate Emergency Service Functions (ESF's) 4-firefighting, 9-urban search and rescue and 10-hazardous materials for the County Division of Emergency Management in the event of a hurricane or other disaster. ICE P 1.2-g Support a Countywide geographic and land information system CME P 2.4-b The County Division of Emergency Management shall coordinate with all affected municipalities and agencies to maintain an efficient and timely evacuation process. CME P 3.1-c Gov't body advise and assist Local Mitigation Strategy program (LMS).</p>			
<p>b) Do the Comp Plan, LMS, CEMP, & other local and regional plans cross-reference each other & include consistent data on hazardous locations?</p>	<p>G 7 To consistently increase the level of coordination of mitigation management concerns, plans and activities at the municipal, county, state and federal levels of government in relation to all hazards.</p>	<p>ICE P 1.1-I Coordinate w South Florida WMD to ensure consistency between planning efforts / address long-term flood control and water supply needs. ICE P 1.3-g Implement strategies identified in the PBC CEMP and the PBC PDRP to address efficient and timely evacuation / coordination with state and federal government, and other jurisdictions. CME O 2.4 Maintain and update as necessary the CEMP. CME P 2.4-a The County shall provide shelter space in accordance with the CEMP. CME P 2.4-c The County shall update its CEMP periodically. CME P 2.4-d Palm Beach County shall maintain a (LMS) CME P 2.4-e The Local Mitigation Strategy program (LMS) shall establish funding priorities and mitigation projects through a formal process. CME P 3.1-c Governing policy body advise and assist w Local Mitigation Strategy program (LMS). HHSE P 4.1-g Protect the safety of its residents and visitors by developing disaster and emergency management plans and maintaining and implementing programs and services supportive of those plans.</p>			

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<p>c) Are hazard mitigation projects addressed in the 5-year schedule of Capital Improvement Projects?</p>		<p>CIE P 1.4-b Prioritize LMS projects as Essential in the annual Capital Project Request Proposals. CME P 2.4-e The Local Mitigation Strategy program (LMS) shall establish funding priorities and mitigation projects through a formal process / coordinates between the municipalities and the County.</p>			
<p>d) Are there measures to educate residents, homeowner/property associations, & the business community of ways they can mitigate against hazards?</p>	<p>G 6 To increase the continual distribution of information on a consistent basis with respect to the existence of flood hazards and the availability of measures to mitigate the problems presented by such hazards.</p>	<p>CE O 1.2 Provide information and educational activities for the citizens / conservation and sustainable use of natural resources CE P 1.2-a The County shall implement public information programs concerning natural resource issues including, but not limited to: 2. Beaches and dunes; 6. Exotic species control; 10. Natural areas protection and stewardship; 11. Prescribed burning; 13. Vegetation surplus; 14. Volunteer opportunities; 15. Water conservation; 18. Wetlands.</p>		<p>Include a goal that promotes ongoing dissemination of hazard mitigation and emergency preparedness information to the public and to government employees.</p>	<p>While the LMS includes initiatives to educate citizens and government officials on natural hazards and emergency preparedness, a goal in the LMS could ensure that education is a part of the long-term hazard mitigation strategy and information will be available to existing as well as future residents. Also, training public officials including engineers, building inspectors, site plan reviewers on the hazards associated with natural disasters may help the County take mitigative actions before development occurs.</p>

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Palm Beach County's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current LMS Information, Goals, or Objectives	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Options for Enhancement of the LMS	Basis For Suggested Options
Strategy 2 - Get out of the way: provide evacuation and sheltering services					
<p>a) Are there measures to provide adequate evacuation clearance time to support current population and population growth?</p>		<p>CIE P 1.4-c Provide adequate evacuation in the event of an emergency; ICE P 1.3-g Coordination to assure an efficient and timely evacuation process in the case of a hurricane event. CME P 2.1-c Provide for safe evacuation from coastal areas by reviewing all development proposals in the Hurricane Vulnerability Zone. CME P 2.4-b DEM shall coordinate / to maintain an efficient and timely evacuation process in the case of a hurricane.</p>	<p>The County include a Comprehensive Plan policy that establishes an evacuation clearance time level of service.</p>	<p>The LMS could include a goal or an objective that aims to maintain or improve hurricane evacuation times.</p>	<p>As development is likely to occur, population within the region will increase. Evacuation route demand will likely increase as well and maintaining capacity could be an ongoing challenge for the County and for local municipalities. Having a goal in the LMS may keep this challenge in the forefront of mitigation activities. Evacuation route capacity and clearance times are regional concerns and apply to all jurisdictions in the County, much like the existing goals in the LMS.</p>
<p>b) Are there measures to provide adequate shelter space to meet population growth and special needs?</p>		<p>CME P 2.4-a The County shall provide shelter space in accordance with the CEMP. Where deficits exist, the County shall seek to reduce the deficit through federal and state retrofit funds. SE P 2.2-g Design and/or retrofit of public schools as emergency shelters; 2. Enhancing public awareness of evacuation zones, shelter locations, and evacuation routes; 3. Designation of sites other than public schools as long term shelters, to allow schools to resume normal operations following emergency events. FLUE P 1.2-h LDRs shall require mobile home parks to include a permanent structure adequate for an emergency shelter.</p>	<p>The Comprehensive Plan currently has strong goals that address evacuation shelters. The Comprehensive Plan could include a policy that aims to meet shelter demand in accordance with the State Shelter Plan. The County can also state that it will use all funding opportunities available.</p>	<p>The LMS could include a goal that aims to meet shelter demand in accordance with the State Shelter Plan.</p>	<p>As development is likely to occur and the regional population increase, shelter demand will rise. Creating a policy in the Comprehensive Plan to meet existing and future shelter demand may help ensure safety for residents in the event of a hurricane. The County should not limit itself to only using Federal and State funding to retrofit shelters as the need to provide more shelter space may require them to find other funding sources including local sources.</p>

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Strategies & Integration Topics	Current LMS Information, Goals, or Objectives	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Options for Enhancement of the LMS	Basis For Suggested Options
Strategy 3 - Make the environment less hazardous: Protect and enhance natural protective features					
<p>a) Are there measures to protect and/or restore natural resources that might in turn decrease the risk from natural hazards?</p>		<p>Natural Resources CE GOAL 1 Preserve, protect, and enhance the County's natural resources. CE P 2.1-f Coordinate with all applicable entities to protect and conserve environmentally sensitive lands and native ecosystems. ROSE O 1.4 ESLs protected for inclusion in the Countywide open space system. FLUE P 2.2.7-b Designate ESLs as Conservation. / Coordinate with municipalities to designate County acquired ESLs within incorporated areas as Conservation. FLUE P 2.6-h The County shall not approve the designation of receiving areas, which would result in a significant negative impact upon adjacent ESLs. FLUE GOAL 5 Protect, preserve, and enhancement of the County's various high quality environmental communities. FLUE O 5.1 Enforce and monitor existing environmentally related ordinances and developing ordinances. FLUE P 5.1-a Protect natural resources and systems, including quality uplands and wetlands, ESLs, wildlife habitats and regional water management areas.</p>	<p>Encourage the removal of wildfire fuel sources near structures, especially in rural areas, to reduce risk to homes and businesses in the event of a wildfire.</p> <p>Update existing polices that protect natural resources to include hazard mitigation as a benefit.</p>		<p>The County has many existing policies that mitigate the impacts of hazards, however they have not been identified as beneficial in this area. Current growth management techniques such as land conservation, buffering, and the clustering of development to protect and conserve natural resources but also provide the major benefit of protecting development from natural disasters. The County could update these policies in the Comprehensive Plan and emphasize the benefits of hazard mitigation.</p>
		<p>Coastal CME GOAL 1 Preserve, protect, and enhance coastal resources, and to discourage development activities that would damage or destroy coastal resources. CME O 1.1 Maintain programs and seek funding to protect, preserve and enhance coastal and estuarine wetlands, living marine resources, coastal barriers, and wildlife habitat. CME P 1.1-c Protect wetlands / offshore natural reefs through the ULDC CME P 1.1-d Protect selected estuarine and coastal habitats by the acquisition of coastal and wetland properties. CME P 1.1-e Protect estuarine waters through ULDC FLUE P 5.1-b The impact of development on natural resources / coastal and inland wetlands / shall be evaluated during the development review process.</p>			

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		<p>CME P 1.1-h Protect existing native vegetation through ULDC to provide a buffer between development and adjacent coastal ecosystems. CME O 1.2 Protect, enhance and restore the beaches and dunes through the Palm Beach County Shoreline Protection Plan. CME P 1.2-d Avoid the use of shoreline armoring (except as a last resort measure) and shall use shore protection alternatives such as beach nourishment, dune restoration, and inlet sand transfer that reduce the need for armoring. CME P 1.2-e The County shall continue to reestablish damaged dunes and eroded beaches where possible to promote the enhancement of these resources and reduce damage resulting from storms. CME P 1.2-f Protect and restore existing dunes and dune vegetation. CME P 1.2-g Monitor and evaluate the condition of the County's beaches and dunes.</p>			
		<p>Flood CE O 2.2 Reduce the loss of wetlands. CE P 2.2-a Implement ULDC and continue to review and comment on wetland alteration applications in order to avoid wetland impacts, minimize unavoidable wetland impacts, and compensation for wetland impacts through mitigation. CE P 2.2-b Mitigation required for any wetland that is degraded or destroyed. CE P 2.2-d Prohibit activities that would diminish the functions and values of wetlands. CE P 2.2-e Buffer wetlands near new development. CE P 3.1-d Encourage that wetland mitigation, environmental protection and water management efforts support and optimize the functions of the East Coast Buffer and the Water Preserve Areas. FLUE P 2.2.7-c The County may designate privately held lands that have a Conservation future land use designation, as sending areas for the transfer of development rights, consistent with the requirements of the TDR program. FLUE O 2.6 Implement a (TDR) program. The TDR program is designed to protect ESLs.</p>			
		<p>Wildfire CE O 2.5 Prohibited Invasive Non-Native Vegetation CE P 2.5-a Implement ULDC / require the immediate and long-term removal, or</p>	<p>The County could add policies in the Comprehensive that could</p>		<p>Currently, there are not policies that directly address wildfire in the</p>

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Palm Beach County's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current LMS Information, Goals, or Objectives	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Options for Enhancement of the LMS	Basis For Suggested Options
		<p>eradication of prohibited invasive non-native vegetation.CE P 2.5-b Maintain programs for the eradication and control of prohibited invasive non-native vegetation.CE P 2.5-c Implement ULDC to require the eradication of prohibited invasive non-native vegetation as a condition of all development orders.CE P 3.1-a Coordinate with the SFWMD to implement regional water plan.FRSE GOAL 1 Provide an effective program of emergency fire and rescue services with a comprehensive fire prevention program that is responsive to the desires, needs and economic capacity of the community.FLUE P 5.2-a The Department of Environmental Resources Management shall provide for the preservation and protection of native vegetation and environmental systems by applying the Native Ecosystem Overlay through implementation of the Vegetation Preservation and Protection Ordinance. PWWSE GOAL 2 Promote the conservation and protection of surface and groundwater resources with the purpose of securing future water supplies for urban and agricultural users..PWWSE O 2.1 Continue to implement procedures and programs to conserve water.PWWSE P 2.1-a Palm Beach County encourages and promotes the use of innovative alternative technologies to augment water resources.</p>	<p>address this hazard prior to development. The County could explore hazard mitigation resources provided by the Florida Division of Forestry and develop a relationship to use their services to carry out prescribed burning. The County can create an educational program that provides information about wildfire mitigation strategies and Firewise Communities to the public. Finally, the County could explore the adoption of a firewise building code that may reduce wildfire risk to structures and persons.</p>		<p>Comprehensive Plan. As development is likely to occur in Palm Beach County, development may encroach on wildfire prone lands, as shown on the maps in Appendix C.</p>
Strategy 4 - Make structures more resistant to natural hazard forces					
<p>a) Are there measures that support relocating or retrofitting private &/or public structures in hazard areas?</p>	<p>G 3 To take preventative actions to reduce the number of repetitive loss properties published annually by FEMA on the list of "Repetitive Loss Properties".</p>				

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<p>b) Are there measures to require compliance with or exceed building codes &/or design standards for certain hazard areas?</p>	<p>G 4 To qualify the county and jurisdictions for incremental improvements on the Community Rating System classification in relation to flood insurance under the National Flood Insurance Program (NFIP) and to reduce flood hazards.</p>	<p>CME P 2.5-d The County shall continue to enforce regulations and codes, which provide for hazard mitigation. These include land use, building construction, flood elevation, septic and sanitary sewer, coastal construction setback, and stormwater facility regulations. These regulations shall also be applied to eliminate unsafe conditions and inappropriate uses. CME P 2.5-e Continue recommended hazard mitigation activities including LDRs and construction law administration. Post-disaster recommendations contained in Hazard Mitigation Plans shall be incorporated to avoid future destruction and loss of life. FLUE P 2.2-d Ensure the ULDC is consistent with the appropriate elements of the Comprehensive Plan. / seasonal flooding / open spaces and natural resources / historically significant properties.</p>	-		
<p>c) Are there measures to protect cultural resources from natural disasters?</p>		<p>HPE GOAL 1 Locate, identify, evaluate, protect and enhance historic resources / expand public awareness. HPE O 1.1 Historic Preservation Palm Beach County shall ensure the protection of its historic resources through ULDC FLUE P 4.4-a Locate, identify, evaluate and protect historic and archaeological sites.</p>			
<p>Strategy 5 - Manage the development and redevelopment of land in hazardous areas</p>					
<p>a) Are there measures to limit population densities in high-hazard areas?</p>		<p>CME O 2.3 Direct population concentrations away from known or predicted CHHA, and shall not approve increases in population densities in the CHHA. CME P 2.3-a Will not increased densities in the CHHA. CME P 2.3-c Infill or redevelopment densities and intensities in CHHA shall be consistent with existing adjacent development but at densities and intensities no greater than the adopted future land use designations. FLUE P 1.2-c Coordinate with coastal municipalities to control population densities in CHHA.</p>	-		

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Palm Beach County's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current LMS Information, Goals, or Objectives	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Options for Enhancement of the LMS	Basis For Suggested Options
<p>b) Are there measures to limit public expenditures that subsidize development in high-hazard areas?</p>		<p>CIE P 1.4-c Limit public funds / infrastructure expansion in CHHA to evacuation needs. CME GOAL 2 Protect human life by limiting public expenditures in areas subject to destruction by natural disasters within the CHHA, maintaining and implementing a safe and effective emergency management program, and providing for orderly redevelopment in a post-disaster period. CME O 2.1 Establish and maintain urban levels of service, areas of service, and phasing of infrastructure in the unincorporated coastal area. CME O 2.2 Prohibit subsidy of new or expanded development in the coastal area. CME P 2.2-a Limit public funds for infrastructure expansion or improvements, or development subsidization in CHHA.</p>			
<p>c) Are there creative neighborhood design solutions or development regulations that mitigate hazards, such as clustering or transfer of development rights?</p>		<p>FLUE P 1.2-d Use TDR and Special Overlay (s) to direct growth away from natural resources. FLUE P 1.4-I Use TDR to limit dev in wetlands. FLUE P 2.2.7-c Use Conservation lands as sending areas for the transfer of development rights. FLUE O 2.6 The TDR program is designed to protect Environmentally Sensitive Lands and the Agricultural Reserve.</p>			

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Palm Beach County's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current LMS Information, Goals, or Objectives	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Options for Enhancement of the LMS	Basis For Suggested Options
<p>d) Are there measures to limit redevelopment in hazard areas and procedures for post-disaster recovery that will lead to a more disaster-resistant community?</p>	<p>G 8 To establish a program that facilitates orderly recovery and redevelopment, and minimizes economic disruption following a disaster.O 5 Speed community recovery when disasters occur.</p>	<p>CME O 2.5 Reduce or eliminate the risks associated with natural hazards through PDRP.CME P 2.5-a Coordinate with gov agencies to reduce or eliminate the exposure of human life and public and private property to natural hazards. CME P 2.5-b Prohibit the rebuilding of non-conforming uses that have experienced damage of greater than or equal to 50 percent of value, in areas most vulnerable to the effects of storms.CME P 2.5-c Explore the applicability of using TDR and other programs for the acquisition of property or property rights, as methods of compensating property owners who do not rebuild structures in those areas most vulnerable to the effects of storms.CME P 2.5-e Continue recommended hazard mitigation activities, including land development regulations and construction law administration. Post-disaster recommendations contained in Hazard Mitigation Plans shall be incorporated to avoid future destruction and loss of life.</p>			

Abbreviations: G= Goal; O= Objective; P=Policy; PDRP= Post-Disaster Redevelopment Plan; HVZ= Hurricane vulnerability zone; CHHA= Coastal High Hazard Area; LMS= Local Mitigation Strategy; CEMP= Comprehensive Emergency Management Plan; DEM= Department of Emergency Management; LDRs= Land Development Regulations; ESLs= Environmentally Sensitive Lands; ULDC= Unified Land Development Code; SFWMD= South Florida Water Management District; TDR= Transfer of Development Rights. CE= Conservation Element; CME= Coastal Management Element FLUE= Future Land Use Element; ; CIE= Capital Improvements Element; ICE= Intergovernmental Coordination Element; ROSE= Recreational and Open Space Element; PWWSE= Potable Water and Wastewater Sub-Element; HHSE=Health and Human Services Element; SE= School Element; FRSE= Fire-Rescue Services Element

6. Municipal Case Study: Riviera Beach

As part of this study, a similar analysis to that of the County profile was completed for a statewide sample of 14 Florida municipalities, including Riviera Beach in Palm Beach County. The results of this analysis are provided in this section.

Hazards Analysis

The following analysis looks at three hazard types that the City is vulnerable to: flooding, surge, and wildfire. Sinkholes are not a high-risk for the City. All of the information in this section was obtained online through MEMPHIS.

Existing Population at Risk

Table 6.1 presents the population of Riviera Beach at risk from hazards, as well as a breakdown of the sensitive needs populations at risk. The first column in the table summarizes the residents of the City that live within FEMA Flood Insurance Rate Map zones that signify special flood hazard areas. There are 11,357 residents that live within a flood hazard area, 3,980 of which are a minority. Also, 1,471 people live within a flood zone and are below the poverty line. Currently, the City of Riviera Beach does not participate in the National Flood Insurance Program’s Community Rating System and therefore cannot offer discounts for flood insurance to its residents. Of the natural hazards analyzed in this report, wildfires affect the least amount of people in Riviera Beach. However, there are 419 disabled people within a medium-high risk wildfire area which could make a quick evacuation more difficult. The third column shows that 5,661 people are at risk from storm surge, 2,010 of which are disabled. People living in this zone would likely be evacuated in the event of a hurricane. Many of these people may need special-needs sheltering or evacuation assistance.

Table 6.1 Estimated Number of Persons at Risk from Selected Hazards

Population	Flood	Wildfire (medium-high risk)	Surge
Minority	3,980	344	1,558
Over 65	2,303	364	1,083
Disabled	2,825	419	2,010
Poverty	1,471	129	638
Language Isolated	35	0	35
Single Parent	743	84	337
Citywide Total	11,357	1,340	5,661

Source: Florida Department of Community Affairs, 2005a.

Existing Built Environment

While the concern for human life is always of greatest importance in preparing for a natural disaster, there also are large 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 recover from a disaster. **Table 6.2** presents estimates of the number of buildings in Riviera Beach, by structure type, that are at risk from each of the three hazards being analyzed.

Flooding is by far the largest risk to property in the City, with 12,486 structures located in a flood zone. Of the structures within flood zones, 96.7% are residential. Storm surge is also a major risk for the City with 3,895 structures possibly vulnerable. Of those at risk, 6.8% are multi-family homes probably built right on the beach edge. **Table 6.2** also shows 1,050 structures at risk from wildfires. Surprisingly, the majority of these structures are multi-family homes which are typically not in areas at risk to wildfire.

Table 6.2 Estimated Number of Structures at Risk from Selected Hazards

Structure Type	Flood	Wildfire (medium-high risk)	Surge
Single-Family Homes	4,316	319	988
Mobile Homes	3,964	28	2
Multi-Family Homes	3,793	623	2,602
Commercial	361	66	198
Agriculture	50	11	1
Gov./Institutional	2	3	104
Total	12,486	1,050	3,895

Source: Florida Department of Community Affairs, 2005a.

Analysis of Current and Future Vulnerability

Riviera Beach’s vulnerability to surge, flood, and wildfire were analyzed spatially in relation to existing and future land uses within the City. The following maps and tabulations of existing land use within hazard areas are based on 2004 Palm Beach County Property Appraiser’s Office data. Maps and tabulations of future land uses in hazard areas were developed using the Riviera Beach Future Land Use Map obtained January 2005.

In **Attachment A**, two maps show the existing and future land uses within the coastal hazard zone (Category 1 storm surge zone) and the hurricane vulnerability zone (Category 1 evacuation zone) for Riviera Beach. The coastal hazard zone (CHZ) and the hurricane vulnerability zone (HVZ) are both located on the barrier island and up to one mile inland along waterways. The HVZ is slightly larger than the CHZ, encompassing 71 acres. **Table 6.3** shows that 50.8% of the CHZ acres and 46% of the HVZ acres are currently used for single-family residences. There are very few undeveloped acres left in Riviera Beach and most of those are shown in **Table 6.4** to be designated for future mixed use or single-family residences. Currently, however, the City has been working on redevelopment plans that include some of the waterfront property. These plans should be analyzed in more detail for any increases in the City’s vulnerability to surge and its ability to safely evacuate residents.

In **Attachment B**, two maps present the existing and future land uses within a 100-year flood zone. There are 1,050 acres within a flood zone. The maps show that all of the land in the HVZ is also within a flood zone. Additionally, land adjacent to the canal along Garden Road is also within a flood zone. Of the flood-prone acres shown in **Table 6.3**, 23.9% are currently used for single-family residences. There also are 237 acres used for either government and institutional uses or utilities. These public uses if vulnerable to flooding are probably not a wise use of taxpayer dollars and mitigation or relocation should be considered. **Table 6.3** shows that there are 193 vacant acres in the flood zone, most of which are located along Watchtower Road, just east of Interstate 95. **Table 6.4** shows that 55.3% of those vacant flood-prone acres are designated for special preservation.

In **Attachment C**, maps present the land uses associated with high-risk wildfire zones. Riviera Beach has a limited amount of land susceptible to wildfires largely due to the fact that it is almost

fully developed and that it is in the center of a large metropolitan area. There are a few areas totaling 205 acres, however, with medium-high wildfire risk in the western portion of the City. **Table 6.3** shows that 21.4% of these areas are currently used for parks or conservation and another 27.4% is vacant. In **Table 6.4**, we see that all of the undeveloped acres susceptible to wildfire are designated for future commercial and industrial uses. It would be a good idea to monitor or regulate any flammable materials used in these future businesses since they could be exposed to wildfire.

Table 6.3 Total Municipal 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	0.0	0.0	11.4
	%	0.0	0.0	0.0	5.6
Attractions, Stadiums, Lodging	Acres	15.4	19.6	19.8	0.0
	%	5.6	5.7	1.9	0.0
Places of Worship	Acres	0.0	0.2	2.0	5.3
	%	0.0	0.1	0.2	2.6
Commercial	Acres	6.9	17.8	32.1	2.9
	%	2.5	5.2	3.1	1.4
Government, Institutional, Hospitals, Education	Acres	23.9	34.3	131.8	3.3
	%	8.8	10.0	12.5	1.6
Industrial	Acres	6.5	9.1	103.2	10.5
	%	2.4	2.6	9.8	5.1
Parks, Conservation Areas, Golf Courses	Acres	25.6	27.4	29.0	43.7
	%	9.4	8.0	2.8	21.4
Residential Group Quarters, Nursing Homes	Acres	0.2	0.2	0.2	4.0
	%	0.1	0.1	0.0	2.0
Residential Multi-Family	Acres	8.9	18.3	43.9	39.7
	%	3.3	5.3	4.2	19.4
Residential Mobile Home, or Commercial Parking Lot	Acres	1.3	2.9	3.8	0.0
	%	0.5	0.8	0.4	0.0
Residential Single-Family	Acres	138.4	158.1	251.5	10.7
	%	50.8	46.0	23.9	5.2
Submerged Lands (Water Bodies)	Acres	12.3	12.3	126.8	6.7
	%	4.5	3.6	12.1	3.3
Transportation, Communication, Rights-of-Way	Acres	6.0	6.9	7.8	6.5
	%	2.2	2.0	0.7	3.2
Utility Plants and Lines, Solid Waste Disposal	Acres	3.1	5.4	105.2	3.8
	%	1.1	1.6	10.0	1.9
Vacant	Acres	24.1	31.0	193.3	56.0
	%	8.8	9.0	18.4	27.4
Total Acres	Acres	272.6	343.5	1,050.4	204.5
	%	100.0	100.0	100.0	100.0

Table 6.4 Total and Undeveloped Acres in Hazard Areas by Future Land Use Category for the City

Future Land Use Category		Coastal Hazard Zone		Hurricane Vulnerability Zone		Flood Zones		Wildfire Susceptible Areas	
		Total	Undev.	Total	Undev.	Total	Undev.	Total	Undev.
Commercial	Acres	8.0	0.4	18.9	0.9	25.6	2.9	7.4	6.9
	%	3.3	3.0	6.2	4.9	2.9	3.0	7.8	37.3
Community Facility	Acres	2.0	0.2	2.2	0.2	2.9	0.2	0.0	0.0
	%	0.8	1.5	0.7	1.1	0.3	0.2	0.0	0.0
General Mixed Use	Acres	21.2	8.7	29.6	9.4	34.1	9.4	0.0	0.0
	%	8.7	65.4	9.6	51.4	3.8	9.6	0.0	0.0
High Density Multiple Family Residential	Acres	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Industrial	Acres	0.0	0.0	0.0	0.0	222.5	11.1	27.4	11.6
	%	0.0	0.0	0.0	0.0	25.1	11.3	28.9	62.7
Low Density Multiple Family Residential	Acres	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium Density Multiple Family Residential	Acres	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Office	Acres	0.0	0.0	4.5	0.2	4.9	0.2	0.0	0.0
	%	0.0	0.0	1.5	1.1	0.6	0.2	0.0	0.0
Port	Acres	8.5	0.0	14.5	0.0	19.6	0.0	0.0	0.0
	%	3.5	0.0	4.7	0.0	2.2	0.0	0.0	0.0
Recreational	Acres	25.6	0.0	27.4	0.0	39.2	0.9	43.9	0.0
	%	10.5	0.0	8.9	0.0	4.4	0.9	46.3	0.0
Resort Hotel up to 40 suites per acre	Acres	14.5	0.7	16.9	0.7	15.2	0.9	0.0	0.0
	%	5.9	5.3	5.5	3.8	1.7	0.9	0.0	0.0
Single Family Residential up to 6 du per acre	Acres	143.3	3.3	159.8	3.8	254.1	12.5	12.0	0.0
	%	58.7	24.8	52.1	20.8	28.7	12.7	12.6	0.0
Special Preservation	Acres	6.9	0.0	6.9	0.0	145.8	54.4	0.0	0.0
	%	2.8	0.0	2.2	0.0	16.5	55.3	0.0	0.0
Utilities	Acres	2.5	0.0	4.0	0.0	97.0	2.2	4.2	0.0
	%	1.0	0.0	1.3	0.0	10.9	2.2	4.4	0.0
Working Waterfront	Acres	11.8	0.0	22.1	3.1	25.2	3.6	0.0	0.0
	%	4.8	0.0	7.2	16.9	2.8	3.7	0.0	0.0
Total	Acres	244.3	13.3	306.8	18.3	886.1	98.3	94.9	18.5
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Comprehensive Plan

Riviera Beach’s Comprehensive Plan (revised in 2001) was reviewed in order to see what the City has already done to integrate the Palm Beach County LMS policies, and hazard mitigation in general, into their planning process. A list of the goals, objectives, and policies currently in the plan that contributes to hazard mitigation is found in **Attachment G**. The following is a summary of how well the plan addressed the three hazards of this analysis.

Coastal Hazards

Coastal Resources are addressed in many policies. Submerged lands, bottom lands, the natural shoreline, beaches and dunes, coastal barriers, estuarine wetlands, and native vegetation are protected through various polices. Policies also regulate development that impacts these resources. The Coastal Management Element directs residential populations away from the CHHA, discourages increases in density in the Category 1 hurricane areas, and supports zoning policies that regulate structures in the CHHA. There are also many polices that aim to limit public spending and the siting of public facilities in the CHHA.

Flooding Hazards

There are many polices that protect wetlands through the Wetlands Preservation Ordinance and the Land Development Code, the use of buffering, acquisition of flood prone areas, and development setbacks. A policy also supports participation in the NFIP and the CRS, although the City has not yet entered the CRS program. Development in flood zones is addressed in several policies, requiring sufficient floor elevations, stormwater drainage facilities, and adherence to the State Building Code.

Wildfire Hazards

There are no policies in the Comprehensive Plan that directly address wildfire areas. There are several policies that support the conservation of water which could reserve water for fire suppression during drought conditions.

Other Hazard Mitigation Related Policies

The Comprehensive Plan has several policies that promote information sharing and coordination between multi-jurisdictional organizations and programs as well as governing documents including the Comprehensive Plan and the LMS. Many policies support adherence and involvement with the LMS, the NFIP and the Palm Beach County Emergency Management Plan. Policies also support prioritizing hazard mitigation related projects in the countywide LMS and the Capital Improvements Element. There is a policy that promotes public awareness of evacuation zones, shelter locations, and evacuation shelters. Other policies aim to maintain evacuation route capacity by regulating development in the CHHA and through coordination with regional agencies. Shelters are addressed in two policies and involve coordination with the American Red Cross and the Palm Beach County Department of Emergency Management. Redevelopment in the City is addressed in many policies and requires strict adherence to the development code.

Recommendations

For the LMS to be effective in the decision-making process of growth management, its objectives and policies must be integrated into all jurisdictions' Comprehensive Plans. The Plan is the legal basis for all local land use decisions made. If hazard mitigation is to be accomplished beyond the occasional drainage project, these hazards must be addressed in comprehensive planning, where development can be limited or regulated in high-risk hazard areas just as sensitive environments are routinely protected through growth management policies. Mitigation of hazards is considerably easier and less expensive if done when raw land is being converted into development. Retrofitting structure and public facilities after they have been built is significantly more expensive. However, if older neighborhoods or communities are scheduled to be revitalized or redeveloped, hazard mitigation needs to be an aspect considered and integrated into the project prior to the time of development approval.

Riviera Beach has begun the process of integrating hazard mitigation throughout its Plan's elements. The previous section summarized how the major hazards for the City have been for

the most part well-addressed. There is, however, still an opportunity to incorporate more of the Palm Beach LMS objectives into the policies in the Comprehensive Plan. By tightening the connection between these documents, the City will find it easier to implement hazard mitigation, and there will be higher awareness of these issues within the City. **Table 6.5** presents options for further integration as well as the basis for these recommendations.

NOTE: The recommendations set out in this section are only suggestions. Through the workshop process and contact with the local governments, the goal of this project is to result in specific recommendations tailored and acceptable to each jurisdiction. While the profile addresses hurricanes, flooding, and wildfire, during the update of the local Comprehensive Plan, the City should consider other hazards if appropriate, such as tornadoes or erosion.

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Riviera Beach's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Basis For Suggested Options
Strategy 1 - Collaboration, coordination, and education			
<p>a) Is there information sharing &/or involvement in plan development between planners & emergency managers?</p>	<p>CE P5.1.1 Beginning in 2001 the City shall begin the process of acquiring all available Geographic Information System (GIS) data bases showing flood hazard areas within Riviera Beach and overlaying them with City property appraiser maps. These digital data bases include • The NFIP rate maps • The SLOSH model storm surge projection maps; • The new TAOS model storm surge projection maps; and • The revised USGS topographic maps for Florida's east coast as they become available.</p> <p>CME O 3.1 Seek appropriate vehicles and forums for achieving effective intergovernmental coordination and cooperation regarding the impacts and implications of development in the coastal area on fragile coastal ecosystems and hazard mitigation.</p> <p>ICE P1.1.2 The City shall be involved in multi-jurisdictional organizations/committees or programs and the LMS.</p> <p>ICE P1.1.8 All existing and proposed planning and development activities are consistent with the City's Comprehensive Plan.</p> <p>ICE P3.1.4 Ensure consistency between the City's and the WMDs planning efforts and long-term flood control and water supply needs.</p>		
<p>b) Do the Comp Plan, LMS, CEMP, & other local and regional plans cross-reference each other & include consistent data on hazardous locations?</p>	<p>FLUE O 1.13 Coordinate future land uses with the adopted County-wide Hazard Mitigation plan.</p> <p>P1.13.1 Review the Hazard Mitigation Plan and determine and implement any necessary actions.</p> <p>IE P1.4.2 Participate on the LMS Steering Committee.</p> <p>IE P1.4.3 All stormwater projects shall be submitted to the LMS Program for inclusion on the Countywide list of Prioritized Projects, and shall be included in the City's Capital Improvements Element.</p> <p>CE P5.2.1 Support the LMS and the Countywide Project Prioritization List.</p> <p>CE P5.2.2 Apply for membership in the FEMA NFIP - CRS program.</p> <p>CME O 2.3 Maintain Emergency Management Plan (EMP).</p> <p>CME P2.3.3 Update the EMP Emergency Management Plan periodically.</p> <p>CME P2.4.1 Continue to participate on the LMS Steering Committee.</p> <p>CME P2.4.5 Incorporate and enforce LMS and EMP</p> <p>ICE P1.1.2 Be involved in multi-jurisdictional organizations/committees</p> <p>ICE P2.1.7 Participate in the LMS</p>		

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Riviera Beach's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Basis For Suggested Options
<p>c) Are hazard mitigation projects addressed in the 5-year schedule of Capital Improvement Projects?</p>	<p>P1.13.2 Prioritize a list of hazard-mitigation related projects, and seek funding assistance through the program. IE P1.4.3 All stormwater projects shall be submitted to the LMS Program for inclusion on the Countywide list of Prioritized Projects, and shall be included in the City's Capital Improvements Element. CE P5.2.3 Continue to identify all relevant disaster-related capital projects, and submit them for inclusion on the LMS Countywide Project Prioritization List.</p>		
<p>d) Are there measures to educate residents, homeowner/property associations, & the business community of ways they can mitigate against hazards?</p>	<p>CME P1.1.6 Provide technical assistance to property owners who restore and enhance coastal or estuarine vegetation.PSFE P2.2-g Coordinate with local governments and the School District on emergency preparedness including 1. Design and/or retrofit of public schools as emergency shelters; 2. Enhancing public awareness of evacuation zones, shelter locations, and evacuation routes; 3. Designation of sites other than public schools as long term shelters, to allow schools to resume normal operations following emergency events.</p>	<p>The City can create a Comprehensive Plan policy that promotes educational programs to inform the public and city officials about hazard mitigation techniques.</p>	<p>Public School Facilities Element Policy 2.2g supports "enhancing public awareness of evacuation zones, shelter locations and evacuations routes," but does not address flood hazards, mitigative actions for homeowners, programs to aid in the retrofit of private structures, or the training of public officials. Including a policy that expands educational programs for the public may help ensure citizens receive adequate information to protect themselves and their property prior to a natural disaster. Also, a policy that promotes the education of public officials (including site plan reviewers, city engineers, public works officials, and building inspectors) in hazard mitigation matters may help the city address hazard mitigation issues prior to development as well as provide insight to the strengths and weaknesses of the City's current strategy. .</p>

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Riviera Beach's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Basis For Suggested Options
Strategy 2 - Get out of the way: provide evacuation and sheltering services			
<p>a) Are there measures to provide adequate evacuation clearance time to support current population and population growth?</p>	<p>FLUE O 1.5 No land use plan amendments shall increase residential land use density and intensity in the CHHA. FLUE P1.5.1 Evaluate plan amendments and rezoning requests that would increase residential population densities permitted by the Comprehensive Plan in the CHHA in order to avoid further burdens on the hurricane evacuation process. FLUE P1.5.2 Adopt the hurricane evacuation routes and times as stated in the PBCCEMP. CME P2.1.2 Provide for safe evacuation from coastal areas by requiring that within the Hurricane Vulnerability Zone by maintaining evacuation route capacity. CME P2.3.2 Coordinate with regional agencies to maintain an efficient and timely evacuation process.</p>		
<p>b) Are there measures to provide adequate shelter space to meet population growth and special needs?</p>	<p>CME P2.3.1 Coordinate with the American Red Cross, Palm Beach County Chapter, and Palm Beach County Division of Emergency Management regarding the issue of shelter. PSFE P2.2-g Coordinate with local governments and the School District on emergency preparedness including 1. Design and/or retrofit of public schools as emergency shelters; 2. Enhancing public awareness of evacuation zones, shelter locations, and evacuation routes; 3. Designation of sites other than public schools as long term shelters, to allow schools to resume normal operations following emergency events.</p>	<p>The Comprehensive Plan could include a policy that aims to meet shelter demand in accordance with the State Shelter Plan.</p>	<p>As development is likely to occur, city population will increase causing a rise in shelter demand. Creating a policy in the Comprehensive Plan to meet existing and future shelter demand may help ensure safety for residents in the event of a hurricane.</p>

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Riviera Beach's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Basis For Suggested Options
Strategy 3 - Make the environment less hazardous: Protect and enhance natural protective features			
<p>a) Are there measures to protect and/or restore natural resources that might in turn decrease the risk from natural hazards?</p>	<p>Natural Resources and Environmentally Sensitive LandsFLUE GOAL 1 Protect and enhance the residential, commercial, industrial and natural resource areas.FLUE O 1.1 Coordinate all development and redevelopment availability of facilities and services, and with soil conditions and topography.FLUE P1.2.13 The 2001 Redevelopment Plan shall attempt to make Riviera Beach a model environmentally conscious city.FLUE O 1.4 Ensure protection of natural resources and environmentally sensitive land; particularly man groves, significant estuarine bottomlands, wetlands, the beach and well fields.ROS O 1.4 Improve and enhance level of open space in new development and redevelopment by public and private agencies.ROS P1.4.1 Ensure compliance with the open space standards CE G 1 Preserve, protect, and enhance the City's natural resourcesCE O 1.1 Protect and conserve the City's natural resources CE P1.2.1 The City will coordinate, at a minimum, with the SFWMD, Palm Beach County, Department of Environmental Resource Management, FIND, and Florida Department of Environmental Protection regarding conservation efforts.CE P3.1.3 Continue to coordinate with all applicable public and private entities to protect and conserve environmentally sensitive lands and native ecosystems through the development review process, joint acquisition and management processes, inter-local agreements, and through other available means.</p>	<p>Update existing polices that protect natural resources to include hazard mitigation as a benefit.</p>	<p>The City has many existing policies that mitigate the impacts of hazards, however they have not been identified as beneficial in this area. Current growth management techniques such as land conservation, buffering, and the clustering of development to protect and conserve natural resources but also provide the major benefit of protecting development from natural disasters. The City could update these policies in the Comprehensive Plan and emphasize the benefits of hazard mitigation.</p>
	<p>WetlandsFLUE P1.4.1 Continue to enforce the Wetlands Preservation Ordinance and shall continue to pursue public acquisition of submerged lands.FLUE P1.4.3 Implement the use of native vegetation, through the Land Development Code.IE O 1.4 Storm water system minimizes flooding.CE O 3.2 Maintain the functions and values provided by freshwater and marine wetlands CE P3.2.1 Implement the Wetlands Protection Section of the Land Development Code.CE P3.2.2 Designate appropriate and inappropriate uses for wetlands.CE P3.2.3 Disallow activities that would diminish the functions and values of wetlands.CE P3.2.4 Require buffer zone around wetlands.CE P3.2.5 Support wetland creation, restoration, enhancement, and preservation and shall encourage public and private sector initiatives for these efforts.CE P3.3.4 Continue to enforce the Wetlands Preservation Ordinance and shall continue to pursue public acquisition of submerged lands. CE G 5 Manage floodplains to minimize hazards to public health, safety, and property and to preserve natural recharge areas. CE O 5.1 Continue to work with the digitized (NFIP) rate maps, (SLOSH) and The Arbitor of Storms (TAOS) model projections for category I through 5 storm surge areas, and its own property appraiser maps to develop accurate overlays showing all areas prone to flooding within its jurisdiction.</p>		

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Riviera Beach's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Basis For Suggested Options
	<p>Coastal Resources ROS O 1.1 Preserve and enhance the 1,000 feet of city- owned, direct ocean beach park access. CE P3.1.5 Preclude any development of Submerged Lands except as specifically permitted by this section, including but not limited to mangroves, wetlands and estuarine bottomlands. CE P3.1.6. Adopt Land Development regulations addressing the use of the bottomlands CE P3.3.5 There will be no net loss of the 7,000 lineal feet of natural shoreline bordering the Lake Worth Lagoon estuary on Singer Island. CME G 1 To preserve, protect, and enhance coastal resources, and to discourage development activities that would damage or destroy coastal resources. CME O 1.1 Preserve and enhance coastal and estuarine wetlands, living marine resources, coastal barriers, and wildlife habitat. CME P1.1.2 Prohibit shoreline alteration and construction that have the potential to significantly degrade the natural functions and values of wetlands. CME P1.1.3 Protect selected estuarine and coastal habitats by the acquisition of coastal and wetland properties. CME P1.1.5 Protect existing native vegetation in accordance with the Land Development Code to provide a buffer between development and adjacent coastal ecosystems. CME P1.1.9 Encourage and support the management of the offshore natural reefs. CME O 1.2 Protect, enhance and restore the beaches and dunes through implementation and maintenance of the Palm Beach County Shoreline Protection Plan. CME P1.2.3 Protect and restore existing dunes and dune vegetation. CME P1.2.4 Continue to monitor and evaluate the condition of the City's beaches and dunes.</p>		
	<p>WildfiresIE P1 .4.5 Implement regional water plan, evaluate long-term environmental needs. Restrict degrading activities.IE O 1.6 Reduce water consumption by 15 percent in times of a water supply emergency and reduce water consumption by 5 percent on a permanent basisIE P1.6.1 In the event of low water supply, the City shall adopt an emergency water conservation program.CE G 3 Conserve, appropriately use, and protect the natural functions of native communities and ecosystems. CE O 3.1 The City shall preserve and protect native communities and ecosystems to ensure that representative communities remain intact. Priority shall be given to environmentally sensitive lands. CE P3.1.2 The City shall continue to facilitate the acquisition, protection, and long-term maintenance of native plant communities. CE O 3.5 The City shall continue efforts to eradicate invasive non-native plant species CE P3.5.1 Require the immediate and long-term removal or eradication of invasive non-native plant species and prohibits the planting of these species. CE P3.5.2 Maintain programs for the eradication and control of invasive non-native plant species.</p>		

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Riviera Beach's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Basis For Suggested Options
Strategy 4 - Make structures more resistant to natural hazard forces			
<p>a) Are there measures that support relocating or retrofitting private &/or public structures in hazard areas?</p>	<p>IE P1.2.2 Address public facilities repairs in 100 year floodplain.</p>	<p>Include a policy that promotes the retrofit or relocation of private structures outside hazard zones.</p>	<p>This suggestion can be carried out in conjunction with CME P 2.4.3 and also address the rehabilitation of low income housing.</p>
<p>b) Are there measures to require compliance with or exceed building codes &/or design standards for certain hazard areas?</p>	<p>FLUE P1.1.3 LDC will assure new development elevations sufficient to minimize flood impact. FLUE P1.1.4 Periodically review all development codes to determine needed refinements relative to on-site drainage, open-space and parking lot design standards. FLUE O 1.13 Coordinate future land uses to reduce or eliminate uses inconsistent with the adopted County-wide Hazard Mitigation plan. IE P1.5.3 All new development retain on site the rainfall / ground floor elevations shall be one foot above a 100-year storm elevation or one foot above the crown of the road. CE O 5.2 Continue to regulate development in and around natural flood plain areas and areas subject to tropical storm and hurricane storm surge, and implement projects to mitigate long-term damage. CME P1.2.1 Work with FDEP regarding implementation of the Coastal Construction Control Line (CCCL) CME P2.2.6 Evaluate the development implications of building within the CHHA, and determine whether special development standards need to be developed in order to mitigate long-term adverse physical impacts and to reduce public costs resulting from flood or hurricane events in this hazard sensitive area. CME P2.4.3 Continue to enforce regulations and codes that provide for hazard mitigation. CME P2.4.4 Building code to ensure that it is consistent with the newly adopted State Building Code. CME P2.4.5 Continue recommended hazard mitigation activities including land development regulations and construction law administration. .</p>	<p>-</p>	

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Riviera Beach's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Basis For Suggested Options
<p>c) Are there measures to protect cultural resources from natural disasters?</p>	<p>FLUE O 1.11 Determine the reuse of the Spanish Courts Motel Building / structural feasibility shall be determined by a certified structural engineer. FLUE P1.11.1 Complete perform an archaeological and historic assessment of the downtown redevelopment area (the City's oldest area) in conjunction with redevelopment planning. No later than the end of 2002, the City, in coordination with the CRA, shall perform an archeological and historic survey of the downtown redevelopment area. HE O 1.10 A survey of pre-1950 housing will be achieved. HE P1.10.1 The CRA shall assess all structures in the redevelopment area to determine if any houses are of historic significance; if any significant units are found, the CRA and planning staff shall establish restoration standards and review procedures consistent with the Department of the Interior standards for renovation.</p>	<p>Determine if the survey in HE O 1.10 and P 1.10.1 addresses mitigative actions to reduce damage associated with hurricanes and floods. Expand the policy to address all significant historical structures in the city.</p>	<p>Addressing structures and taking structural mitigative actions before a natural disaster may reduce damage associated with storm events.</p>
<p>Strategy 5 - Manage the development and redevelopment of land in hazardous areas</p>			
<p>a) Are there measures to limit population densities in high-hazard areas?</p>	<p>CME O 2.2 Direct permanent residential population concentrations away from CHHA, and shall discourage increases in permanent residential population densities or land use that would increase the eight-hour hurricane evacuation time currently predicted for the CHHA. CME P2.2.1 Carefully evaluate all land use plan amendments and zoning amendments that would increase residential land use density or intensity in the CHHA. CME P2.2.2 The City shall discourage increased densities in the Category 1 hurricane evacuation areas as defined by the Division of Emergency Management. CME P2.2.3 New development in the Coastal Planning Area shall be consistent with the densities proposed by the Future Land Use Element for the area. CME P2.2.5 Maintain zoning policies that prohibit tall signs, new hospitals, and mobile home parks in the coastal high hazard area.</p>	<p>-</p>	

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Riviera Beach's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Basis For Suggested Options
<p>b) Are there measures to limit public expenditures that subsidize development in high-hazard areas?</p>	<p>CME G 2 Protect human life by limiting public expenditures in areas subject to destruction by natural disasters within the CHHA, maintain and implement a safe and effective emergency management program, and provide for orderly redevelopment in a post-disaster period. CME O 2.1 Maintain adequate public infrastructure capacity in the CHHA to ensure the protection of its residents during disaster events. PSFE P2.1-d The proposed (school site) location shall comply with the provisions of the Coastal Zone Management Element of the comprehensive plan, if applicable to the site. CIE O 1.5 Limit public expenditures that subsidize development in high hazard coastal areas. CIE P1.5.3 Consider public funding of infrastructure in the CHHA where development existed prior to the date of adoption of this plan, and the infrastructure is needed • to provide adequate evacuation; • to maintain adopted level of service standards; • to provide recreational needs or other water-dependent uses; or • to restore or enhance natural resources. • Is in the public interest.</p>		
<p>c) Are there creative neighborhood design solutions or development regulations that mitigate hazards, such as clustering or transfer of development rights?</p>	<p>FLUE O 1.7 Innovative Land Development The City shall continue to develop and encourage utilization of innovative land regulations and zoning districts, including PUD, mixed use development, and new urbanist approaches, as measured below</p>	<p>Include a policy that promotes the use of growth management techniques including TDR, Clustering, and PDR to limit development in hazard areas.</p>	<p>These techniques could limit the amount of property at risk from natural hazards.</p>

Table 5.1 Options for Integrating LMS Hazard Mitigation Principles into Riviera Beach's Comprehensive Plan (DRAFT)

Strategies & Integration Topics	Current Comprehensive Plan Policies	Options for Further Integration into the Comprehensive Plan	Basis For Suggested Options
<p>d) Are there measures to limit redevelopment in hazard areas and procedures for post-disaster recovery that will lead to a more disaster-resistant community?</p>	<p>FLUE O 1.13 Coordinate future land uses as necessary to encourage the reduction or elimination of uses that the City determines are inconsistent with the adopted County-wide Hazard Mitigation plan. CME P2.2.4 Infill or redevelopment densities and intensities in Category 1 hurricane evacuation areas shall be consistent with existing adjacent development. CME O 2.4 Reduce post-disaster damage by implementing steps to create a more disaster-resistant community. CME P2.4.2 Prohibit the rebuilding of non-conforming uses that have experienced damage of greater than or equal to 50 percent of the assessed value, in the hurricane vulnerability zone. CME P2.4.6 Post-disaster redevelopment activities shall fall into two categories 1) Emergency Work; and 2) Permanent Work. Removal, relocation or structural modification of infrastructure and unsafe structures shall be prioritized into one of the two categories. CME P2.4.7 During the post-disaster recovery period, the Public Works Department, the Community Development Department, and other appropriate agencies shall identify the damaged areas requiring rehabilitation or redevelopment, (i.e. interim repairs prior to redevelopment versus demolition using pre-established criteria; prepare a redevelopment plan which reduces or eliminates the future exposure of life and property to hurricanes particularly where repeated damage has occurred; analyze and recommend to the City Council hazard mitigation options for damaged public facilities). CIE P1.5.1 All infrastructure, public or private, that occurs in the CRA area or other areas located in the CHHA must address and integrate engineering and construction techniques that make structures more disaster-resistant.</p>		

Abbreviations: G= Goal; O= Objective; P=Policy; PDRP= Post-Disaster Redevelopment Plan; HVZ= Hurricane vulnerability zone; CHHA= Coastal High Hazard Area

CE= Conservation Element; CME= Coastal Management Element; FLUE= Future Land Use Element; IE= Infrastructure Element; CIE= Capital Improvements Element; ICE=Intergovernmental Coordination Element; HE= Housing Element; PSFE= Public Schools Facilities Element; ROS= Recreation and Open Space

7. Sources

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Attachment A

**Maps of the Existing and Future Land Uses within the
Coastal Hazard Zone and the Hurricane Vulnerability Zone**

Attachment B

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

Attachment C

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

Attachment D

**Maps of the Existing and Future Land Uses
within Potential Sinkhole Hazard Areas**

Attachment E

Palm Beach County Local Mitigation Strategy Goals and Objectives

Goals

1. To reduce the loss of life, property, and repetitive damage from the effects of natural, societal and technological hazards from all sources but especially, in the county, hurricanes, tornadoes, major rainfall and other severe weather events.
2. To achieve safe and fiscally sound, sustainable communities through thoughtful long-range planning of the natural and man-made environment.
3. To take preventative actions to reduce the number of repetitive loss properties published annually by FEMA on the list of "Repetitive Loss Properties".
4. To qualify the county and jurisdictions for incremental improvements on the Community Rating System classification in relation to flood insurance under the National Flood Insurance Program (NFIP) and to reduce flood hazards.
5. To optimize the effective use of all available resources by establishing public/private partnerships, and encouraging intergovernmental coordination and cooperation.
6. To increase the continual distribution of information on a consistent basis with respect to the existence of flood hazards and the availability of measures to mitigate the problems presented by such hazards.
7. To consistently increase the level of coordination of mitigation management concerns, plans and activities at the municipal, county, state and federal levels of government in relation to all hazards.
8. To establish a program that facilitates orderly recovery and redevelopment, and minimizes economic disruption following a disaster.
9. To ensure an enforceable commitment for the implementation of the local hazard mitigation strategy.

The ultimate objectives of the LMS process are to:

- 1) Improve the community's resistance to damage from known natural, technological, and societal hazards;
- 2) Place Palm Beach County in a position to compete more effectively for pre and post-disaster mitigation funding;
- 3) Encourage strong jurisdictional, nongovernmental and public participation with all LMS activities;
- 4) Reduce the cost of disasters at all levels; and
- 5) Speed community recovery when disasters occur.

Attachment F

Palm Beach County Comprehensive Plan Excerpts Related to Hazard Mitigation

Capital improvements Element

CIE P 1.4-b

The County shall prioritize projects, programs and services, and their associated facilities in the annual Capital Project Request Proposals. These proposals shall be categorized as follows:

Essential: Services that are directly related to protecting the immediate health and safety of citizens from an existing or imminent hazard. An example would be an expenditure request which responds to a danger arising from an imminent bridge failure. Other examples are projects developed through the Local Mitigation Strategy program to strengthen emergency preparedness. Essential services shall be provided throughout the County.

Necessary: Services that are directly related to maintaining the level of service for concurrency items mandated by State law and fire-rescue services. Examples include expenditure requests, which are necessary to meet the minimum level of service standards for concurrency regarding roadway, mass transit, potable water, wastewater, solid waste, stormwater protection, recreation/open space, and fire-rescue. Necessary services shall be provided throughout the County.

Desirable: Services that are related to enhancing the desirability of Palm Beach County as a place to live. Examples include expenditure requests for libraries, and roadway beautification. The Urban/Suburban Tier shall be given the highest priority within this category, followed by the Exurban Tier, and then the Rural Tier.

CIE P 1.4-c

The County shall not utilize public funds for infrastructure expansion or improvements in coastal high-hazard areas unless such funds are necessary to: 1. Provide services to existing development; 2. Provide adequate evacuation in the event of an emergency; 3. Provide for recreational needs and other appropriate water-

dependent uses; or 4. Maintain the urban level of service. (9J-5.016(3)(b)2)

Conservation Element

CE GOAL 1

PROTECTION OF NATURAL RESOURCES It is the GOAL of Palm Beach County to preserve, protect, and enhance the County's natural resources, encouraging the highest possible environmental quality and best long-term management of natural resources.

CE O 1.2

Informational and Educational Activities The County shall provide information and educational activities for the citizens of the County to assist them in understanding the needs and issues related to the conservation and sustainable use of the County's natural resources.

CE P 1.2-a

The County shall implement public information programs concerning natural resource issues including, but not limited to:

1. Air quality;
2. Beaches and dunes;
3. Clean fill;
4. Drinking water;
5. Endangered and threatened species;
6. Exotic species control;
7. Hazardous waste;
8. Illegal dumping;
9. Natural and artificial reefs;
10. Natural areas protection and stewardship;
11. Prescribed burning;
12. Septic tanks and wastewater use;
13. Vegetation surplus;
14. Volunteer opportunities;
15. Water conservation;
16. Waste management;
17. Wellfield protection; and
18. Wetlands.

CE P 2.1-f

The County shall continue to coordinate with all applicable public and private entities to protect and conserve environmentally sensitive lands and native ecosystems through the environmental review process, joint acquisition and management processes, interlocal agreements, and through other available means. [9J- 5.013 (2)(c)8 F.A.C.]

CE O 2.2

Wetlands The County shall maintain the functions and values provided by freshwater and marine wetlands so there will be no net loss of wetland functions and values due to development or other activities. [9J-5.013 (2)(b)4. F.A.C.] *Cross Reference: See Coastal Management Element Policy 1.1-c.*

CE P 2.2-a The County shall continue to implement the Wetlands Protection Section of the Unified Land Development Code and shall continue to review and comment on wetland alteration applications being reviewed by other agencies to ensure that no activity results in the net loss of wetland values and functions. The County shall ensure that the following steps are taken, in order, when assessing proposed activities that may result in wetland impacts: *[9J-5.013 (2)(c)6 and 9J-5.013 (3)(b) F.A.C.]*

1. Avoidance of wetland impacts
2. Minimization of unavoidable wetland impacts
3. Compensation for wetland impacts through mitigation

CE P 2.2-b The County shall require, for any wetland that is degraded or destroyed, that mitigation be provided through the creation of new wetland habitat, through the restoration of degraded habitat, or through the enhancement of functions and values provided by existing habitat. Mitigation efforts that include creating new wetland habitats shall be designed, constructed, and maintained in a manner which will reflect the habitat being altered, degraded or destroyed. *[9J-5.013(3)(b) F.A.C.]*

CE P 2.2-d The County shall not allow activities that would diminish the functions and values of wetlands by altering the quantity or timing of water availability to existing wetlands or altering their water regimes. *[9J-5.013(3)(b) F.A.C.]*

CE P 2.2-e The County shall require, when reviewing development activities adjacent to or within wetland areas, that a buffer zone of native vegetation, which may include canopy, understory and ground cover, as appropriate, be provided and maintained around all wetlands. The area requirements for the buffer zone shall be consistent with the Treasure Coast Strategic Regional P Plan.

CE O 2.5 Prohibited Invasive Non-Native Vegetation The County shall continue efforts to eradicate prohibited invasive non-native vegetation and, where appropriate, require their removal and replacement with native plant vegetation.

CE P 2.5-a The County shall continue to implement the Sections of the Unified Land Development Code, which require the immediate and long-term removal, or eradication of prohibited

invasive non-native vegetation and prohibits the planting of this vegetation.

CE P 2.5-b The County shall maintain programs for the eradication and control of prohibited invasive non-native vegetation as part of the maintenance activities of County owned or managed property. The County shall seek funding and enforcement procedures in cooperation with federal, state and municipal agencies.

CE P 2.5-c: The County shall continue to implement the Unified Land Development Code to require the eradication of prohibited invasive non-native vegetation as a condition of all development orders, to require the continual maintenance of landscaped and preserved areas for the removal of this vegetation and to prohibit the planting of this vegetation.

CE P 3.1-a The County shall continue to coordinate with the South Florida Water Management District and/or an advisory committee created by the District to assist with implementation of the provisions of the regional water plan to evaluate long-term environmental needs and restrict activities that result in the degradation or over utilization of potable water resources and assure adequate water supply for: 1) native ecosystems and other lands with significant native vegetation; 2) agriculture; and 3) domestic and industrial needs. *[9J-5.013(2)(c)1&4 F.A.C.] Cross reference: Please also refer to the policies below and the Utilities Element, Potable Water & Sanitary Sewer Sub-Element, Policy 2.1-e.*

CE P 3.1-d The County, in close coordination with the South Florida Water Management District and other environmental regulatory and planning agencies, shall encourage that wetland mitigation, environmental protection and water management efforts support and optimize the functions of the East Coast Buffer and the Water Preserve Areas.

Fire-Rescue Services Element

FRSE GOAL 1 EFFECTIVE FIRE AND RESCUE SERVICES It is the GOAL of Palm Beach County to provide an effective program of emergency fire and rescue services with a comprehensive fire prevention program that is responsive to the desires, needs and economic capacity of the community.

P 1.4-d Coordinate Emergency Service Functions (ESF's) 4-firefighting, 9-urban search and rescue and 10-hazardous materials for the County Division of Emergency Management in the event of a hurricane or other disaster.

Historic Preservation Element

HPE GOAL PROTECTION AND AWARENESS OF HISTORIC RESOURCES It is the GOAL of Palm Beach County to recognize the importance of its historic resources; to locate, identify and evaluate those resources; and to provide for the preservation and enhancement of the resources while expanding public awareness of the contribution these resources make to the County.

HPE O 1.1 Historic Preservation Palm Beach County shall ensure the protection of its historic resources through the identification of existing and potential sites, and enforcement of the Unified Land Development Code (ULDC) provisions for their protection.

HPEP 1.1-b The County shall continue to identify county-owned historic sites and structures and shall determine all sites' potential for heritage tourism development, including restoration and reuse, and historic markers.

Intergovernmental Coordination Element

ICE P 1.1-I The County shall coordinate with the South Florida Water Management District to ensure consistency between the County's and the District's planning efforts and to address the combined long-term flood control and water supply needs of the environment, agriculture and urban areas through measures identified in Potable Water & Wastewater Policy 2.1-e.

ICE P 1.2-g The County shall continue to support the development of a Countywide geographic and land information system (GIS/LIS) with coordination through the Geographic Information Systems Policy Advisory Committee (GISPAC). The GIS/LIS information shall be maintained in a form for inter-agency use and be accessible to the public.

ICE P 1.3-g The County, through the Emergency Management Division of the Public Safety Department, shall implement strategies identified in the Palm Beach County Comprehensive Emergency Management Plan and the Palm Beach County Post- Disaster Redevelopment Plan to address the following: 1. Coordination with all pertinent municipalities, local, regional or state agencies to assure an efficient and timely evacuation process in the

case of a hurricane event; 2. Coordination with state and federal government, Palm Beach County municipalities, other counties and agencies to respond to natural or manmade disasters in the coastal area.

Coastal Management Element

CME GOAL 1 ENVIRONMENTAL RESOURCES MANAGEMENT It is the GOAL of Palm Beach County to preserve, protect, and enhance coastal resources, and to discourage development activities that would damage or destroy coastal resources. [9J-5.012(3)(a)]

CME O 1.1 Protection and Enhancement of Coastal and Estuarine Environmental Quality Palm Beach County shall continue to maintain and develop programs, and seek funding to expand its efforts necessary to protect, preserve and enhance coastal and estuarine wetlands, living marine resources, coastal barriers, and wildlife habitat. [9J-5.012(3)(b)1,2]

CME P 1.1-c The County shall protect freshwater, estuarine and marine wetlands, including mangroves, sea grasses, salt marsh vegetation, offshore natural reefs, and productive submerged habitats through the implementation and maintenance of its applicable sections of the ULDC and coordination with FDEP's Environmental Resource Permit Program. The County shall further prohibit shoreline alteration and construction that have the potential to significantly degrade the natural functions and values of wetlands. Mitigation shall be required if adverse impacts to water quality and natural habitats are unavoidable. [9J-5.012(3)(c)1]

CME P 1.1-d The County shall protect selected estuarine and coastal habitats by the acquisition of coastal and wetland properties (or properties adjacent to such habitats) and managing the properties for the purpose of preservation and/or environmental enhancement. [9J-5.012(3)(c)2]

CME P 1.1-e The County shall protect estuarine waters through the continued implementation and maintenance of regulations in the Unified Land Development Code (ULDC), the surface water quality management program, and by expanding and maintaining the water quality monitoring network to provide additional information for the identification and regulation of point and non-point discharges into estuarine waters. [9J-5.012(3)(c)1,2]

CME P 1.1-h The County shall require the protection of existing native vegetation in accordance with the Unified Land Development Code (ULDC) to

provide a buffer between development and adjacent coastal ecosystems. [9J-5.012(3)(c)1,2]

CME O 1.2

Shoreline Protection Palm Beach County shall protect, enhance and restore the beaches and dunes through implementation and maintenance of the Palm Beach County Shoreline Protection Plan. [9J- 5.012(3)(b)2]

CME P 1.2-d

The County shall avoid the use of shoreline armoring (except as a last resort measure) and shall use shore protection alternatives such as beach nourishment, dune restoration, and inlet sand transfer that reduce the need for armoring.

CME P 1.2-e

The County shall continue to reestablish damaged dunes and eroded beaches where possible to promote the enhancement of these resources and reduce damage resulting from storms. [9J-5.012(3)(c)1,2]

CME P 1.2-f

The County shall work cooperatively with the DEP, coastal municipalities, special districts and private property owners to protect and restore existing dunes and dune vegetation. The County shall make recommendations to the State for modification of State rules or policy that will enable DEP and local governments to more effectively protect dune vegetation. [9J-5.012(3)(c)15]

CME P 1.2-g

The County shall continue to monitor and evaluate the condition of the County's beaches and dunes.

CME GOAL 2

COASTAL DEVELOPMENT AND EMERGENCY MANAGEMENT It is the GOAL of Palm Beach County to protect human life by limiting public expenditures in areas subject to destruction by natural disasters within the coastal high hazard area, maintaining and implementing a safe and effective emergency management program, and providing for orderly redevelopment in a post-disaster period. [9J-5.012(3)(a)]

CME O 2.1

Levels of Service Palm Beach County shall establish and maintain urban levels of service, areas of service, and phasing of infrastructure in the unincorporated coastal area. [9J-5.012(3)(b)5]

CME P 2.1-c

The County shall provide for safe evacuation from coastal areas by reviewing all development proposals in the Hurricane Vulnerability Zone, which are submitted for certification through the zoning approval and development review committee processes, to determine whether the development is expected to result in an increase in hurricane evacuation times. Developments which cause such an increase shall be required

to provide mitigation measures, including but not limited to safe rooms in homes or common facilities, or roadway improvements, such that hurricane evacuation times are not increased in the hurricane vulnerability zone. [9J-5.012(3)(c)4,7]

CME O 2.2 Public Subsidy of New Coastal Development Palm Beach County shall not subsidize new or expanded development in the coastal area. [9J-5.012(3)(b)5]

CME P 2.2-a The County shall not use public funds for infrastructure expansion or improvements, or development subsidization in coastal high-hazard areas unless such funds are necessary to: provide services to development approved prior to the implementation of this policy, provide adequate evacuation (in the event of emergency) of existing developments; to maintain the urban level of service; or provide for recreational needs, other appropriate water-dependent uses, and natural resource restoration or enhancement.

CME O 2.3 Development in High Hazard Area Palm Beach County shall direct population concentrations away from known or predicted coastal high-hazard areas, and shall not approve increases in population densities in the coastal high hazard area. [9J-5.012(3)(b)6,7]

CME P 2.3-a The County shall not increased densities in the coastal high hazard area.

CME P 2.3-c Infill or redevelopment densities and intensities in coastal high hazard areas shall be consistent with existing adjacent development but at densities and intensities no greater than the adopted future land use designations. [9J-5.012(3)(c)7,9]

CME O 2.4 Emergency Preparedness Palm Beach County, through the Emergency Management Division of the Public Safety Department, shall maintain and update as necessary, the Palm Beach County Comprehensive Emergency Management Plan (1995), which provides for direction and control of activities during the period of any disaster, including preparedness, response and recovery. [9J- 5.012(3)(b)7,8]

CME P 2.4-a The County shall provide shelter space in accordance with the Comprehensive Emergency Management Plan. Where deficits exist, the County shall seek to reduce the deficit through federal and state retrofit funds. [9J-5.012(3)(c)3,4]

CME P 2.4-b The County Division of Emergency Management shall coordinate with all affected municipalities; and, local, regional, or state agencies to maintain an efficient and timely evacuation process in the case of a hurricane, in accordance with the provisions of Rules 9G-6 FAC. [9J-5.012(3)(c)3,4,14]

CME P 2.4-c The County shall update its Comprehensive Emergency Management Plan periodically in a manner consistent with Rules 9G-6 FAC to incorporate changes to population, highways/bridges, shelter modifications, hurricane hazard analysis, and forecast techniques. [9J-5.012(3)(c)4]

CME P 2.4-d Palm Beach County shall maintain a Local Mitigation Strategy program (LMS) with the purpose of developing and implementing a unified approach among County and municipal governments for dealing with identified hazards and hazard management problems. The program's primary objectives shall:

1. Improve the community's resistance to damage from identified natural, technological, and social hazards;
2. Increase Palm Beach County's eligibility for receiving local, state, federal, and other mitigation funds;
3. Reduce the cost of disasters; and
4. Expedite post-disaster community recovery.

CME P 2.4-e The Local Mitigation Strategy program (LMS) shall establish funding priorities and mitigation projects through a formal process that mandates coordination between the municipalities and the County. The LMS shall accomplish this through a Prioritized Project List (PPL) that will rank-order mitigation projects at least twice per year using established evaluative criteria and structured procedures.

CME O 2.5 Post-Disaster Redevelopment Palm Beach County, through the Emergency Management Division of the Public Safety Department, shall reduce or eliminate the risks associated with natural hazards through the implementation and maintenance of the Palm Beach County Post-Disaster Redevelopment Plan.

CME P 2.5-a The County shall coordinate with applicable local governments and agencies, via the countywide operational structure and emergency activities of its Comprehensive Emergency Management Plan, to implement

and update as necessary, its Post-Disaster Redevelopment Plan to reduce or eliminate the exposure of human life and public and private property to natural hazards. [9J-5.012(3)(c)3,5,14

CME P 2.5-b The County shall prohibit the rebuilding of non-conforming uses that have experienced damage of greater than or equal to 50 percent of value, in areas most vulnerable to the effects of storms. When structures are rebuilt, they shall be required to be brought up to code. [9J-5.012(3)(c)3,5]

CME P 2.5-c The County shall explore the applicability of using transfers of development rights and other programs for the acquisition of property or property rights, as methods of compensating property owners who do not rebuild structures in those areas most vulnerable to the effects of storms. Lands so acquired shall be used for parks and other recreational uses. [9J-5.012(3)(c)3,5]

CME P 2.5-d The County shall continue to enforce regulations and codes, which provide for hazard mitigation. These include land use, building construction, flood elevation, septic and sanitary sewer, coastal construction setback, and stormwater facility regulations. These regulations shall also be applied to eliminate unsafe conditions and inappropriate uses. [9J-5.012(3)(c)3,5]

CME P 2.5-e The County shall, pursuant to the Comprehensive Emergency Management Plan, continue recommended hazard mitigation activities, including land development regulations and construction law administration. Post-disaster recommendations contained in Hazard Mitigation Plans shall be incorporated to avoid future destruction and loss of life. [9J-5.012(3)(c)3,5]

CME P 3.1-c For disaster preparedness, there shall be a governing policy body to advise and assist in the development and administration of a Local Mitigation Strategy program (LMS). It shall be comprised of representatives who are assigned by each of the 37 municipalities and Palm Beach County, and shall be governed by policies, procedures and/or inter-local agreements.

Health and Human Services Element

HHSE P 4.1-g

Palm Beach County will protect the safety of its residents and visitors by developing disaster and emergency management plans and maintaining and implementing programs and services supportive of those plans.

Recreation and Open Space Element

ROSE O 1.4

Open Space The County's ULDC shall have adequate provisions to ensure that lands are set aside in new developments for open space, and that environmentally sensitive lands are protected for inclusion in the Countywide open space system.

Schools Element

SE P 2.2-g

The County shall coordinate with local governments and the School District on emergency preparedness issues which may include consideration of: 1. Design and/or retrofit of public schools as emergency shelters; 2. Enhancing public awareness of evacuation zones, shelter locations, and evacuation routes; 3. Designation of sites other than public schools as long term shelters, to allow schools to resume normal operations following emergency events.

Future Land Use Element

FLUE P 1.2-c

The County shall coordinate with coastal municipalities to control population densities in coastal high-hazard areas, in accordance with Coastal Management Objective 2.3. The County shall not increase the density in unincorporated areas located within the coastal high-hazard areas.

FLUE P 1.2-d

The County may allow an increase in density greater than the HR-12 Future Land Use category in appropriate areas within the County to direct growth away from natural resources and to use infrastructure more efficiently if the proposed development applies one of the following:

1. The Workforce Housing Program, which allows an opportunity to set aside a certain percentage of units for affordable housing, as described in the policies in Housing Element Objective 1.1 and 1.5;
2. The Transfer of Development Rights (TDR) Program as described in Objective 2.6;

- 3. The provisions of a Special Overlay as described in Future Land Use Table 2.1- 3; or
- 4. The Traditional Neighborhood Development, Traditional Marketplace Development, Traditional Town Development, Mixed-use Planned Development districts, or Transit Oriented Development option.

FLUE P 1.2-h Land development regulations shall require mobile home parks to include a permanent structure adequate for an emergency shelter. The size of this shelter shall be established in the Unified Land Development Code pursuant to the square footage per person shelter requirements contained in the Comprehensive Emergency Management Plan.

FLUE P 1.4-I As an incentive to preserve wetlands, the County shall continue to assign areas with a RR20 Future Land Use designation as sending areas, consistent with the TDR program described in Objective 2.6.

FLUE P 2.2-d The County shall ensure its Unified Land Development Code is consistent with the appropriate elements of the Comprehensive Plan. This consistency shall, at a minimum: 6. Protect areas subject to seasonal or periodic flooding, as provided in the Utility and Conservation Elements; 9. Protect open spaces and natural resources; 10. Protect historically significant properties, as provided in the Historic Preservation Element;

FLUE P 2.2.7-b The County shall initiate amendments to designate environmentally sensitive lands purchased by the County as Conservation. The County shall also coordinate with municipalities to designate County acquired environmentally sensitive lands within incorporated areas as Conservation.

FLUE P 2.2.7-c The County may designate privately held lands, that have a Conservation future land use designation, as sending areas for the transfer of development rights, consistent with the requirements of the Transfer of Development Rights (TDR) Program described in Future Land Use O 2.6. The sending rate shall be one dwelling unit per 10 acres.

FLUE O 2.6 Transfer of Development Rights Palm Beach County shall implement a Transfer of Development Rights (TDR) program. The TDR program is designed to protect Environmentally Sensitive Lands and the Agricultural Reserve.

FLUE P 2.6-h The County shall not approve the designation of receiving areas, which would result in a significant negative impact upon adjacent Environmentally Sensitive Land. Significant negative impact shall be determined by the BCC based on findings by the Planning Division, in conjunction with the Department of Environmental Resources Management, the South Florida Water Management District and other applicable agencies, and be based upon data and analysis.

FLUE P 4.4-a The County shall locate, identify, evaluate and protect historic and archaeological sites, through the policies of the Historic Preservation Element and the implementing provisions of the Unified Land Development Code.

FLUE GOAL 5 NATURAL RESOURCE PROTECTION It is the GOAL of Palm Beach County to provide for the continual protection, preservation, and enhancement of the County's various high quality environmental communities for the benefit of its current and future residents and visitors.

FLUE O 5.1 Protection of Natural Resources and Systems Palm Beach County shall ensure the protection of natural resources and systems by enforcing and monitoring existing environmentally related ordinances and developing ordinances, as needed, pursuant to the Conservation Element.

FLUE P 5.1-a Palm Beach County shall ensure the protection and stewardship of natural resources and systems, including quality uplands and wetlands, environmentally sensitive lands, wildlife habitats and regional water management areas. The County shall request review and comments from the South Florida Water Management District, Department of Environmental Protection, Game and Fresh Water Fish Commission, and other governmental/ environmental agencies, during the Plan amendment process.

FLUE P 5.1-b The impact of development on natural resources and systems, including high quality coastal and inland wetlands and future potable water supply well field areas, as identified in the Future Land Use, Coastal Management, and Conservation Elements, shall be evaluated during the development review process, as outlined in the

Unified Land Development Code, to protect these resources from the adverse impacts associated with incompatible future land uses on or near such sites.

FLUE P 5.2-a

The Department of Environmental Resources Management shall provide for the preservation and protection of native vegetation and environmental systems by applying the Native Ecosystem Overlay through implementation of the Vegetation Preservation and Protection Ordinance. Areas identified shall require preparation of a written environmental assessment, as part of the environmental review process. This review will result in specific recommendations regarding purchase or development, subject to conditions such as reduced density or intensity of future land use, and increased set-aside requirements.

Potable Water and Wastewater Sub-Element

PWWSE GOAL 2

WATER AND GROUNDWATER PROTECTION It is the GOAL of Palm Beach County to promote the conservation and protection of surface and groundwater resources with the purpose of securing future water supplies for urban and agricultural users and for the preservation and enhancement of the regional ecosystem.

PWWSE O 2.1

Water Conservation Palm Beach County shall continue to implement procedures and programs to conserve water through reuse, and other methods, consistent with federal, state and regional policy plan goals and regulations.

PWWSE P 2.1-a

Palm Beach County encourages and promotes the use of innovative alternative technologies to augment water resources including: conventional reclaimed water irrigation piping systems, constructed wetlands, aquifer storage and recovery (ASR), groundwater recharge and indirect reuse systems.

Attachment G

Riviera Beach Comprehensive Plan Excerpts Related to Hazard Mitigation

Future Land Use Element

GOAL 1 To protect and enhance the residential, commercial, industrial and natural resource areas of Riviera Beach.

OBJECTIVE 1.1 Public Facility Availability The City shall continue to insure that all development and redevelopment is coordinated with the availability of facilities and services, and is compatible with soil conditions and topography.

Policy 1.1.3 The City shall continue to use the flood plain provisions of the Land Development Code to assure new development at topographic elevations sufficient to minimize flood impact.

Policy 1.1.4 Periodically review all development codes to determine needed refinements relative to on-site drainage, open-space and parking lot design standards.

Policy 1.2.13 The 2001 Redevelopment Plan shall attempt to make Riviera Beach a model environmentally conscious city among the cities surrounding the Lake Worth Lagoon.

OBJECTIVE 1.4 Natural Resources Development activities shall ensure protection of natural resources, and the city shall continue to enforce the Land Development Code and amend if necessary to assure adequate protection of natural resources and environmentally sensitive land; particularly man groves, significant estuarine bottomlands, wetlands, the beach and well fields.

Policy 1.4.1 In order to achieve protection of the natural Singer Island lakefront habitat (particularly mangroves, adjacent wetlands and significant estuarine bottomlands) the City shall continue to enforce the Wetlands Preservation Ordinance and shall continue to pursue public acquisition of submerged lands

Policy 1.4.3 The City shall continue to implement the use of native vegetation, through the Land Development Code.

OBJECTIVE 1.5 Hurricane Evacuation Grant no land use plan amendments that would increase residential land use density and intensity in the Coastal High Hazard

Policy 1.5.1 Evaluate plan amendments and rezoning requests that would increase residential population densities permitted by the Comprehensive Plan in the CHHA in order to avoid further burdens on the hurricane evacuation

process. Vacant parcels shall be developed at densities and intensities consistent with the Future Land Use Map; and will adhere to Objective 2.2 and related policies of the Coastal Management Element.

Policy 1.5.2 The City of Riviera Beach shall adopt the hurricane evacuation routes and times as stated in the Palm Beach County Comprehensive Emergency Management Plan.

OBJECTIVE 1.7 Innovative Land Development The City shall continue to develop and encourage utilization of innovative land regulations and zoning districts, including PUD, mixed use development, and new urbanist approaches, as measured below

OBJECTIVE 1.11 Historic Preservation The City shall consider the historic value and character of the downtown in the context of redevelopment efforts. Moreover, to the extent structurally feasible, the City shall preserve and adaptively reuse the restored Spanish Courts Motel Buildings. Structural feasibility shall be determined by a certified structural engineer, in consultation with the Florida Division of Historical Resources and the Florida Trust for Historic Preservation. The City shall also preserve any readily accessible artifacts located in the archeological site.

Policy 1.11.1 By 200-1, the CRA (in coordination with the City planning staff) shall complete perform an archaeological and historic assessment of the downtown redevelopment area (the City's oldest area) in conjunction with redevelopment planning. No later than the end of 2002, the City, in coordination with the CRA, shall perform an archeological and historic survey of the downtown redevelopment area. No structural disturbance of the restored Spanish Courts will occur prior to completion of the survey.

Policy 1.12.3 All proposed school sites shall be located away from industrial uses, major arterial roadways, railroads, airports, seaports, and similar land uses to avoid noise, odors, dust, and traffic impacts and hazards.

OBJECTIVE 1.13 Hazard Mitigation The City shall coordinate future land uses as necessary to encourage the reduction or elimination of uses that the City determines are inconsistent with the adopted County-wide Hazard Mitigation plan. Policy 1.13.1 By 2001, the City shall review the Hazard Mitigation Plan and determine and implement any necessary actions. Policy 1.13.2 The City shall prioritize a list of hazard-mitigation related projects, and seek funding assistance through the program.

Housing Element

OBJECTIVE 1.10 Historic Housing By 2004, a survey of pre-1950 housing will be achieved. Policy 1.10.1 The CRA shall assess all structures in the redevelopment area to determine if any houses are of historic significance; if any significant units are found, the CRA and planning staff shall establish

restoration standards and review procedures consistent with the Department of the Interior standards for renovation

Infrastructure Element

Policy 1.2.2 In areas within the 100-year flood plain where existing public utility systems (e.g., sewer, potable water) require repair, rehabilitation or increased capacity, water and sewer lines shall incorporate measures to avoid backflow, and should be adequately protected to prevent damage caused by erosion, scour, debris impact, velocity flow, and wave action. Once identified and costed, the City will submit all projects for inclusion on the Palm Beach County LMS Prioritized Ranking List.

OBJECTIVE 1.4 Stormwater The City shall ensure that its storm water system minimizes flooding, and protects the water quality of its coastal water bodies.

Policy 1.4.2 The City will actively participate on the Palm Beach County Local Mitigation Strategy Steering Committee.

Policy 1.4.3 All stormwater projects shall be submitted to the LMS Program for inclusion on the Countywide list of Prioritized Projects, and shall be included in the City's Capital Improvements Element.

Policy 1.4.5 The City shall continue to coordinate with Palm Beach County and the South Florida Water Management District to assist with implementation of the provisions of the regional water plan, and to evaluate long-term environmental needs. Activities that result in the degradation or over-utilization of potable water resources will be restricted and an adequate water supply assured for 1. native ecosystems and other environmentally sensitive areas; and 2. domestic and industrial needs

Policy 1.5.3 Stormwater All new development retain on site the rainfall from a one-hour storm that statistically occurs once in 3 years. This amount is estimated to be at 2.7 inches. All ground floor elevations shall be one foot above a 100-year storm elevation or one foot above the crown of the road, whichever is greater. The stormwater system of new developments shall also be designed to comply with the water quantity and quality requirements of the appropriate permitting agency but post-development runoff shall not exceed pre-development runoff.

OBJECTIVE 1.6 Water Conservation The City shall achieve the capability to reduce water consumption by 15 percent in times of a water supply emergency and reduce water consumption by 5 percent on a permanent basis for City-owned or maintained areas. Policy 1.6.1 In the event of low water supply, the City shall adopt an emergency water conservation program.

Recreation and Open Space Element

OBJECTIVE 1.1 Waterfront Park Access The City of Riviera Beach shall continue to preserve and enhance the 1,000 feet of city- owned, direct ocean beach park access

OBJECTIVE 1.4 Open Space The City shall improve and enhance level of open space in new development and redevelopment by public and private agencies.

Policy 1.4.1 By June 2002, the City shall complete a review of the open space provisions in the development code to ensure compliance with the open space standards and definitions set forth in this element, and insure the provision of usable, high quality open space (e.g. parks).

Conservation Element

GOAL 1 PROTECTION OF NATURAL RESOURCES To preserve, protect, and enhance the City’s natural resources, encourage the highest possible environmental quality and maintain best long-term management of natural resources.

OBJECTIVE 1.1 Codes, Ordinances and Regulations The City shall continue to implement, revise, maintain and adopt new codes, ordinances and regulations as necessary, to protect and conserve the City’s natural resources including • Air; • Beaches, shores; • Fisheries; • Native plant and animal communities and ecosystems; • Noise Level; • Wetlands; • Soils; • Water; and • Wildlife and wildlife habitats.

OBJECTIVE 1.2 Informational and Educational Activities The City shall provide in formation and educational activities for the citizens of Riviera Beach assist and them in understanding the needs and issues related to the conservation and sustainable use of the City’s natural resources

Policy 1.2.1 The City will coordinate, at a minimum, with the SFWMD, Palm Beach County, Department of Environmental Resource Management, FIND, and Florida Department of Environmental Protection regarding conservation efforts.

GOAL 3 PROTECTION OF NATIVE COMMUNITIES AND ECOSYSTEMS To conserve, appropriately use, and protect the natural functions of native communities and ecosystems. OBJECTIVE 3.1 Native Communities and Ecosystems The City shall preserve and protect native communities and ecosystems to ensure that representative communities remain intact. Priority shall be given to environmentally sensitive lands.

Policy 3.1.1 Development activities proposed in native ecosystems shall continue to be regulated through the Land Development Code to assure protection of environmentally sensitive lands and native communities.

Policy 3.1.2 The City shall continue to facilitate the acquisition, protection, and long-term maintenance of native plant communities through mechanisms including, but not

limited to, conservation easements, grants and matching funds, and donations of land.

Policy 3.1.3 The City shall continue to coordinate with all applicable public and private entities to protect and conserve environmentally sensitive lands and native ecosystems through the development review process, joint acquisition and management processes, inter-local agreements, and through other available means.

Policy 3.1.5

Special Preservation; Mangrove, wetlands and special estuarine bottomlands. These mangroves and special estuarine bottomlands are protected by Federal, State and local agencies involved in wetlands preservation, dredge and fill permitting, and other hydrological modifications. It is the expressed policy objective of the City to preclude any development of Submerged Lands except as specifically permitted by this section, including but not limited to mangroves, wetlands and estuarine bottomlands, to the maximum extent permissible by law. Private residential fishing or viewing platforms and docks for non-motorized boats may be permitted subject to the following regulations 1. Platforms and docks shall not extend outward past the mean low water line. 2. Construction must be fully achievable from an on-shore location. 3. Permits must be obtained from all other applicable regulatory agencies.

Policy 3.1.5

Special Preservation; Mangrove, wetlands and special estuarine bottomlands. These mangroves and special estuarine bottomlands are protected by Federal, State and local agencies involved in wetlands preservation, dredge and fill permitting, and other hydrological modifications. It is the expressed policy objective of the City to preclude any development of Submerged Lands except as specifically permitted by this section, including but not limited to mangroves, wetlands and estuarine bottomlands, to the maximum extent permissible by law. Private residential fishing or viewing platforms and docks for non-motorized boats may be permitted subject to the following regulations 1. Platforms and docks shall not extend outward past the mean low water line. 2. Construction must be fully achievable from an on-shore location. 3. Permits must be obtained from all other applicable regulatory agencies.

Policy 3.1.6.

By 2002, The City shall adopt Land Development regulations addressing the use of the bottomlands for purposes listed above and which are compatible with the City's preservation policies contained in the Future Land Use Element Objective 1 .8, Coastal Management Element Objective 1.1 and Conservation Element 3.3 which mandates no net loss of the natural shoreline bordering the estuary on Singer Island or destruction of bottomlands.

OBJECTIVE 3.2 Wetlands The City shall maintain the functions and values provided by freshwater and marine wetlands so there will be no net loss of wetland functions and values due to development or other activities.

Policy 3.2.1 The City shall continue to implement the Wetlands Protection Section of the Land Development Code and shall continue to review and comment on wetland alteration applications being reviewed by other agencies to ensure that no activity results in the net loss of wetland values and functions, being particularly diligent in the review of any coastal zone or wetland projects, in order to protect the Singer Island mangrove and wetlands, Lake Worth bottomland areas, and the most environmentally sensitive lands in the City. The City shall ensure that the following steps are taken, in order, when assessing proposed activities that may result in wetland impacts 1. Avoidance of wetland impacts 2. Minimization of unavoidable wetland impacts 3. Compensation for wetland impacts through mitigation

Policy 3.2.2 The City shall designate appropriate and inappropriate uses for wetlands, including the use of wetlands for wastewater treatment, to ensure that the functions and values of existing wetland systems are maintained or enhanced.

Policy 3.2.3 The City shall not allow activities that would diminish the functions and values of wetlands by altering the quantity or timing of water availability to existing wetlands or altering their water regimes.

Policy 3.2.4 The City shall require, when reviewing development activities adjacent to or within wetland areas, that a buffer zone of native vegetation, which may include canopy, understory and ground cover, as appropriate, be provided and maintained around all wetlands.

Policy 3.2.5 The City shall support wetland creation, restoration, enhancement, and preservation and shall encourage public and private sector initiatives for these efforts.

Policy 3.3.4 In order to achieve protection of the natural Singer Island lakefront habitat (particularly mangroves, adjacent wetlands and significant estuarine bottomlands) the City shall continue to enforce the Wetlands Preservation Ordinance and shall continue to pursue public acquisition of submerged lands by reviewing public records concerning delinquent property taxes.

Policy 3.3.5 There will be no net loss of the 7,000 lineal feet of natural shoreline bordering the Lake Worth Lagoon estuary on Singer Island.

OBJECTIVE 3.5 Invasive Non-native Plant Species The City shall continue efforts to eradicate invasive non-native plant species and, where appropriate, require their removal and replacement with native plant species. Policy

3.5.1 The City shall continue to implement as condition of all development orders the Sections of the LDC which require the immediate and long-term removal or eradication of invasive non-native plant species and prohibits the planting of these species.

Policy 3.52 The City shall maintain programs for the eradication and control of invasive non-native plant species as part of the maintenance activities of City-owned or managed property. The City shall seek funding and enforcement procedures in cooperation with federal, state and county agencies.

GOAL 5 PROTECTION OF NATURAL FLOODPLAINS To manage its floodplain in such a way as to minimize hazards to public health, safety, and property and to preserve natural recharge areas. **OBJECTIVE 5.1** Identification and Mapping of Natural and Man-made Flood Prone Areas The City shall continue to work with the digitized Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP) rate maps, Sea Lake and Overland Surge from Hurricane (SLOSH) and The Arbiter of Storms (TAOS) model projections for category I through 5 storm surge areas, and its own property appraiser maps to develop accurate overlays showing all areas prone to flooding within its jurisdiction.

Policy 5.1.1 Beginning in 2001 the City shall begin the process of acquiring all available Geographic Information System (GIS) data bases showing flood hazard areas within Riviera Beach and overlaying them with City property appraiser maps. These digital data bases include • The NFIP rate maps • The SLOSH model storm surge projection maps; • The new TAOS model storm surge projection maps; and • The revised USGS topographic maps for Florida's east coast as they become available.

OBJECTIVE 5.2 Regulation and Mitigation The City shall continue to regulate development in and around natural flood plain areas and areas subject to tropical storm and hurricane storm surge, and implement projects to mitigate long-term damage.

Policy 5.2.1 The City shall support the Local Mitigation Strategy (LMS), and the Countywide Project Prioritization List.

Policy 5.2.2 The City will apply for membership in the FEMA NFIP - Community Rating System (CRS) program.

Policy 5.2.3 The City will continue to identify all relevant disaster-related capital projects, and submit them for inclusion on the LMS Countywide Project Prioritization List.

Coastal Management Element

GOAL I ENVIRONMENTAL RESOURCES MANAGEMENT To preserve, protect, and enhance coastal resources, and to discourage development activities that would damage or destroy coastal resources.

OBJECTIVE 1.1

Protection and Enhancement of Coastal Wetlands, Marine Resources, Coastal Beaches and Barriers, Wildlife, and Wildlife Habitat The City of Riviera Beach shall continue to maintain and develop programs, and seek funding to expand its efforts necessary to protect, preserve and enhance coastal and estuarine wetlands, living marine resources, coastal barriers, and wildlife habitat.

- Policy 1.1.1** The City shall continue to participate on the Countywide Beaches and Shores Council that, advises the Board of County Commissioners on federal, state, regional, municipal and environmental interests in the coastal area, recommending review criteria for shoreline development. Council membership is composed of appointed representatives of the County, the municipalities, special districts and environmental organizations.
- Policy 1.1.2** The City shall protect freshwater, estuarine and marine wetlands, including mangroves, sea grasses, salt marsh vegetation, offshore natural reefs, and productive submerged habitats through the implementation and maintenance of its applicable sections of the LDC and coordination with FDEP's Environmental Resource Permit Program. The City shall further prohibit shoreline alteration and construction that have the potential to significantly degrade the natural functions and values of wetlands. Mitigation shall be required if adverse impacts to water quality and natural habitats are unavoidable.
- Policy 1.1.3** The City shall protect selected estuarine and coastal habitats by the acquisition of coastal and wetland properties (or properties adjacent to such habitats) and managing the properties for the purpose of preservation and/or environmental enhancement.
- Policy 1.1.5** The City shall require the protection of existing native vegetation in accordance with the Land Development Code to provide a buffer between development and adjacent coastal ecosystems.
- Policy 1.1.6** The City shall provide technical assistance to property owners who restore and enhance coastal or estuarine vegetation.
- Policy 1.1.9** The City shall encourage and support the management of the offshore natural reefs in order to provide protection to corals and other unique underwater natural resources.

OBJECTIVE 1.2

Shoreline Protection The City of Riviera Beach shall protect, enhance and restore the beaches and dunes through implementation and maintenance of the Palm Beach County Shoreline Protection Plan.

- Policy 1.2.1** The City shall work with FDEP regarding implementation of the Coastal Construction Control Line (CCCL) established by FDEP in August 1997. Policy 1.2.2 The City shall continue to reestablish damaged dunes and

eroded beaches where possible to promote the enhancement of these resources and reduce damage resulting from storms.

Policy 1.2.3 The City shall work cooperatively with the County, the FDEP, other coastal municipalities, special districts and private property owners to protect and restore existing dunes and dune vegetation. The City shall support recommendations made by Palm Beach County to the State for modification of State rules or policy that will enable FDEP and local governments to more effectively protect dune vegetation.

Policy 1.2.4 The City shall continue to monitor and evaluate the condition of the City’s beaches and dunes.

GOAL 2 **COASTAL DEVELOPMENT AND EMERGENCY MANAGEMENT** It is the GOAL of City of Riviera Beach to protect human life by limiting public expenditures in areas subject to destruction by natural disasters within the coastal high hazard area, maintain and implement a safe and effective emergency management program, and provide for orderly redevelopment in a post-disaster period.

OBJECTIVE 2.1 Levels of Service The City of Riviera Beach shall maintain adequate public infrastructure capacity in the coastal high hazard area to ensure the protection of its residents during disaster events. Policy 2.1.1 The City shall insure that infrastructure is available to serve the development or redevelopment in the coastal area by implementing the Concurrency Management System.

Policy 2.1.2 The City shall provide for safe evacuation from coastal areas by requiring that within the Hurricane Vulnerability Zone as defined by Rule 9J-2.0256(f), F.A.C., the amount of new development or redevelopment be controlled by the capacity of existing coastal roads, such that evacuation times shall be no greater than currently exist.

OBJECTIVE 2.2 Development in High Hazard Area (Coastal Management Element) The City of Riviera Beach shall direct permanent residential population concentrations away from known or predicted coastal high hazard areas, and shall discourage increases in permanent residential population densities or land use that would increase the eight-hour hurricane evacuation time currently predicted for the CHHA.

Policy 2.2.1 The City shall carefully evaluate all land use plan amendments and zoning amendments that would increase residential land use density or intensity in the CHHA in order to reduce adverse impacts to property and people and public costs associated with disaster recovery. [9J05.O1 2(3)(b)5,6,7, F.A.C.

Policy 2.2.2 The City shall discourage increased densities in the Category 1 hurricane evacuation areas as defined by the Division of Emergency Management. Policy 2.2.3 New development in the Coastal Planning Area shall be

consistent with the densities proposed by the Future Land Use Element for the area.

Policy 2.2.4 Infill or redevelopment densities and intensities in Category 1 hurricane evacuation areas shall be consistent with existing adjacent development.

Policy 2.2.5 Maintain zoning policies that prohibit tall signs, new hospitals, and mobile home parks in the coastal high hazard area.

Policy 2.2.6 By January 2003, the City will have evaluated the development implications of building within the CHHA, and determine whether special development standards need to be developed in order to mitigate long-term adverse physical impacts and to reduce public costs resulting from flood or hurricane events in this hazard sensitive area.

OBJECTIVE 2.3 Emergency Preparedness and Evacuation The City of Riviera Beach shall maintain and update as necessary, its Emergency Management Plan (EMP), which provides for direction and control of activities during the period of any disaster, including preparedness, response and recovery.

Policy 2.3.1 The City shall coordinate with the American Red Cross, Palm Beach County Chapter, and Palm Beach County Division of Emergency Management regarding the issue of shelter.

Policy 2.3.2 The City shall coordinate with local, regional, or state agencies to maintain an efficient and timely evacuation process in the case of a hurricane.

Policy 2.3.3 The City shall update its EMP Emergency Management Plan periodically in a manner consistent with Rules 9G-6 and 9G-7, FAC to incorporate changes to population, highways/bridges, shelter modifications, hurricane hazard analysis, and forecast techniques.

OBJECTIVE 2.4 Post-Disaster Redevelopment The City of Riviera Beach will reduce post-disaster damage by implementing steps to create a more disaster-resistant community.

Policy 2.4.1 The City will continue to actively participate on the Palm Beach County Unified Local Mitigation Strategy (LMS) Steering Committee.

Policy 2.4.2 The City shall prohibit the rebuilding of non-conforming uses that have experienced damage of greater than or equal to 50 percent of the assessed value, in the hurricane vulnerability zone.

Policy 2.4.3 The City shall continue to enforce regulations and codes that provide for hazard mitigation. These include land use, building construction, flood elevation, septic and

sanitary sewer, coastal construction setback, and stormwater facility regulations. These regulations shall also be applied to eliminate unsafe conditions and inappropriate uses.

Policy 2.4.4 The City shall review its building code to ensure that it is consistent with the newly adopted State Building Code.

Policy 2.4.5 The City shall, pursuant to the Local Mitigation Strategy document, continue recommended hazard mitigation activities, including land development regulations and construction law administration. Post-disaster recommendations contained in Hazard Mitigation Plans shall be incorporated to avoid future destruction and loss of life.

Policy 2.4.6 The City's post-disaster redevelopment activities shall fall into two categories 1) Emergency Work; and 2) Permanent Work. Emergency Work shall commence immediately after a disaster and shall include only those activities necessary to save lives, protect property and remove threats to public health and safety. Permanent work includes any replacement or repair activities to facilities which were damaged, but which do not pose an immediate threat. Removal, relocation or structural modification of infrastructure and unsafe structures shall be prioritized into one of the two categories.

Policy 2.4.7 During the post-disaster recovery period, the Public Works Department, the Community Development Department, and other appropriate agencies shall identify the damaged areas requiring rehabilitation or redevelopment, (i.e. interim repairs prior to redevelopment versus demolition using pre-established criteria; prepare a redevelopment plan which reduces or eliminates the future exposure of life and property to hurricanes particularly where repeated damage has occurred; analyze and recommend to the City Council hazard mitigation options for damaged public facilities).

Policy 2.4.8 The City shall use its mandated \$ 250,000 budget reserve as a source to provide matching funds for obtaining Federal Financial assistance. To advance the level of intergovernmental coordination and cooperation for decision making and policy development, regarding coastal issues.

OBJECTIVE 3.1 Environmental Preservation, Enhancement, and Hazard Mitigation The City of Riviera Beach shall seek appropriate vehicles and forums for achieving effective intergovernmental coordination and cooperation regarding the impacts and implications of development in the coastal area on fragile coastal ecosystems and hazard mitigation.

Policy 3.1.1 The City shall utilize the mechanisms provided in the Intergovernmental Coordination Element and the LMS to

resolve intergovernmental conflicts and issues regarding environmental protection, preservation and restoration, and hazard mitigation.

Intergovernmental Coordination Element

- Policy 1.1.2** The City shall be involved in multi-jurisdictional organizations/committees (e.g., League of Cities of Palm Beach County, TCRPC, Palm Beach Countywide Beaches and Shores Council) or programs (e.g., bus and special transportation services through PalmTran, Tn-Rail), Local Mitigation Strategy that deal in matters or issues of concern to the City.
- Policy 1.1.7** The City shall coordinate with the Port of Palm Beach to resolve problems related, but not limited to, transportation, land use, natural and manmade hazards, and protection of natural resources by staff level coordination committees, public board meetings, and other applicable forums.
- Policy 1.1.8** The City shall maintain and/or establish coordination mechanisms with other entities to ensure that all existing and proposed planning and development activities are consistent with the City's Comprehensive Plan, which will include but is not limited to providing land use amendments, population projections, level of service data on public facilities, and public facilities siting data.
- Policy 2.1.2** The City shall refer all major estuarine shoreline development proposals to the County Department of Environmental Resources Management to assure intergovernmental coordination.
- Policy 2.1.7** The City shall participate in the countywide Local Mitigation Strategy (LMS) whose purpose is to reduce exposure of loss of life and property during natural and manmade disasters, and in all future activities of the LMS Steering Committee.
- Policy 3.1.4** The City shall coordinate with the SFWMD to ensure consistency between the City's and the District's planning efforts and long-term flood control and water supply needs.

Public School Facilities Element

- Policy 2.1-d** The proposed location shall comply with the provisions of the Coastal Zone Management Element of the comprehensive plan, if applicable to the site.
- Policy 2.2-g** The City of Riviera Beach shall coordinate with local governments and the School District on emergency preparedness issues which may include consideration of

1. Design and/or retrofit of public schools as emergency shelters;
2. Enhancing public awareness of evacuation zones, shelter locations, and evacuation routes;
3. Designation of sites other than public schools as long term shelters, to allow schools to resume normal operations following emergency events.

Capital Improvements Element

OBJECTIVE 1.5 Coastal High-Hazard Area Expenditures The City shall seek to limit public expenditures that subsidize development in high hazard coastal areas and are not in the public interest, through implementation of the following policies.

Policy 1.5.1 Redevelopment in the CRA area (both on the mainland and Singer Island) shall be considered in the public interest. However, all infrastructure, public or private, that occurs in the CRA area or other areas located in the CHHA must address and integrate engineering and construction techniques that make structures more disaster-resistant. The City will evaluate its Land Development Code by 2002 to ensure that it contains provisions that will ensure such techniques and construction methods are a requirement of development approval.

Policy 1.5.3 The City may consider public funding of infrastructure in Coastal High Hazard areas where development existed prior to the date of adoption of this plan, and the infrastructure is needed • to provide adequate evacuation; • to maintain adopted level of service standards; • to provide recreational needs or other water-dependent uses; or • to restore or enhance natural resources. • Is in the public interest