

# **Integrating Hazard Mitigation into Comprehensive Planning**

## **Indian River County Profile**

**Florida Department of Community Affairs**

## Executive Summary

The experiences of the 2004 and 2005 hurricane seasons epitomize the importance of better integrating hazard mitigation activities into local comprehensive planning. In the fall of 2004, residents all over the state experienced significant damages from Hurricanes Charley, Frances, Jeanne, and Ivan as a result of winds, tornadoes, surge, and/or flooding. But this was not the only time we have experienced natural disasters, nor will it be the last. In 1992, Hurricane Andrew devastated South Florida. In 1998 and 1999, most counties in Florida experienced wildfires. In some cases, despite 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 Indian River 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 Indian River 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 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 Indian River 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.

### INDIAN RIVER COUNTY GENERAL RECOMMENDATIONS

- The County has done a great job of integrating hazard mitigation into their comprehensive plan and addressing land use planning in their Local Mitigation Strategy (LMS). Therefore, a main recommendation to the county is to ensure the enforcement of the comprehensive plan and LMS. Also it is very important to foster the development of these programs and further the integration of all the county planning mechanisms.
- The comprehensive plan states that a Transfer of Development Rights Program has been used to direct development and densities away from coastal and flood-prone areas. This

is a good policy to implement and encourage. The county should consider offering incentives to participate in this program to further its use.

- Currently, there is an objective in the comprehensive plan pertaining to Post-Disaster Recovery and Redevelopment. The correlating policies with this objective relate to the maintenance of the LMS, FEMA Flood Insurance Rate Maps and National Flood Insurance Requirements. This objective also lists policies that regulate development and manage natural resources within the Coastal Zone. However it doesn't address the development of a Post Disaster Redevelopment Plan (PDRP) in the comprehensive plan, as it does in the LMS. The county should consider how the Community Development and Emergency Management staff could contribute in this process. The County could provide clear directives to planning and emergency management staff to work together on hazard mitigation and redevelopment plans and ensure that the plans fully address all aspects of hazards.
- The County can include a map of hazard locations overlaying land uses as a new map in the Future Land Use series. Also, the Comprehensive plan can reference the LMS as a source of data to be used in the EAR process. The LMS could include existing and future land uses on hazard maps and reference the PDRP as a hazard mitigation tool after its adoption. By using consistent data and showing linkages between the different plans, each plan will be stronger. Maps, such as the ones in this profile, provide useful visual knowledge on the relationship between land uses and hazard zones that can be used for planning mitigation or changes in future land use. However if better data is available at the local level, this should be used in addition to the information in this profile.
- Currently the Comprehensive Plan contains a policy to include, during the evaluation and update of the Capital Improvements Element, the impact of new development on hurricane evacuation times and the need and timing of improvements to evacuation routes in order to maintain or reduce evacuation times. It would be useful to incorporate this policy into the Metropolitan Planning Organization's planning process, if this hasn't been done yet.
- Currently the Comprehensive Plan contains a policy to require that all developments and all single-family units in coastal hazard areas fully pay the cost for required infrastructure improvements through impact fees, capacity charges, developer dedications, assessments, and contributions. The County can encourage new residential developments to include a shelter in the development or build safe rooms into each home if not in a flood or surge zone. They can also identify safe zones (large defensible space and non-flammable materials) throughout the county for wildfire emergency shelters. The LMS could add an objective that supports increasing the amount of shelter space in the county.

### **Coastal Hazards**

- The Comprehensive Plan contains an objective aimed at controlling coastal population increases. It states that during 1995-2020, the county will have no increase in land use designation density or intensity within the Coastal High Hazard Areas. This is a great objective and should be continued beyond the year 2020.

### **Wildfire Hazards**

- Currently the county has two policies in the comprehensive plan aimed at mitigating the impacts of wildfires through prescribed burns. The County can require management plans for conservation areas that address reduction of wildfire fuels. Forests that are

maintained, through prescribed fire or other mechanical means, will not become a wildfire risk to the nearby community.

- The County can adopt LDRs that limit residential development in high-risk fire areas, such as those adjacent to conservation lands. Limiting development near conservation areas will assuage some of the liability and practical issues of using prescribed fire as a management practice.
- The County can require firewise neighborhood design as a condition of approval for subdivision or PUD in high-risk areas.
- The County can adopt a firewise building code before future development occurs in the wildland-urban interface.

### **Sinkhole Hazards**

- The County can restrict development through overlay zones or preservation districts in high-risk, karst- sensitive areas. This is considered a best management practice from *Protecting Florida's Communities*. (FDCA, 2005b)
- The County can use buffers to prevent development from building too close to an existing sinkhole.
- In karst-sensitive areas, the County can require a geotechnical evaluation be made prior to development approval.

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 Vero Beach in Indian River County. The options for integration of hazard mitigation into the City's comprehensive plan are as follows:

### **VERO BEACH GENERAL RECOMMENDATIONS**

- Currently the city comprehensive plan contains a policy to coordinate with other municipalities and appropriate agencies to develop Evacuation Zone Management Plans designed to reduce excessive evacuation times to the optimum seven hours. The city indicates that it will use land use strategies to accomplish this objective. The city should then incorporate the Evacuation Zone Management Plan into the local comprehensive plan. Furthermore, if the Evacuation Zone Management Plan contains any projects related to hazard mitigation, these should be incorporated into the LMS.
- Currently there is an objective in the comprehensive plan that states that the city "will (by 1991) develop a detailed strategy to minimize the impacts of future hurricanes, such strategy to be coordinated with plans and concerns of Indian River County, other beach communities, and affected state and regional agencies." It is not clear as to whether or not the city completed this objective as planned. This type of planning might be most appropriately conducted through the Local Mitigation Strategy and the Post-Disaster Redevelopment Plan.
- Currently the comprehensive plan states that by 1995, post disaster recovery time in Vero Beach will be reduced to eliminate or lessen the future risk to human life, and public and private property from natural hazards via recovery and redevelopment strategies. It is not clear as to whether or not this objective was accomplished. If it has not been accomplished, the city should begin to implement this objective. The development of a Post Disaster Redevelopment Plan would also be a good project to add to the LMS.

- The City can seek emergency management input from the County for Comprehensive Plan amendments and land use decisions.
- The Comprehensive Plan can include hazard mitigation initiatives found in the LMS that apply to the City in its 5-year Capital Improvements Schedule. Criteria used to prioritize projects in the Capital Improvement Schedule can include hazard mitigation.
- The City can promote educational programs to the public, local businesses, and City personnel about flood prone areas, hurricane preparedness, wildfire hazards, hazardous materials, evacuation routes and shelters, and business emergency plans. Educational programs may help create an informed public and decrease loss of property and life in the event of a natural disaster. Further education of city officials and employees may promote hazard mitigation initiatives before development occurs. Also, the City can educate local site plan reviewers on the importance of flood, wildfire, and hurricane mitigation as well as the strategies used to reduce the vulnerability. Plan reviewers could then promote these ideas to local developers and explain their importance during the site plan review process.
- The City can update existing polices that protect natural resources to include hazard mitigation as a benefit. Current growth management techniques, such as land conservation, the clustering of development away from natural resources, transfer of development rights, purchase of development rights, limiting density and intensity, and land acquisition, protect and conserve natural resources but also provide the benefit of protecting development from natural disasters. The City could update these policies in the Comprehensive Plan and emphasize the benefits of hazard mitigation.
- The Indian River County LMS provides a strong strategy to protect existing structures that are in hazard areas through retrofit and relocation. The City can strengthen this strategy by adding Comprehensive Plan polices that require the retrofitting or relocation of public and private facilities, and policies that prioritize such projects in the 5-year Capital Improvements Schedule. Also, the City can explore programs to purchase, relocate, or demolish repetitive loss structures.

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# 1. County Overview

## Geography and Jurisdictions

Indian River County is located along the eastern coast of Central Florida. It covers a total of 503 square miles with an average population density of 224.4 people per square mile (U.S. Census, 2000).



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

## Population and Demographics

Official 2004 population estimates for all jurisdictions within Indian River 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 Indian River County is 126,829 people (University of Florida, Bureau of Economic and Business Research, 2004). The most populated city in Indian River County is Vero Beach, but 64% of the countywide population lives in the unincorporated portion of the County. Between 1990 and 2000, Indian River County as a whole had a growth rate of 25.2%, which was greater than the statewide growth rate of 23.5% in those 10 years.

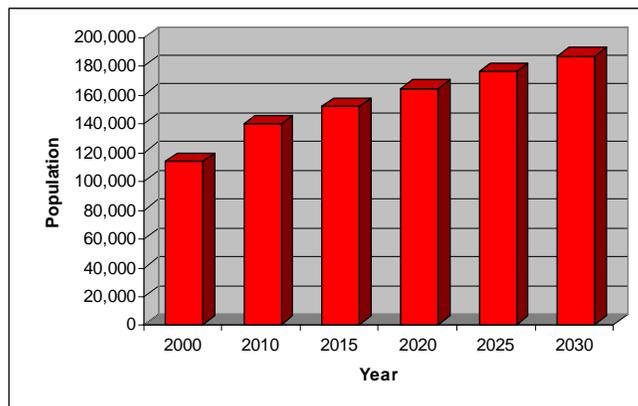
**Table 1.1 Population Estimates by Jurisdiction**

Jurisdiction	Population, Census 2000	Population Estimate, 2004	% Change, 2000-2004	% of Total Population (2004)
UNINCORPORATED	71,660	81,217	13.3%	64.0%
Fellsmere	3,813	4,284	12.4%	3.4%
Indian River Shores	3,448	3,647	5.8%	2.9%
Orchid	140	304	117.1%	0.2%
Sebastian	16,181	19,365	19.7%	15.3%
Vero Beach	17,705	18,012	1.7%	14.2%
<b>Countywide Total</b>	<b>112,947</b>	<b>126,829</b>	<b>12.3%</b>	<b>100.0%</b>

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

According to the University of Florida, Bureau of Economic and Business Research (2004), Indian River County's population is projected to grow steadily for the next 25 years, reaching 186,200 people by the year 2030. **Figure 1.1** illustrates medium population projections for Indian River County based on 2004 calculations.

**Figure 1.1 Medium Population Projections for Indian River County, 2010-2030**



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

Of particular concern within Indian River 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, 29.2% of Indian River County residents are listed as 65 years old or over, 21.7% are listed as having a disability, 9.3% are listed as below poverty, and 10.4% 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): floods, hurricanes/tropical storms, tornadoes, severe storms/lightning, drought, wildland/urban interface fires, muck fires, soil/beach erosion, sinkhole/soil failure and temperature extremes. The LMS did not prioritize these hazards, however, the hazard profiles did include a discussion of the probability of the hazard affecting the County. Flooding and Hurricane/Tropical Storms were considered to have a high probability of occurrence. Tornadoes, severe storms/lightning, drought, wildland/urban interface fires, soil/beach erosion and temperature extremes were considered to have a moderate probability of occurrence with both muck fires and sinkholes/soil failures listed as having a low probability.

The County experiences flooding on a regular basis from severe thunderstorms and tropical storms. The Flood of 1947 resulted in major losses to the agriculture industry including beef cattle, dairy and vegetable farmers. In 1993 a flash flood caused \$500,000 in damages to the City of Vero Beach. Two floods in 2002 resulted in damages to both the City of Vero Beach and Town of Fellsmere. There have been 8 recorded tornado events considered to be significant in Indian River County since 1953, ranging from intensities of F0 to F1. Since the turn of the century, Indian River County has experienced (i.e., a storm within a 125-mile radius) 51 storms of hurricane intensity. (Indian River County, 2005)

### 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 first column in the table summarizes the residents of Indian River County that live within FEMA Flood Insurance Rate Map zones that signify special flood hazard areas. According to these maps, 31% of the population, or 35,010 people, are within the 100-year flood zone. A majority of those at risk of flooding are either elderly and/or disabled. These special-needs citizens require extra planning by local governments to ensure their safety. Wildfire is also a hazard of concern to the County, with 22.4% of the population living in medium- to high-risk wildfire zones. Thirty-three percent of those

at risk from wildfire are disabled, making a quick evacuation difficult. There are 29,814 people, or 26.4% of the county population at risk from surge due to a Category 3 hurricane. Local emergency management officials likely would recommend that all of these residents at risk from surge evacuate or go to a County shelter.

**Table 2.1 Estimated Number of Persons at Risk from Selected Hazards**

Population	Flood	Sinkhole (high-adjacent risk)	Wildfire (medium-high risk)	Surge
Minority	3,081	0	2,815	1,290
Over 65	9,269	0	6,711	14,148
Disabled	10,136	0	8,424	10,234
Poverty	2,932	0	1,746	1,839
Language Isolated	864	0	170	917
Single Parent	1,485	0	1,190	1,145
<b>Countywide Total</b>	<b>35,010</b>	<b>0</b>	<b>25,383</b>	<b>29,814</b>

Source: Florida Department of Community Affairs, 2005a.

*Evacuation and Shelters*

As discussed in the previous sections, population growth in Indian River County has been steady, 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 Indian River County are estimated to be 12 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. Indian River County is able to meet this recommendation for now, but 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 Indian River County, but also for other counties in the region as shown in **Table 2.2**.

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

County	Hurricane Category				
	1	2	3	4	5
Indian River	5.5	5.5	12	12	12
Martin	7.5	12	12	12.75	12.75
Okeechobee	10	10	10	10	10
St. Lucie	8.75	8.75	9	9	9

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 Indian River 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 7,521 people in the County’s shelters meaning currently the county has a shelter space surplus of 721 spaces. However, it is projected that by 2009 there will be a deficit of 115 spaces (FDCA, 2004). While the County is currently meeting its shelter demands, they will need to address this future 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 Indian River County by structure type that are at risk from each of the four hazards being analyzed.

Flooding presents a large risk to property in the County, with 40,798 structures within a flood zone. A majority of those structures are single-family homes. According to the latest National Flood Insurance Program Repetitive Loss Properties list, there are 64 homes in unincorporated Indian River County that have had flood damage multiple times and received insurance payments but have not remedied the recurring problem. There also are 18,624 structures at risk from surge, as shown in **Table 2.3**.

**Table 2.3** also shows 279 structures within high to adjacent risk sinkhole areas, with 88% of those structures being single-family homes. Single-family homes are also at risk from wildfire, with 56.4% of the total 16,545 structures at risk being single-family homes.

**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	15,032	245	9,332	7,755
Mobile Homes	11,501	1	1,950	74
Multi-Family Homes	7,965	3	3,183	8,929
Commercial	3,094	0	865	972
Agriculture	2,236	17	704	196
Gov./Institutional	970	13	511	698
<b>Total</b>	<b>40,798</b>	<b>279</b>	<b>16,545</b>	<b>18,624</b>

*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 vulnerabilities to these hazards spatially and in relation to existing and future land uses. The following maps of existing land use within hazard areas are based on the 2004 geographic information system (GIS) shapefiles from the Indian River County Property Appraisers Office/ Florida Department of Revenue. Maps of future land uses in hazard areas were developed using the Indian River County future land use map obtained March 2006.

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). The affected area for the coastal hazard zone (CHZ) and hurricane vulnerability zone (HVZ) is mostly east of Highway US-1. **Table 2.4** shows that a majority of the land in these two categories is used for institutional, government, hospital, education, parks, conservation areas, and golf courses. The largest percentage of acreage in these categories is found in parks, conservation areas, and golf courses with 20.7% in the CHZ and 18.8% in the HVZ. Approximately 20% of the land in these two areas is used for various residential uses. Also 26.3% of the land in the CHZ and 25.3% of the land in the HVZ is currently vacant. Therefore, a large portion of these hazard areas are currently being conserved or have not yet been developed. This gives the County opportunities to limit the amount of people needing evacuation or shelter and the amount of property damage that can occur from a hurricane. **Table 2.5** shows, however, that 73.7% of the undeveloped land in the CHZ and 67.7% in the HVZ has been designated for various densities of residential use in the future. While there is a significant amount of land designated for conservation as well, it is important to note the increase in allowable future residential uses. Allowing residential uses in these two hazard zones increases the amount of people needing evacuation of shelter space in the county.

In **Attachment B**, two maps present the existing and future land uses within a 100-year flood zone. A majority of the county is located within a flood-prone area. This is due to the proximity of the Atlantic Ocean and the Intracoastal Waterway on the eastern side of the county and Blue Cypress Lake and the St. Johns River basin in the central and western portions of the county. The total amount of land in these special flood hazard areas is 203,063.6 acres for the unincorporated County. As shown in **Table 2.4**, 9.8% of these acres are currently undeveloped and 84.8% of the flood prone land is in parks and conservation or agricultural uses. Of the 19,881.8 undeveloped flood prone acres, **Table 2.5** shows that 66.3% are designated for future agricultural use while 24.8% are designated for future residential uses. Keeping the land within the 100-year floodplain in conservation or agricultural uses will greatly limit the county's vulnerability to flooding and maintain the natural drainage ways that will prevent new flood prone areas. Residential development within these areas should be limited or strictly regulated.

In **Attachment C**, maps present the land uses associated with high-risk wildfire zones. There are wildfire susceptible areas scattered along the eastern side of the county and along I-95, with a significant area found in the west-central portion of the county. Of the 18,186.7 wildfire susceptible acres, 63.1% are in conservation, parks, or agricultural use (**Table 2.4**). These areas, while having a limited amount of people or structures at risk, could be a risk to surrounding development and should therefore have regular wildfire fuel maintenance, which also benefits the environment of conservation areas. Eighteen percent, or 3,274.4 acres, of wildfire susceptible areas in the unincorporated county are still vacant. Of those undeveloped acres, 69.8% is designated for residential uses of various intensities in the future (**Table 2.5**). If homes are built in these risk areas, Indian River County's vulnerability to wildfire hazards will greatly increase. Additionally, 13.4% of the wildfire susceptible areas already have residential development present, as seen in **Table 2.4**. 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. There are only 3 small areas located within the county that have the potential for sinkhole development. One is located west of Fellsmere and the other two are on the southern border of the county, between I-95 and US-1. A large portion of the sinkhole hazard area is used for agriculture- 57.3% (**Table 2.4**). There are also 131.3 acres, or 8.7% of the potential sinkhole area, in residential single-family use. Of the 401.5 undeveloped acres at risk, 79.0%, or 317 acres, is designated for future use as agriculture, as seen in **Table 2.5**. Assuming this agricultural land is not converted for residential development in the future, the county mostly needs to worry about the small amount of existing development potentially at risk from sinkholes.

**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	454.1	2,122.5	90,656.9	5,550.3	869.4
	%	5.5	13.6	44.6	30.5	57.3
Attractions, Stadiums, Lodging	Acres	0.4	15.4	1.8	0.0	0.0
	%	0.0	0.1	0.0	0.0	0.0
Places of Worship	Acres	3.6	25.6	93.4	60.9	0.0
	%	0.0	0.2	0.0	0.3	0.0
Commercial	Acres	72.0	431.6	150.9	45.9	0.0
	%	0.9	2.8	0.1	0.3	0.0
Government, Institutional, Hospitals, Education	Acres	1,420.7	1,794.8	2,872.2	735.2	91.0
	%	17.1	11.5	1.4	4.0	6.0
Industrial	Acres	1.3	268.6	125.7	74.0	0.0
	%	0.0	1.7	0.1	0.4	0.0
Parks, Conservation Areas, Golf Courses	Acres	1,724.4	2,935.5	81,676.9	5,926.8	0.0
	%	20.7	18.8	40.2	32.6	0.0
Residential Group Quarters, Nursing Homes	Acres	4.7	164.1	80.7	17.2	0.0
	%	0.1	1.1	0.0	0.1	0.0
Residential Multi-Family	Acres	264.4	699.8	631.6	188.2	23.2
	%	3.2	4.5	0.3	1.0	1.5
Residential Mobile Home, or Commercial Parking Lot	Acres	32.8	243.7	202.2	54.8	0.0
	%	0.4	1.6	0.1	0.3	0.0
Residential Single-Family	Acres	1,363.4	2,157.5	4,405.8	2,193.0	131.3
	%	16.4	13.8	2.2	12.1	8.7
Submerged Land (Water Bodies)	Acres	36.8	37.0	71.3	7.6	0.0
	%	0.4	0.2	0.0	0.0	0.0
Transportation, Communication, Rights-of-Way	Acres	14.5	16.7	45.3	6.5	0.0
	%	0.2	0.1	0.0	0.0	0.0
Utility Plants and Lines, Solid Waste Disposal	Acres	744.8	752.4	2,167.1	51.9	0.0
	%	8.9	4.8	1.1	0.3	0.0
Vacant	Acres	2,187.8	3,956.8	19,881.8	3,274.4	401.5
	%	26.3	25.3	9.8	18.0	26.5
<b>Total Acres</b>	<b>Acres</b>	<b>8,325.7</b>	<b>15,622.0</b>	<b>203,063.6</b>	<b>18,186.7</b>	<b>1,516.4</b>
	<b>%</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

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.
Agriculture - 3 (1-du/20 ac)	Acres	0.0	0.0	0.0	0.0	24,212.9	152.9	3,273.1	42.6	0.0	0.0
	%	0.0	0.0	0.0	0.0	11.9	0.8	18.0	1.3	0.0	0.0
Agriculture - 2 (1-du/10 ac)	Acres	0.0	0.0	0.0	0.0	66,921.6	9,925.1	1,341.4	306.1	889.3	113.2
	%	0.0	0.0	0.0	0.0	33.0	49.9	7.4	9.3	58.6	28.2
Agriculture - 1 (1 du/5 ac)	Acres	0.0	0.0	589.2	1.1	13,933.1	3,099.4	1,402.5	224.0	350.4	203.8
	%	0.0	0.0	3.8	0.0	6.9	15.6	7.7	6.8	23.1	50.8
Blue Cypress Improvement District (10 du/ac)	Acres	0.0	0.0	0.0	0.0	19.4	1.6	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
Commercial/Industrial	Acres	198.6	86.3	2,258.7	747.9	1,131.1	536.8	637.6	350.0	0.7	0.0
	%	2.4	3.9	14.5	18.9	0.6	2.7	3.5	10.7	0.0	0.0
Conservation - 1	Acres	1,556.5	14.7	2,423.9	21.0	81,854.5	731.4	4,454.6	14.9	0.0	0.0
	%	18.7	0.7	15.5	0.5	40.3	3.7	24.5	0.5	0.0	0.0
Conservation - 2 (1-du/40 ac)	Acres	1,639.9	463.0	1,638.3	463.2	1,752.9	471.7	132.2	31.2	0.0	0.0
	%	19.7	21.2	10.5	11.7	0.9	2.4	0.7	1.0	0.0	0.0
Conservation - 3 (1-du/2.5 ac)	Acres	53.1	8.5	303.6	43.9	108.3	15.2	81.6	6.2	0.0	0.0
	%	0.6	0.4	1.9	1.1	0.1	0.1	0.4	0.2	0.0	0.0
Low Density Residential - 1 (3-du/ac)	Acres	1,994.6	591.2	3,092.0	853.6	7,350.9	2,779.5	2,242.5	913.8	0.0	0.0
	%	24.0	27.0	19.8	21.6	3.6	14.0	12.3	27.9	0.0	0.0
Low Density Residential - 2 (6 du/ac)	Acres	1,558.5	646.3	2,160.9	844.5	2,395.6	898.4	3,053.2	1,050.2	234.1	84.5
	%	18.7	29.5	13.8	21.3	1.2	4.5	16.8	32.1	15.4	21.0
Medium Density Residential - 1 (8 du/ac)	Acres	527.5	260.6	1,555.8	771.6	1,973.6	1,036.0	834.2	231.0	0.0	0.0
	%	6.3	11.9	10.0	19.5	1.0	5.2	4.6	7.1	0.0	0.0
Medium Density Residential - 2 (10 du/ac)	Acres	329.5	117.0	876.3	209.8	513.2	177.7	241.0	87.6	0.0	0.0
	%	4.0	5.3	5.6	5.3	0.3	0.9	1.3	2.7	0.0	0.0
Public	Acres	0.0	0.0	0.0	0.0	106.6	0.0	27.0	0.9	41.9	0.0
	%	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	2.8	0.0
Recreation	Acres	457.0	0.2	472.2	0.2	686.6	2.5	393.9	0.0	0.0	0.0
	%	5.5	0.0	3.0	0.0	0.3	0.0	2.2	0.0	0.0	0.0
Regional Commercial	Acres	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rural Residential (1 du/ac)	Acres	10.7	0.0	251.0	0.0	73.8	37.5	70.7	14.9	0.0	0.0
	%	0.1	0.0	1.6	0.0	0.0	0.2	0.4	0.5	0.0	0.0
Transitional (1-3 du/ac)	Acres	0.0	0.0	0.0	0.0	29.4	16.3	0.9	0.9	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
<b>Total</b>	<b>Acres</b>	<b>8,325.8</b>	<b>2,187.8</b>	<b>15,622.0</b>	<b>3,956.8</b>	<b>203,063.6</b>	<b>19,881.8</b>	<b>18,186.6</b>	<b>3,274.4</b>	<b>1,516.4</b>	<b>401.5</b>
	<b>%</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table 2.6** presents the total numbers of acres in a hazard zone in Indian River County’s incorporated areas and how many of those acres are currently undeveloped. Indian River Shores, Orchid, Sebastian and Vero Beach are all within the coastal hazard and hurricane vulnerability zone, with 22.9% these acres at risk are not yet developed. Indian River Shores has the most land within a flood zone, but 24.3% of those are not yet developed. By working with the County on drainage projects and structure mitigation, they may be able to decrease the vulnerability in the already developed acres and by analyzing their future land uses they could limit future vulnerability. Sebastian has the most acres of any of the incorporated areas that are susceptible to wildfire. The Florida Division of Forestry may be able to assist the city in developing a Community Wildfire Protection Plan to mitigate the hazard. Vero Beach’s vulnerability will be presented in more detail in **Section 6** of this profile.

**Table 2.6 Total and Vacant Incorporated Acres in Hazard Areas**

Jurisdiction		Coastal Hazard Zone		Hurricane Vulnerability Zone		Flood Zones		Wildfire Susceptible Areas		Sinkhole Susceptible Areas	
		Total	Vacant	Total	Vacant	Total	Vacant	Total	Vacant	Total	Vacant
Fellsmere	Acres	0.0	0.0	0.0	0.0	1,256.2	95.2	826.4	1.8	0.0	0.0
	%	0.0	0.0	0.0	0.0	100.0	7.6	100.0	0.2	0.0	0.0
Indian River Shores	Acres	2,790.0	749.5	2,790.0	749.5	2,634.8	640.9	199.1	25.2	0.0	0.0
	%	100.0	26.9	100.0	26.9	100.0	24.3	100.0	12.7	0.0	0.0
Orchid	Acres	667.5	223.4	667.5	223.4	674.6	211.3	246.8	58.4	0.0	0.0
	%	100.0	33.5	100.0	33.5	100.0	31.3	100.0	23.7	0.0	0.0
Sebastian	Acres	134.9	31.7	755.5	256.1	1,116.4	434.0	1,756.9	689.3	0.0	0.0
	%	100.0	23.5	100.0	33.9	100.0	38.9	100.0	39.2	0.0	0.0
Vero Beach	Acres	1,426.8	143.8	1,835.2	191.3	1,042.6	128.4	880.4	29.0	0.0	0.0
	%	100.0	10.1	100.0	10.4	100.0	12.3	100.0	3.3	0.0	0.0
<b>Total Acres</b>	<b>Acres</b>	<b>5,019.2</b>	<b>1,148.4</b>	<b>6,048.2</b>	<b>1,420.3</b>	<b>6,724.6</b>	<b>1,509.8</b>	<b>3,909.6</b>	<b>803.7</b>	<b>0.0</b>	<b>0.0</b>
	<b>%</b>	<b>100.0</b>	<b>22.9</b>	<b>100.0</b>	<b>23.5</b>	<b>100.0</b>	<b>22.5</b>	<b>100.0</b>	<b>20.6</b>	<b>0.0</b>	<b>0.0</b>

### 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 Indian River County LMS (adopted in 2005) 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*

This section of the LMS was briefly reviewed for its ability to provide hazard data that can support comprehensive planning. The LMS uses detailed data on structures at risk for all of the major hazards discussed in this profile. It also discusses populations at risk or future land use issues. The maps in the LMS show the hazard areas and correlate them with population centers or land uses through discussion in the text. Incorporating land use and population data into the risk assessment of the LMS provides a better source of data for planners to use in policy making and policy evaluation of the local Comprehensive Plan. The LMS also sets a standard for the quality of data that should be used in determining risk and thereby used to determine mitigation policies. Indian River County's LMS objective to create and maintain an all-hazards database shows its commitment to providing the best source of hazard data for making these important decisions.

#### *Guiding Principles*

There is an appendix in the Indian River LMS titled the, "Indian River County Comprehensive Growth Management Plan Hazard Mitigation Inventory" that lists policies from the comprehensive plan that relate to hazard mitigation. This appendix also lists existing plans, reports, studies and programs for the county. However, the Land Development Code and the Comprehensive Emergency Management Plan (CEMP), were not consulted in this inventory. This appendix is very useful and allows all jurisdictions and County departments access to this information that can be used to judge whether more integration is needed.

#### *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.

Indian River County has many objectives and projects that tie mitigation through the LMS to programs and regulations that are found in other plans. Limited references are made to the Indian River County Comprehensive Plan and to the Land Development Code for the County. The first objective to create and maintain an all-hazards database includes three projects directly

related to comprehensive planning and growth management. The first project involves improved mapping of the Coastal High Hazard Area (CHHA) to allow for better and more precise implementation of County regulations related to development within that area. This type of project would be very beneficial for comprehensive planning efforts in the county. There also is a project that would establish a county GIS department to improve flood mapping for flood damage reduction as well as a project to update annually the list of critical facilities and depict them on all appropriate hazard risk maps. Updating the mapping systems for the county would aid in the future land use mapping process and allow the county to integrate flood mitigation into their land use planning process. Referencing other plans and programs in the goals and objectives of the LMS lays a clear foundation for this plan to be integrated with other plans and for its committee to oversee programs that may involve many different departments of the County and municipalities.

The LMS also addresses the improvement of local roadways to ensure safe, efficient evacuation. These roadway improvements would be appropriate to integrate into the local Capital Improvements Plan and Metropolitan Planning Organization efforts. In addition to this, there is a goal to achieve safe and fiscally sound, sustainable communities. The correlating objective states that the county will ensure that local planning and development matters address hazard mitigation. The county intends to achieve this objective through the modification of current building standards for manufactured homes. Post-disaster planning is addressed through an objective as well. While the LMS may not be able to regulate land use, having these objectives increases the likelihood of the jurisdictions of Indian River County adopting and implementing corresponding policies that are legally enforceable.

There is an objective in the LMS to prepare informational materials regarding the importance of hazard mitigation through the establishment of a public education program on the importance of maintaining drainage systems. Furthermore, the LMS contains a goal to minimize economic disruption and ensure orderly, effective recovery and redevelopment. This includes educational projects aimed at local businesses. These are good objectives because the LMS is an ideal arena for creating public education programs, and these initiatives are sometimes difficult to include in the Comprehensive Plan.

In addition to addressing the integration of hazard mitigation into local planning mechanisms in the goals, objectives, and projects, the LMS also contains a section that describes the process of integration into local plans.

### **Comprehensive Emergency Management Plan**

The Mitigation Annex of the 2002 Indian River County CEMP 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 Mitigation Annex identifies the Department of Emergency Services as the lead agency for hazard mitigation. While it is good that this position is tied to Emergency Management, there could be more responsibility for mitigation assigned to those responsible for land use planning. Major programs and initiatives from the LMS are cited, such as the strengthening of the building codes and land development regulations as well as the National Flood Insurance Program and Community Rating System Program. Structural and non-structural mitigation activities are listed. The CEMP directly addresses integration into land use planning efforts by stating that hazard mitigation will also involve making recommendations for zoning in addition to building or land use controls in order to reduce or eliminate disasters or their impacts. This also includes the provision of assistance in the prevention of disasters caused or aggravated by inadequate land use planning (Indian River CEMP, 2002, Annex II, p.5). The risk assessment of the CEMP was not reviewed, however, it is suggested that this section be updated on a regular basis to be consistent with the risk assessment of the LMS.

### **Post-Disaster Redevelopment Plan**

A PDRP for Indian River County was not available for review at the time this profile was drafted. If Indian River County has a current PDRP, this will be obtained and reviewed for the final version of this document.

### **National Flood Insurance Program/Community Rating System**

Indian River County, Vero Beach, and Inverness are all participating communities in the National Flood Insurance Program. In addition, Indian River County and the City of Vero Beach participate in the Community Rating System with current classes of 7 and 8, respectively.

## **4. Comprehensive Plan Review**

Indian River County's Comprehensive Plan (updated 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**

Indian River County's Comprehensive Plan has many policies considered to be best management practices for mitigating hurricane and coastal surge impacts. There are several policies that deal with evacuation needs, including setting level of service standards for peak evacuation and conducting a survey of existing schools, municipally-owned and county-owned buildings to identify those appropriate to be used as shelters. Furthermore the county has a policy that relates emergency evacuation clearance times to land use development through the Capital Improvements Element of the Comprehensive Plan. There are also many policies referring to the Coastal High Hazard Area (CHHA). The Comprehensive Plan advocates the use of a Transfer of Development Rights (TDR) Program for areas within the CHHA. The County must relocate or replace infrastructure in the CHHA, and all public expenditures in the CHHA are to be limited. There are several policies that also limit development in the CHHA, by not allowing certain uses, such as assisted living facilities, or not allowing the expansion of certain uses, including residential.

### **Flooding Hazards**

Flooding was addressed in the Comprehensive Plan in multiple policies. There were many policies for protecting or limiting densities in floodplains and wetlands. The County has several policies that regulate new construction to be compliant with the County Floodplain Standards, and they require repetitive loss properties to be modified to remedy the recurring damage. The County also advocates the use of a TDR program to relocate densities away from estuarine wetlands to approved uplands. Furthermore, the County has a policy that states all development shall be regulated according to the National Flood Insurance Program Standards and that the county shall maintain a Community Rating System classification of "7."

### **Wildfire Hazards**

The Comprehensive Plan includes a policy to work in cooperation with both the State Division of Forestry, U.S. Fish and Wildlife Service and the Florida Game and Freshwater Fish Commission to conduct prescribed burns on a rotational basis at the Wabasso Scrub Conservation, the North Sebastian Conservation Area and other county-owned scrub habitat. Furthermore, the County has a policy stating that it will solicit grants from regional, state and federal agencies for the purposes of eradication of nuisance exotic vegetation and prescribed burning on scrub lands.

## Sinkhole Hazards

No policies were found during this review that directly related to sinkhole hazards. There was a policy aimed at conserving land for groundwater recharge. This policy contributes to mitigating sinkholes by decreasing the probability of human-induced sinkholes, which can occur from changes in the water level of the aquifer in karst areas that are already susceptible to sinkhole activity.

## Other Hazard Mitigation Policies

There were several policies that referenced hazard mitigation in other plans, such as coordinating with local and regional evacuation plans. One objective states, “within one year of the issuance of a Hazard Mitigation Report by Indian River County or the Treasure Coast Regional Planning Council, any recommendations that identify land use conflicts or inconsistencies will have been implanted” (Indian River County Comprehensive Plan, 2005). The corresponding policies state that the county shall issue Hazard Mitigation Reports following natural or manmade hazardous incidents and the county shall review its comprehensive plan for consistency with the hazard mitigation report. Upon completion of the review, any plan amendments based upon the Report shall be issued.

## 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.

Indian River 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. In the final draft of this profile, **Table 5.1** will present options for further integration as well as the basis for the recommendations presented in the **Executive Summary**.

NOTE: The recommendations set out in this profile 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.

## 6. Municipal Case Study: Vero 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 Vero Beach in Indian River County. The results of the analysis are provided in this section.

### Hazards Analysis

The following analysis looks at three hazard types that the City is vulnerable to: flood, surge, and wildfire. All of the information in this section was obtained online through MEMPHIS. Unfortunately, flood data was not available for Vero Beach through MEMPHIS.

#### *Existing Population at Risk*

**Table 6.1** presents the population of Vero Beach at risk from hazards, as well as a breakdown of the sensitive needs populations at risk. According to these maps, 55.9% of the population, or 9,911 people, are within the storm surge zone. A majority of those at risk from surge are either elderly or disabled. Wildfire does not affect as many people as surge in Vero Beach, but it is still a concern with 7.3% of the population living within medium- to high-risk wildfire zones.

**Table 6.1 Estimated Number of Persons at Risk from Selected Hazards**

Population	Flood	Wildfire (medium-high risk)	Surge
Minority	N/A	0	428
Over 65	N/A	438	3,851
Disabled	N/A	325	3,220
Poverty	N/A	32	520
Language Isolated	N/A	25	166
Single Parent	N/A	27	401
<b>Countywide Total</b>	<b>N/A</b>	<b>1,306</b>	<b>9,911</b>

N/A= Not available

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 Vero Beach, by structure type, that are at risk from each of the three hazards being analyzed.

Storm Surge is by far the largest risk to property in the City, with 6,072 structures located in a surge zone. Single-family and multi-family structures are most at risk from surge. **Table 6.2** shows that single-family homes are also at risk from wildfire, with 52.7% of the total 2,303 structures at risk being single-family homes.

**Table 6.2 Estimated Number of Structures at Risk from Selected Hazards**

Structure Type	Flood	Wildfire (medium-high risk)	Surge
Single-Family Homes	N/A	1,214	2,770
Mobile Homes	N/A	132	9
Multi-Family Homes	N/A	697	2,377
Commercial	N/A	143	487
Agriculture	N/A	106	36
Gov./Institutional	N/A	11	393
<b>Total</b>	<b>N/A</b>	<b>2,303</b>	<b>6,072</b>

N/A= Not available

Source: Florida Department of Community Affairs, 2005a.

**Analysis of Current and Future Vulnerability**

Vero Beach’s vulnerabilities to surge, flood, and wildfire were analyzed spatially in relation to existing and future land uses within the City. The following maps of existing land use within hazard areas are based on the 2004 shape files obtained from the Indian River County Property Appraisers Office/ Florida Department of Revenue. Maps of future land uses in hazard areas were developed using the Vero Beach Future Land Use Map obtained March 2006.

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) for Vero Beach. The hurricane vulnerability zone (HVZ) covers all of the barrier islands and the portion of the mainland east of US-1. The coastal hazard zone (CHZ) covers the same area except it does not reach as far inland as US-1, staying closer to the beach and Highway 60. **Table 6.3** shows that much of the CHZ and HVZ are currently used for residential single-family, 35.2% and 33.5%, respectively. However, 11.5% of the City’s acres within the Category 1 evacuation zone are classified as parks, conservation areas and golf courses which limits increases in residents that must evacuate to some degree. **Table 6.4** presents future land use estimates and a breakdown of how currently undeveloped land has been designated for future use. Low density residential future land use designations make up about half of the CHZ and HVZ areas and also account for around a third of the future use allowances for currently vacant land in the zones. However, 29.4% of the CHZ and 23.7% of the HVZ is designated for future conservation, environmentally significant, or park use which is greater than the amount currently found in those uses. Because of the Vero Beach’s location near the coast, the City will always have to deal with development in the CHZ and HVZ since most of its land falls in these zones, however; they can concentrate on building codes and other mitigation techniques as well as carefully designating their land uses.

In **Attachment B**, two maps present the existing and future land uses within a 100-year flood zone. The areas of Vero Beach that fall along the Intracoastal Waterway and a large area in the southwest corner of the city fall within the 100-year flood zone. The total land area in these special flood hazard areas is 1,042.6 acres. As shown in **Table 6.3**, only 12.3% of these acres are currently undeveloped and 19.9% have single-family homes on them. There also are 284.7 acres, or 27.3% of the floodplain, that have government, institutional, hospital, or education uses currently. The City should make sure that public uses such as these are properly mitigated for flooding and should consider relocating some of these uses when feasible. **Table 6.4** shows that 41.9% of the undeveloped acres are designated for future residential use. If homes must be built in these areas, proper elevations and other mitigation measures should be enforced. However, the City has also designated 50.7% of the undeveloped acres within the floodplain for conservation purposes.

In **Attachment C**, maps present the land uses associated with high-risk wildfire zones. The wildfire susceptible areas are scattered throughout the city, but a majority are found in the northwestern corner of the city. According to the data in **Table 6.3**, only 3.3% of the land within these wildfire zones is currently vacant and 50.8% is currently used for government, institutional, hospital and educational uses. Parks, conservation areas, and golf courses make up 32.8% of the wildfire risk areas. The City's vulnerability could be reduced if the parks and conservation areas are regularly maintained to control wildfire fuels. Of the 29.0 undeveloped acres, 68.3% is shown to be designated for low density residential uses in the future (**Table 6.4**). If firewise precautions are taken in building and landscaping these homes, wildfire risk can be reduced.

**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	0.4
	%	0.0	0.0	0.0	0.0
Attractions, Stadium, Lodging	Acres	10.0	13.4	2.0	0.0
	%	0.7	0.7	0.2	0.0
Places of Worship	Acres	11.4	18.7	11.6	0.0
	%	0.8	1.0	1.1	0.0
Commercial	Acres	60.9	151.1	51.7	0.0
	%	4.3	8.2	5.0	0.0
Government, Institutional, Hospitals, Education	Acres	275.8	323.7	284.7	447.4
	%	19.3	17.6	27.3	50.8
Industrial	Acres	0.0	13.8	0.0	0.2
	%	0.0	0.8	0.0	0.0
Parks, Conservation Areas, Golf Courses	Acres	173.4	211.3	140.9	288.7
	%	12.2	11.5	13.5	32.8
Residential Group Quarters, Nursing Homes	Acres	0.0	3.6	0.0	0.7
	%	0.0	0.2	0.0	0.1
Residential Multi-Family	Acres	95.4	131.5	55.5	2.7
	%	6.7	7.2	5.3	0.3
Residential Mobile Home, or Commercial Parking Lot	Acres	30.5	39.2	29.4	0.2
	%	2.1	2.1	2.8	0.0
Residential Single-Family	Acres	502.7	614.6	207.3	91.6
	%	35.2	33.5	19.9	10.4
Submerged Land (Water Bodies)	Acres	4.9	4.9	1.3	0.0
	%	0.3	0.3	0.1	0.0
Transportation, Communication, Rights-of-Way	Acres	3.1	3.1	3.3	0.0
	%	0.2	0.2	0.3	0.0
Utility Plants and Lines, Solid Waste Disposal	Acres	114.8	114.8	126.4	19.4
	%	8.0	6.3	12.1	2.2
Vacant	Acres	143.8	191.3	128.4	29.0
	%	10.1	10.4	12.3	3.3
<b>Total Acres</b>	<b>Acres</b>	<b>1,426.7</b>	<b>1,835.0</b>	<b>1,042.5</b>	<b>880.3</b>
	<b>%</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

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	99.4	10.5	193.3	16.1	71.6	7.1	10.5	0.7
	%	7.0	7.3	10.5	8.4	6.9	5.5	1.2	2.4
Conservation	Acres	28.1	0.7	37.5	0.7	33.2	0.7	235.6	2.7
	%	2.0	0.5	2.0	0.4	3.2	0.5	26.8	9.3
Environmentally Significant	Acres	301.2	49.7	301.2	49.7	346.0	64.4	40.1	1.8
	%	21.1	34.6	16.4	26.0	33.2	50.2	4.6	6.2
Government / Institutional / Public Use	Acres	49.5	0.0	63.1	0.0	39.2	0.0	8.7	0.0
	%	3.5	0.0	3.4	0.0	3.8	0.0	1.0	0.0
Industrial	Acres	0.0	0.0	19.4	0.9	0.0	0.0	193.9	2.5
	%	0.0	0.0	1.1	0.5	0.0	0.0	22.0	8.6
Mixed Residential	Acres	0.0	0.0	7.8	2.7	0.0	0.0	0.0	0.0
	%	0.0	0.0	0.4	1.4	0.0	0.0	0.0	0.0
Mixed Use	Acres	0.0	0.0	76.9	25.6	0.0	0.0	0.2	0.2
	%	0.0	0.0	4.2	13.4	0.0	0.0	0.0	0.7
Mobile Home Park	Acres	26.1	0.0	27.9	0.0	28.8	0.0	0.0	0.0
	%	1.8	0.0	1.5	0.0	2.8	0.0	0.0	0.0
Park	Acres	90.1	3.3	96.5	3.3	86.1	2.5	43.9	0.4
	%	6.3	2.3	5.3	1.7	8.3	1.9	5.0	1.4
Residential High	Acres	58.2	12.3	82.7	18.3	16.1	3.3	0.9	0.2
	%	4.1	8.6	4.5	9.6	1.5	2.6	0.1	0.7
Residential Low	Acres	706.5	56.2	835.1	60.2	351.1	39.9	342.0	19.8
	%	49.5	39.1	45.5	31.5	33.7	31.1	38.8	68.3
Residential Medium	Acres	67.8	11.1	93.9	13.8	70.7	10.5	4.5	0.7
	%	4.8	7.7	5.1	7.2	6.8	8.2	0.5	2.4
<b>Total</b>	<b>Acres</b>	<b>1,426.8</b>	<b>143.8</b>	<b>1,835.2</b>	<b>191.3</b>	<b>1,042.6</b>	<b>128.4</b>	<b>880.4</b>	<b>29.0</b>
	<b>%</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

## Comprehensive Plan

Vero Beach's Comprehensive Plan (adopted in 1992) was reviewed in order to see what the City has already done to integrate the Indian River 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.

There are many polices that address hazard mitigation in the Vero Beach Comprehensive Plan. Many growth management techniques and development requirements are employed by the City to protect natural resources. These include the use of setbacks, restoration of natural features, density and intensity limitations, land conservation, easements, acquisition, density transfers, transfer of development rights, purchase of development rights, and land exchanges. By protecting natural resources such as beaches and dunes or wetlands, the city is also protecting natural protective features from hazards.

### Coastal Hazards

There are several policies that protect coastal resources using density controls, transfer of development rights, and land conservation. Also there are many policies addressing beach and dune preservation as well as beach maintenance and restoration. Policies also restrict government subsidies and facilities in hazard areas and aim to limit populations in the CHHA as well as limit future development on barrier islands. There is also a policy that uses land use strategies to reduce hurricane evacuation times.

### Flooding Hazards

There are many policies that protect water bodies, wetlands, and the 100-year floodplain. By controlling and restricting development near these features, flood hazard risk is reduced. Also, protecting the natural drainage features of wetlands can also reduce flooding in developed areas. There is an objective that will ensure that a drainage system to prevent flooding from a 10-year/24-hour storm event is provided within the City to meet existing and future needs through the requirements of Chapter 73 of the City Code which addresses flood prevention and drainage.

### Sinkhole Hazards

There is a policy that refers to guidelines that provide vegetative buffers around sinkholes. This practice is used to act as a natural filter for runoff and to reduce erosion. There are also polices that refer to the protection of soils to reduce erosion.

### Wildfire Hazards

There are no policies in the Comprehensive Plan that address wildfire hazards.

## 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.

Vero 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 Indian River 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. In the final draft of this profile, **Table 6.5** will present options for further integration as well as the basis for the recommendations presented in the **Executive Summary**.

NOTE: The recommendations set out in this profile 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.

## 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

### **Indian River County Local Mitigation Strategy Goals and Objectives**

Goal 1: To minimize the loss of life and property and repetitive loss.

Objective 1.1: Create and maintain current an all-hazards database.

Objective 1.2: Restore or protect waterfront areas susceptible to erosion.

Objective 1.3: Improve local roadways to ensure safe, efficient evacuation.

Objective 1.4: Reduce the potential threat of wildland fires.

Objective 1.5: Increase primary shelter space and supplies to meet stated need.

Goal 2: To achieve safe and fiscally sound, sustainable communities.

Objective 2.1: Ensure that local planning and development matters address hazard mitigation.

Objective 2.2: Retrofit critical facilities.

Objective 2.3: Prepare informational materials regarding the importance of hazard mitigation.

Goal 3: To minimize economic disruption and ensure orderly, effective recovery and redevelopment.

Objective 3.1: Promote the importance of creating disaster-resistant businesses.

Objective 3.2: Develop a program to reduce the length of economic disruption following a major event.

Objective 3.3: Provide mechanism(s) that provide local citizens a way of assisting their neighborhoods following disaster events.

## Attachment F

### Indian River County Comprehensive Plan Excerpts Related to Hazard Mitigation

Indian River County 2020 Comprehensive Plan. Adopted 1990.

#### Future Land Use Element

**Policy 1.3:** Indian River County shall maintain, periodically review, and revise if necessary, its various zoning districts (including special districts) and overlay districts as may be warranted to ensure the implementation of the comprehensive plan.

Additionally, Indian River County shall maintain, periodically review and revise if necessary, and enforce land development regulations. Those land development regulations shall be the primary mechanism through which the county shall implement the Comprehensive Plan. The criteria and standards established in the various elements of the comprehensive plan shall be the basis for the land development regulations. Those regulations shall include, but not be limited to, provisions for:

- The use of land and water consistent with the Future Land Use Map and the Comprehensive Plan;
- The subdivision of land;
- The use of areas subject to periodic flooding and the provision of adequate drainage and stormwater protection;
- The protection of potable water wellfields;
- The protection of environmentally sensitive lands;
- The regulation of signage, landscaping and other aesthetic controls;
- The provision of safe on-site and off-site traffic circulation and adequate parking; and
- The review of all development applications and modifications to ensure that all provisions of the Comprehensive Plan are enforced.

**Policy 1.6:** Development of conservation designated land shall be limited to the following:

C-2 Conservation 2 (Privately owned estuarine wetland and undeveloped lagoon island conservation areas.

Conservation Uses

Passive Recreational Uses

- Including but not limited to, nature centers and trails, hiking trails, canoe launches, observation towers, scenic areas, wildfire sanctuaries, wildlife feeding stations, picnic areas, bathrooms, and parking areas.
- Up to 0.25 FAR

Residential Uses

- Up to 1 unit/40 acres (on-site).
- Up to 1 unit/acre (Transfer of Development Rights)

Residential development in C-2 designated areas in C-3 designated areas shall be limited to approved Planned Developments (PDs). The county shall require cluster development and density transfers to limit the impact of development on conservation lands. The PD and clustering requirements shall not apply to single-family lots along the east side of the St. Sebastian River that were legally created prior to February 13, 1990.

**Policy 1.8:** C-2 and C-3 designated lands shall be considered for public acquisitions.

Objective 7: Protection of Natural Resources. By 2000, there will be at least 79,589 acres of environmentally important land under federal, state or county ownership or control within the unincorporated portion of Indian River County.

**Policy 7.1:** Indian River County shall regulate development of areas which are prone to flooding and areas within the 100 year floodplain in a manner that is consistent with the regulations established by the National Flood Insurance Program.

**Policy 7.2:** The County shall continue to provide for the transfer of development rights (TDR) from estuarine wetlands to approved uplands. All projects involving TDRs must be Planned Development projects. No density can be transferred to agriculturally designated land. Deed restrictions and/or easements shall be used to ensure that land from which density has been transferred is preserved and protected. The development rights transferred shall be up to 1 unit per acre of estuarine wetlands, provided, however, that the maximum density permitted on the upland project area receiving the density transfer shall not increase by more than:

- o Twenty percent of the maximum density allowed by the receiving site's underlying comprehensive plan land use designation(s) where the receiving site is not adjacent to the area from which density is transferred; or
- o Fifty percent of the maximum density allowed by the receiving site's underlying comprehensive plan land use designation(s) where the receiving site is adjacent to the area from which density is transferred.

**Policy 7.3:** The County shall provide protection to environmentally sensitive lands through land development regulations that limit building densities, require mitigation for impacted areas, permit the transfer of development rights, and promote the use of conservation easements, dedications, and public acquisition.

**Policy 7.6:** Indian River County shall maintain and enforce regulations to protect wetlands from negative impacts of development. These regulations address buildings setbacks, protection from solid and liquid wastes including pesticides and herbicides, dredging or filling of wetlands, incorporation of wetlands into a site's development scheme, and mitigation of lost or destroyed wetlands.

**Policy 7.10:** Through the use of fee simple purchase, transfer of development rights, and conservation easements, Indian River County shall coordinate with other state, federal and local agencies to identify and protect vegetative communities identified in Conservation Element policies 6.1 through 6.7.

**Objective 8:** Protection of Historic Resources. Through 2005, at least 95% of unincorporated Indian River County's historic properties (as identified in Historic Properties Survey of Indian River County, Florida, prepared by Historic Properties Associates, Inc., April 1989) will continue to be preserved in fair, good or excellent condition.

**Policy 8.2:** Indian River County shall use incentive such as transfer of development rights, tax relief, mitigation, and public acquisitions; and penalties such as fines and imprisonment, to protect and preserve historically and archaeologically important resources. The following criteria are used to determine the historical significance of a resource:

- o Whether or not the resources is at least 50 years old;
- o Whether or not the resource contains significant character, interest or value as part of the historical, cultural, aesthetic and architectural heritage of the county;
- o Whether or not the resource displays unique and/or distinguishing characteristics of an architectural style, design period, construction method, detail, craftsmanship, or material; and
- o Whether or not the resources is a work by prominent architect, designer, engineer, builder or landscape architect.

**Objective 12:** Coordinated Planning. All development in Indian River County will be consistent with the resource planning and management activities of the state, and with approved management plans including the Hutchinson Island Management Plan.

**Policy 12.2:** As part of the country's periodic Capital Improvements Element evaluation and update process, the impact of new development on hurricane evacuation times and the need for improvements and the timing of improvements to evacuation routes in order to maintain or reduce evacuation times shall be assessed.

**Policy 12.3:** Indian River County shall include within its land development regulations to assess the impact of new development on emergency evacuation.

**Objective 16:** Protection of the Indian River Lagoon. Through 2020, the portion of the Indian River Lagoon within unincorporated Indian River County will have a class II state water quality rating.

**Policy 16.1:** Indian River County land development regulations shall require an environmental impact analysis of development within conservation districts or lands abutting the Indian River or St. Sebastian River.

**Policy 16.2:** Indian River County shall prohibit land use activity which results in alteration, degradation or destruction of coastal and estuarine resources except when necessary to prevent a public hazard or provide public benefits which exceed those lost as a result of such activity. Public benefits of such resources include floodplain protection, natural habitat for threatened and endangered plants and animals, natural aquifer groundwater recharge, agriculture and recreation.

**Policy 16.3:** Indian River County shall continue to provide technical, monetary and political support to conservation programs aimed at land acquisition on the barrier island and in other coastal conservation areas.

- Policy 16.4:** Indian River County shall review all proposed land use changes for consistency with policies set forth in the Conservation and Coastal Management Elements.
- Objective 17: Coastal Population Control. During the 1995-2020 time period, the county will have no increase in land use designation density or intensity within the Coastal High Hazard Area.
- Policy 17.1:** The County shall not approve plan amendments that increase the residential density or land use intensity within the Coastal High Hazard Area.
- Policy 17.2:** The County shall support programs of land acquisition on the barrier island for natural resources preservation, recreation or both.
- Policy 17.3:** The County shall limit densities in the coastal high hazard area to ensure timely evacuation of the barrier island.
- Policy 17.4:** The County shall prohibit new development of adult congregate living facilities, nursing homes, homes for the aged, total care facilities, and similar developments within the Coastal High Hazard Area.
- Objective 19: Hazard Mitigation Report Recommendations. Within one year of the issuance of a Hazard Mitigation Report by Indian River County of the Treasure Coast Regional Planning Council, any recommendations that identify land use conflicts or inconsistencies will have been implemented.
- Policy 19.1:** Indian River County shall issue Hazard Mitigation Reports following natural or manmade hazardous incidents. Such incidents may include, but not be limited to , hurricanes and tropical storms, tornadoes, flooding, hazardous material accidents, nuclear power plant accidents, armed violence (civil disturbance, terrorism, or military conflict), mass immigration, coastal oil spill, freezes, fires, and drought.
- Policy 19.2:** Following the issuance of any Hazard Mitigation Reports, Indian River County shall review its comprehensive plan for consistency with that Hazard Mitigation Report. Appropriate Hazard Mitigation Report based plan amendments shall be processed at that time.

**Infrastructure Element, Sanitary Sewer Sub Element**

- Objective 4: Water Conservation. Through 2020, 100% of the wastewater effluent produced by the county centralized sanitary sewer facilitated will be reused.
- Policy 4.1:** The County shall continue to reuse wastewater by spray irrigation, with percolation ponds as back-up.
- Policy 4.2:** The County shall require large volumes irrigation users, such as developments with golf courses, to use reuse water for spray irrigation.
- Policy 4.3:** The County shall continue to enforce Land Development Regulations that require developments that use treated wastewater for spray irrigation to construct and dedicate to the county the effluent transmission lines needed to transport the effluent to the development.

**Policy 4.4:** By January 2001, the County shall complete a study of the feasibility of developing man-made wetlands for effluent disposal near county wastewater treatment plants and/or reuse water transmission lines.

#### **Potable Water Sub-Element**

Objective 4: Water Conservation. By 2000, the county's per capita water use will be less than 1995 level of 70 gallons/day.

#### **Natural Groundwater Aquifer Recharge Sub-Element**

**GOAL:** It is the goal of Indian River County to protect the function of natural groundwater aquifer recharge areas, to prevent the contamination of groundwater and to extend the life span of the county's aquifers through water conservation.

Objective 2: Preserving the Quantity of the Surficial Aquifer. Through 202, there will be no reduction in the availability of groundwater from the surficial aquifer. For the purpose of this Objective, water quantity will be based on an average well depth of 90 feet for domestic wells that tap the surficial aquifer, and on data that will be available in the Groundwater Basin Resource Availability Inventory (GWBRAI), pending completion of by the SJRWMD.

**Policy 2.1:** The County shall implement water conservation measures, as designated in the policies under Objective 4 of the Potable Water Sub-Element and Objective 4 of the Sanitary Sewer Sub-Element, to protect the surficial aquifer from depletion.

**Policy 2.2:** By 1999, the County shall adopt a water conservation ordinance to minimize the unnecessary and wasteful use of groundwater from the surficial aquifer.

**Policy 2.3:** The County shall use natural groundwater aquifer recharge areas for passive parks and open space.

Objective 5: Capital Improvements. By 2000, the County shall protect a minimum of 100 additional acres of aquifer recharge areas for the surficial aquifer through conservation easements and fee simple acquisition.

**Policy 5.2:** The County shall pursue state and federal sources of funding available for the preservation and protection of environmentally sensitive areas, such as natural groundwater aquifer recharge areas.

#### **Stormwater Management Sub-Element**

**GOAL:** Provide a drainage system for Indian River County which reduces the risk of property damage and inconvenience from long term flooding, promotes stormwater recharge of the shallow aquifer, reduces stormwater pollutant loading of the Indian River Lagoon and receiving waters and provides proper floodplain management.

Objective 1: Flood Protection. By 2020, all existing and new development in the unincorporated section of Indian River County will be protected from flooding from a 25 year/24 hour storm event.

- Policy 1.2:** The finished floor elevation of any new buildings constructed within a flood zone, as designated in the 1989 Federal Emergency Management Agency (FEMA) Flood Insurance Study – Indian River County and Incorporated Areas, shall be subject to the following requirements:
- “AE” zone – structures must be elevated a minimum of six (6) inches above the base flood level;
  - “A” zone – structure must be elevated a minimum of 18 inches above the crown of the road or at the elevation required by DHRS, whichever is higher, if no base flood data are available, the structure must be elevated at least three (3) feet above the highest natural elevation or the ground surface prior to construction next to the proposed wall of the structure;
  - “VE” zone – structures must be elevated so that the bottom of the lowest horizontal structural member of the lowest floor is elevated one-half (1/2) foot or more above the base flood level.
- Policy 1.3:** The County shall ensure that adequate stormwater management facilities are constructed and maintained to prevent major flooding of the road network of Indian River County during storm events.
- Objective 2: Stormwater Management Facilities. By 2010, all drainage basins in Indian River County shall, at a minimum, meet the Flood Protection Level of Service (FPLOS) for a 10 year/24 hour storm event.
- Objective 5: Preservation of Floodplains and Floodways. By 2002, the County will have adopted a comprehensive floodplain management plan approved by the Federal Emergency Management Agency.
- Policy 5.1:** The County shall prohibit encroachments, including fill, new construction, substantial improvements, and other development, within a county adopted regulatory floodway, as identified in the data section of this sub-element, that would result in any increase in flood levels during the occurrence of a flood discharge, unless specifically approved by the Administrator of the Federal Insurance Administration under the provisions of 44 CFR 65.12, as amended.
- Policy 5.2:** By 2003, the County shall preserve a minimum of 1,000 acres located within the 100 year floodplain.
- Policy 5.3:** For any structures or fill placed within the 100 year floodplain, an equal volume of storage capacity must be created for any volume of the base flood that would be displaced by fill or structures, except for the following instances as more specifically described in LDR Chapter 930:
- Development projects within the floodplain along the Indian River Lagoon granted a waiver by the county upon showing the development will not create material adverse impact on flood protection;
  - Subdivided lots less than one (1) acre in size existing prior to July 1, 1990;
  - Development projects located in the St. Johns Marsh, when granted a cut and fill waiver by the county based on lack of material adverse impact; or
  - Development within the Vero Lake Estates Municipal Services Taxing Unit (MSTU) for which a cut and fill waiver has been granted by the county.

- Policy 5.4:** The county will preserve the natural functions and values of wetlands by implementing the policies listed under Objective 5 of the Conservation Elements.
- Policy 7.9:** The County, in cooperation with the Indian River Soil and Water Conservation District (IRSWCD), shall require all new groves and replanted groves to implement conservation plans, and non-structural best management practices (BMPs). Non-structural BMPs, as defined by the Natural Resource Conservation Service (NRCS), include land use planning, preservation of wetlands and floodplains, education, and erosion control.
- Policy 8.1:** The County will allow only low density land uses in areas designated as flood prone (within the 100 year floodplain) as depicted on the Future Land Use Map. The only exception is where platted subdivisions were developed prior to existing regulations.

### **Transportation Element**

- Policy 7.4:** The County shall not fund transportation improvements which will allow increased development in coastal high-hazard areas.
- Policy 7.7:** The County will coordinate the mitigation of adverse structural and non-structural impacts from airports and related facilities, upon natural resources and land uses with the expansion of and development of these facilities consistent with the future land use, coastal management and conservation elements.

### **Capital Improvements Element**

- Objective 2:** Development in Coastal High Hazard Areas. Through 2020, development in coastal high hazard areas will not increase beyond the density or intensity levels indicated on the current Future Land Use Map.
- Policy 2.1:** The coastal high hazard area is defined as the area of the county designated as evacuation zones for a category one hurricane.
- Policy 2.2:** The County shall not increase land use density and intensity, in the coastal high hazard area, beyond that reflected in the county's current Future Land Use Map.
- Policy 2.3:** The County shall make appropriations for infrastructure in coastal high hazard area, beyond that reflected in the County's current Future Land Use Map.
- Policy 2.4:** The County shall ensure that the replacement of infrastructure in the coastal high hazard area will be limited to maintaining the adopted level-of-service standards.
- Policy 2.5:** The county shall require that all developments and all single-family units in coastal high hazard areas fully pay the cost for required infrastructure improvements through impact fees, capacity charges, developer dedications, assessments and contributions.

**Policy 2.6:** The County shall not use public funds to subsidize increased density or intensity of urban development in coastal high hazard areas; however, public beach, shoreline access, resource restoration, or similar projects may be constructed.

### **Conservation Element**

**GOAL:** It is the goal of Indian River County to protect, conserve, enhance, or appropriately use the County's natural resources in a manner which maximizes their natural functions and values.

**Policy 2.6:** The County shall continue to assist the SJRWMD, FDEP, U.S. Army Corps of Engineers (ACOE), and the County Environmental Health Department by undertaking code enforcement actions, as necessary, to ensure the protection of wetlands and surface water quality.

**Policy 3.2:** The County shall use water conservation measures, as described under Objective 4 of the Potable Water Sub-Element and Objective 4 of the Sanitary Sewer Sub-Element, to protect the surficial aquifer and Floridian aquifer from groundwater quantity depletion.

**Policy 3.6:** By 1999, the County will establish an emergency water conservation plan consistent with the SJRWMD's District Water Shortage Plan, as specified in Chapter 40C-21, F.A.C. The County's emergency water conservation plan shall include the following criteria:

- o Local enforcement procedures relating to the District Water Shortage Plan;
- o Availability of public information on water conservation techniques; and
- o Advertisement of water restriction requirements and water conservation techniques in the local press during drought conditions.

**Objective 4:** Floodplains. Through 2020, there will be no reduction in flood storage capacity or the other natural functions and values of floodplains in Indian River County.

**Policy 4.1:** Consistent with Policy 5.1 of the Stormwater Management Sub-element, the county shall regulate development in areas designated as regulatory floodways in the 1989 FEMA Flood Insurance Study for Indian River County. Within designated regulatory floodways, all encroachment shall be prohibited, including: fill, new construction, substantial improvements, and other development within the adopted regulatory flood that would result in any increase in flood levels within the county during the occurrence of the base flood discharge.

**Policy 4.2:** The County shall continue to regulate development within flood prone areas to minimize flood storage capacity reduction and to afford protection to life and property within floodplains.

**Objective 5:** Wetlands. Through 2020, there will be no net loss of the natural function and values of wetlands or deepwater habitats in Indian River County.

**Policy 5.2:** Indian River County shall require the restoration and management of wetlands as mitigation for the limited filling of degraded wetlands,

provided that the following criteria, as defined in LDR Chapter 928, are met:

- The benefits of the restoration and management of natural functions shall offset the losses of wetland functions associated with the limited wetland filling;
- A conservation easement shall be established to ensure protection; in addition, Indian River Mosquito Control District (IRMCD) will be granted access easements to allow for mosquito inspection, treatment, and management; and
- The restoration and management plan shall be consistent with U.S. Army Corps of Engineers regulations, as defined in Section 404 of the Clean Water Act, and FDEP and/or SJRWMD regulations, as specified in Chapter 373, F.S., Chapter 40C-4, and Chapter 40C-40 F.A.C.

**Policy 5.5:** The County shall continue to accept fee-in-lieu payments as a last alternative for mitigation of wetlands alteration when on-site mitigation is not practicable, and only in cases where the affected wetland is a small, isolated, disturbed wetland with minimal functional value. Funds obtained from fee-in-lieu payments will be earmarked for acquisition, restoration, or management of similar wetlands elsewhere in the country.

**Policy 6.7:** As specific conditions of the site plan approval process, the county shall require the removal of all exotic vegetation from new development sites, and require that new development sites remain free of nuisance exotic vegetation. Furthermore, the county shall continue to prohibit the planting and sale of nuisance exotic vegetation.

**Policy 6.13:** The County shall continue to prohibit the disturbance of dune vegetation oceanward of the county dune stabilization setback line, with the exception of dune walkover construction and other similar minor structures that may be allowed subject to approval from the FDEP Bureau of Beaches and Coastal Systems.

**Policy 6.15:** The County shall protect the xeric scrub community abutting the St. Sebastian River by limiting densities in the area to maximum of 1 unit per 2.5 acres, by encouraging cluster developments through density transfer, and by requiring residential developments to maintain a river buffer setback consisting of native vegetation in accordance with land development regulations. No off-site mitigation or fee-in-lieu payments will be accepted for developments proposing to locate in the area.

Objective 8: Recreational Uses of Natural Resources. Using 1990 recreational and open space land acreage as a baseline, by 2005 the county shall increase by a minimum of 500 acres, the amount of recreational and open space land accessible to the public for resource-based passive recreation, compatible with natural resource conservation.

Objective 10: Soil erosion associated with land development and agricultural activities will be minimized by the 1998, the county will have an established comprehensive beach and dune management regulatory program to address shoreline erosion and stabilization methods.

**Policy 10.1:** Consistent with Policy 7.9 of the Stormwater Management Sub-element, the county, in cooperation with the Indian River Soil and Water Conservation District (IRSWCD), shall provide technical assistance to

agricultural operations in implementing conservation plans and non-structural best management practices (BMPs), Non-structural BMPs, as defined by the Natural Resource Conservation Service (NRCS), include: land use planning, preservation of wetlands and floodplains, education, and erosion control methods.

- Policy 10.3:** The County shall undertake beach shoreline stabilization activities including:
- Monitoring of the experimental Pre-fabricated Erosion Protection (PEP) reef to determine the need for supplemental beach stabilization, such as sand renourishment.
  - Determining a funding source for public beach stabilization projects, including consideration of establishing a beach taxing district;
  - Coordinating with the Sebastian Inlet Tax District and the City of Vero Beach on beach restoration projects; and
  - Continuing meetings of a beach preservation and restoration advisory committee concerning recommendations on related issues.
- Policy 10.4:** To protect existing dune communities and reduce shoreline soil erosion, the county shall continue to prohibit development encroachment oceanward of the county dune stabilization setback line, with the exception of dune walkovers and other similar minor structures subject to approval by the FDEP Bureau of Beaches and Coastal Systems.
- Objective 12: Natural Resource Management. By 2000, the county shall establish a comprehensive conservation land management program to address long-term management of county-owned scrub habitat.
- Policy 12.1:** The County in cooperation with the State Division of Forestry, U.S. Fish and Wildlife Service, and the Florida Game and Freshwater Fish Commission, will conduct prescribed burns on a rotational basis at the Wabasso Scrub Conservation Area, the North Sebastian Conservatino Area, and other county-owned scrub habitat.
- Policy 12.5:** The County shall solicit grants from regional, state and federal agencies to supplement management funds for acquired lands. Funding will be used for following purposes:
- 1) Restoration and enhancement of impacted wetland and upland areas;
  - 2) Establishment and/or improvement of public access;
  - 3) Promotion of environmental education/awareness;
  - 4) Eradication of nuisance exotic vegetation;
  - 5) Posting of signage and boundary markers; and
  - 6) Prescribed burning on scrub lands.
- Policy 12.8:** by 2000, the county shall devise a dune cross-over construction and maintenance plan for publicly-owned oceanfronts tracts, as specified in Policy 4.4 of the Coastal Management Element.

### **Coastal Management Element**

**GOAL:** To protect, maintain and enhance coastal resources and provided for the enjoyment of the social, economic and natural benefits to these resources, while

reducing the potential loss of life, and public and private expenditures in the coastal zone.

- Objective 1:** Natural Resource Protection. Using 1990 data as a baseline, through 2020, there will be no significant reductions in the overall amount of terrestrial and marine resources within the coastal zone of Indian River County.
- Policy 1.1:** The County shall not permit development in areas deemed environmentally-sensitive and environmentally-important unless the criteria established in the following sections of the Comprehensive Plan are met:
- o Comprehensive Wetlands Management Program (CWMP), as outline in the Conservation Element;
  - o Policies 1.6 and 1.7 of the Future Land Use Management; and,
  - o Policies of Objectives 5 and 6 of the Conservation Element.
- Policy 1.2:** As set forth in the CWMP and Policy 1.6 of the Future Land Use Element, all estuarine wetlands and deepwater habitats in Indian River County shall be deemed environmentally-sensitive and designated as C-2 on the future land use map. The extent of estuarine wetlands on C-2 designated lands shall be based on a jurisdictional wetlands boundary determination, as verified by the Environmental Planning Section, U.S. Army Corps of Engineers and the Florida Department of Environmental Protection or the St. Johns River Water Management District. Land designated C-2 shall be afforded the following protective measures:
- o Development on C-2 designated wetlands shall be limited to one (1) unit per 40 acres, subject to approval of jurisdictional agency wetlands alteration permits;
  - o For development projects having C-2 designated lands and contiguous uplands, the County shall allow a density transfer of one (1) unit per acre from the wetlands portion to the upland portion of the subject property, provided that the underlying zoning density of the receiving upland portion is not increased by more than 50 percent. Such density transfers shall be limited to planned residential developments (PDs).
  - o No density transfers from off-site lands, and no density bonuses shall be permitted within PD projects on C-2 designated lands; and
  - o The County shall allow a density transfer of one (1) unit per acre from C-2 estuarine wetlands to non-contiguous uplands, provided that the receiving uplands are developed as residential PD, and underlying zoning density of the receiving uplands is not increased by more than 20 percent.
- Policy 1.9:** As set forth in the policies and objectives of the Conservation Element, the county shall protect and preserve significant coastal vegetative communities, such as coastal (maritime) hammocks and coastal strand, through conservation easements and fee simple acquisition.
- Policy 1.10:** Consistent with Policy 6.1 of the Conservation Element, the county shall continue to assist the USFWS and the FDEP in acquiring undeveloped tracts of tropical/coastal hammock and coastal strand by identifying lands eligible for acquisition, evaluation local cost-sharing funding and by providing “in-kind” services, such as land management.

- Objective 4:** Beaches and Dunes. By 1998, all natural functions of the beach and dune system in Indian River County shall be protected and no unmitigated human-related disturbance of the primary dune system shall occur.
- Policy 4.1:** The county shall continue to recognize the 1981 Florida Department of Natural Resources (FDNR) Coastal Construction Control Line (CCCL), as established by Chapter 161.053, F.S., and recorded on June 10, 1981 in Plat Book 10, pages 93-93H, as being the county's line of regulatory prohibition or Dune Stabilization Setback Line (DSSL). Construction encroachment, except for the following, shall be prohibited oceanward of the DSSL:
- Federal, state and locally permitted erosion control stabilization and beach renourishment projects;
  - The construction of dune cross-over structures and other minor structures;
  - Public navigational projects, markers or other control structures;
  - Maintenance and/or restoration of legal nonconforming structures no requiring greater than 50 percent construction, per Federal Emergency Management Agency (FEMA) regulations;
  - Use of emergency equipment and/or activities, such as removal of ordinance and debris, to protect life and/or loss of upland property;
  - Structural and non-structural stabilization techniques to protect coastal buildings from a 15 year or less storm event.
- Policy 4.2:** To ensure appropriate protection of the beach and dune system, the county shall review all proposed beach and dune projects in the unincorporated area of the county and within the City of Vero Beach and shall review and submit comments regarding permit applications of all appropriate federal, state and local agencies.
- Policy 4.3:** The county shall solicit cost-share funding for beach renourishment and shoreline stabilization from the U.S. Army Corps of Engineering and the Florida Department of Environmental Protection.
- Policy 4.4:** The County shall require dune cross-over structures for all new public and private development during beach access. The county shall not approve plans which do not include FDEP approved dune cross-over structures at beach access points.
- Policy 4.5:** By 2000, Indian River County shall devise a dune cross-over construction and maintenance plan to be implemented through the Parks and Recreation Division of the County. Criteria shall include:
- Elevated structures at all designated public access points designated to minimize environmental impacts and withstand adverse climatic conditions.
  - Public structures a minimum of six (6) feet wide which utilize approach ramp facilities for the handicapped.
  - The planting of native species in conjunction with the construction of new dune cross-over structures to discourage encroachment onto the neighboring sensitive dune area.
- Policy 4.6:** Indian River County shall protect and preserve natural beach and dune systems by adopting the specific criteria for shoreline stabilization within the unincorporated portion of Indian River County and within the

municipal limits of the City of Vero Beach, as outlined in Policy 10.5 of the Conservation Element.

- Policy 4.7:** The county shall continue to prohibit motorized vehicles on the beach/dune area, except for vehicles engaged in emergency activities, permitted government vehicles and permitted vehicles associated with approved construction, restoration and/or scientific projects.
- Policy 4.8:** The County shall enforce its beach and dune protection land development regulations by requiring mitigation or restoration of dune disturbances, and imposing fines as warranted in association with code violations.
- Policy 4.9:** County staff will attend meetings held by the Sebastian Inlet Tax District and will participate in evaluating technical studies prepared by the district.
- Objective 5: Limiting Public Expenditures in the Coastal High-Hazard Area. Through 2004, there will be no expansion of infrastructure within the Coastal High Hazard Area (CHHA) other than that which is deemed necessary to maintain existing levels-of-service.
- Policy 5.1:** In accordance with rule 9J-5.003, F.A.C., the county hereby designates the "Coastal High Hazard Area" (CHHA) as identified in the Treasure Coast Regional Planning Council Hurricane Evacuation Study (1994). Figure 9.22 of this element is hereby adopted as the county's CHHA designation map.
- Policy 5.2:** The county shall not subsidize public facilities within the CHHA, other than those which are deemed necessary to maintain existing levels of service standards, and those which are directly related to public access and/or resource management. Furthermore, the county shall adopt Objective 2 and its associated policies of the Capital Improvement Element.
- Policy 5.3:** Following a storm event, the Public Works Department shall assess all county facilities damaged from storm activity in the CHHA, and shall make recommendations to reduce future expenditures and potential damage risks. In addition, the Public Works Department shall conduct a cost/benefit analysis to evaluate the relocation of storm damaged infrastructure or infrastructure which is repeatedly threatened by potential storm damage.
- Policy 5.4:** The county shall maintain at a minimum, a Federal Emergency Management Agency (FEMA) Community Rating System (CRS) classification of "7" by continuing to enforce LDR Chapter 930 – Stormwater Management and Flood Protection, and by evaluating structures for compliance with the FEMA's 50% Rule, as described in Policies 7.4 and 7.5 of this element.
- Objective 6: Reduction of Hurricane Evacuation Times of Reduce Public Risk. Through 2020, Indian River County will maintain an estimated evacuation time of 12 hours or less for a Category III Hurricane.
- Policy 6.2:** Consistent with Chapter 252, F.S., by 1998, the County will conduct a survey of existing schools, municipally-owned and county-owned

buildings to identify those buildings that are appropriately designed and located to serve as hurricane evacuation shelters. Once this survey is completed, the county will solicit state funding from the Florida Division of Emergency Management to decrease the deficit of "safe" shelter capacity by retrofitting existing primary shelter facilities.

- Policy 6.3:** By August 1999, the utilities department and public works department shall assist the Department of Emergency Services in assessing the vulnerability of public infrastructure located within the CHHA. The Community Development Department shall assist the Department of Emergency Services in assessing the vulnerability of private residences and businesses within the CHHA, and by ensuring that all new developments incorporate hazard mitigation techniques, such as dedicating emergency accesses, as required by the Department of Emergency Services.
- Policy 6.4:** Indian River County shall continue to coordinate with the Treasure Coast Regional Planning Council (TCRPC), Brevard County and St. Lucie County concerning evacuation routes and populations involved to assess impact of regional growth on local evacuation times.
- Policy 6.5:** To maintain current evacuation times, the county shall adopt Objective 11 of the Coastal Management Element and Objective 17 of the Future Land Use Element and their associated policies relating to no increase in the density of land use within the Coastal High Hazard Area (CHHA)
- Policy 6.6:** The county shall continue to coordinate with the Florida East Coast Railroad (FECRR) and other concerned agencies to ensure that train movements will be stopped during hurricane evacuations.
- Policy 6.7:** The county shall prohibit the location of new adult congregate living facilities, nursing homes and other similar medical facilities that serve the county's special needs populations within the CHHA.
- Objective 7:** Post-Disaster Recovery and Redevelopment. Consistent with the requirements of Chapter 163, F.S. and DCA Rule 9J-5, F.A.C. the county shall have a Local Mitigation Strategy (LMS), as an annex to the Indian River County Comprehensive Emergency Management Plan (CEMP). The LMS shall list and prioritize disaster mitigation projects.
- Policy 7.2:** The county shall continue to maintain its LMS, and to implement the short-term and long-term recommendations contained in the LMS.
- Policy 7.3:** Following a natural disaster, principal structures and uses located eastward of the County Dune Stabilization Setback Line (DSSL) which sustain greater than 50 percent of MAI (Member of Appraisal Institute) assessed current market value damage from a naturally occurring storm shall be required to relocate upland of their location and, when possible, westward of the DSSL. Prior to reconstruction, principal structures east of the 1987 State Coastal Construction Control Line (CCCL) exhibiting damaged from a naturally occurring storm event, greater than 50 percent of MAI assessed market value, shall be required to obtain all applicable permits and comply with all applicable building codes concerning coastal construction.

- Policy 7.4:** Consistent with National Flood Insurance Program (NFIP) requirements, any structure predating 1989 FEMA Flood Insurance Rate Maps (FIRMs) and located within a flood hazard area that sustains “substantial damage” due to a natural disaster (i.e. repair costs that exceed 50% of more of the buildings value” shall be required to be elevated a minimum of six (6) inches above the base flood elevation (BFE), as depicted on current FIRMs.
- Policy 7.5:** Consistent with NFIP requirements, any proposed “substantial improvement” (i.e. additions, renovations, or modifications, that exceed 50% or more of the building’s value) to a pre-FIRM structure located within a flood hazard area shall be required to be elevated a minimum of six (6) inches above the BFE, as depicted on current FIRMs. The list contained in Annex IV of the CEMP will be used to determine the total value of “substantial improvement.”
- Policy 7.6:** The County shall continue to regulate development and manage natural resources within the Coastal Zone by:
- Continuing to enforce LDR Chapter 932- Coastal Management, and LDR Chapter 402- Coastal Construction Code;
  - Preserving flood storage capacity in the 100 year floodplain, in accordance with the policies listed under Objective 5 of the Stormwater management Sub-Element;
  - Maintaining or reducing land density allowances in the Coastal High Hazard Area (CHHA) in accordance with policies under Objective 17 of the Future Land Use Element and Objective 11 of this element;
  - Minimizing beach and dune disturbance in accordance with Coastal Management Element Policy 4.8 and County Code Chapter 932; and
  - Reviewing in coordination with the FDEP Bureau of Beaches and Coastal Systems, all emergency seawall permit applications within the unincorporated area of Indian River County and within the City Limits of Vero Beach.
- Objective 9:** Historic Resources. Through 2020, there will be no significant impact to roads, sites or structures deemed historically or archaeologically significant in Indian River County.
- Policy 9.1:** Consistent with Policy 8.2 of the Future Land Use Element, the county shall continue to use incentives such as transfer of development rights, tax relief, mitigation and public acquisition to protect and preserve historic and archaeological resources in the Coastal Zone.
- Policy 9.2:** The county shall pursue state and federal funding or order to acquire and/or preserve cultural and historic sites recognized as important and/or significant.
- Policy 9.3:** The county shall provide developers with incentives, such as transfer of development rights, tax incentives and others, in return for preserving historic resources.
- Policy 9.4:** Developments which include historical resource sites shall be required to submit archaeological surveys prior to commencing construction activities. Developers shall be required to preserve these resources while maintaining a reasonable use of the land.

- Policy 9.5:** The County shall recognize and properly manage its historical resources by implementing Objective 8 of the Future Land Use Element.
- Policy 9.6:** By 2005, the county will develop management plans for the following scenic/historic roads: Fellsmere Grade, Quay Dock Road, Old Winter Beach Road and Gifford Dock Road (Ref. Policies 7.2 and 7.3 Recreation and Open Space Element).
- Policy 10.1:** By 2003, the county shall decommission all remaining wastewater treatment package plants in the Hurricane Vulnerability Zone.
- Policy 10.2:** Consistent with DCA Rule 9J-5.012(3)(c)(8), the county shall identify and assess all infrastructure located within the CHHA to determine its vulnerability. This vulnerability assessment will be based on data from FIRMs, The Arbiter of Storms (TAOS) computer model, and the Sea Lake, and Overland Surge from Hurricanes (SLOSH) map. Any decision to abandon or relocate infrastructure outside of the CHHA following a natural disaster will be based on a benefit-cost analysis of vulnerable infrastructure. This benefit-cost analysis will be included in the Local Mitigation Strategy, once completed.
- Policy 10.3:** The county shall coordinate with all state and federal agencies in the funding and implementation of beach stabilization projects.
- Policy 10.4:** Indian River County shall permit the utilization of local funds for shoreline stabilization and beach renourishment projects. Priority shall be given to those projects which demonstrate the benefit-cost ratio while having the least impact to the offshore reef, and the nearshore beach and dune ecological communities.
- Policy 10.5:** The county shall not allow new underground storage tanks for specific facilities to be located oceanward of the county's Dune Stabilization Setback Line (DSSL).
- Objective 11: Limit Densities in the Coastal High Hazard Area (CHHA). Through 2020, there will be no increase in the density of land use within the Coastal High Hazard Area.
- Policy 11.1:** Lands acquired by the county under its Environmental Lands Program shall include property located within the Hurricane Vulnerability Zone (HVZ). This land shall be used for either natural resource conservation, passive recreation or both.
- Policy 11.2:** Within the CHHA, the county will not make infrastructure improvements to accommodate development more intense than allowed by the comprehensive plan.
- Policy 11.3:** The County shall utilize all applicable state and federal regulations, and the appropriate objectives and policies of the Indian River County Comprehensive Plan, to limit public and private development in the CHHA.

### Recreation and Open Space Element

**Policy 8.1:** The County shall acquire those environmentally sensitive areas programmed for acquisition in the conservation element of this plan. These areas will be used as open space, passive recreation areas, and historic sites as appropriate.

## Attachment G

### Vero Beach Comprehensive Plan Excerpts Related to Hazard Mitigation

#### Future Land Use Element

- Objective 3: As also provided for in the Coastal Management Element, the City will develop a detailed strategy by 12/91 to minimize impacts of future hurricanes, such strategy to be coordinated with plans and concerns of Indian River County, other beach communities, and affected state and regional agencies.
- Policy 3.1** A contingency plan which addresses hurricane preparedness and recovery will be prepared by 12/91 as a basis for notifying and evacuating residents, providing temporary shelter, and restoring services in the event of future hurricane emergencies.
- Policy 3.2** Upon adoption of the Comprehensive Plan, development permitted on the barrier island portion of the City of Vero Beach shall not exceed that amount which can be evacuated in a safe and orderly manner within seven (7) hours.
- Policy 3.3** Siting standards and requirements will be established by 9/1/90 to permit safe and insurable development and reconstruction in coastal high hazard areas consistent with applicable rules and regulations of state and federal governments.
- Objective 5: Upon adoption of the Comprehensive Plan, the City will act to protect and preserve identified environmentally sensitive areas and resources in the community, and to promote responsible site development through new land development regulations and standards established by 9/1/90.
- Policy 5.1** Environmentally sensitive areas and resources, both natural and historic, will be defined and mapped through cooperative arrangements with Indian River County and cognizant state and regional agencies, which arrangements the City will seek to establish by 3/31/91.
- Policy 5.3** Future development on undeveloped islands in the Indian River lagoon will be limited to residential densities not exceeding 0.2 unit per new acre, and a transfer of development rights (TDR) procedure will be established by 9/1/90 to facilitate transfer of development to other locations in the City.
- Objective 7: Land development regulations which implement this Comprehensive Plan will be adopted by the City by 9/1/90, such regulations to include standards, procedures and requirements governing type, character and density of land use; bulk, height and placement of buildings; conservation and protection of natural resources; and mitigation of off-site impacts of development.

**Objective 8:** By 1993, the City shall have a program to protect, preserve or appropriately re-use the historic resources in the City.

**Policy 8.1** The Vero Beach Land Development Regulations, to be adopted by September 1, 1990, shall require that by 1993, the City shall adopt an historic preservation ordinance to provide appropriate protection for significant historic resources.

**Policy 8.4** The Vero Beach Land Development Regulations, to be adopted by September 1, 1990, shall develop a transfer of development rights procedure that would encourage the protection of historic resources from the potential impacts of development and redevelopment.

**Policy 8.5** Historic resources and their environments should be included in public acquisition programs for recreation, open space and conservation areas.

**Potable Water Sub Element**

**Goal 1:** Provide efficient wastewater and potable water service compatible with conservation of natural resources.

**Objective 2:** On an ongoing basis, required the use of new technology and management practices, to increase water use efficiency and promote conservation of natural resources.

**Policy 2.1** Continue to explore, in conjunction with other local governments and agencies, new technologies and management practices which lower costs and/or better protect natural resources.

**Policy 2.3** By 1991, require conservation programs for potable water. These programs should promote water conservation through public education and public involvement.

**Policy 2.6** In an effort to further lower levels of service, continue to promote water conservation through the City Resource Conservation Program which provides educational materials relative to reduced water consumption and installation of low flow shower heads free of charge. It is anticipated that the program will reduce the level of service by up to five percent by the year 2000.

**Objective 4:** Continue to promote potable water conservation and decrease per capita potable water consumption through the use of inverted rate structure and effluent reuse program.

**Policy 4.1** Require the use of water conserving plumbing fixtures in the Land Development Regulations to be adopted by September 1, 1990.

**Policy 4.4.2.0.** Provide a drainage system for Vero which reduces the risk of property damage and inconvenience from long-term flooding, promotes storm-water reuse, and reduces stormwater pollutant loading of the Indian River Lagoon and receiving waters.

**Objective 15:** The City will ensure that a drainage system to prevent flooding from a ten-year/24-hour storm event is provided within the City to meet existing and future needs.

**Policy 15.1** Maintain the requirements of Chapter 73 of the City Code which addresses flood prevention and drainage.

**Coastal Management Element**

**Goal1:** To establish growth management strategies that will allow growth in the coastal zone which does not damage or destroy the natural resources, protects human life and limits public expenditures in those areas subject to destruction by natural disaster.

**Objective 3:** The City shall continue to implement a beach and dune management program which protects, enhances and restores the naturally functioning beach system.

**Policy 3.1** The Land Development Regulations to be adopted by September 1, 1990 shall include regulations governing the location, construction and maintenance of development adjacent to the Atlantic shoreline. New development seaward of the CCCL shall be governed by the following conditions, at a minimum. Criteria:

- A. To maintain the existing vegetation on the dune line or replace it with vegetation approved by the Vero Beach Planning Department.
- B. No new shore hardening structures shall be permitted.
- C. Setbacks or other non—structural methods of shoreline protection shall be given the highest priority.
- D. “Soft” shoreline protection devices such as sand filled geotextile containers may be permitted, when it can be demonstrated, through competent engineering studies, that they will exert minimum adverse effects upon shoreline functions or dynamics, as well as adjacent properties. Further, these devices shall not impede public access to or along the shore.
- F. Reconstruction of existing hard erosion control structures shall be permitted subject to meeting current standards.

**Policy 3.2** The City shall continue to implement programs for re-establishment and maintenance of the primary dune area. These standards shall include, at a minimum, the following provisions. Criteria:

- A. Excavations will be prohibited unless it is shown they are necessary to mitigate natural disaster occurrences or are FDNR permitted and monitored projects.
- B. Native dune vegetation shall be maintained on site unless removal or alteration is permitted by both the City and the Florida Department of Natural Resources, or other appropriate regulatory agency.
- G. Publicly owned dunes which have been denuded shall be revegetated with approved native vegetation.
- I. Through the site plan review process, the City shall require dune restoration for new development or redevelopment.

**Policy 3.3** The City may participate in beach stabilization and restoration programs, where necessary, that include local, state and/or federal agencies. The City shall encourage continued study of beach and shore to determine characteristics and causes of beach erosion and buildup.

- Policy 3.4** The City shall prohibit vehicular traffic on or over the dune and on the beach except for beach cleaning, police vehicles, emergencies and the turtle patrol. Access will be at designated locations.
- Objective 4: Limit future public expenditures for infrastructure and service facilities which subsidize growth within the coastal high hazard and high risk vulnerability zones areas of Vero Beach, except for expenditures for public land acquisition or enhancement of natural resources.
- Policy 4.1** The Coastal High—Hazard Area shall encompass the area so defined in Section 5.5.2.0 of the Coastal Management Element.
- Policy 4.2** The City shall not fund public facilities built in the coastal high hazard area unless the facility is for public access, resource restoration or property protection.
- Policy 4.3** The City shall not accept improved roadways for operation and maintenance responsibilities within the coastal high hazard zone.
- Policy 4.4** If City utility lines are relocated for any purpose, they should be located outside of the coastal high hazard zone, except where there is no cost—feasible alternative.
- Objective 5: Limit densities within the coastal high hazard zone and direct future development outside of this area.
- Policy 5.1** The City shall continue to limit future development on the barrier island through the use of, but not limited to, the following: 1. Building height limitations to 35 feet. 2. Density limitations. 3. Open space requirements. 4. Parking restrictions.
- Policy 5.2** The City shall continue its program of land acquisition and management for recreation and preservation based on the expenditures designated in the Capital Improvements Element of this plan.
- Objective 6: By 1995, to reduce hurricane evacuation times that exceed seven hours where they currently exist.
- Policy 6.1** The City shall use public service announcements and the local cable-access station to promote awareness of the County Civil Defense disaster preparedness plans.
- Policy 6.2** The City shall coordinate with other municipalities and appropriate agencies to develop Evacuation Zone Management Plans designed to reduce excessive evacuation times to the optimum seven hours. The following shall be considered at a minimum: Criteria: A. Roadway and other infrastructure improvements and funding mechanisms. B. Programs designed to improve the behavioral response to hurricane evacuation orders. C. Land use strategies.
- Policy 6.3** City representatives shall recommend roadway improvements to the hurricane evacuation network based upon the number of people who cannot be evacuated within the optimum seven hour evacuation time

limit. Criteria: A. First priority shall be given to improvements serving the zone with the highest number of people remaining after the seven hour evacuation time. B. The remaining improvements shall be given priority in descending order according to the number of people remaining after the seventh hour.

**Policy 6.4** The City shall utilize hurricane evacuation times, as well as volume to capacity ratios, in determining the timing and priority of roadway improvements as contained within the Traffic Circulation Element of this Plan.

**Policy 6.5** The City Planning Department shall request recommendations from the County Emergency Management Office in order to develop an ongoing public education program, by September 1, 1992, to notify the public as to the necessity to evacuate as quickly as possible in order to reduce or eliminate evacuation times in excess of seven hours. One goal of the program is to improve the behavioral response curve, as well as educate regarding hurricane evacuation procedures.

**Policy 6.6** The City's Peacetime Emergency Plan shall be consistent with the local, regional and state emergency management and evacuation plans.

**Policy 6.7** The City shall coordinate with Florida East Coast Railroad, and other agencies as necessary, to stop train flow during hurricane evacuations.

Objective 8: By 1995, projected post-disaster recovery time in Vero Beach will be reduced to eliminate or lessen the future risk to human life, and public and private property from natural hazards via recovery and redevelopment strategies.

**Policy 8.1** The City shall create a Recovery Task Force by 1992 to hear preliminary damage assessments and direct post-disaster recovery and redevelopment activities. The Recovery Task Force shall consist of the following: Criteria: A. City members of the Recovery Task Force may include the City Manager, Planning Director, City Engineer, Public Works Director, Utilities Director, City Attorney and other members as appointed by the City Council. Staff of the member departments may also serve on the Recovery Task Force as necessary.

**Policy 8.4** In the event of a disaster, all infrastructure and other City owned improvements, shall be analyzed to determine the cost effectiveness of relocation versus repair.

**Policy 8.5** The City shall provide copies of building permits, which have been issued for storm damage repair, to the Recovery Task Force for their evaluation and identification of areas susceptible to repeated damage by hurricane erosion and flooding.

**Policy 8.7** The City's post-disaster redevelopment and mitigation plan shall be coordinated with other local, regional and state entities. As additional interagency hazard mitigation reports are received, they shall be reviewed and incorporated into this plan, as appropriate.

Objective 11: By 1993, the City shall have a program to protect, preserve or appropriately re—use the historic resources in the City's coastal zone.

**Policy 11.1** The Vero Beach Land Development Regulations, to be adopted by September 1, 1990, shall require that by 1993, the City shall adopt an historic preservation ordinance to provide appropriate protection for significant historic resources, including those within the coastal zone.

**Conservation Element**

**Goal:** To conserve, protect and manage the natural resources of Vero Beach to ensure a high quality natural environment (balanced with the built environment).

**Policy 2.3** On or before September 1, 1990, land development regulations will be adopted that shall include, at a minimum, the following standards for development in and adjacent to Class III waters. These will be reviewed, and revised as necessary, upon adoption of the performance standards. Criteria: A. A shoreline protection buffer from the mean or ordinary high water line shall be established. B. Within the shoreline protection buffer, no development shall be permitted C. Shoreline alteration shall be prohibited unless necessary to prevent or repair erosion or provide access to the water. Such alteration shall not adversely impact water quality, natural habitat and adjacent shoreline uses.

**Policy 2.8** Adopt Land Development Regulations on or before September 1, 1990, to regulate development of floodplains and stormwater management areas to prevent impairment of water storage and carrying functions

**Policy 3.5** The City shall prepare and adopt an emergency water conservation program in accordance with the plans of the St. Johns River Water Management District.

**Policy 4.4** The City shall require that prior to development, a developer shall fund a mutually acceptable study to determine the functional quality of existing wetlands to determine the necessary level of conservation and protection. The criteria for wetlands shall be defined by the appropriate jurisdictional agency.

**Policy 4.6.3** Require restoration of disturbed wetlands or appropriate mitigation of like kind for destroyed wetlands.

**Policy 4.7** The City shall promote the use of native vegetation and require the removal of exotic species as specified in its ordinances in all new multifamily, commercial and industrial development.

**Objective 8:** To designate environmentally sensitive lands for protection.

**Policy 8.1** By March 31, 1991, the City, through cooperative efforts with Indian River County and cognizant state and regional agencies, shall determine environmentally sensitive lands within the City and maintain a map of these lands in the City Planning Department. The City Land Development Regulations (to be adopted by September 1, 1990) shall address protection standards for the lands. The criteria for identifying environmentally sensitive lands shall evaluate, at a minimum, the following:

1. Endangered or threatened wildlife or marine life habitats.
2. Threatened or endangered vegetative species.
3. Tidal flow pattern.

4. Hydric soils.
5. 100-year flood zones.
6. Aquifer recharge potential.
7. Beach and dune conditions.
8. Unique habitat characteristics.

### **Recreation and Open Space Element**

- Policy 4.3** The City shall through its Land Development Regulations, to be adopted by September 1, 1990, require that all environmentally sensitive areas from which density is transferred and other such areas as are appropriate, be maintained as open space in perpetuity and that this be accomplished through recordation of conservation easements.

### **Intergovernmental Coordination Element**

- Policy 1.4** The City will maintain active participation on committees and in meetings of the Treasure Coast Regional Planning Council for the purposes of coordinating plans, programs and policies relating to land use, housing, public facilities, environmental protection and other issues to be addressed under the Comprehensive Regional Policy Plan.
- Objective 2: Public expenditures in high hazard coastal areas will be limited to those improvements included in the Coastal Management Element.
- Policy 2.1** The City will expend funds in the high hazard coastal areas only for projects that (1) enhance and restore natural resources in the area, (2) relocate threatened infrastructure away from the area, or (3) replace worn out or obsolete facilities.
- Policy 2.2** Capital improvements in the high hazard coastal area will not be planned or designed to create any excess capacity.