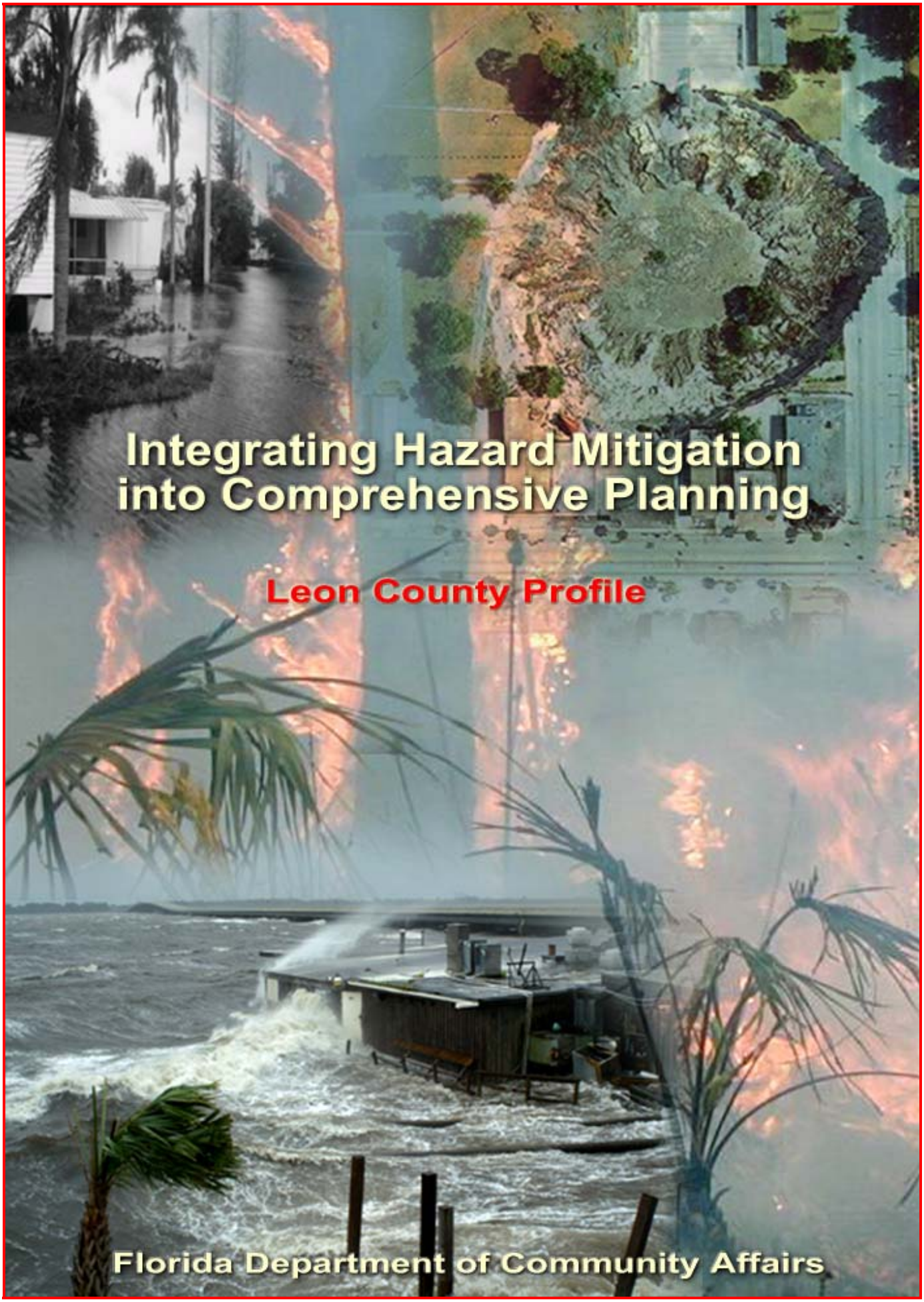

Integrating Hazard Mitigation into Comprehensive Planning
Leon County Profile
Florida Department of Community Affairs

Executive Summary

The experiences of the 2004 hurricane season epitomize the importance of better integrating hazard mitigation activities into local comprehensive planning. Last fall, residents 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 Leon 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 Leon 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, guidance is provided on how hazard mitigation can 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 Leon 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.

Currently Leon County does a great job mitigating flood hazards through the Comprehensive Plan, however, wildfire and sinkhole hazards have not been given the same treatment. Our recommendations include ways to educate citizens and employees on the importance of mitigation planning for all hazards during the comprehensive planning process. It also suggests various growth management techniques such as Transfer of Development Rights (TDR), Purchase of Development Rights (PDR), overlay zones, and cluster development to mitigate the impacts of hazards. These recommendations have been curtailed to the specific needs and issues of the community..

Table of Contents

1. County Overview

Geography and Jurisdictions

Leon County is located in the Big Bend Area of Florida.
It covers a total of 671 667 square miles with an average population density of 359.1 people per square mile (U.S. Census, 2000).

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

Population and Demographics

Official 2004 population estimates for all jurisdictions within Leon 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 Leon County is 263,896 people (University of Florida, Bureau of Economic and Business Research, 2004). Most of the county's population resides within the City of Tallahassee, however approximately 36% live in the unincorporated areas of the County. Between 1990 and 2000, Leon County as a whole had a growth rate of 24.4%, which was slightly greater than the statewide growth rate of 23.5% in those 10 years.

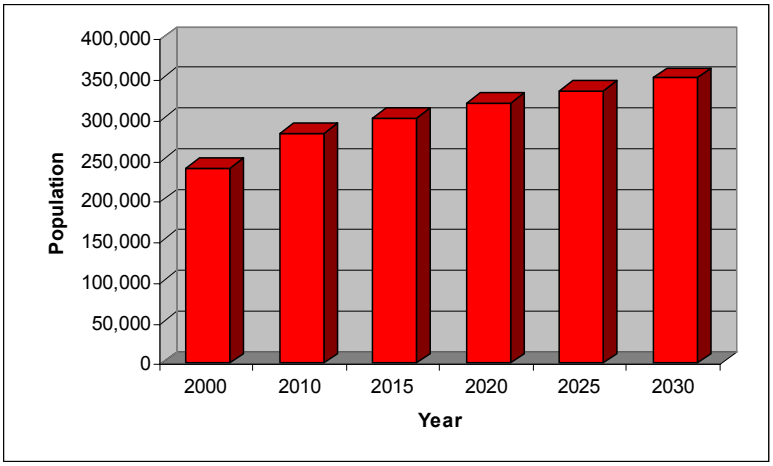
Table 1.1 Population Estimates by Jurisdiction

Jurisdiction	Population, Census 2000	Population Estimate, 2004	% Change, 2000-2004	% of Total Population (2004)
Unincorporated	88,828	94,760	6.7%	35.9%
Tallahassee	150,624	169,136	12.3%	64.1%
Countywide Total	**239,452**	**263,896**	**10.2%**	**100.0%**

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

According to the University of Florida, Bureau of Economic and Business Research (2004), Leon County's population is projected to grow steadily for the next 25 years, reaching 351,200 people by the year 2030. **Figure 1.1** illustrates medium population projections for Leon County based on 2004 calculations.

Figure 1.1 Medium Population Projections for Leon County, 2010-2030



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

Of particular concern within Leon 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, 8.3% of Leon County residents are listed as 65 years old or over, 14.0% are listed as having a disability, 18.2% are listed as below poverty, and 7.6% 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): flooding, high winds, lightning, drought, wildfire, winter storms, landslide erosion, dam/levee failure, subsidence and expansive soils. This list has been prioritized according to its risk rating, with two hazards, flooding and high winds, listed as having a high relative risk. Those that were identified as moderate risks are, lightning, drought, wildfire and winter storms, with the remaining four identified hazards listed as posing a low relative risk.

The county has experienced 13 disaster declarations since 1985, with two of the declarations, Hurricane Frances and Hurricane Ivan occurring during Hurricane Season 2004 and one declaration, Hurricane Dennis, occurring in 2005. According to the Leon County LMS, the primary damage received by the county during these 13 declarations has been flooding and debris. However, it is not just wind events and flooding that pose a threat to the county. In 1998 and 1999 the county experienced wildfires that resulted in fire and crop damage. The LMS attributes this vulnerability to the abundant rainfall and loamy soils that support the county's lush vegetation and forest cover which can become a source of potential storm debris and fuel for wildfire. (Leon County, 2005).

Hazards Analysis

The following analysis looks at three major hazard types: 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 (KAC) under contract with the Florida Department of Community Affairs (FDCA). Estimated exposure values were determined using 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. 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 Leon County that live within FEMA Flood Insurance Rate Map zones that signify special flood hazard areas. According to these maps, 9.7% of the population, or 25,580 people, are within the 100-year flood zone. A majority of those at risk of flooding are minority groups, people living in poverty, and persons with disabilities. In many cases, citizens living in these areas might fall under more than one of these categories. These special-needs citizens require extra planning by local governments to ensure their safety. In Leon County, sinkholes are a considerable risk with 20.6% of the population living within a high- to adjacent- risk sinkhole zone. This is a widespread problem for the County with no easy solution; however, steps can be taken to further define potential sinkhole locations and to build in a way that lessens the risk. Wildfire is also a hazard of concern to the County, with 26.3% of the population living in medium- to high-

risk wildfire zones. Twenty-three percent of those at risk from wildfire are disabled, making a quick evacuation difficult.

Table 2.1 Estimated Number of Persons at Risk from Selected Hazards

Population	Flood	Sinkhole (high-adjacent risk)	Wildfire (medium-high risk)
Minority	9,303	18,474	23,825
Over 65	1,988	4,608	5,787
Disabled	6,423	12,244	15,890
Poverty	3,428	9,082	14,427
Language Isolated	74	240	268
Single Parent	1,674	3,645	4,700
Countywide Total	**25,580**	**54,404**	**69,333**

Source: Florida Department of Community Affairs, 2005a.

Evacuation and Shelters

As discussed in the previous sections, population growth in Leon 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 Leon County are estimated to be 23 hours for Category 3 hurricanes and 24.5 hours for Category 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. Leon County has some of the highest evacuation clearance times in the region and state and should address this issue before more growth occurs. 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 Leon 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
Dixie	6	6	6	6	6
Franklin	5.5	8	8	8	8
Gulf	7	9.75	9.75	10.75	10.75
Jefferson	3.5	3.5	5.25	5.25	5.25
Leon	15.75	23	23	24.5	24.5
Taylor	12	12	12	24	24
Wakulla	13.25	21.25	21.25	22	22

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 Leon 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 891 people in the County's shelters, and there are 11,743 more people that will need

sheltering in the case of a Category 5 hurricane. It is projected that by 2009 the deficit will increase to 12,975 people in need of space (FDCA, 2004). The County will need to address this deficiency but might also try to decrease the demand for public shelters by encouraging new homes to be built with safe rooms if they are outside of flood zones. Residents who are 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 Leon County by structure type that are at risk from each of the four hazards being analyzed.

Flooding presents a risk to property in the County, with 26,140 structures within a flood zone. Approximately 44% of those structures are single-family homes, however it is also worth noting that 22.6% of the structures located within a flood zone are mobile homes. According to the latest National Flood Insurance Program Repetitive Loss Properties list, there are 68 homes in unincorporated Leon County that have had flood damage multiple times. Out of the 68 homes, only 24 homes have been mitigated to reduce or eliminate the possibility of future flooding.

Table 2.3 also shows 14,217 structures within high- to adjacent-risk sinkhole areas, with 74% of those structures being single-family homes. Single-family homes are also at risk from wildfire, with 71% of the total 30,195 structures at risk being this structure type. Efforts to educate these at risk neighborhoods on hazard mitigation techniques will be needed if the County wishes to reduce its vulnerability to these major hazards.

Table 2.3 Estimated Number of Structures at Risk from Selected Hazards

Structure Type	Flood	Sinkhole (high-adjacent risk)	Wildfire (medium- high risk)
Single-Family Homes	11,550	14,217	21,507
Mobile Homes	5,918	1,760	2,790
Multi-Family Homes	5,259	1,294	2,749
Commercial	1,692	1,373	1,754
Agriculture	1,523	404	1,120
Gov./Institutional	198	151	275
Total	**26,140**	**19,199**	**30,195**

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 County Property Appraiser. Maps of future land uses in hazard areas were developed using the Leon County future land use map obtained February 2001.

In **Attachment A**, two maps present the existing and future land uses within a 100-year flood zone. The flood-prone areas identified are, in most cases, adjacent to large waterbodies, such as Lakes Iamonia, Jackson, and Carr on the northwestern side of the County, Lake Talquin on the southwestern side; Lake Miccosukkee in the northeastern area, and Lake Lafayette in the eastern portion of the Ccounty. There are many other smaller flood zones located throughout the County, which can be attributed to the renowned rolling hills of Tallahassee hilly terrain. This type of topography makes areas at the base of hills more vulnerable. The total amount of land in these special flood hazard areas is 120,292 acres for the unincorporated County. As shown in **Table 2.4**, only 6.6% of these acres are currently undeveloped, although a majority of the flood-prone land is in parks and conservation or agricultural uses. However, 13.8%, or 16,602 acres, is currently being utilized for government, institution, hospital and education uses. This presents a problem as hospitals and institutions are considered critical facilities during hazard events, as well as the fact that education buildings sometimes double as evacuation shelters during storms. **Table 2.5** shows that 40.8% of the flood prone acres are designated for recreation and open space and 34.4% are designated as rural. Other designations include agriculture and lake protection. The county also decided to reduce the risk to government, institutions and educational uses by 95%, demonstrating that the community is committed to flood mitigation. Only a very small percentage of the flood zone is designated for development, described as either mixed-use, urban fringe, or residential preservation.

In **Attachment B**, maps present the land uses associated with high-risk wildfire zones. Wildfire susceptible areas are scattered throughout the County, however, there is a large concentration within Capital Circle and in the southeast portion of the County. Currently the largest land use at risk to wildfire is agriculture. This can be attributed to the timber industry in Northwest Florida. However, 26.8% of the vulnerable areas are designated single family residential, with much of this land located within the Tallahassee city limits. This shows that housing is located within the wildland urban interface, which poses a threat not only to those in the wildfire potential zones, but also surrounding city properties. A total of 8.4% of the land within these wildfire zones is currently vacant, as shown in **Table 2.4**. Of those 1,167 undeveloped acres, 74.8% is shown to be designated for residential preservation, mixed uses or rural residential use in the future (**Table 2.5**). If homes are built in these risk areas, Leon County's vulnerability to wildfire hazards will greatly increase. Additionally, 28.7% of the wildfire susceptible areas already have residential development (multi-family, mobile home or single-family), 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 C includes maps of potential sinkhole areas in the County. Almost all of the incorporated City of Tallahassee is at risk due to the karst foundation of the area. These potential sinkhole areas include a wide array of existing land uses, including 11.4% as parks and conservation areas, 15.4% as agriculture, and 27.4% as residential single-family. Of the undeveloped land at risk (4,962 acres), 44.6%, is designated for mixed-use development and 21% is designated for residential-preservation uses, as seen in **Table 2.5**. This means that the potential persons and property at risk could increase in the future.

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

Existing Land Use Category		Flood Zones	Wildfire Susceptible Areas	Potential Sinkhole Areas
Agriculture	Acres	36,573.9	5,700.8	4,339.3
	%	30.4	41.4	15.3
Attractions, Stadiums, Lodging	Acres	5.8	1.1	13.6
	%	0.0	0.0	0.0
Places of Worship	Acres	74.5	68.0	344.2
	%	0.1	0.5	1.2
Commercial	Acres	333.1	76.2	1,001.2
	%	0.3	0.6	3.5
Government, Institutional, Hospitals, Education	Acres	16,601.6	597.2	3,354.0
	%	13.8	4.3	11.8
Industrial	Acres	160.3	5.1	370.5
	%	0.1	0.0	1.3
Parks, Conservation Areas, Golf Courses	Acres	52,636.0	2,194.5	3,230.5
	%	43.8	15.9	11.4
Residential Group Quarters, Nursing Homes	Acres	91.8	8.0	404.2
	%	0.1	0.1	1.4
Residential Multi-Family	Acres	106.1	130.4	574.5
	%	0.1	0.9	2.0
Residential Mobile Home, or Commercial Parking Lot	Acres	1,380.8	132.9	1,918.8
	%	1.1	1.0	6.8
Residential Single-Family	Acres	4,188.2	3,687.7	7,777.8
	%	3.5	26.8	27.4
Submerged Land (Water Bodies)	Acres	0.0	2.9	7.4
	%	0.0	0.0	0.0
Transportation, Communication, Rights-of-Way	Acres	148.0	9.8	118.2
	%	0.1	0.1	0.4
Utility Plants and Lines, Solid Waste Disposal	Acres	2.9	0.0	1.8
	%	0.0	0.0	0.0
Vacant	Acres	7,988.7	1,166.8	4,962.2
	%	6.6	8.5	17.5
Total Acres	**Acres**	**120,291.7**	**13,781.4**	**28,418.2**
	%	**100.0**	**100.0**	**100.0**

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

Future Land Use Category		Flood Zones		Wildfire Susceptible Areas		Potential Sinkhole Areas	
		Total	Undev.	Total	Undev.	Total	Undev.
Activity Center	Acres	29.0	2.7	18.3	1.6	41.2	0.0
	%	0.0	0.0	0.1	0.1	0.1	0.0
Agriculture	Acres	4,855.9	31.4	789.4	0.0	0.0	0.0
	%	4.0	0.4	5.7	0.0	0.0	0.0
Central Urban	Acres	179.7	41.9	33.4	5.8	357.4	47.0
	%	0.1	0.5	0.2	0.5	1.3	0.9
Downtown	Acres	0.9	0.2	0.4	0.0	37.5	2.2
	%	0.0	0.0	0.0	0.0	0.1	0.0
Educational	Acres	151.8	0.2	18.7	0.2	649.8	3.8
	%	0.1	0.0	0.1	0.0	2.3	0.1
Industrial	Acres	35.0	22.1	5.8	1.6	239.2	81.6
	%	0.0	0.3	0.0	0.1	0.8	1.6
Institutional Government	Acres	713.6	31.0	180.8	6.0	529.7	22.5
	%	0.6	0.4	1.3	0.5	1.9	0.5
Lake Protection	Acres	4,055.3	288.9	393.7	42.6	2,780.4	442.5
	%	3.4	3.6	2.9	3.7	9.8	8.9
Mixed Use	Acres	4,236.1	1,838.1	933.0	121.9	7,297.6	2,211.7
	%	3.5	23.0	6.8	10.4	25.7	44.6
None	Acres	7.4	1.3	0.9	0.0	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0
Open Space/Stormwater	Acres	712.0	1.6	26.8	7.1	14.7	0.7
	%	0.6	0.0	0.2	0.6	0.1	0.0
Recreation - Open Space	Acres	49,108.6	192.8	1,279.8	20.1	3,343.3	32.1
	%	40.8	2.4	9.3	1.7	11.8	0.6
Res. - Preservation	Acres	3,713.1	1,330.7	3,333.5	234.7	7,203.5	1,039.7
	%	3.1	16.7	24.2	20.1	25.3	21.0
Rural	Acres	41,371.8	3,253.7	5,641.9	517.2	3,047.5	314.3
	%	34.4	40.7	40.9	44.3	10.7	6.3
Rural Community	Acres	230.7	89.4	30.3	10.7	1,304.6	385.4
	%	0.2	1.1	0.2	0.9	4.6	7.8
University Transition	Acres	43.5	9.6	0.0	0.0	47.9	2.7
	%	0.0	0.1	0.0	0.0	0.2	0.1
Urban Fringe	Acres	4,628.9	681.9	1,087.5	197.3	1,523.7	375.9
	%	3.8	8.5	7.9	16.9	5.4	7.6
Water	Acres	6,218.4	171.2	7.4	0.0	0.0	0.0
	%	5.2	2.1	0.1	0.0	0.0	0.0
Total	**Acres**	**120,291.7**	**7,988.7**	**13,781.5**	**1,166.8**	**28,418.0**	**4,962.2**
	%	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 2.6 presents the total numbers of acres in a hazard zone in Leon County's incorporated areas and how many of those acres are currently undeveloped. The City of Tallahassee has 5,253 acres located within the 100-year floodplain, with 22.1% of this land currently vacant. It also has 3,900 acres located in wildlife susceptible areas with only 4.8% of the land vacant. However, the city's vulnerability to sinkholes is the highest, with 54,749 acres located within sinkhole susceptible areas and only 13.2% of this land currently vacant. The City can work to limit development on the currently vacant acres in each hazard category, although there are many more acres that are already developed and putting people and property at risk. The City should work closely with the County on educational campaigns and mitigation projects that will make the City less vulnerable.

Table 2.6 Total and Vacant Incorporated Acres in Hazard Areas

Jurisdiction		Flood Zones		Wildfire Susceptible Areas		Sinkhole Susceptible Areas	
		Total	Vacant	Total	Vacant	Total	Vacant
Tallahassee	Acres	5,252.5	1,162.8	3,899.5	185.7	54,748.7	7,199.7
	%	100.0	22.1	100.0	4.8	100.0	13.2
Total Acres	**Acres**	**5,252.5**	**1,162.8**	**3,899.5**	**185.7**	**54,748.7**	**7,199.7**
	%	**100.0**	**22.1**	**100.0**	**4.8**	**100.0**	**13.2**

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

Hazard Identification and Vulnerability Assessment

This section of the LMS was briefly reviewed for its ability to provide hazard data that can support comprehensive planning. The LMS gives land use extensive treatment with regards to the structures and populations at risk. Furthermore it recognizes the vulnerability of mobile homes and identifies the locations of mobile homes at risk. Vulnerable structures have also been discussed in terms of residential and commercial structures within the 100-year floodplain. It also discusses future land uses and development recognizing that past development is the largest problem undermining the proper management of stormwater. The maps in the LMS show the hazard areas as well as the location of mobile homes, FEMA repetitive loss properties, properties with reported flood problems and the city limits, however the maps do not attempt to correlate this with population centers or land uses. 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. The LMS references a GIS database of known and probable karst features in Leon County. Having this data in GIS format allows the County to overlay it with the Future and Existing Land Use Maps to determine the areas that might be subject to sinkholes. Furthermore the hazard identification and vulnerability assessment in the LMS states that there was a proposed amendment to the Comprehensive Plan to include a policy promoting land management practices that utilize prescribed burns as a fire protection strategy. This shows the county's commitment to protecting the community from all hazards, including flooding, sinkholes, and wildfires.

Guiding Principles

There is not a section of the Leon LMS that directly fits the above-described Guiding Principles section. The Leon LMS does not list policies from other plans that relate to hazard mitigation. It does, however, have a section that lists the plans and studies that were used in updating the LMS. It would be much more useful if a list of the hazard-related policies from each jurisdiction's Comprehensive Plan were included in the LMS for reference. This would allow 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 D**. The goals and objectives are also summarized in **Section 5** as part of the recommendations analysis. The following is a summary of how well the LMS has addressed mitigation issues that coincide with planning concerns.

Leon County has many objectives that tie mitigation through the LMS to programs and regulations that are found in other plans. Limited references are made to the Leon County Comprehensive Plan and to the Land Development Code for the County, however, it would also

be appropriate to include several specific references to both of these documents.. The objectives following the first goal include many growth management strategies that would limit development in hazardous areas. This includes limiting public expenditures in areas identified as subject to repetitive damage from the disasters; reducing or eliminating development in hazard prone areas such as floodplains; regulating non-conforming land uses particularly in areas subject to damages from disasters; considering the impacts of hazard mitigation when conducting development review and approval; and considering the use of land acquisition programs for properties subject to development that are located in high-hazard areas. There are also goals and objectives concerning economic stability, enhanced regional cooperation and the promotion of adequate and safe housing. Through the goals and objectives, Leon County also supports participation in both the National Flood Insurance Program and the Community Rating System Program. Referencing other plans and programs lays a clear foundation for the LMS to be integrated with other plans and for its committee to oversee programs that may involve many different departments of the County and municipalities. There is no section in this LMS, however, that lists existing policies or guiding principles from other plans within the County or its municipalities. This component is found in most counties' LMSs and is useful in providing the different jurisdictions ideas for enhancing their own plans or providing the LMS committee an analysis of where there may be weaknesses in implementing mitigation strategies.

The LMS objectives also address planning land use regulation, floodplains and stormwater run-off. It encourages the County to "regulate land use, floodplains, non-point source stormwater run-off, and the design and location of sanitary sewer and septic tanks in hazard-prone areas, pursuant to rule 9J5.012(3)(c)3, F.A.C." (Leon County, 2004, pg. 90). This is consistent with the requirements of Rule 163 and Chapter 9J-5, which the Comprehensive Plan must follow. Having the same language in the LMS presents a united front on decreasing risk in the County. The LMS also addresses the removal and/or relocation of damaged and vulnerable infrastructure. Pre and 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 Leon County adopting and implementing corresponding policies that are legally enforceable.

The hazard mitigation initiatives listed in the Leon County LMS further emphasize the importance of integrating mitigation into comprehensive planning. Initiatives such as regulation of development within the floodplains and regulation of manufactured housing demonstrate the County's commitment to integration efforts.

Comprehensive Emergency Management Plan

The Mitigation Section of the 2002 Leon County CEMP was reviewed for consistency with the other plans and evaluated in its effectiveness as a tool for planners. The Mitigation process is described thoroughly in the CEMP, tying the operations component of mitigation to the LMS process. The membership of the LMS Committee is discussed as well as their responsibilities. The LMS process is described in terms of the prioritization process of the project list as well as funding opportunities through the State Division of Emergency Management. The Mitigation Section does a good job of summarizing the responsibilities of hazard mitigation among the different agencies and organizations within the County. Mitigation public awareness is also discussed, especially with regards to its role in the Disaster Recovery Center. However, there is little mention of comprehensive planning in the CEMP, with the exception of the fact that the Growth Management Department has a support role in the LMS. 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 Leon County was not available for review at the time this profile was drafted. If Leon 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

Leon County, and the City of Tallahassee are both participating communities in the National Flood Insurance Program. In addition, The City of Tallahassee participates in the Community Rating System and has a current class of 7.

4. Comprehensive Plan Review

Leon County's Comprehensive Plan (adopted in 2004) 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 E**. These policies are also presented in **Section 5**. The following is a summary of how well the plan addressed the four hazards of this analysis.

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 also had policies to protect natural water bodies with shoreline buffers and protection zones. Land acquisition programs have been created to protect floodplains and solve flood problems. Stormwater management standards have been established and applied to new road construction. This is especially important in the City of Tallahassee due to the high volumes of new road construction and the widening of the main arterial roads facilitated through the Blueprint 2000 project.

Wildfire Hazards

There were a few policies aimed at protecting the community from wildfire hazards, including a policy to develop regulations to provide for adequate water pressure fire flows. There is also a policy that regulates the development of cul-de-sacs and dead-ends since these often cause a problem for fire trucks to turn around. It also encourages the development of a roadway system that is interconnected by discouraging dead-ends. The county states that dead-ends can only end in cul-de-sacs, unless designed to connect to future streets. Having an interconnected roadway system offers residents more than one way out of a neighborhood when threatened by a wildfire. This is becomes especially important when the only exit is blocked by the hazard. It also allows fire fighters to more quickly reach the fire, rather than having to take an indirect route.

Sinkhole Hazards

While there are no policies that actually site sinkholes as the purpose for the regulation, there are a few that could be applied to development within sinkhole-prone areas. This includes the prohibition of residential development where physical constraints or hazards exist, including unstable soil and unstable geological conditions. This policy requires the density and design to adjust accordingly to the hazard. Another policy emphasizes the location of land uses in order to minimize topographical changes and to fit the site location.

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.

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

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

General Recommendations

-- Facilitate coordination between the LMS Committee and the 2 State Universities with regards to hazard mitigation and determine whether or not the Universities will be included as a participant in the Leon County LMS.

-- When prioritizing projects in the Capital Improvements Element of the Comprehensive Plan, consider hazard mitigation and/or whether or not this project should also be listed in the LMS.

-- Consider large known population concentrations such as the two state universities and the state office complexes, and create mitigation projects to be included on the LMS project list that would further reduce the risk to these populations. For example, this may include proper sheltering for all students on campus as well as state office complexes.

-- Educate local site plan reviewers on the importance of flood, wildfire and sinkhole mitigation as well as the tools used to reduce the vulnerability of a community to these hazards. The plan reviewers could then promote these ideas to local developers and/or explain their importance during the site plan review process.

-- Form a policy in the comprehensive plan to create an overlay district for each hazard based on LMS hazard maps that limits development in these high hazard areas. Require or offer incentives for professional site analysis of properties within the overlay district for the potential hazard and mitigation (if present) before development approval is granted. For example, in Leon County if a developer wishes to develop in the southeastern portions of the county where a known flood

problem exists, require that mitigation efforts such as the elevation of structures and/or infrastructure be undertaken as a condition of receiving the building permits.

-- For developed areas considered to be at high risk for hazards, create policies in the Post Disaster Redevelopment Plan, through the Comprehensive Plan, that would require the mitigation of these areas if damaged in a hazard event. The mitigation of non-conforming uses could then be facilitated through the Local Mitigation Strategy. This should be highly considered for properties designated as FEMA repetitive loss properties or as properties with reported flooding problems, as identified in the Leon County LMS.

Wildfire Hazards

-- Create a policy in the Comprehensive Plan, as well as the LMS, that promotes public awareness concerning wildfire mitigation and the specific problems faced by the County. This policy should be a supplement to the information found in the Wildfire Mitigation Guidebook published by FDCA and should be curtailed to the wildfire issues faced by Leon County. For example, in North Florida, with the recent change of primarily agricultural uses to large Developments with Regional Impacts and Planned Unit Developments, the County should address how to develop these lands properly without creating areas that are vulnerable to wildfire.

-- A component of the above public awareness program should encourage homeowners to undertake wildfire mitigation efforts on their own property to decrease the risk to their home. This could be facilitated through Firewise educational materials and or local workshops and could be a funded initiative on the communities' LMS project list

-- Create a policy in the Comprehensive Plan to update the Land Development Regulations for the County to include wildfire mitigation principles, such as defensible space buffers surrounding developments or multiple exits for large developments. This could also include provisions for vegetation maintenance and the required removal of exotic vegetation or land cover that could be conducive to wildfire. These practices should be mandated for any development found to increase the potential for wildfire risk or identified in the hazard and vulnerability analysis of the LMS.

-- Create an initiative in the LMS to facilitate prescribed burns through the provision of resources and funding in known wildfire high hazard areas. This should be done in concert with the efforts of the Division of Forestry.

-- Include wildfire management areas such as defensible buffers around communities as eligible projects for local land acquisition program.

Flooding Hazard

-- Through the Comprehensive Plan, promote purchase of development rights (PDR) and transfer of development rights (TDR) in areas highly susceptible to flooding. In this way, areas such as the southeastern portions of the County, could be preserved for natural drainage while increasing densities within the incorporated area of the City of Tallahassee.

Sinkhole Hazard

-- As used in the above suggestion, the County should promote PDR and TDR in areas highly susceptible to sinkholes as well.

-- Through the Comprehensive Plan and/or the overlay zones suggested above, promote the use of cluster development to mitigate sinkhole hazards. In this way, the areas highly susceptible to sinkholes could be preserved as open space, while allowing other areas to be developed at a

higher density. When creating these clustered developments however, buffer zones between the sinkhole prone areas and developed land should be established.

-- Create a policy in the Comprehensive Plan that would require geotechnical testing before approving building permits in sinkhole hazard areas.

6. Sources

Florida Department of Community Affairs. 2004. *Statewide Emergency Shelter Plan.* Tallahassee, FL.

Florida Department of Community Affairs. 2005a. *Mapping for Emergency Management, Parallel Hazard Information System.* Tallahassee, FL. *http://lmsmaps.methaz.org/lmsmaps/index.html.*

Florida Department of Community Affairs. 2005b. *Protecting Florida's Communities: Land Use Planning Strategies and Best Development Practices for Minimizing Vulnerability to Flooding and Coastal Storms.* Tallahassee, FL.

Leon County. 2002. *Comprehensive Emergency Management Plan*.

Leon County. 2001. *Leon County Comprehensive Plan.*

Leon County. 2004. *Local Mitigation Strategy*.

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

University of Florida, Bureau of Economic and Business Research. 2004. *Florida Statistical Abstract.* Gainesville, FL.

U.S. Census Bureau. 2000. *State & County Quickfacts. Retrieved in 2005 from http://quickfacts.census.gov/qfd/index.html*.

Attachment A

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

Attachment B

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

Attachment C

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

Attachment D

Leon County Local Mitigation Strategy

Goals and Objectives

1. Goal: Protect human health, safety and welfare

   Objectives:

   1.1. Limit public expenditures in areas identified as subject to repetitive damage from disasters.

   1.2. Ensure the protection of critical facilities such as prohibitions on constructing critical facilities in high-hazard areas.

   1.3. Reduce or eliminate development in hazard prone areas such as floodplains.

   1.4. Regulate non-conforming land uses particularly in areas subject to damage from disasters.

   1.5. Encourage the removal of septic tanks and technically hazardous sites such as chemical storage facilities from high hazard areas.

   1.6. Consider the impact of hazard mitigation when conducting development review and approval.

   1.7. Implement additional development restrictions on high-hazard areas.

   1.8. Consider the use of land acquisition programs for properties subject to development that are located in high-hazard areas.

2. Goal: Protect economic activities within the community.

   Objectives:

   2.1. Encourage economic diversification to protect the community from hazards that may affect a single economic source.

   2.2. Encourage programs to address repetitively damaged and vulnerable commercial structures.

   2.3. Coordinate with the local business community in the development of existing and proposed mitigation initiatives.

3. Goal: Enhance regional mitigation efforts.

   Objectives:

   3.1. Coordinate with other government agencies to develop regional mitigation efforts.

   3.2. Encourage hazard response training with agencies throughout the region.

4. Goal: Promote adequate and safe housing.

Objectives:

4.1. Encourage programs to address repetitively damaged and vulnerable residential structures.

4.2. Encourage the development of hazard mitigation-related building codes and inspection procedures.

5. Goal: Protect community resources, including, but not limited to, infrastructure, and environmental, recreational and historic resources.

Objectives:

5.1. Provide for the removal and/or relocation of damaged and vulnerable infrastructure.

5.2. Regulate land use, floodplains, non-point source stormwater run-off, and the design and location of sanitary sewer and septic tanks in hazard-prone areas, pursuant to rule 9J5.012(3)(c)3, F.A.C.

5.3. Encourage the removal of septic tanks from high-hazard areas.

6. Goal: Promote the community's ability to respond to a disaster in a timely manner.

Objectives:

6.1. Participate in the National Flood Insurance Program (NFIP) and Community Rating System (CRS).

6.2. Develop procedures to request limited revision of Flood Insurance Rate Map studies from the NFIP.

6.3. Develop procedures to address activities that can earn credit toward reduction of NFIP insurance premiums through CRS.

6.4. Encourage public awareness of hazards and hazard prone areas in the community.

6.5. Preserve the ability to evacuate hazard areas.

6.6. Develop policies and procedures for pre- and post-storm development.

Attachment E

Leon County Comprehensive Plan Excerpts
Related to Hazard Mitigation

Conservation Element

POLICY 2.2.3: *(Effective 7/16/90)* Allow some redevelopment in floodplains that have been altered, while severely limiting alterations in undeveloped floodplains, by restricting vegetation removal and limiting fill. Altered floodplains may be redeveloped as long as the redevelopment does not impede water flow or displace volume.

POLICY 2.2.13: *(Effective 9/19/91)* All water bodies that meet the following definition shall be protected by interim protection standards until a study can be done on the lake or water body to determine protection standards needed for that water body and the limits of the special development zone specific to that particular water body.

Water Bodies – A water body is a depression in the ground that normally and continually contains surface water. This definition is not intended to include aquaculture ponds or facilities whose sole purpose is water management for rate, volume or water quality.

Interim Protection Standards for Lakes/Water Bodies

1) Shoreline Buffer – A natural vegetated buffer will be maintained from the normal high water line 50 feet landward. Allowances may be made for essential access or an approved management plan. These areas will be placed in environmental easements.
2) A 50 foot natural shoreline buffer is presently part of the special development zone language.
3) Lake/Water Body Protection Zone – This protection zone will include the 100 year floodplain around a lake or water body. Within this area only 5% or 4,000 square feet of the site may be disturbed.

Objective 3.2: *(Effective 7/16/90)* By 1992, local government shall establish site review procedures to reduce area soil erosion, dissemination, and arbitrary changes of grade and topography.

Parks and Recreation Element

POLICY 1.1.2: *(Effective 7/16/90)* Local government shall maintain a land acquisition program adequate to maintain the level of service standards consistent with the Capital Improvements Element. This acquisition program is intended to serve multiple uses such as protection of flood plains or natural habitat areas, or solve flooding problems. This acquisition program can include requirements and incentives for private land donation.

Infrastructure Element

Potable Water

Objective 1.3: *(Effective 7/16/90)* Programs for the conservation of potable water resources will be established by 1992.

POLICY 1.3.1: *(Effective 7/16/90)* Education programs such as inserts in newsletters and utility billings as well as media interaction that inform the public on the importance and value of water resource conservation will be initiated.

POLICY 1.3.2: *(Effective 7/16/90)* Incentives programs that promote water resource conservation will be established.

POLICY 2.1.1: *(Effective 8/17/92)* Regulations shall be developed to provide for adequate fire flows.

Stormwater Management

GOAL 1: *(Effective 7/16/90)* Provide a stormwater management system which protects the health, welfare, and safety of the general public by reducing damage and inconvenience from flooding and protects surface water and groundwater quality.

POLICY 1.1.1: *(Effective 7/16/90)* Regulations will be established by 1991 that retain wetlands, floodways, and floodplains in their natural state.

Future Land Use Element

POLICY 1.2.1: *(Rev. Effective 7/1/04)* **City of Tallahassee Only**. Emphasize land use location that minimizes topographical changes. The proposed land use should fit the site location. The location should not be substantially altered to fit the proposed land use, unless an off-site mitigation plan for the development of a site with significant grades has been approved. Such off-site mitigation plans shall recognize the contribution of preserved significant grades to community character, ameliorating the impacts of stormwater, and providing conditions for native plant communities.

POLICY 1.4.6: *(Effective 7/16/90)* By February 1991, land development regulations will include standards for the regulation of future land use categories, subdivision, signage, and areas subject to seasonal or periodic flooding. Regulations concerning areas subject to seasonal or periodic flooding shall be consistent with all applicable state and federal regulations.

POLICY 2.1.2: *(Effective 7/16/90)* Prohibit residential development where physical constraints or hazards exist, or require the density and design to be adjusted accordingly. Such constraints or hazards include but are not limited to flood, storm, or slope hazards and unstable soil or geologic conditions.

Transportation Element

POLICY 1.1.2: *(Effective 7/16/90)* New road construction shall include stormwater management improvements designed to maintain, natural stormwater quantity, timing, rate, and direction of flow characteristics consistent with the Stormwater Level of Service Standard.

POLICY 1.1.6: *(Effective 7/16/90)* Roads shall be designed, constructed, and maintained to prevent flooding and minimize pollution resulting from the transportation system. Special consideration and implementation of mitigation techniques will be required when roadway construction may affect water quality and volume of flow consistent with the adopted Stormwater Level of Service Standard.

POLICY 1.3.2: *(Effective 7/16/90)* Acquire and maintain sufficient right-of-way when building new roads or widening old facilities in order to protect waterbodies, wetlands, and flood plains. Plan corridor alignments to avoid environmentally sensitive areas and where this is not possible, acquire wide roadside buffers and prohibit driveways by purchase of access rights, as necessary, to prevent development from occurring within the environmentally sensitive area, as a result of the roadway availability.

POLICY 1.5.17: *(Effective 7/1/04)* Cul-de-sacs shall be limited in length and have a turnaround that accommodates emergency and delivery vehicles in order to protect emergency access and to promote convenient daily use. Dead-end streets other than cul-de-sacs shall not be permitted unless they are designed to connect with future streets on adjacent land, in which case an adequate temporary turnaround easement must be provided at the end of the street.