

Integrating Hazard Mitigation into Comprehensive Planning

Polk County Profile

Florida Department of Community Affairs



The experiences of the 2004 hurricane season epitomize the importance of better integrating hazard mitigation activities into local comprehensive planning. That 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 Polk 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 Polk 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 Polk 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.

POLK COUNTY GENERAL RECOMMENDATIONS

- The County can include a map of hazard locations overlaying land uses as a new map in the Future Land Use series. The LMS could also include existing and future land uses on hazard maps. 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. This would also support the County's development of future development flood scenarios (Comprehensive Plan Policy 3.104-E2).

- The County can support a program in coordination with the LMS committee to educate homeowners of mitigation techniques for protecting their structures, including wind, flood, firewise, and sinkhole mitigation techniques. While regulation can prevent new vulnerabilities to hazards, one of the best ways to mitigate existing vulnerabilities is through education. Also, LMS initiatives can be drafted to implement goals and objectives pertaining to education.
- Polk County currently has a shelter capacity deficit of over 30,000 people according to the 2004 State Shelter Plan. The County through the Comprehensive Plan and LMS can encourage new residential developments to include a shelter in the development or build safe rooms into each home if not in a flood 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 through hardening of public buildings or new shelter facilities. The Comprehensive Plan could add a policy for determining future shelter demand based on future land use scenarios and could even set of a level of service for shelter space related to new development.
- The County could adopt development regulations that employ cluster development to avoid natural features.
- The County could protect natural and cultural resources by locating cultural facilities away from hazard areas. The LMS could assess the vulnerability and risk of historic sites and structures to natural hazards. Also, the County could prioritize drainage projects that will protect historical structures.
- The County can address redevelopment in the hazard area by only allowing redevelopment after a natural disaster to occur at the density/intensity of the land use designation currently in place. This is considered one of the best management practices from *Protecting Florida's Communities*. (FDCA, 2005b)

Flood Hazards

- Polk County can use incentives or provide assistance in retrofit, relocation, or demolition of repetitive loss structures and/or acquire repetitive loss properties for parks or conservation. Table 2.3 shows that 121,402 structures are within the 100-year floodplain and there are 21 homes in the State's Repetitive Flood Loss database. To eliminate repetitive loss structures (i.e. from flood or sinkhole damages) residents may need assistance with relocation or costly retrofits.

Wildfire Hazards

- 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 or requiring adequate defensible buffers 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 subdivisions or PUDs in high-risk areas. There are 97,777 residential structures in medium-high wildfire risk zones as shown in Table 2.3. In addition, 24.3% of the wildfire

susceptible areas shown on the maps in Attachment B are designated for future residential use. Through design techniques and/or adoption of a firewise building code for these at risk areas, the County could reduce its vulnerability to wildfire and make many new homes much safer.

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 already has several types of overlay districts to which this could be a new type or the Development- Limitation Areas overlay could have sinkholes added as another characteristic.
- The County can use buffers or setbacks to prevent development from building too close to an existing sinkhole.
- In karst-sensitive areas such as those shown on the maps in Attachment C, the County can require a geotechnical evaluation be made prior to development approval. They can then employ clustering or transfer of development rights to provide the property owner with other options.



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Geography and Jurisdictions

Polk County is located in Central Florida. It covers a total of 1,874 square miles with an average population density of 258.2 people per square mile (U.S. Census, 2000).

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



Population and Demographics

Official 2004 population estimates for all jurisdictions within Polk 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 Polk County is 528,389 people (University of Florida, Bureau of Economic and Business Research, 2004). The most populated city in Polk County is Lakeland, but 62.1% of the countywide population lives in the unincorporated portion of the County. Between 1990 and 2000, Polk County as a whole had a growth rate of 19.4%, which was less than the statewide growth rate of 23.5% in those 10 years. (U.S. Census Bureau, 2000)

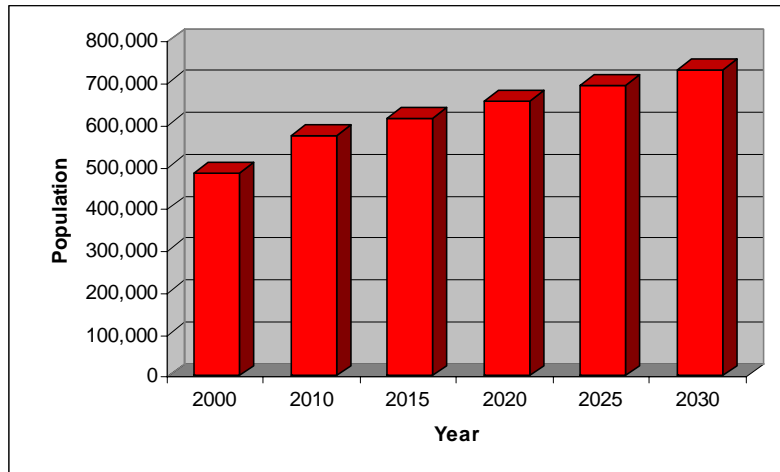
Table 1.1 Population Estimates by Jurisdiction

Jurisdiction	Population, Census 2000	Population Estimate, 2004	% Change, 2000-2004	% of Total Population (2004)
UNINCORPORATED	302,797	328,359	8.4%	62.1%
Auburndale	11,032	11,928	8.1%	2.3%
Bartow	15,340	15,709	2.4%	3.0%
Davenport	1,924	2,248	16.8%	0.4%
Dundee	2,912	2,986	2.5%	0.6%
Eagle Lake	2,496	2,511	0.6%	0.5%
Ft. Meade	5,691	5,828	2.4%	1.1%
Frostproof	2,975	2,978	0.1%	0.6%
Haines City	13,174	14,771	12.1%	2.8%
Highland Park	244	251	2.9%	0.0%
Hillcrest Heights	266	266	0.0%	0.1%
Lake Alfred	3,890	4,004	2.9%	0.8%
Lake Hamilton	1,304	1,379	5.8%	0.3%
Lake Wales	10,194	12,433	22.0%	2.4%
Lakeland	78,452	89,731	14.4%	17.0%
Mulberry	3,230	3,402	5.3%	0.6%
Polk City	1,516	1,720	13.5%	0.3%
Winter Haven	26,487	27,885	5.3%	5.3%
Countywide Total	483,924	528,389	9.2%	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), Polk County’s population is projected to grow steadily for the next 25 years, reaching 730,000 people by the year 2030. **Figure 1.1** illustrates medium population projections for Polk County based on 2004 calculations.

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



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

Of particular concern within Polk 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, 18.3% of Polk County residents are listed as 65 years old or over, 22.6% are listed as having a disability, 12.9% are listed as below poverty, and 12.1% live in a home with a primary language other than English. (U.S. Census Bureau, 2000)



Hazards Identification

The following are natural hazards that pose a high risk for the County as identified in the County’s Local Mitigation Strategy (LMS): floods, hurricanes and coastal storms, severe storms/tornadoes, wildfires, and drought/heat wave.

Polk County was directly affected by 2 hurricanes in 2004 and indirectly affected by 2 others. The County was impacted by inland flooding and high winds. In the past 50 years, Polk has had several minor flooding events totaling approximately \$3 million in damages. The most impacted areas of the county were adjacent to rivers and streams that overflowed their banks. The county has also had several sinkholes but no detailed data exists on these events. In the past 10 years, 10 wildland fires have burned several acres throughout the county. The most recent was in 2001 when a large wildfire burned over 11,000 acres of mainly grass, scrub trees and shrubs along the north side of the Interstate 4 corridor over mainly rural portions of northern Polk County. A ten mile stretch of Interstate 4 was closed between Polk City and Lakeland due to the wildfire for nearly ten days. (Polk 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 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 Polk County that live within FEMA Flood Insurance Rate Map zones that signify special flood hazard areas. According to these maps, 16% of the population, or 77,503 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. In Polk County, sinkholes are a major risk, and 35% of the population is 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 57.6% of the population living in medium- to high-risk wildfire zones. Forty-one percent of those at risk from wildfire are disabled, making a quick evacuation more difficult.

Table 2.1 Estimated Number of Persons at Risk from Selected Hazards

Population	Flood	Sinkhole (high-adjacent risk)	Wildfire (medium-high risk)
Minority	13,709	38,838	61,752
Over 65	16,727	27,259	46,862
Disabled	33,362	69,156	114,989
Poverty	9,144	23,211	37,347
Language Isolated	0	0	0
Single Parent	4,561	11,264	17,701
Countywide Total	77,503	169,728	278,651

Source: Florida Department of Community Affairs, 2005a.

Evacuation and Shelters

As discussed in the previous sections, population growth in Polk 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 Polk County are estimated to be 13 hours for all category 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. Polk County is just above this recommendation for now, but with continued growth and the limited road network of the region, 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 Polk 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
Desoto	18	18	18	18	18
Glades	3	3	3	9	9
Hardee	5	5	5	5	5
Hendry	6	6	6	6	6
Highlands	2	2	2	2	2
Polk	13	13	13	13	13

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 Polk 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 11,172 people in the County’s shelters, and there are 30,668 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 34,063 people in need of space (FDCA, 2004). The County will need to address this deficiency but might also try to decrease the demand for public shelters by encouraging new homes to be built with safe rooms if they are outside of flood and surge zones. Residents who are further inland in the County and not in a flood zone could shelter in place if they had a safe room that could withstand hurricane-force winds. Safe rooms could at least be a last option for residents who cannot evacuate in time, especially in the case of a tornado.

Existing Built Environment

While the concern for human life is always of utmost importance in preparing for a natural disaster, there also are large economic impacts to local communities, regions, and even the State when property damages are incurred. To be truly sustainable in the face of natural hazards, we must work to protect the residents and also to limit, as much as possible, property losses that slow down a community’s ability to recover from a disaster. **Table 2.3** presents estimates of the number of buildings in Polk 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 121,402 structures within a flood zone. A majority of those structures are single-family or mobile homes. According to the latest National Flood Insurance Program Repetitive Loss Properties list, there are 21 homes in unincorporated Polk County that have had flood damage multiple times and received insurance payments but have not remedied the recurring problem.

Table 2.3 also shows 68,454 structures within high to adjacent risk sinkhole areas, with 67.4% of those structures being single-family homes. Residences are also at risk from wildfire, with 71.3% of the total 123,521 structures at risk being single-family or mobile homes.

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	49,094	46,133	68,369
Mobile Homes	22,156	7,136	19,680
Multi-Family Homes	18,271	4,421	9,728
Commercial	14,136	5,448	9,665
Agriculture	13,816	2,809	9,100
Gov./Institutional	3,929	2,507	6,979
Total	121,402	68,454	123,521

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, and wildfire 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 and tabulations of existing land use within hazard areas are based on the 1999 and 1995 geographic information system (GIS) shapefiles from the Florida Department of Environmental Protection, the Southwest Florida Water Management District, and the South Florida Water Management District. Maps and tabulations of future land uses in hazard areas were developed using the Polk County future land use map obtained August 2002.

In **Attachment A**, two maps present the existing and future land uses within a 100-year flood zone. There are large swaths of flood-prone areas scattered across the county, as there are wetlands, streams, and lakes found all throughout the county. The total amount of land in these special flood hazard areas is 383,904 acres for the unincorporated County. As shown in **Table 2.4**, only 7.9% of these acres are currently undeveloped, however, a majority of the flood prone land is listed as submerged land or is in parks and conservation or agricultural uses. **Table 2.5** shows that 75.3% of the currently undeveloped flood-prone acres are designated for conservation phosphate mining.

In **Attachment B**, maps present the land uses associated with high-risk wildfire zones. Wildfire susceptible areas are scattered across the county, however, a large concentration lies on the western side of the county. A total of 35% of the land within these wildfire zones is currently vacant, as shown in **Table 2.4**. Another 36.1% of the wildfire susceptible areas are either used for agriculture or parks and conservation and 25.9% is currently in residential use. A majority of the residential development in Polk is low to medium density. 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. Of the 52,787 undeveloped acres, 65.9% are shown to be designated for phosphate mining in the

future (**Table 2.5**). Another 17.3% of the undeveloped wildfire areas are designated for agricultural use which also allows rural residences that could be highly vulnerable to a wildfire.

Attachment C includes maps of potential sinkhole areas in the County. A majority of the potential sinkhole areas are found in the central portion of the county, clustered around the many lakes which were created through sinkhole processes. Currently 30.3% of these sinkhole risk areas are used for agriculture, while another 23.8% is in single-family residential use, and 24.8% is vacant (**Table 2.4**). Of the undeveloped land at risk, 54.8%, or 8,472 acres, are designated for future use as lakes, preservation, recreation, or agriculture as seen in **Table 2.5**. These designations will limit new development in these hazardous areas, however, another 35.3% of the undeveloped land is set aside for residential development. To make sure that development is safe on these acres, geological testing could be used prior to building and appropriate design adjustments could be made.

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

Existing Land Use Category		Flood Zones	Wildfire Susceptible Areas	Sinkhole Susceptible Areas
Agriculture	Acres	165,009.2	38,581.4	18,868.1
	%	43.0	25.6	30.3
Attractions, lodging	Acres	0.7	11.6	0.0
	%	0.0	0.0	0.0
Attractions, Stadiums, Lodging	Acres	0.0	0.0	30.5
	%	0.0	0.0	0.0
Places of Worship	Acres	0.0	0.0	336.6
	%	0.0	0.0	0.5
Commercial	Acres	539.0	987.6	718.5
	%	0.1	0.7	1.2
Government, Institutional, Hospitals, Education	Acres	9,954.5	584.1	3,748.6
	%	2.6	0.4	6.0
Industrial	Acres	307.9	599.9	988.5
	%	0.1	0.4	1.6
Parks, Conservation Areas, Golf Courses	Acres	88,560.7	15,802.6	1,403.8
	%	23.1	10.5	2.3
Residential Group Quarters, Nursing Homes	Acres	0.0	0.0	11.8
	%	0.0	0.0	0.0
Residential High-Density	Acres	824.6	1,003.4	0.0
	%	0.2	0.7	0.0
Residential Low-Density	Acres	4,915.8	22,113.5	0.0
	%	1.3	14.7	0.0
Residential Medium-Density	Acres	3,398.8	15,881.1	0.0
	%	0.9	10.5	0.0
Residential Multi-Family	Acres	0.0	0.0	309.2
	%	0.0	0.0	0.5
Residential Mobile Home, or Commercial Parking Lot	Acres	0.0	0.0	4,853.0
	%	0.0	0.0	7.8
Residential Single-Family	Acres	0.0	0.0	14,802.3
	%	0.0	0.0	23.8
Submerged Land (Water Bodies)	Acres	79,274.6	1,183.1	0.0
	%	20.6	0.8	0.0
Submerged Land (Water Bodies)	Acres	0.0	0.0	259.5
	%	0.0	0.0	0.4
Transportation, Communication, Rights-of-Way	Acres	560.0	983.6	367.8
	%	0.1	0.7	0.6
Utility Plants and Lines, Solid Waste Disposal	Acres	196.8	221.8	148.9
	%	0.1	0.1	0.2
Vacant	Acres	30,361.5	52,787.4	15,443.0
	%	7.9	35.0	24.8
Total Acres	Acres	383,904.1	150,741.1	62,290.1
	%	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.
Agriculture/Resid.-Rural	Acres	152,155.3	3,248.3	51,297.1	9,125.2	14,698.7	2,410.1
	%	39.6	10.7	34.0	17.3	23.6	15.6
Business Park Center	Acres	936.3	65.3	1,347.6	342.2	2,342.5	277.3
	%	0.2	0.2	0.9	0.6	3.8	1.8
Business Park Center - Limited	Acres	1,403.3	322.8	1,534.0	635.4	606.6	80.3
	%	0.4	1.1	1.0	1.2	1.0	0.5
CARMP Core	Acres	32,526.4	186.4	1,558.9	79.6	0.0	0.0
	%	8.5	0.6	1.0	0.2	0.0	0.0
Commercial Enclave	Acres	112.1	15.2	101.9	34.6	130.0	23.0
	%	0.0	0.1	0.1	0.1	0.2	0.1
Community Activity Center	Acres	65.1	10.7	97.4	40.6	241.7	58.9
	%	0.0	0.0	0.1	0.1	0.4	0.4
Convenience Center	Acres	5.1	0.0	40.4	16.7	58.2	19.8
	%	0.0	0.0	0.0	0.0	0.1	0.1
Devel. of Regional Impact	Acres	12,982.6	515.4	7,027.9	2,428.2	113.7	36.3
	%	3.4	1.7	4.7	4.6	0.2	0.2
Employment Center	Acres	8.5	0.0	0.9	0.0	36.8	0.0
	%	0.0	0.0	0.0	0.0	0.1	0.0
High-Impact Commercial Center	Acres	55.3	18.1	17.4	6.2	29.4	8.0
	%	0.0	0.1	0.0	0.0	0.0	0.1
Industrial	Acres	1,565.9	240.8	1,231.5	466.6	1,439.5	438.3
	%	0.4	0.8	0.8	0.9	2.3	2.8
Institutional	Acres	1,823.8	355.1	1,658.8	1,040.9	607.5	31.2
	%	0.5	1.2	1.1	2.0	1.0	0.2
Lakes	Acres	81,155.4	716.3	771.6	284.0	7,521.4	5,982.8
	%	21.1	2.4	0.5	0.5	12.1	38.7
Leisure Recreation	Acres	847.6	98.5	338.6	115.0	229.6	3.8
	%	0.2	0.3	0.2	0.2	0.4	0.0
Linear Commercial Corridor	Acres	213.1	13.2	518.8	119.7	422.7	147.6
	%	0.1	0.0	0.3	0.2	0.7	1.0
Neighborhood Activity Center	Acres	39.2	0.4	72.0	19.2	118.2	21.6
	%	0.0	0.0	0.0	0.0	0.2	0.1
Office Center	Acres	0.4	0.0	7.4	2.7	14.7	11.4
	%	0.0	0.0	0.0	0.0	0.0	0.1
Phosphate Mining	Acres	33,358.1	22,870.8	39,657.0	34,786.2	434.7	284.0
	%	8.7	75.3	26.3	65.9	0.7	1.8
Preservation	Acres	14,670.8	38.8	1,443.2	15.4	365.8	67.5
	%	3.8	0.1	1.0	0.0	0.6	0.4
Professional/Institutional	Acres	69.8	0.0	17.4	1.1	0.0	0.0
	%	0.0	0.0	0.0	0.0	0.0	0.0
Recreation and Open Space	Acres	23,995.1	262.6	5,137.9	494.2	795.9	11.4
	%	6.3	0.9	3.4	0.9	1.3	0.1

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.
Regional Activity Center	Acres	49.7	0.0	108.1	0.0	23.4	4.5
	%	0.0	0.0	0.1	0.0	0.0	0.0
Residential Low-2	Acres	745.0	23.4	2,666.9	177.7	1,187.3	184.4
	%	0.2	0.1	1.8	0.3	1.9	1.2
Residential High Density	Acres	47.0	19.2	84.9	41.2	120.2	37.5
	%	0.0	0.1	0.1	0.1	0.2	0.2
Residential Low-1	Acres	11,413.8	700.0	8,726.8	1,078.8	9,152.4	1,541.8
	%	3.0	2.3	5.8	2.0	14.7	10.0
Residential Low-3	Acres	1,712.5	70.4	3,688.4	245.2	4,011.4	744.6
	%	0.4	0.2	2.4	0.5	6.4	4.8
Residential Low-4	Acres	723.4	34.8	1,980.7	122.4	1,480.0	282.9
	%	0.2	0.1	1.3	0.2	2.4	1.8
Residential Medium Density	Acres	1,414.9	34.6	1,622.5	208.2	1,818.9	307.9
	%	0.4	0.1	1.1	0.4	2.9	2.0
Residential Suburban	Acres	9,339.4	439.4	17,250.3	788.3	14,084.5	2,368.4
	%	2.4	1.4	11.4	1.5	22.6	15.3
Rural-Cluster Center	Acres	309.0	16.3	619.7	70.2	0.0	0.0
	%	0.1	0.1	0.4	0.1	0.0	0.0
Tourism-Commercial Center	Acres	43.2	1.1	97.0	0.0	204.7	58.0
	%	0.0	0.0	0.1	0.0	0.3	0.4
Town Center	Acres	116.8	43.7	18.1	1.8	0.0	0.0
	%	0.0	0.1	0.0	0.0	0.0	0.0
Total	Acres	383,904.2	30,361.5	150,741.0	52,787.4	62,290.2	15,443.0
	%	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 Polk County’s incorporated areas and how many of those acres are currently undeveloped. All of the municipalities have land within the 100-year floodplain. Lakeland, Winter Haven, Lake Alfred, Auburndale, and Lake Wales all have over 2,000 acres at risk from flooding. These municipalities also have the least amount of undeveloped acres at risk, meaning that mitigation of existing flood problems is a priority for them. Lakeland, followed by Bartow and Winter Haven, have the most acres of any of the incorporated areas susceptible to wildfire, but all of the municipalities have some risk area. Again, most of the area at risk has already been developed with only 17.7% of the total incorporated areas still vacant. The municipalities will need to concentrate on homeowner education about techniques to protect their property from wildfire. Sinkholes are not an issue for all of the municipalities. Fort Meade, Frostproof, Highland Park, Hillcrest Heights, Lake Hamilton, and Polk City do not have any acres within a high to adjacent sinkhole risk zone. Lakeland, Winter Haven, Bartow, and Lake Wales all have substantial land within a potential sinkhole area, though, with only Bartow having very many undeveloped acres.

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
Auburndale	Acres	2,827.0	5.1	601.5	45.3	1,569.7	45.5
	%	100.0	0.2	100.0	7.5	100.0	2.9
Bartow	Acres	1,509.2	271.5	1,993.7	618.2	3,788.9	762.9
	%	100.0	18.0	100.0	31.0	100.0	20.1
Davenport	Acres	210.9	4.7	210.4	5.1	19.2	0.0
	%	100.0	2.2	100.0	2.4	100.0	0.0
Dundee	Acres	714.7	121.9	251.9	25.2	1,440.6	106.8
	%	100.0	17.1	100.0	10.0	100.0	7.4
Eagle Lake	Acres	144.5	0.0	167.2	0.0	670.1	0.0
	%	100.0	0.0	100.0	0.0	100.0	0.0
Fort Meade	Acres	505.4	151.6	690.2	282.7	0.0	0.0
	%	100.0	30.0	100.0	41.0	0.0	0.0
Frostproof	Acres	152.3	0.0	303.4	13.8	0.0	0.0
	%	100.0	0.0	100.0	4.6	0.0	0.0
Haines City	Acres	1,275.2	24.1	725.2	46.8	870.1	7.4
	%	100.0	1.9	100.0	6.5	100.0	0.8
Highland Park	Acres	453.9	0.0	142.9	0.0	0.0	0.0
	%	100.0	0.0	100.0	0.0	0.0	0.0
Hillcrest Heights	Acres	5.8	0.0	62.6	0.0	0.0	0.0
	%	100.0	0.0	100.0	0.0	0.0	0.0
Lake Alfred	Acres	2,944.7	26.1	270.2	11.1	1,076.3	37.5
	%	100.0	0.9	100.0	4.1	100.0	3.5
Lake Hamilton	Acres	858.5	19.2	243.7	32.5	0.0	0.0
	%	100.0	2.2	100.0	13.4	0.0	0.0
Lake Wales	Acres	2,585.3	14.3	834.4	41.2	3,194.4	66.7
	%	100.0	0.6	100.0	4.9	100.0	2.1
Lakeland	Acres	7,223.4	359.1	6,580.9	1,130.3	9,527.6	323.0
	%	100.0	5.0	100.0	17.2	100.0	3.4
Mulberry	Acres	338.6	57.5	757.3	347.5	1,150.5	156.9
	%	100.0	17.0	100.0	45.9	100.0	13.6
Polk City	Acres	43.7	0.0	174.1	6.9	0.0	0.0
	%	100.0	0.0	100.0	4.0	0.0	0.0
Winter Haven	Acres	6,536.8	106.1	1,739.3	176.1	4,229.7	206.4
	%	100.0	1.6	100.0	10.1	100.0	4.9
Total Acres	Acres	28,329.7	1,161.2	15,748.9	2,782.8	27,537.0	1,713.0
	%	100.0	4.1	100.0	17.7	100.0	6.2



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 Polk 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 from MEMPHIS on populations and structures at risk for all of the major hazards discussed in this profile. It also describes the potential for damages from each hazard with dollar estimates. The maps in the LMS show only the hazard areas and 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.

Guiding Principles

There is not a section of the Polk LMS that directly fits the above-described Guiding Principles section. The Polk LMS does not list policies from other plans that relate to hazard mitigation. It does, however, have a section that lists the plans that the LMS should be incorporated into (Section 8 Incorporation into other Plans, pg.7). It lists the Polk Comprehensive Plan and Capital Improvements Plan, as well as the Comprehensive Emergency Management Plan (CEMP), as some of the plans that should reference and use the hazard assessment of the LMS. It would be very useful for integration purposes 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 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 following is a summary of how well the LMS has addressed mitigation issues that coincide with planning concerns.

Polk County's LMS has only a few broad, multi-hazard goals. They focus largely on mitigation projects, stating that the LMS projects should benefit as many people as possible, be long-term solutions, and cost-effective. There are also goals to protect critical services and facilities and provide sufficient shelter space. Another goal encourages participation in flood programs and the only other goal promotes education of homeowners and businesses of mitigation measures.

Comprehensive Emergency Management Plan

The Mitigation Annex of the 2003 Polk 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 and summarizing the main priorities for hazard mitigation. The CEMP Mitigation Annex is a good place for planners who are not familiar with the County's mitigation practices to begin. It summarizes the most prevalent hazard risks for the County and the assumptions the Annex and the LMS are working from. It outlines the major factors for consideration in post-disaster redevelopment and the stakeholder groups who should be involved in redevelopment decisions. The Annex not only summarizes each department's responsibilities but also has an intergovernmental coordination matrix which visually shows which departments have what responsibilities. The Annex also outlines funding opportunities and describes the LMS review process. 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 Polk County was not available for review at the time this profile was drafted. If Polk 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

Polk County and all of its municipalities, except Highland Park and Hilcrest Heights, are participating communities in the National Flood Insurance Program. In addition, Polk County and Lakeland participate in the Community Rating System and have current classes of 7 and 8, respectively.



Polk County's Comprehensive Plan (revised in 2003) 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**. 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, including a Floodplain Protection Areas overlay. There also is a policy for determining and prioritizing floodways and for implementing regional watershed management plans. These policies are in addition to standard wetland and floodplain protection policies and those that require structure elevation. In fact there is even a policy to maintain existing roads to above a 10-year flood elevation and to build all new roads to above a 100-year flood elevation. The Plan has many policies specifically dealing with the Kissimmee River floodplain and has established a special overlay district for it in addition to the Floodplain Protection overlay and the Wetland Protection overlay. Another policy requires the County to update future development flood scenarios based on projected growth patterns and to identify potential problem areas. This is a very progressive way to combat flooding and if implemented through appropriate land use decisions can be very effective. Another effective set of flood protection policies in the plan include those that prioritize acquiring open space in the floodplain and those that provide incentives for property owners to not develop within the floodplain.

Wildfire Hazards

There were no policies in the Comprehensive Plan that directly related to wildfire hazards. There was, however, a policy for locating development which included criteria of fire protection with adequate response times, properly trained personnel, and proper firefighting equipment. There also are several policies to conserve water supplies which indirectly relates to having sufficient water to put out a wildfire.

Sinkhole Hazards

No policies were found during this review that explicitly aimed to mitigate sinkhole damage besides one policy that lists sinkholes as a natural topographic feature that should be preserved. 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. There also is a policy for funding the Polk Soil and Water Conservation District and for the district to provide technical assistance for development (including mining) and agriculture to use best management practices. Best management practices for mining would limit the amount of human-induced sinkholes as well.

Other Hazard Mitigation Policies

Polk's Comprehensive Plan included several general hazard mitigation policies that are key to integration with the LMS. Objective 2.123-G is one of these. It states that future land uses will be coordinated with the goals, objectives, and recommendations of the LMS. The corresponding policy calls for purchasing property for preservation purposes if consistency with the LMS means that the property should not be developed. There also is a policy for using transfer of development rights to remove densities in the floodplain. The Intergovernmental Coordination Element includes policies for the County to coordinate with the municipalities in relation to emergency management and the LMS.



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.

Polk 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 version of this document, a table will present options for further integration as well as the basis for the recommendations described in the **Executive Summary**.

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.

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- 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.
- Polk County. 2003. *Polk County Comprehensive Plan*.
- Polk County. 2005. *Local Mitigation Strategy*.
- Polk County. 2003. *Comprehensive Emergency Management Plan*.
- 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 D

Polk County Local Mitigation Strategy Goals and Objectives

- Educate home and business owners on mitigation measures
- Encourage participation in the National Flood Insurance and Flood Mitigation Assistance Programs
- Complete projects that benefit as many residents as possible
- Insure that critical services and facilities are protected
- Insure that projects produce long-term, cost effective benefits
- Provide sufficient shelter space in public facilities by retrofitting those facilities

Attachment E

Polk County Comprehensive Plan Excerpts Related to Hazard Mitigation

Future Land Use Element

POLICY 2.102-A6: TOPOGRAPHY CONSIDERATIONS — Polk County shall evaluate all development within unincorporated Polk County with regard for, and for impacts on, existing topography. The County's Land Development Code shall specify necessary protection and/or mitigation requirements. Development standards shall include, but not be limited to, the following guidelines:

a. Encourage the preservation the natural topographic features by preserving floodplains, streams, sinkholes and other water bodies in accordance with policies of this Plan.

POLICY 2.102-A7: SOILS — Polk County shall evaluate all development within unincorporated Polk County with regard for, and for impacts on, soils. The County's Land Development Code shall specify development/construction standards necessary to protect against soil erosion, provide for sound engineering construction techniques, and/or mitigate adverse impacts due to soil conditions. These development standards shall be guided by DEP's best management practices cited in Florida Development Manual, Chapter Six, and the Polk County Soil and Water Conservation District's Best Management Practices manual. Criteria for Polk County's inspection of development sites during construction activities shall include erosion-control standards.

POLICY 2.102-A9: LOCATION CRITERIA — The following factors shall be taken into consideration when determining the appropriateness of establishing or expanding any land use or development area: 2. sanitary sewer and potable water service; 3. storm-water management; 5. fire protection with adequate response times, properly trained personal, and proper firefighting equipment; 6. emergency medical service (EMS) provisions; and f. environmental factors, including, but not limited to: 1. environmental sensitivity of the property and adjacent property; 2. surface water features, including drainage patterns, basin characteristics, and flood hazards; 3. wetlands and primary aquifer recharge areas; 4. soil characteristics; 5. location of potable water supplies, private wells, public well fields; and 6. climatic conditions, including prevailing winds, when applicable.

POLICY 2.109-A2: SPECIAL-AREA OVERLAY DISTRICTS/AREAS ESTABLISHED The following Overlay Districts and Areas are hereby established for the Polk County Comprehensive Plan: a. Special-Area Overlay Districts/Areas 1. Development-Limitation Areas (a) Floodplain-Protection Areas (b) Wetland-Protection Areas (c) Aquifer-Protection Areas (d) Kissimmee-River Flood-Protection Area (e) Green-Swamp Protection Area (f) Historic-Preservation Sites

OBJECTIVE 2.123-A: The Polk County Plan shall define those areas of the County that are subject to natural development limitations through the establishment and mapping of Development-Limitation Areas as part of the Future Land Use Map Series.

POLICY 2.123-A1: CHARACTERISTICS — Development-Limitation Areas are areas which contain natural or environmentally based development constraints, including: a. areas subject to 100-year flooding; b. environmentally sensitive lands; c. areas with on-site sewage disposal system restrictions due to severe percolation limitations, and/or d. areas requiring protection for the public's health, safety, and welfare.

OBJECTIVE 2.123-B: The Polk County Plan shall limit development and redevelopment within areas subject to flooding, as designated in the Floodplain Protection Areas overlay, to development activities and intensities which will not enlarge the off-site floodplain, alter the natural function of the floodplain and for which the risk of loss of property and life is minimal by: a. the designation and mapping of a Floodplain-Protection Area overlay; b. the establishment of density-transfer provisions; and c. the establishment of criteria applicable to the development of lands within the Floodplain-Protection Areas.

POLICY 2.123-B1: DESIGNATION AND MAPPING — The Future Land Use Map Series shall designate and map as the "Floodplain-Protection Area" overlay those areas classified by the Federal Emergency Management Agency (FEMA) as within the 100-year floodplain. The "Floodplain Areas" shall be amended, at least annually, to include or exclude any areas added or removed from the official FEMA floodplain area maps.

POLICY 2.123-B2: DEVELOPMENT CRITERIA Development within a "Floodplain-Protection Area" shall conform to the following criteria: a. Development shall be encouraged to locate on the non-floodplain portions of a development site and density may be transferred from undeveloped floodplain areas to contiguous nonfloodplain areas, (continued); b. Development or redevelopment shall meet the requirements of the Polk County Land Development Code, and shall not: 1. enlarge the off-site floodplain; 2. alter the natural function of the floodplain; nor 3. result in post development run-off rates which exceed pre-development run-off rates for storm frequencies at least as stringent as those rates established by the applicable water management district pursuant to Titles 40C, 40D, and 40E, F.A.C. c. Development and redevelopment shall meet the requirements of the Polk County Land Development Code and as specified below: 1. Riverine Floodplains: Encroachments into the Floodplain, including fill material or structures, shall not be located within a distance of the center of the watercourse equal to .25 times the width of the area of special flood hazard or 50 feet each side from the center of the stream, whichever is greater, unless certification by a registered professional engineer is provided demonstrating (with supporting technical data) that such encroachments shall not result in any increase in flood levels during the occurrence of the 100-year base-flood discharge. An undisturbed 100-foot-wide wildlife habitat buffer shall be maintained from the ordinary high-water line. This buffer may be disturbed, to the extent necessary, and as approved by DEP, to provide reasonable access to a water body, to include the construction of boat ramps, docks, and walkways. 2. Lake Floodplains: Encroachment, including fill, new construction, substantial improvements, and other development, shall be prohibited from the floodplain. 3. All Other Floodplains: Development shall meet the requirements of the Polk County Land Development Code.

POLICY 2.123-B3: LAND-DEVELOPMENT REGULATIONS Polk County adopted the Land Development Code, in accordance with Section 163.3202(1), FS, for establishing standards and procedures to: a. provide for construction techniques which protect the planned and existing development from flood hazards, and maintain the floodplain's natural flow functions; b. control unnecessary project-related site alteration, erosion, sedimentation, and storm-water runoff; c. prohibit development activities that are incompatible with the 100-year floodplain unless acceptable mitigation techniques are utilized, which may include utilizing DEP's Florida Development Manual or the applicable water management district's mitigation standards; and d. require that all permits for an agency with jurisdiction (i.e. U. S. Corps of Engineers, Water Management District, Department of Environmental Protection, etc.) be approved prior to, or concurrently with, the County issuing a final development order.

POLICY 2.123-B4: The County shall investigate techniques — such as transfer of development rights (TDRs) — that would promote and encourage: a. the transfer of density or intensity to off-site locations, and/or b. the transfer of density or intensity to on-site locations further removed from the floodplain.

OBJECTIVE 2.123-C: The Polk County Plan shall limit development and redevelopment within wetlands areas, as generally designated in the Wetland-Protection Areas overlay, to development activities and intensities which will have minimal impact upon the natural functions of the County's wetland areas by: a. the designation and mapping of a Wetland-Protection Area overlay, b. the establishment of density transfer provisions; and c. the establishment of criteria applicable to the development of lands within the Wetland Protection Areas.

POLICY 2.123-C2: DEVELOPMENT CRITERIA — Development within a wetland, as determined by appropriate regulatory agencies having the authority to designate areas as wetlands and exercise jurisdiction over the wetlands so designated shall conform to the following criteria: a. all permits for an agency with jurisdiction shall be approved prior to, or concurrently with, the County issuing a final development order. b. Wetland impacts shall first be avoided. Secondly, where they cannot be avoided, impacts shall be minimized and shall be mitigated by wetland compensation or wetland enhancement. Wetland impacts, where unavoidable and where properly mitigated, as determined by agencies having jurisdiction, shall be permitted for (continued).

POLICY 2.123-C4: The County shall implement, through the land development regulations, the transfer of development rights which allows the transfer of density to off-site and on-site locations outside the wetland areas, and shall continue to investigate other techniques that promote and encourage the preservation of wetlands.

OBJECTIVE 2.123-E: The Polk County Plan shall limit development and redevelopment within the Kissimmee River floodplain, as designated in the Kissimmee River Floodplain- Protection Area overlay, to development activities and intensities which will not enlarge the off-site floodplain and/or alter the natural function of the floodplain by: a. the designation and mapping of a Kissimmee River Flood-Protection Area overlay; b. the establishment of density transfer provisions; and c. the establishment of criteria applicable to the development of lands within the Kissimmee River Flood-Protection Areas.

POLICY 2.123-E1: DESIGNATION AND MAPPING — The Future Land Use Map Series shall designate and map as the as the "Kissimmee River Flood-Protection Area" overlay those areas within the Kissimmee River 100-year floodplain south of Lake Kissimmee, as determined by the Resource Management Plan for the Lower Kissimmee River and Taylor Creek Drainage Basins (dated 21 AUG 85).

POLICY 2.123-E2: DEVELOPMENT CRITERIA — Development within the "Kissimmee River Floodplain-Protection Area" shall be conform to the following development criteria: a. "Floodplain-Protection Areas" under Policy 2.123-B2

OBJECTIVE 2.123-F: GREEN SWAMP PROTECTION AREA: The Polk County Plan shall limit development and redevelopment within Green Swamp Area of Critical State Concern, as designated in the Green Swamp Protection Area overlay, to development activities and intensities which will not alter the natural function of its wetlands and aquifer-recharge areas by: a. the designation and mapping of a Green Swamp Protection Area overlay; b. the establishment of density transfer provisions; and c. the establishment of criteria applicable to the development of lands within the Green Swamp Protection Areas.

POLICY 2.123-F2: DEVELOPMENT CRITERIA — Development within the "Green-Swamp Protection Area" shall conform to the following requirements: a. "Floodplain-Protection Areas" requirements under Policy 2.123-B2, where applicable; b. "Wetland-Protection Areas" requirements under Policy 2.123-C2 where applicable; and c. All development, as defined in Section 380.04, FS, shall be reviewed for consistency with the following objectives: 1. Minimize the adverse impacts of development on resources of the Floridian Aquifer, wetlands, and flood-detention areas. 2. Protect or improve the normal quantity, quality and flow of ground water and

surface water which are necessary for the protection of resources of state and regional concern. 8. Protect or improve the water-retention capabilities of wetlands. 10. Protect or improve the natural flow regime of drainage basins. 11. Protect or improve the design capacity of flood-detention areas and the water management objectives of these areas through the maintenance of hydrologic characteristics of drainage basins.

OBJECTIVE 2.123-G: Polk County shall coordinate future land use designations to eliminate or reduce inconsistencies with the goals, objectives, and recommendations of the adopted Local Mitigation Strategy.

POLICY 2.123-G1: The County, through the implementation of its land development regulation, will ensure that development approvals are consistent with the objectives and policies of the Local Mitigation Strategy. If the site is such that all beneficial use of the property is precluded due to the hazard identification/determination, then the County will consider purchasing the property for preservation purposes through the use of moneys from environmental lands preservation programs, grants or other similar sources of funding.

CONSERVATION ELEMENT

GOAL: To protect, manage, and enhance the natural resources and environmental quality of Polk County.

OBJECTIVE 2.303-A: By the date established in Section 163.3202(1),FS, Polk County shall require all construction/development sites to implement best management practices .

POLICY 2.303-A1: Polk County's development regulations shall require all construction/development sites to implement best management practices based on DEP's Florida Development Manual, Chapter Six.

OBJECTIVE 2.303-B: Polk County shall ensure adequate funding to the Polk Soil and Water Conservation District in order for the District to provide, upon request, technical assistance with the use of best management practices for development (including mining) and agriculture.

POLICY 2.305-A1: Polk County shall continue to coordinate with FDEP to update through the surface water ambient monitoring program, the 305 (b) list of priority water bodies which is submitted to EPA. [

POLICY 2.305-A9: Polk County shall continue to protect the natural flow of streams within the County by enforcing the floodway protection provisions of the Land Development Code.

POLICY 2.305-A10: The wetlands protection standards shall be enforced through the Land Development Code.

POLICY 2.305-A12: Polk County shall implement watershed management plans to address regional flooding and water quality along major water courses.

OBJECTIVE 2.306-A: DEVELOPMENT REGULATIONS — Polk County shall develop a groundwater protection program.

POLICY 2.306-A1: Land Development regulations shall establish performance standards providing for: d. vegetation preservation, e. stormwater-retention design consideration, and f. control of point and non-point pollution of ground and surface waters (including but not limited to contact with sinkholes and the use of vegetative buffered and proper design of stormwater management systems). g. no reduction by new development and redevelopment within a "high recharge area"

in the aquifer recharge quality or quantity (volumes and rates) and for Subsurface storage and flow to simulate pre-development natural conditions.

OBJECTIVE 2.306-B: Polk County shall continue to implement a water conservation and reuse program for development and redevelopment in accordance with Water Management districts.

POLICY 2.306-B1: Polk County shall provide for enforcement of water use restrictions declared by applicable water management districts during district-declared water shortages.

POLICY 2.306-B2: Polk County shall continue to develop new water conservation techniques to minimize use or conserve more water. Connection to reuse water, xeriscaping and planting of drought resistant plants should be required when available and feasible.

POLICY 2.306-B3: Polk County's development regulations shall include landscaping requirements for residential, commercial and industrial development that stress water conservation techniques such as xeriscaping or use of drought-tolerant native vegetation.

POLICY 2.306-B4: Interim potable water conservation measures shall be established, to include:
a. requiring a standard(s) be set for residential, commercial, and industrial developments over a certain size to install effluent reuse systems; d. developing a water-conservation educational program; f. preparing of a water-conservation program (Policy 3.105-D2).

OBJECTIVE 2.307-A: Polk County shall continue its floodplain protection measures.

POLICY 2.307-A1: The Polk County Engineer shall prioritize floodplains associated with watercourses, based on the floodplains' development potential, and shall routinely perform hydrologic studies of selected floodplains to determine floodplain and floodway limits. The results of these studies shall be submitted to FEMA for review and revision of existing FIRM and floodway maps.

POLICY 2.307-A2: Polk County shall continue to enforce floodplain regulations to ensure the protection of floodplains' natural functions.

POLICY 2.307-A3: Polk County shall require that new development in the form of structures and structural improvements be placed one foot or more above the 100-year flood elevation.

POLICY 2.307-A5: Development within floodplains shall be limited in accordance to the policies stated in the Future Land Use Element "Floodplain-Protection Areas" Section 2.123-B.

OBJECTIVE 2.308-A: Polk County shall continue its protection of natural wetlands.

POLICY 2.308-A2: Polk County shall, to the greatest extent that is financially feasible, enhance degraded wetland systems found on the site of any County public works project undertaken.

POLICY 2.308-A4: Polk County shall enforce its existing wetlands regulations through the implementation of the land development code.

POLICY 2.308-A5: Development within wetlands shall be limited in accordance to the policies stated in the Future Land Use Element "Wetland-Protection Areas" Section 2.123-C.

POLICY 2.308-A6: Application for development near wetlands shall include a wetland delineation report to identify if a wetland is either isolated or within a wetlands system and provide for a mitigation strategy.

OBJECTIVE 2.311-A: Polk County shall continue to support enforcement of all local, state and federal air and water quality regulations.

POLICY 2.311-A3: The following areas have the potential of being environmentally sensitive and the County shall identify them by designating the areas on overlay maps within the Future Land Use Map Series and/or through policies of the Future Land Use and/or Conservation Elements of this plan: a. wetlands, b. floodplains, d. areas supporting unique vegetative communities, g. water bodies, and h. the Green Swamp Area of Critical State Concern.

Infrastructure Element

POLICY 3.104-A1: All applicable federal, state, regional, and local regulations pertaining to flood control and water quality preservation shall continue to be met in public and private project design.

POLICY 3.104-A2: The following facilities shall meet Level-of-Service IV: Existing man-made stormwater facilities (i.e. canals, ditches, detention/retention ponds), and existing drainage structures (i.e. culverts and bridges).

POLICY 3.104-A3: Existing roads shall be maintained above the 10-year flood elevation; and new roads shall be constructed and maintained above the 100-year flood elevation.

OBJECTIVE 3.104-C: By September 30, 2001, Polk County shall, in conjunction with Objective 3.104-B, implement the strategies developed in the Regional Drainage and Water Quality Management Work Plan (RDWQ).

POLICY 3.104-C3: The Natural Resources Division shall prioritize and implement proposed solutions in the 67 flooding-problems areas originally identified in the SWMP.

OBJECTIVE 3.104-D: Polk County shall continue to update regulations which implement design criteria for water quantity and quality consistent with adopted level-of-service (LOS) standards for stormwater-runoff management; and, within these development regulations, the County will address the requirements and measures necessary for the preservation or restoration of nature systems.

POLICY 3.104-D2: Polk County shall implement development regulations in support of Objective 3.104-D which require the preservation and restoration of natural flood-control and conveyance systems within the County.

POLICY 3.104-D4: The County has developed and will continue to develop basin specific criteria to: a. Mitigate the impacts on existing facilities that can not meet adopted LOS; and b. Avoid adverse impacts of future development on identified potential flood-problem areas.

OBJECTIVE 3.104-E: Polk County shall continue to maintain and update the DFN and watershed management plan.

POLICY 3.104-E2: Polk County shall develop a priority program to detail and upgrade the studies performed in the watershed management plan. Pursuant to the Land Development Code, flood studies may be required for development within areas subject to flooding. The results of these studies and updates will be submitted for incorporation into federal and state programs related to floodplain and stormwater management (e.g. FEMA).

POLICY 3.104-E3: The County shall update future-development flood scenarios, based on the Comprehensive Plan's projected growth patterns, to identify potential flood-problem areas.

POLICY 3.105-C5: The County shall coordinate with the utility providers and water management districts having jurisdiction in Polk County to require all new development to use water conservation techniques.

OBJECTIVE 3.105-D: Polk County shall preserve existing water supplies (potable, industrial, and agricultural) to meet the demands for future growth.

POLICY 3.105-D2: By October 1, 2005, the County shall prepare, in coordination with the water managements districts and DEP, programs which incorporate strategies and techniques to implement water-conservation, water-reuse, and any other activity equivalent to a consumption rate of 110 gallons per capita per day with the intent of reducing the need for additional demand on the hydrological system.

Intergovernmental Coordination Element

POLICY 4.102-A3: Polk County will coordinate with the municipalities within the County's jurisdiction to draft a local hazard mitigation strategy and will review all final recommendations for incorporation into the County's plans.

POLICY 4.102-A7: The County will continue to work with municipalities within the County and other local governmental entities to identify joint planning areas, and to enter into and implement inter-local agreements concerning the following issues: I. coordination for the provision of the following services:

1. fire protection, 3. emergency medical, 5. emergency management.

Recreation and Open Space Element

POLICY 3.502-E5: Polk County shall purchase recreation areas to be used for resource-based recreation within the recreation service areas depicted on the Future Lands Use Map. Purchase of these properties shall be evaluated and prioritized on the following considerations: a. sites with river and lake frontage, b. sites that include water bodies or wetlands, c. sites designated as conservation protection,

OBJECTIVE 3.506-C: Polk County shall separate and provide buffers between incompatible land uses, and provide for the retention and absorption of floodwaters through open-space areas.

POLICY 3.506-C2: Within one year of the date that the Florida Department of Community Affairs finds the County's Comprehensive Plan in compliance, Polk County shall establish development review procedures which shall encourage designated floodplains to be used as open space. The review procedures shall provide incentives, as defined in Policy 3.506-A2, to property owners not to develop within floodplains.