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EXECUTIVE SUMMARY

OVERVIEW

In 1992, Hurricane Andrew left South Florida devastated. In its wake, it left the area struggling to recover from $27 billion in damages. In 1997, wildland fires burned Flagler County. During the spring of that same year, tornadoes ripped through Osceola and Volusia counties, leaving not only destroyed homes, but also fatalities in their path. In 1998, nearly 50 homes were consumed by wildland fire in Port St. Lucie. All these events could have occurred in St. Lucie County; fortunately, only one did. Natural hazards are not the only type of hazards that create disaster situations. Disaster management changed forever following the events of September 11th in New York City and Washington, DC. Mitigating and responding to technological hazards has come to the forefront of emergency management. Throughout the state, technological disasters occur daily – truck rollovers, communication failures, toxic spills, and wellfield contamination. Only recently, a fertilizer plant in St. Lucie County was razed by a fire that released toxic fumes and polluted nearby water sources. These type of events as well as other historic disasters led the Florida Department of Community Affairs to create the Local Mitigation Strategy (LMS) Program. The goal of the program was to encourage public and private sector entities to take actions that permanently reduce or eliminate the long-term risk to people and property from the different types of hazards faced by Florida residents.

Both public and private sectors win by developing an LMS. It leads to

- reducing future vulnerability to disasters;
- reducing the time (and cost) of recovery from such events when they do happen;
- minimizing disruption to the local economy;
- facilitating recovery and the receipt of post-disaster funding; and
- educating and informing the public about hazards and steps they can take to mitigate the effects.

INITIATING ACTION

In 1998, St. Lucie County, along with all the municipalities, the local business community, and non-profit organizations such as the American Red Cross, joined together to develop a countywide LMS. During that time, the St. Lucie County LMS Steering Committee, the policy body for this program, has had the responsibility for developing the LMS. This committee focused on achieving two key results:

- the creation of a long-term LMS planning process; and
- the development of the LMS document itself along with a list of prioritized mitigation projects.

In the year 2000, the Federal Emergency Management Agency's (FEMA's) recognition of the growing costs of responding to and recovering from disasters materialized in the Disaster Mitigation Act of 2000 (DMA2K). DMA2K created a new Pre-Disaster Mitigation (PDM) Program aimed at reducing the cost of disasters as well as risk through comprehensive planning before disasters occur. DMA2K requires that all communities,

tribes, and states have a FEMA-approved hazard mitigation plan consistent with the DMA2K requirements in place to retain eligibility for PDM project funds and post-disaster Hazard Mitigation Grant Program funds. This plan was developed following the guidelines of the DMA2K.

THE PROCESS

The process by which the LMS was completed involved

- describing current community conditions;
- identifying the potential hazards;
- assessing each community's vulnerabilities to those specific hazards;
- proposing initiatives to reduce these vulnerabilities;
- developing evaluation criteria to rank mitigation projects regardless of jurisdiction; and
- establishing procedures that will be needed if the LMS Program is to retain long-term viability.

All of these aspects are integrated into this unified LMS document, which has been provided to St. Lucie County Department of Community Development.

FINDINGS

Some of the key findings pertinent to St. Lucie County include the following:

- Flooding and hurricanes occur the most frequently, place the most people at risk, and produce the greatest amount of damage of all the natural hazards faced by the County.
- While wildland fires do not occur with the frequency of flooding and hurricanes, major drought periods over the past several years have made the County extremely vulnerable to wildland fires. Exposure to the impacts of wildland fire continues to increase as new development pushes further west into wildland areas.
- Agriculture is an important component of the local economy; therefore, drought and agricultural pests and disease are as important to the agriculture community as beach erosion and flooding are to the coastal communities.
- While a major focus of mitigation is on retrofitting, the most effective time to mitigate is before development orders are approved. Adding hazard mitigation requirements may add to the cost of development, but this cost is relatively small. Following a disaster the cost of recovery and redevelopment can be enormous. Recovery cost tends to become public cost that local governments must assume.
- While all jurisdictions in St. Lucie County are in the National Flood Insurance Program, not all eligible local governments have participated in the Community Rating System Program (CRS) or the Flood Mitigation Assistance (FMA) Program to the maximum extent possible. Having a strong CRS Program reduces the cost of flood insurance premiums to St. Lucie County residents, and the FMA Program is a major source of funding to assist in retrofitting flooding problems.

- Properties on north and south Hutchinson, along the Intracoastal Waterway (Indian River Lagoon), and along the St. Lucie River are susceptible to both flooding and wind-related storm damage. There are a number of important public facilities in those areas. By hardening these facilities, the chance of them being impacted by storm events can be significantly reduced.
- As the amount of trucking on Interstate 95 increases in the future, the probability of truck rollovers and spilling of toxic contaminants will continue to increase, and hazard management teams need to plan now for this eventuality.
- The Florida East Coast Railroad passes through several areas of coastal urban population and development, putting an ever increasing number of people at risk from train derailment and potentially significant toxic materials spills.
- The County currently has limited staff resources available to effectively manage the LMS Program.

PROJECT PRIORITIZATION LIST (PPL)

St. Lucie County government, as well as the individual cities, have already implemented numerous mitigation projects, such as

- installing storm shutters on public buildings;
- retrofitting stormwater drainage systems;
- raising finished floor elevation to 18 inches above base flood elevation;
- distributing informative publications on hurricanes to local residents; and
- installing emergency generators at key critical facilities.

The objective of developing a unified, countywide PPL for mitigation projects is to allow the St. Lucie County City and County governments to better focus their mitigation efforts and dollars. The existence of this list will speed local receipt of Federal disaster mitigation funds after a disaster, and will place St. Lucie County in a more competitive position when competing for other, non-disaster-related mitigation grant funds.

To develop the PPL, each local government was invited to submit a list of mitigation projects for inclusion in the unified, countywide list. A project prioritization methodology was developed by the Steering Committee as a means of scoring each project, and developing a ranked list of projects. The St. Lucie County LMS Steering Committee last updated the PPL in January 2002.

The development of this PPL is not a one-time process. To be effective, this list must be dynamic. It will need to be revised as old projects are accomplished and new hazards or increased vulnerabilities are identified. The PPL process will be implemented on an ongoing basis.

UPDATING PROCESS

Like all local comprehensive planning efforts, the LMS itself will need to be reviewed and updated from time to time to ensure that it adequately addresses the various types of hazards currently facing the community. An LMS updating process was prepared and adopted by the Steering Committee. The St. Lucie County LMS will be updated every 5 years.

1.0 INTRODUCTION

1.1 PURPOSE

In the United States, 7 of the 10 most costly disasters in history, based on dollar losses, occurred between 1989 and 1994: Hurricane Andrew (1992), Oakland wildfire (1991), a winter storm (1993), Hurricane Iniki (1992), Loma Prieta earthquake (1989), Midwest floods (1993), and Northridge earthquake (1994) (Mileti, 1999). In the year 2000, the Federal Emergency Management Agency's (FEMA's) recognition of the growing costs of responding to and recovering from disasters materialized in the Disaster Mitigation Act of 2000 (DMA2K). DMA2K created a new Pre-Disaster Mitigation (PDM) program aimed at reducing the cost of disasters as well as risk through comprehensive planning before disasters occur. DMA2K requires that all communities, tribes, and states have a FEMA-approved hazard mitigation plan consistent with the DMA2K requirements in place to retain eligibility for PDM project funds and post-disaster Hazard Mitigation Grant Program funds.

Florida is one of the most hazard prone states in the nation. The state is susceptible to a number of hazards including flooding, hurricanes, tornados, severe thunderstorms, and wildland fires, to name a few. In Florida, the goals of the new PDM program are being achieved through the Local Mitigation Strategy (LMS) process. LMS is a pre-disaster mitigation planning initiative of the Florida Department of Community Affairs (FDCA) Division of Emergency Management, and is intended to reduce the disrupting effects of natural disasters on the economic and social fabric of the community. Pre-disaster mitigation is defined as "sustained action that reduces or eliminates long-term risk to people and property from hazards and their effects" as part of the FEMA's National Mitigation Strategy (FEMA, 1995).

This definition generally distinguishes between actions that have a long-term impact from those that are more closely associated with preparedness for, immediate response to, and short-term recovery from a specific hazard event. The intent of the LMS is to focus on practices that have cumulative benefits over time and to ensure that fewer of the state's citizens and communities are victims of disasters. One of the most important elements is the idea that the resulting mitigation practices are instituted prior to the disaster occurring.

Mitigation practices can be applied to strengthen homes so that people and their belongings are better protected from hurricanes, tropical storms, and inland floods. Pre-disaster mitigation planning can be used to identify and protect at-risk critical facilities, such as hospitals and fire stations, so they can remain operational or reopen quicker after a hazard event. Mitigation planning allows communities to consider the vulnerability of land that is currently undeveloped but may be developed in the future, as well as the risk to people and property on existing developed land. The consideration of the potential for damage to properties in vulnerable areas and implementation of actions to reduce the impact can go a long way towards eliminating the disruption a disaster occurrence creates in the community.

The purpose of the St. Lucie County LMS is to develop a unified approach among County and municipal governments for dealing with identified hazards and hazard

management problems in the St. Lucie County area. This strategy will serve as a tool to direct the County and municipal governments in their ongoing efforts to reduce their vulnerabilities to impacts produced by both the natural and manmade hazards to which southeast Florida is exposed. The strategy also will help establish funding priorities for currently proposed mitigation projects and for such disaster assistance funds as may be made available for disaster mitigation activities.

This LMS is intended to represent the following jurisdictions:

- St. Lucie County
- City of Port St. Lucie
- City of Fort Pierce
- Village of St. Lucie

This plan will be adopted by each of these jurisdictions. Copies of the adopted resolutions can be found at the end of this section.

The St. Lucie County LMS hazard mitigation program has been funded by the FDCA with FEMA funds for the development of comprehensive mitigation planning.

The ultimate objectives of the LMS process are as follows:

1) Improve the total communities resistance to damage from known natural, technological, and societal hazards;
2) Place St. Lucie County in a position to compete more effectively for pre- and post-disaster mitigation funding;
3) Reduce the cost of disasters at all levels; and
4) Speed community recovery from disasters that do occur.

Adoption of this strategy will provide the following benefits to both County and municipal governmental entities:

- Compliance with Administrative Rules 9G-6 and 9G-7, Florida Administrative Code (F.A.C.), requirements for local comprehensive emergency management plans to identify problem areas and planning deficiencies relative to severe and repetitive weather phenomenon, and to identify pre- and post-disaster strategies for rectifying identified problems;
- Compliance with FEMA's DMA2K and thus, eligibility for certain FEMA pre- and post-disaster funding programs;
- Credit from the National Flood Insurance Program's Community Rating System Program for developing a Floodplain Management Program, which will help further reduce flood insurance premium rates for property owners;
- Access to FEMA's Flood Mitigation Assistance (FMA) Program grants, which provides funding for pre-disaster mitigation projects and activities;
- Identification and prioritization of projects for funding under the State of Florida's Residential Construction Mitigation Program, to help reduce losses from properties subject to repetitive flooding damage; and
- Eligibility for local governmental funds from the Emergency Management Preparedness and Assistance (EMPA) Competitive Grant Program.

1.2 PLANNING PROCESS

The St. Lucie County Community Development Department (CDD) was the lead agency in the development of the LMS. CDD contracted with Continental Shelf Associates, Inc. (CSA) to develop and facilitate the following planning process. CSA gathered all relevant background data, developed the content, and facilitated the meetings of the St. Lucie County LMS Steering Committee, and developed proposed strategies for risk reduction in the County.

The development of the DMA2K has placed greater emphasis on the process undertaken to develop a mitigation plan rather than the end product. In an effort to better define the planning process used to develop the St. Lucie County LMS, the following process description and diagram have been developed (**Figure 1.1**). This LMS document:

- CSA worked with CDD to establish and convene an LMS Steering Committee to oversee the LMS planning process (**Section 1.3**);
- CSA and CDD identified opportunities for individuals, jurisdictions, community organizations, and other interested stakeholders to become involved in the LMS planning process;
- The Steering Committee developed and revised guiding principles for St. Lucie County (as a single entity composed of both the County and municipal entities) to use to address the issue of hazard mitigation;
- CSA developed a community profile describing the County in terms of geography, population, infrastructure, economic resources, environmental resources, historic and cultural resources, critical facilities, and property and development trends (**Section 2.0**, **Community Profile**);
- CSA and the Steering Committee identified the known hazards to which the County is susceptible, discusses their ranges of impacts, as well as the individual vulnerabilities of the various jurisdictions and population centers within the County (**Section 4.0**, **Hazard Identification, Vulnerability Assessment, and Risk**); and
- CSA reviewed and evaluated the existing legal, regulatory, and response framework currently in place to deal with hazard mitigation (**Section 3.0**, **Institutional Analysis**); The following documents were reviewed as part of this capability assessment:
  - St. Lucie County Comprehensive Growth Management Plan (Mandatory Elements: Future Land Use, Transportation, Infrastructure, Housing, Recreation and Open Space, Conservation, Coastal Management, Intergovernmental Coordination, and Capital Improvements);
  - St. Lucie County Land Development Code;
  - St. Lucie County Comprehensive Emergency Management Plan;
  - St. Lucie County Board of Commissioners Annual Report, 2002;
  - St. Lucie County FMA and Community Rating System related plans;
  - St. Lucie County Flood Insurance Study (FEMA, 1991);
  - St. Lucie Village Comprehensive Growth Management Plan (Mandatory Elements: Future Land Use, Transportation, Intergovernmental Coordination, Infrastructure, Conservation, Housing, Recreation and Open Space, Coastal Management, and Capital Improvements);

Insert Figure 1.1

  - Port St. Lucie Comprehensive Growth Management Plan (Mandatory Elements: Future Land Use, Transportation, Housing, Recreation and Open Space, Infrastructure, Intergovernmental Coordination, Conservation, Coastal Management, and Capital Improvements);
  - Fort Pierce Comprehensive Growth Management Plan (Mandatory Elements: Future Land Use, Transportation, Housing, Recreation and Open Space, Infrastructure, Intergovernmental Coordination, Conservation, Coastal Management, and Capital Improvements);
  - Treasure Coast Regional Strategic Policy Plan, Emergency Management Element; and
  - Florida Department of Environmental Protection (FDEP), Division of Water Facilities, Bureau of Beaches and Coastal Systems report entitled "Critical Erosion Areas in Florida."
- Based on input from CDD and the Steering Committee, as well as the data, CSA developed an all-hazard mitigation strategy aimed at reducing the risks posed by natural hazards in St. Lucie County;
- CSA developed a detailed method by which St. Lucie County local governments can evaluate and prioritize proposed mitigation projects (**Section 6.0**, **Implementation Strategy**);
- A conflict resolution procedure by which city and County governmental entities can resolve any differences that arise over prioritized mitigation projects or mitigation strategies was developed during the planning process (**Section 6.0**);
- CSA developed a process and schedule by which this entire Unified LMS will be reviewed and updated, and develops guidelines for updating the Project Prioritization List (PPL) (**Section 6.0**); and
- CSA documented the PPL (**Section 6.0**) of mitigation projects cross-referenced with potential funding sources.

Various appendices are provided listing existing policies (**Appendix A**), mitigation projects (**Appendix B**), mitigation funding sources (**Appendix C**), hazard data information sources (**Appendix D**), documentation of LMS participation (**Appendix E**), and acronyms (**Appendix F**).

1.3 PUBLIC PARTICIPATION PROCESS

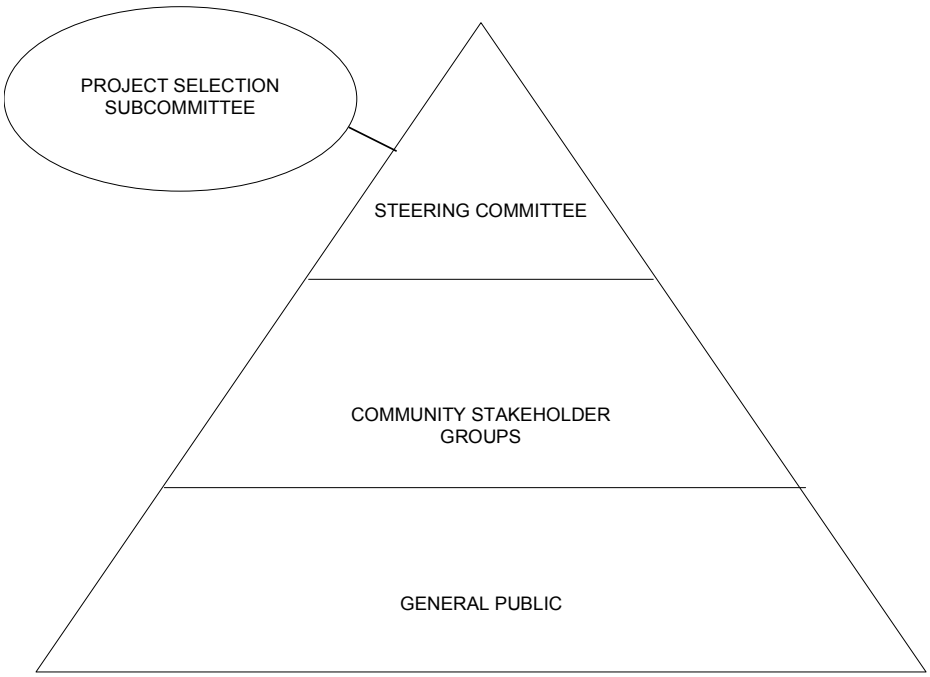
St. Lucie County sought to involve a diverse group of individuals and organizations in planning for natural, technological, and societal hazards within the County. From a broad decision-making body to incorporating public comment to information dissemination, multiple methods of involving the jurisdictions, organizations, businesses, and citizens of St. Lucie County are employed. In designing the public participation process, input has been received from the existing LMS Steering Committee (Committee). The Committee seeks to enhance and expand opportunities for public involvement. The graphic that follows illustrates how the Committee will expand participation. The Committee envisions a three-tiered participation process. Descriptions of each level of participation are discussed as follows.

1.3.1 Steering Committee

A representative Committee oversees the St. Lucie County LMS process.

1.3.1.1 Role of Committee

The Committee serves as the policy development body for the LMS program. The role of the Committee is to advise and assist in the formulation, implementation, administration, and refinement of the unified St. Lucie County LMS. The Committee shall represent the four governmental organizations and several community stakeholders found in St. Lucie County.



1.3.1.2 Composition

The following organizations are represented on the Committee.

- St. Lucie County
- Port St. Lucie
- Fort Pierce
- St. Lucie Village
- St. Lucie County School Board
- American Red Cross
- Salvation Army
- St. Lucie County Agricultural Extension – University of Florida
- Adelphia
- Comcast
- Chamber of Commerce
- St. Lucie County Council on Aging
- St. Lucie Medical Center
- Lawnwood Hospital
- St. Lucie County Builders Association

- Fort Pierce Utility Authority (FPUA)
- South Florida Water Management District
- LBFH Inc.
- St. Lucie Water Control District
- North St. Lucie River Water Control District
- Florida Division of Forestry (FDOF)
- St. Lucie County Health Department
- St. Lucie County Fire District
- St. Lucie County Tourism Committee

One representative from each of the organizations listed above will be designated to be the contact person for that particular organization.

1.3.1.3 Committee Responsibilities

The Committee will be responsible for reviewing and providing comments on all draft sections of the LMS. A formal voting process will take place for approval of draft final and final sections of the LMS. Informal voting will take place for issues other than approval of draft final or final sections of the LMS. The participating organization representatives are responsible for attending Committee meetings, or arranging for another representative of the organization to attend the meeting in their absence.

1.3.1.4 Voting

The voting and approval process for the Committee shall be as follows. Each organization listed in **Section 1.3.1.2** shall receive one vote. A simple majority rules procedure shall be followed when a vote is required. If an organization's representative is not able to attend a meeting, another representative of the organization can assume the voting responsibilities of the designated representative.

From the Committee members, one Committee Chair and Vice-Chair will be selected. One representative shall be from one of the local governments, and one shall be from a non-governmental organization. The Chair and Vice-Chair will be responsible for organizing Committee meetings and will prepare annual progress reports to the elected bodies of the participating jurisdictions. The Chair and the Vice-Chair will not have regular voting authority, but will have tie-breaking voting authority when such occasion arises.

1.3.1.5 Participation Requirement

1) Attend Committee meetings;
2) Provide input and technical information to the planning process, (if available); and
3) Disseminate information to others within represented sector.

1.3.2 Subcommittees

The Chair of the Committee is authorized to establish ad-hoc subcommittees as needed to further the goals and objectives of the LMS. These groups can be formed to address special issues and can be disbanded once an issue has been properly addressed.

Subcommittee members need not be Committee members, but may be any individual able to provide special expertise and knowledge about specific concerns addressed in the LMS.

1.3.3 Community Stakeholder Groups

Community stakeholder groups are any community group or organization with an interest in reducing the risks posed by natural hazards in St. Lucie County.

1.3.3.1 Role of Community Stakeholder Groups

In an effort to develop a mitigation planning process that is community based and focused on creating disaster-resistant communities in St. Lucie County, community stakeholder groups are invited to participate. Stakeholders provide the process with valuable information about past, present, and future conditions within the community. Stakeholders are asked to participate in an effort to capture input that is representative of the diverse needs of citizens, businesses, and organizations in St. Lucie County.

1.3.3.2 Composition

Community stakeholder groups include any community organization that is not represented on the LMS Steering Committee and can range from neighborhood associations to local businesses, to civic clubs. While these groups are not active or voting members of the Steering Committee, they can provide data and information important in developing the LMS, and may become partners in mitigation activities at some point in the LMS process.

1.3.3.3 Responsibilities

Participation for community stakeholder groups is highly encouraged and voluntary. Groups can participate in the LMS process in the following manners:

1) Attend Steering Committee meetings; or
2) Provide input and technical information to the planning process; or
3) Review and comment on draft final sections of the LMS; or
4) Disseminate information to others within the stakeholder's organization.

1.3.4 Citizen Participation

1.3.4.1 Role of the Citizen

In an effort to develop a mitigation planning process that is community based and focused on creating disaster-resistant communities in St. Lucie County, citizens are invited to participate. Citizens provide the process with valuable information about past, present, and future conditions within the community. Citizens are asked to participate in an effort to capture input that is representative of the diverse needs of citizens, businesses, and organizations in St. Lucie County. Citizens will be made aware of the opportunity to participate in the LMS process via local newspaper ads or other communication modes (e.g., newsletters, websites). Draft copies of the LMS will be available for public comment on the County's website and at library locations throughout the County.

1.3.4.2 Participation Responsibilities

Citizen participation is highly encouraged and voluntary. Individuals can participate in the LMS process in the following manners:

1) Review and comment on draft and final plans via County website or library system; or
2) Attend noticed public meetings.

1.3.5 New Jurisdictions/Entities

In the event of restructuring that duly adds, deletes, or merges jurisdictions within the County, the voting member rolls will be adjusted appropriately.

1.3.6 Documentation

Following each meeting, a summary will be prepared containing how solicitation was completed for that specific meeting along with any comments and suggestions made by the public and/or community stakeholder groups. For each meeting, a meeting summary, attendance list, public invite, public comments, and all other solicitation efforts concerning public comments will be located in **Appendix E** of the LMS.

In order to invite and promote the opportunity for broad participation, at a minimum, meeting notices and agendas will be posted through some combination of the following: newspaper ads or public service announcements, postings on County and municipal websites, announcements on the County's TV station, postings in County and municipal newsletters and calendars, and faxes and e-mailings to previous participants. The procedures of invitation will be documented along with comments in the meeting summaries located in **Appendix E** of the LMS. The various invitation notices are to ensure the continuation of public participation in the LMS update process and other activities in the future.

Once the Local Mitigation Strategy has been adopted, insert adopted resolution for **St. Lucie County**.

Once the Local Mitigation Strategy has been adopted, insert adopted resolution for **City of Port St. Lucie**.

Once the Local Mitigation Strategy has been adopted, insert adopted resolution for **City of Fort Pierce**.

Once the Local Mitigation Strategy has been adopted, insert adopted resolution for **Village of St. Lucie**.

2.0 COMMUNITY PROFILE

This section describes the geography, population, infrastructure, property and development trends, economic resources, environmental resources, historic and cultural resources, and critical facilities within St. Lucie County and the municipalities therein. The three main sources of information for this section are the 2000 U.S. Census, Enterprise Florida (2003), and The 2001 Florida Statistical Abstract (University of Florida, 2001a).

2.1 GEOGRAPHY

St. Lucie County is located along Florida's southeast coast, in the upper reaches of the South Florida geographic region. Locally, this area is referred to as Florida's Treasure Coast because of the many Spanish treasure galleons shipwrecked along this part of the coast. The County comprises approximately 600 square miles, of which 513 square miles are unincorporated. The balance of the land area is located within the incorporated municipalities of Fort Pierce, Port St. Lucie, and St. Lucie Village.

St. Lucie County may be characterized as slightly rectangular in shape. At its widest points, the County measures 24 miles north/south and 29 miles east/west. The County is divided into three physiographic regions, the Atlantic Coastal Ridge (including the barrier islands), the Eastern Valley, and the Osceola Plain. The dominating physiographic region of the east/central portion of the County is known as the Eastern Valley. The Valley extends from the Atlantic Coastal Ridge to the central part of the County. Elevations in this area range from +15 to +30 feet above sea level.

St. Lucie County averages 53 inches of precipitation annually as well as an average of 127 days of rain per year. The average high temperature in January is 73 degrees, while the low is 53 degrees. In July, the average high temperature is 90 degrees, while the average low is 73 degrees.

The vast citrus and ranching areas of central and western St. Lucie County are contained within the physiographic areas known as the Sebastian/St. Lucie Flats, Allapattah Flats, and the Osceola Flats. Except where drained for agricultural activities, these areas are characteristically pocketed with surface wetlands and have limited natural drainage. Elevations in this area are in the range of +30 to +60 feet, with the general fall of the land being from the northwest to the southeast.

The Atlantic Coastal Ridge forms the eastern border of the County and includes the coastal barrier island Hutchinson Island. Elevations range from sea level to about +15/+17 feet on the barrier island to as much as +60 feet along the western shorelines of the Indian River Lagoon. The western terminus of the Atlantic Coastal Ridge lies along the shoreline of the Indian River south of Fort Pierce and along the U.S. Highway 1 right-of-way (eastern side) north of Fort Pierce.

The North Fork of the St. Lucie River is the single principal freshwater estuary in St. Lucie County. Secondary watercourses include the North Fork's two primary tributaries, Five Mile and Ten Mile Creeks. An unconnected freshwater marsh network, known as the Savannas, is located immediately to the west of the Atlantic Coastal Ridge. The Savannas represent a vanishing natural feature that was once found along the entire length of the Indian River Lagoon, from Volusia County to northern Palm Beach County. Over time, the

spatial extent of the habitat has been lost due to the pressures of urban development. The key tracts of habitat that remain are situated in Port St. Lucie and northern St. Lucie County. Through the continued effort of the State of Florida's Conservation and Recreational Land (CARL) acquisition program, privately held properties within this area are being acquired for perpetual public preservation.

Lying between the western edges of the Atlantic Coastal Ridge and Hutchinson Island is Indian River Lagoon. This saltwater estuary is part of a larger ecosystem that extends 115 miles from Volusia County to northern Palm Beach County.

In addition to its inland estuary and isolated wetland network, St. Lucie County has 18 miles of Atlantic Ocean shoreline, much of which is currently undeveloped. Through the efforts of the citizens of St. Lucie County and the State of Florida, approximately 4.5 miles of this unincorporated oceanfront are under public ownership. Another 2 miles of oceanfront property are owned by the Florida Power & Light Company, and are to be maintained in their present natural state in conjunction with the operation of the St. Lucie Power Plant facilities. The balance of the remaining oceanfront properties is held in private ownership and available for development activities, which have historically been residential in character. Presently, approximately 40% of this privately held frontage is developed for residential or business purposes.

From a hazard perspective, especially in terms of flooding, drainage has had an important component shaping the overall development pattern. Many canals and drainage ditches have been constructed throughout St. Lucie County. The primary canals include

- C-23 – Providing drainage for 168 square miles in southern St. Lucie, northern Martin, and eastern Okeechobee counties. C-23 and its structures remove excess water from the C-23 Basin, supply water to the basin (and, occasionally, to the C-24 Basin), and maintain ground water elevations west of S-48 to prevent saltwater intrusion into the local ground water.
- C-24 – Providing drainage to 167 square miles in central St. Lucie and east central Okeechobee counties. C-24 and its control structures remove excess water from the C-24 Basin, supply water to the basin, and maintain ground water table elevation west of S-49 adequate to prevent saltwater intrusion into the local ground water.
- C-25 – Providing drainage to 165 square miles in northwest St. Lucie and eastern Okeechobee counties. C-25 and its control structures remove excess water from the C-25 Basin, supply water to the basin (and occasionally, to the C-24 Basin), and maintain ground water table elevation west of S-50 adequate to prevent saltwater intrusion into the local ground water.

2.2 POPULATION

In 2000, the estimated countywide population was 192,695, up 28% from 1990 (**Table 2.1**). The Treasure Coast has experienced tremendous growth since the 1960's, and this trend is expected to continue. According to a FEMA Post-Disaster Recovery and Redevelopment Guide, St. Lucie County was ranked 13th of the Atlantic and Gulf Coast counties with the largest population growth rates between 1960 and 1990. The County's

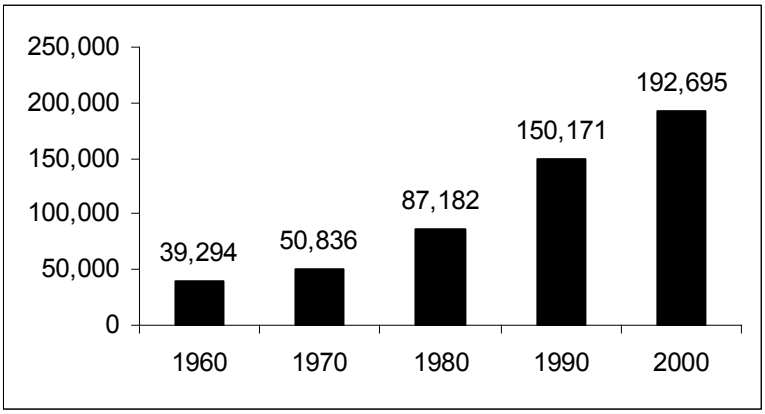
Table 2.1. Population growth in St. Lucie County.

City/County	1980 Census Data	1990 Census Data	2000 Census Data	% Increase (1980 - 1990)	% Increase (1990 - 2000)	2010 (Projected)	% Increase (2000 - 2010)
Fort Pierce	33,802	36,830	37,516	9.0	1.9	55,500	47.9
Port St. Lucie	14,690	55,761	88,769	279.6	59.2	140,700	58.5
Village of St. Lucie	593	584	604	(1.5)	3.4	833	37.9
Unincorporated	38,097	56,996	65,806	49.6	15.5	93,067	45.2
Countywide Totals	87,182	150,171	192,695	72.3	28.3	290,100	50.5

Sources: South Florida Water Management District, 1998.
University of Florida, 1989, 1998, 2001b.

growth rate during this time period was 282.2%. **Figure 2.1** illustrates population growth in St. Lucie County between 1960 and 2000.

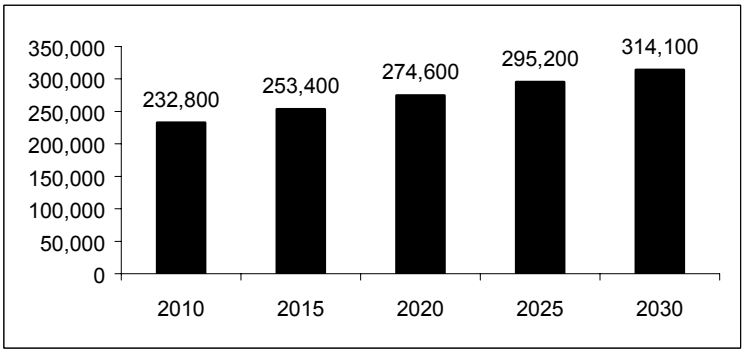
Figure 2.1. Population growth, St. Lucie County, 1960 – 2000.



Source: United States Census, 1990, 2000.

The majority of the growth is expected to occur in proximity to the City of Port St. Lucie, the fastest growing area in St. Lucie County. **Figure 2.2** illustrates the projected population according to the 2001 Florida Statistical Abstract for St. Lucie County between 2010 and 2030.

Figure 2.2. Projected population, St. Lucie County, 2010 – 2030.



Source: University of Florida, 2001a.

There are three municipalities in the County: Fort Pierce, Port St. Lucie, and St. Lucie Village. In terms of population, there is significant variation among them. The 2000 estimate of population for Port St. Lucie is 88,769. Fort Pierce is estimated to have a population of 37,516 and the Village, 604 people. Since 1980, there has been a dramatic shift of population toward south St. Lucie County. From 1980 to 1998, countywide population more than doubled; however, during that same period, the population of Port St. Lucie increased from 14,690 to 88,769, an increase of a little more than 500% or five times the 1980 population base. This growth pattern is expected to continue into the future.

Other significant population characteristics include age, race, income, and special needs. The median age of St. Lucie County residents is 42. Twenty-three percent of the County is over the age of 65. This is significant because elderly populations may require additional or special assistance during a natural hazard event. Because cultural differences can influence an individual's response to an event, it is important to define the County population in terms of race. Eight percent of St. Lucie County's residents are Hispanic or Latino, while 15% are Black or African American. While the entire County population grew nearly 28% between 1990 and 2000, the Hispanic population grew by over 800%. Nearly 14% of residents speak a language other than English at home. Language is an important consideration when developing preparedness materials for residents. The median household income in St. Lucie County is $36,363, and 9.6% of families are considered to live below the poverty level. Per capita personal income in St. Lucie is approximately 26% lower than the state average.

2.3 INFRASTRUCTURE

2.3.1 Public Buildings

Central Services at the County is responsible for 1.4 million square feet of building space. There are a total of 12 fire stations in the County as well as a total of 31 public schools. In addition, the County library system is made up of seven branches. Altogether the County is responsible for 350 miles of paved roadways, 134 miles of rock/dirt roads, and 31 miles of asphalt roads.

2.3.2 Transportation

St. Lucie County is a multi-modal hub as exhibited by the various modes of transportation that exist within the County. Being an urbanizing County, residents and businesses are serviced by many suppliers that depend upon the air, rail, and trucking industries to distribute goods throughout southeast Florida. There are two major traffic corridors (i.e., Interstate 95 and the Florida Turnpike), the Florida East Coast Railroad and CSX, Port of Fort Pierce, and St. Lucie International Airport. The St. Lucie International Airport was the 12th busiest airport in the state in 2002. The Port of Fort Pierce is 28 feet deep, consists of 87 acres, 3 docks, warehouses, and dry and refrigerated storage. Major State Roads in St. Lucie County include SR 68, 70, 605, 611, 615, 707, 712, 713, 716, and 778. The County has a fixed route transit system to serve the transportation needs of County residents. If lessons are to be learned from more highly urbanized areas to the south (Fort Lauderdale and Miami), increased traffic congestion creates a greater potential for transportation accidents if no steps are taken to mitigate against such occurrences.

2.3.3 Utilities

Florida Power & Light Company and the FPUA provide electric service in the County. The FPUA, the City of Port St. Lucie, the City of Fort Pierce, St. Lucie West Utilities, and St. Lucie County Utilities provide water and sewer services in the County. FPUA, NUI/City Gas Company of Florida, and the City Gas Company of Florida provide gas service to County residents. There are three utility districts in the County: HEW/Lakewood Park, North County Holiday Pines, and North Hutchinson Island. Telephone companies that provide service in the County include AT&T, BellSouth, Sprint, and MCI.

2.4 PROPERTY AND DEVELOPMENT

As growth has occurred, the County has become more urbanized, especially east of the Interstate 95 corridor. Land in St. Lucie County is used for three major purposes: urban uses, agriculture, and protecting environmentally sensitive resource areas (e.g., water conservation areas, Savannas State Reserve Area, beach areas). There has been some conversion of rural, agricultural areas into residential communities and industrial and business employment centers. However, the major change has occurred in Port St. Lucie. The City is the result of a massive land sale project created by General Development Corporation (GDC) during the 1960's. However, it was not until the late 1970's that development began to dramatically increase. According to Enterprise Florida (2003), there are 9,809 acres of land zoned industrial in the County, with 1,300 acres of industrial parks designated as well.

Table 2.2 provides a synopsis of the community characteristics for each municipality.

Table 2.2. Community characteristics within St. Lucie County.

City	Location	Urban/Rural	Community Character (Residential/Working/ Retirement)	Economic Base (Industrial/Agricultural/ Retirement/Business)
St. Lucie Village	Coastal	Semi-Urban	Residential/Retirement	Residential/Retirement
Fort Pierce	Coastal	Urban	Residential/Working	Residential/Industrial/ Business
Port St. Lucie	Inland	Urban	Residential/Working/ Retirement	Residential/Business
Unincorporated St. Lucie County	Coastal/Inland	Urban/Rural	Residential/Working/ Retirement	Industrial/Agricultural/ Business

Source: Continental Shelf Associates, Inc., 1999.

St. Lucie County has a total of 91,262 housing units comprised mostly of single-family detached units (62.9%) and mobile homes (12.9%). Seventy-two percent of homes in St. Lucie County were built prior to 1990. Nearly 80% of residents own their own home in St. Lucie County, and the median value of owner-occupied homes in the County is $86,100. According to the 2000 Census, there are approximately 336.6 people per square mile.

Table 2.3 displays United States Department of Housing and Urban Development data on building permits in St. Lucie County.

Table 2.3. Building permits, St. Lucie County, 1980 – 2000.

Location	1980		1990		2000	
	Single-Family	Multi-Family	Single-Family	Multi-Family	Single-Family	Multi-Family
Fort Pierce	49	334	22	76	25	26
Port St. Lucie	1,521	38	1,802	150	1,236	292
Unincorporated County	392	713	432	93	458	56
St. Lucie Village	11	0	4	0	0	0
Total	1,973	1,085	2,260	319	1,719	374

Source: United States Department of Housing and Urban Development, 2003.

According to University of Florida (2001a), St. Lucie County had 1,745 single-family housing starts (new construction) and 642 multi-family housing starts in the year 2000. In 2000, reported building permits and new housing units in the County and municipalities were valued at $193,998,000.

The St. Lucie County Future Land Use Element established an Urban Service Boundary (**Figure 2.3**), which runs generally along the I-95/Turnpike corridor and limits the area for which the County will provide services. Development west of the Urban Service Boundary is limited to densities that range from 1 dwelling unit per acre to 0.20 dwelling units per acre (1 dwelling unit per 5 acres). Development in excess of these densities requires an amendment to the Future Land Use Map in the Land Use Element. Any approval of such an amendment must include findings that the developer will provide the necessary services at no cost to local government, and the conversion of agricultural land maintains the viability of agricultural uses on adjacent lands.

The major use of land within the unincorporated areas of the County is agriculture. Well over 60% of the County is presently used for the production of citrus, cash crops, or ranching activities. These agricultural activities account for St. Lucie County being ranked among the top citrus producers in the State of Florida, contributing substantially to the local and regional economy.

The largest urban use of land within the unincorporated area of the County is for detached, single family residential dwelling units. This use accounts for approximately 13,000 acres with an additional 14,900 acres vacant and available for this use. Multi-family and mobile home development activity account for about 4,000 acres of the remaining developed portions of the County. About 600 additional acres are available for these uses.

Existing commercial and industrial activities account for approximately 5,100 acres. An additional 1,850 acres are available for commercial uses. About 850 acres are available for industrial uses. The remaining urban portions of the County are comprised of public service/recreation and transportation/utility activities.

The City of Fort Pierce is the oldest incorporated municipal body in St. Lucie County. Fort Pierce serves as the County Seat and has historically been the center for both commercial and industrial activity for the entire County. The City of Fort Pierce is consistent

Insert Figure 2.3

with small Florida coastal cities developed around the turn of the century. There is a small but well defined Central Business District (CBD), along with a number of residential neighborhoods. Typical of many established urban communities, the Fort Pierce CBD is being transformed from a retail-oriented business center into a more specialized business/office/service/tourist center. Retail activity is generally located in the "suburban" fringe areas of the City. The City of Fort Pierce is essentially built out. Future growth of the City will depend on the redevelopment and conversion of lower intensity uses to higher intensity uses or the annexation of additional property.

The City of Port St. Lucie and St. Lucie Village are dominated by residential use. Non-residential development activity within these communities is limited to essentially strip commercial development along the U.S. Highway 1 corridor and isolated neighborhood development throughout the City of Port St. Lucie. On the whole, when compared to the County's Future Land Use Plan, there does not appear to be any points of significant land use conflict with the adjacent municipalities of Port St. Lucie or St. Lucie Village. Land use distributions within the City of Fort Pierce are typical of most Florida cities its size and development age. For many years, the U.S. Highway 1 corridor has served as the commercial core of the community. This land use pattern has carried over into the unincorporated areas of the County and is indicated on the Future Land Use Maps. Development to the west has typically been residential with the exception of an emergency commercial area along Okeechobee Road and as far west as the Turnpike.

Port St. Lucie may best be described as a pre-platted, single family residential community. The City encompasses approximately 80 square miles, yet because of the large number of platted, individually owned, single family lots, there is very limited existing opportunity for medium/large scale multi-family, commercial, or industrial development within the City limits. The St. Lucie West Development of Regional Impact provides the City with an opportunity to allow centralized services to develop.

The City of Port St. Lucie is dominated by residential uses. Non-residential development activities within this City occur generally along the U.S. Highway 1 and Port St. Lucie Boulevard corridors, within the St. Lucie West Development of Regional Impact, and to a lesser degree in isolated neighborhood developments throughout the City.

Population projections for Port St. Lucie indicate a continued high rate of residential growth. As in the past, the majority of this growth will be detached, single family dwelling units, located on individual 10,000 – 12,000 square foot lots. This form of community development is typical of the land sales/development practices of Florida in the 1960's and 1970's. This pattern is extremely inefficient for the economical provision of municipal services.

St. Lucie Village is a small residential community located along the west banks of the Indian River, north of Fort Pierce. The Village was incorporated in 1960 and contains about 3 square miles. Until such time as the remaining undeveloped tracts within the Village are built upon, there is not expected to be any significant increase in the Village's population. There are not significant areas of commercial or industrial development within the jurisdiction of St. Lucie Village. St. Lucie Village also is dominated by residential use but at a much smaller scale than Port St. Lucie. Non-residential development activity within the Village generally occurs only along the U.S. Highway 1 corridor.

The County's Future Land Use Element establishes a Future Land Use Map to guide future development. **Figure 2.4** illustrates the current adopted Future Land Use Map for St. Lucie County.

2.5 ECONOMIC RESOURCES

The Chambers of Commerce serves businesses in St. Lucie County from two locations - Port St. Lucie and Fort Pierce. In 1990, the top three occupations in St. Lucie County were sales; precision production, craft, and repair; and administrative support. In 2000, the top three occupations were sales and office, management/professional, and service jobs. In 1990, the top three industries in the County were retail trade, construction, and health provision. In 2000, the top three industries were education, health, and social services; retail trade; and construction. For comparison, the top three industries in the state of Florida in 2001 were "other services," "professional and business services," and "healthcare and social assistance."

According to Enterprise Florida (2003), the top three employers in the County are Lawnwood Regional Medical Center (1,400), Florida Power & Light Company (790), and QVC (700). Also, St. Lucie County is known as the Grapefruit Capital of the World. In 1999, the County ranked 11th of 67 counties in farm cash receipts totally $245,000,000. The County currently supports a job growth incentive program that allows the Commission to issue grants of $1,000 to $2,000 for each new job created in the County. There must be a minimum of five jobs created, each earning a minimum of $10.88 per hour.

There is one Foreign Trade Zone in the County as well. A Foreign-Trade Zone is a specially designated area, in or adjacent to a U.S. Customs Port of Entry, that is considered to be outside the Customs Territory of the U.S. The following is a partial list of the many benefits that can be attained from using Foreign Trade Zones or Foreign Trade Subzones:

- No duty is ever paid on re-exported merchandise from a Foreign Trade Zone.
- If the merchandise is sold domestically, no duty is paid until it leaves the zone or zones.
- Generally, no duty is paid on waste or yield loss in a Foreign Trade Zone or Subzone.
- Duty on scrap is eliminated or reduced in a Foreign Trade Zone.
- Generally, if foreign merchandise is manufactured within a Foreign Trade Zone, into a product with a lower duty rate, then the lower duty rate applies on the foreign content when duty is paid.
- Merchandise in a Foreign Trade Zone may be stored, repackaged, manipulated, manufactured, destroyed, or otherwise altered or changed.

2.6 ENVIRONMENTAL RESOURCES

St. Lucie County maintains approximately 38 parks totaling 1,450 acres, 19 beach access areas, 13 boat launches, 12 beach-front parks, 22 landscaped government sites, 23 ball fields, 3 stadiums, and several community centers (St. Lucie County Board of Commissioners, 2002). There are two State Parks located in St. Lucie County: Fort Pierce Inlet State Park and Savannas Preserve State Park. The Fort Pierce Inlet State Park offers 340 acres of land located on the southern tip of North Hutchinson Island including wide

Insert Figure 2.4

sandy beaches and 1,500 feet of frontage on the Fort Pierce Inlet. The Savannas Preserve State Park is the last remaining freshwater marsh with multi-use trails and wildlife viewing.

To date, St. Lucie County has acquired approximately 6,000 acres under the Environmentally Significant Lands Program (St. Lucie County Environmental Resources Division, 2003). The purpose of the program is to purchase land with the intent of preserving ecologically unique communities, to protect and restore ecosystems to their natural state both upland and wetland to preserve endangered and threatened species, to maintain natural flood protection thereby providing water quality while providing compatible public use. Areas currently protected under this program include: Ancient Oaks, Avalon Addition, Blind Creek, Bluefield Ranch, Indrio North Savannas, South Savanna Buffer Preserve, Kinds Island, North Fork of the St. Lucie River, Ocean Bay, Paleo Hammock, Spruce Bluff, Queen's Island, Pinelands, and Walton Scrub.

2.7 HISTORIC AND CULTURAL RESOURCES

According to the National Register of Historic Places, there are twelve designated places in St. Lucie County. In Fort Pierce, designated places include the Arcade Building, Casa Caprona, Cresthaven, the Old Fort Pierce City Hall, Fort Pierce Old Post Office, Fort Pierce Site, Jules Frere House, Zora Neale Hurston House, St. Lucie High School, and Immokolee. The Captain Hammond House in White City and the St. Lucie Village Historic District also are listed.

Cultural events and festivals in St. Lucie County include the Fort Pierce Friday Fest, the Rainbow Festival, Seafood and Fishing Frenzy, and St. Lucie Water Fest. The City of Fort Pierce currently participates in the Main Street program.

2.8 CRITICAL FACILITIES

Hospitals and medical facilities provide important services during disasters. The medical service facilities in St. Lucie County include Indian River Community Mental Health Center, Lawnwood Pavilion, Lawnwood Regional Medical Center, Savannas Hospital, and St. Lucie Medical Center. St. Lucie County has a total of 10 nursing homes with 1,032 beds and 45 assisted living facilities with 895 beds.

Lines of communication are critical in providing information to the public before, during and after a disaster. There are three AM and five FM radio stations broadcasting in St. Lucie County including WFLM FM 104.7, WIRA AM 1400, WJNX AM 1330, WOSN FM 97.1, WOVV FM 95.5, WPSL AM 1590, WQCS FM 88.3, and WZZR FM 93. There are seven local television stations including WAR (IND), WPBF (ABC), WPTV (NBC), WTVX (IND), WPEC (CBS), WFLX (FOX), and WXEL (PBS). Locally printed newspapers include the Main Street Times, Port St. Lucie News, the Tribune, the Treasure Coast Business Journal, and The Miami Herald.

Fire stations and FDOF facilities are critical in the event of having to battle wildland fire.

- Rhode Island Avenue;
- Seaway Drive;
- SW Prima Vista;
- Aviation Way;

- SE Port St. Lucie Boulevard;
- E. Midway Road;
- Fort Pierce Boulevard;
- South Ocean Drive;
- North Ocean Drive;
- SW Dalton Circle;
- Shinn Road;
- SE Village Green;
- SW Becker Road;
- NW California; and
- Avenue D.

3.0 INSTITUTIONAL ANALYSIS

In the mitigation planning process, it is not only important to identify which hazards a community is at risk from, but it also is important to identify the resources the community has available to prepare for, mitigate against, respond to, and recover from natural, technological, or societal hazards. This section outlines the current resources available to St. Lucie County to reduce the risks posed by the hazards identified in the previous section. Mitigation programs, policies, and projects on the Federal, State, regional, and local levels are described and documented in this section. Sources of intergovernmental coordination, methods of strengthening the role of local governments, and background on private sector involvement also are documented.

3.1 FEDERAL GOVERNMENT

3.1.1 FEMA

FEMA has the lead Federal role in natural hazard mitigation, preparation, response, and recovery. FEMA has several programs aimed at reducing the risks posed by natural hazards in communities nationwide.

3.1.1.1 PDM Program

The PDM Program was authorized by §203 of the Robert T. Stafford Disaster Assistance and Emergency Relief Act (Stafford Act), 42 U.S.C., as amended by §102 of the Disaster Mitigation Act of 2000. Funding for the program is provided through the National Pre-Disaster Mitigation Fund to assist states and local governments in implementing cost-effective hazard mitigation activities that complement a comprehensive mitigation program. The Act establishes criteria for State and local hazard mitigation planning. Local governments applying for PDM funds through the states will have to have an approved local mitigation plan prior to the approval of local mitigation project grants. States also will be required to have an approved standard State mitigation plan in order to receive PDM funds for State or local mitigation projects.

3.1.1.2 National Flood Insurance Program (NFIP)

The U.S. Congress established the NFIP with the passage of the National Flood Insurance Act of 1968. The NFIP is a Federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between communities and the Federal Government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the Federal Government will make flood insurance available within the community as a financial protection against flood losses. This insurance is designed to provide an insurance alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods.

3.1.1.3 Community Rating System (CRS)

The NFIP CRS was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS: 1) reduce flood losses; 2) facilitate accurate insurance rating; and 3) promote the awareness of flood insurance. There are ten CRS classes: Class 1 requires the most credit points and gives the largest premium reduction; Class 10 receives no premium reduction. The CRS recognizes 18 creditable activities, organized under 4 categories numbered 300 through 600: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness.

3.1.1.4 Map Modernization

The goal of FEMA's Map Modernization Plan is to upgrade the 100,000 panel flood map inventory by

- developing up-to-date flood hazard data for all floodprone areas nationwide to support sound floodplain management and prudent flood insurance decisions;
- providing the maps and data in digital format to improve the efficiency and precision with which mapping program customers can use this information;
- fully integrating FEMA's community and State partners into the mapping process to build on local knowledge and efforts;
- improving processes to make it faster to create and update the maps; and
- improving customer services to speed processing of flood map orders and raise public awareness of flood hazards.

3.1.1.5 FMA Program

The goal of the FMA program is to reduce or eliminate claims under the NFIP. FMA provides funding to assist States and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP. There are three types of grants available under FMA: Planning, Project, and Technical Assistance Grants.

3.1.1.6 National Hurricane Program

The National Hurricane Program conducts and supports many projects and activities that help protect communities and their residents from hurricane hazards. Three key components of the Program are Response and Recovery; Planning, Training, and Preparedness; and Mitigation.

3.1.1.7 Other Programs

The National Mitigation Strategy was developed to provide a framework for reducing the exposure of all Americans to the catastrophic losses caused by natural disasters. In addition, FEMA sponsors the Mitigation Assistance, Disaster Preparedness Improvement Grant, Community Assistance, and Fannie Mae Pilot Loan Programs.

3.1.2 United States Environmental Protection Agency (EPA)

The EPA is the lead Federal agency for hazardous materials issues and planning. The EPA is responsible for implementing the Emergency Planning and Community Right-to-Know Act (EPCRA). EPCRA establishes requirements for Federal, State and local governments, Native American tribes, and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous materials and toxic chemicals. The Community Right-to-Know provisions help increase the public's knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. States and communities, working with facilities, can use the information to improve chemical safety and protect public health and the environment. The EPA also sponsors several grant programs focusing on environmental health, including Clean Water Act Section 319 Grants, Brownfields Economic Redevelopment Grants, and the Sustainable Development Challenge Grant.

3.1.3 United States Forest Service

The Fire and Aviation Management part of the United States Forest Service is a diverse group of people working to advance technologies in fire management and suppression, maintain and improve the extremely efficient mobilization and tracking systems in place, and reach out in support of our Federal, State, and International fire partners.

3.1.4 United States Fish and Wildlife Service (USFWS)

The USFWS oversees the implementation of the Coastal Barrier Resources Act (CBRA). The purpose of the CBRA was to eliminate Federal development incentives on undeveloped coastal barriers, thereby preventing the loss of human life and property from storms, minimizing Federal expenditures, and protecting habitat for fish and wildlife. Coastal barriers are landscape features that protect the mainland, lagoons, wetlands, and salt marshes from the full force of wind, wave, and tidal energy.

3.1.5 United States Department of Commerce (DOC)

The National Oceanic and Atmospheric Administration (NOAA) located within the DOC conducts research and gathers data about the global oceans, atmosphere, space, and sun, and applies this knowledge to science and service that touch the lives of all Americans. The DOC manages the Coastal Zone Management Program on the national level. The Economic Development Administration (EDA) within the DOC administers EDA Public Works & Infrastructure Development Grants to promote long-term economic development and assist in the construction of public works and development facilities needed to initiate and support the creation or retention of permanent jobs in the private sector in areas experiencing substantial economic distress.

3.1.6 National Weather Service (NWS)

The NWS provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters, and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure, which can be used by other governmental agencies, the private sector, the public, and the global community.

3.1.7 United States Geological Survey (USGS)

The USGS serves the nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

3.1.8 Unites States Army Corps of Engineers (USACE)

In addition to building projects, the Corps of Engineers, through its Flood Plain Management Services, advises communities, industries, and property owners on protection measures they can take themselves, such as zoning regulations, warning systems, and flood proofing. Last year this service responded to more than 44,000 requests for information. The value of property protected by this program is an estimated $6.2 billion. USACE also manages beach erosion control projects, aquatic restoration programs, floodplain management initiatives, and emergency bank protection projects.

3.1.9 United States Fire Administration (USFA)

As an entity of the Department of Homeland Security and FEMA, the mission of the USFA is to reduce life and economic losses due to fire and related emergencies, through leadership, advocacy, coordination, and support.

3.1.10 National Response Team (NRT)

The NRT is made up of 16 Federal agencies, each with responsibilities and expertise in various aspects of emergency response to pollution incidents. With nationwide responsibilities for interagency planning, policy, and coordination, the NRT ensures that the most valuable tool in an emergency — readiness — is available for pollution incidents of all sizes and kinds. Prior to an incident, the NRT provides policy guidance and assistance. During an incident, the NRT provides technical advice and access to resources and equipment from its member agencies. The EPA serves as chair of the NRT, and the U.S. Coast Guard serves as vice-chair. This interagency planning and coordination framework is replicated at the regional, sub-regional, and local levels. In addition to interagency coordination, the NRT also engages the private sector in prevention, preparedness, and response efforts. The NRT encourages innovation and collaboration to increase the effectiveness and reduce the cost of industry compliance with planning and response regulations. The NRT receives no direct appropriations for its activities.

3.1.11 United States Department of Housing and Urban Development (HUD)

HUD sponsors a number of programs that can be used to further the goals of hazard mitigation within a community. The Community Development Block Grant Small Cities Program provides funding to improve local housing, streets, utilities, and public facilities in small cities. Disaster Recovery Initiative funds are provided for disaster relief, long-term recovery, and mitigation activities in areas affected by a Presidential Disaster Declaration.

3.1.12 United States Department of the Interior (USDOI)

USDOI sponsors several programs that can help further mitigation. The Federal Land-to-Parks Transfer Program provides funds to identify, assess, and transfer available surplus Federal real property to State and local entities for use as parks, recreation areas, and open space. USDOI also supports land acquisition programs, the North American Wetland Conservation Fund, Partners for Fish and Wildlife, and the Rivers, Trails, and Conservation Assistance Program.

3.1.13 United States Department of Agriculture (USDA)

USDA sponsors the following hazard-related programs: Emergency Watershed Protection Program, Watershed Surveys and Planning, Small Watershed Program, and Rural Utilities Service Water and Waste Disposal Program.

3.1.14 United States Department of Transportation

The Federal Highway Administration sponsors a transportation enhancement program that provides funds for transportation enhancements. The Federal Transit Administration offers funding programs related to transportation capital expenses including Section 5309 Capital Funds.

3.2 NON-GOVERNMENT

3.2.1 Firewise Communities USA

Firewise Communities/USA is a project of the National Wildfire Coordinating Group's Wildland/Urban Interface Working Team and is the newest element of the Firewise program. It provides citizens with the knowledge necessary to maintain an acceptable level of fire readiness, while ensuring firefighters that they can use equipment more efficiently during a wildland fire emergency. The program draws on a community's spirit, its resolve, and its willingness to take responsibility for its ignition potential.

3.2.2 Institute for Business and Home Safety (IBHS)

IBHS is a nonprofit association that engages in communication, education, engineering, and research. The goal of IBHS is to reduce deaths, injuries, property damage, economic losses, and human suffering caused by natural disasters.

3.2.3 American Red Cross

Although the American Red Cross is not a government agency, its authority to provide disaster relief was formalized when, in 1905, the Red Cross was chartered by Congress to "carry on a system of national and international relief in time of peace and apply the same in mitigating the sufferings caused by pestilence, famine, fire, floods, and other great national calamities, and to devise and carry on measures for preventing the same." The Charter is not only a grant of power, but also an imposition of duties and obligations to the nation, to disaster victims, and to the people who generously support its work with their donations.

3.2.4 National Fire Protection Association (NFPA)

The mission of the international nonprofit NFPA is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating scientifically-based consensus codes and standards, research, training, and education.

3.2.5 Association of State Floodplain Managers (ASFPM)

ASFPM goals include reducing the loss of human life and property damage resulting from flooding, preserving the natural and cultural values of floodplains, promoting flood mitigation for the prevention of loss and the wise use of floodplains, and avoiding actions that exacerbate flooding.

3.3 STATE GOVERNMENT

3.3.1 FDCA

The FDCA is the State's land planning agency. It is comprised of a number of divisions, including the Division of Emergency Management (DEM). The mission of the Division is to respond to emergencies, recover from them, and mitigate against their impacts. DEM provides FDCA with operational and programmatic guidance as articulated in the State Hazard Mitigation Plan to promote the goals and objectives of the nationally-based Nation Mitigation Strategy coordinated by FEMA.

The FDCA has the lead role in coordinating State resources to support local government unless the scope of the emergency warrants a higher degree of State involvement. This may occur when emergencies involve multi-jurisdictional hazards, when local governments believe the emergency is beyond the capabilities of local resources, or when the Governor determines there is an overriding concern for the safety of the public. For these situations, the Governor can designate the primary responsibility for emergency response to the State by issuing an Executive Order under the provisions of Section 252.36, Florida Statutes (F.S.).

The DEM is the designated State Warning Point in the event of a hazardous materials incident. As such, the DEM is responsible for receiving notification of an emergency from the County Communications Coordinator, and coordinating the request(s) for County support, if requested. The DEM is responsible for assisting Local Emergency Planning Committees (LEPCs) in providing warnings and instructions to the general public. Other DEM programs include the Emergency Management Preparedness and Assistance Grant, Residential Construction Mitigation Program, and the Florida Warning and Information Network.

3.3.2 FDOF

Over the past several years, extensive damage has resulted from wildland fire. The FDOF has major responsibility for protecting forest lands and the public from the effects of wildland fire. Local fire-rescue departments have primary responsibility for structural fires. They also are the first responders to all fires. If the local fire-rescue department has determined that the wildland fire event is beyond its capacity to fight, the local fire-rescue department can request assistance from the FDOF. When that occurs, an incident

command control is established with the State and local fire-rescue departments working together to extinguish the wildland fire.

3.3.3 Department of Environmental Protection (DEP)

The DEP Bureau of Beaches and Wetland Resources oversees the listing of critical erosion areas within the state. The Florida Geological Survey, housed in DEP, is the State lead on geologic hazards such as sinkholes. DEP sponsors two key mitigation related funding programs – the Revolving Fund Loan Program for Waste Water Treatment and the Pollution Control Bond Program. DEP also is home to the State Coastal Management Program. The Florida Coastal Management Program (FCMP) coordinates among local, State, and Federal entities involved in coastal management activities. In addition to working with DEP's programs, the FCMP coordinates among the eight State agencies, five water management districts, and local governments that have responsibilities for coastal management under the federally-approved Florida Coastal Management Plan. The FCMP also develops partnerships with local communities to actively solve problems related to coastal development.

3.3.4 Florida Fish and Game Conservation Commission

The Fish and Game Conservation Commission sponsors environmental education programs aimed at educating adult Floridians about population growth, habitat loss, and coastal and fresh water ecosystems.

3.3.5 Florida Inland Navigation District (FIND)

FIND provides assistance on certain waterway related projects including navigation channel dredging, channel markers, navigation signs or buoys, boat ramps, docking facilities, fishing & viewing piers, waterfront boardwalks, inlet management, environmental education, law enforcement equipment, boating safety programs, beach renourishment, dredge material management, environment mitigation, and shoreline stabilization.

3.3.6 Florida Department of Transportation (FDOT)

FDOT maintains Federal and State roads as well as airport construction and zoning and various other types of transportation administration.

3.3.7 Building Officials Association of Florida (BOAF)

BOAF coordinates building code enforcement among local building officials.

3.3.8 Florida Department of Insurance (FDOI)

FDOI helps finance the reconstruction of communities following a disaster.

3.3.9 Agency for Health Care Administration

The Agency for Health Care Administration oversees hospital construction and various health testing services.

3.3.10 Florida Department of Business and Professional Regulation (FDBPR)

FDBPR oversees elevator maintenance and safety, building inspection, engineering, architecture, and construction contractors.

3.3.11 Florida Department of Corrections (FDOC)

FDOC builds prisons, local detention facilities, and private contract facilities.

3.3.12 Florida Department of Education (FDOE)

FDOE oversees school construction and maintenance. The department also has an emergency planning program that focuses on hazardous materials accident preparedness.

3.3.13 Florida Department of Management Services (FDOMS)

FDOMS manages State public buildings and personnel services.

3.3.14 Florida Department of State (FDOS)

The Division of Historical Resources is one of seven divisions within the Department of State, and the State agency responsible for promoting the historical, archaeological, museum, and folk culture resources in Florida. The Division Director serves as Florida's State Historic Preservation Officer, providing a liaison with the national historic preservation program conducted by the National Park Service. The Bureau of Historic Preservation identifies, evaluates, preserves, and interprets historic structures and properties that reflect the diversity of our past. The Bureau manages the nation's largest historic preservation grants program and oversees the development of State historic markers, heritage publications, and Florida folklife programs.

3.4 REGIONAL

3.4.1 Treasure Coast Regional Planning Council

The Treasure Coast Regional Planning Council (TCRPC) was created under Section 186.501, F.S. The Council is a multi-county entity encompassing Indian River, Martin, Palm Beach, and St. Lucie counties. It has responsibility for addressing growth management issues that are multi-jurisdictional in scope. This includes working in cooperation with Federal and State agencies, planning on emergency management issues as described in Section 252.34(4), F.S. The TCRPC provides full-time staffing for the District X LEPC. The LEPC is charged with administering regional compliance with hazardous materials reporting and training laws. Its many initiatives include the State Hazardous Materials Training Task Force; District X Hazardous Materials Emergency Plan; training for emergency first response personnel; hospital and hazardous materials response team needs; public hazardous chemical awareness and reporting seminars; public and private sector hazardous materials emergency exercises; and assisting public and private facilities with chemical emergency preparedness planning.

Section 186.507, F.S. directs regional planning councils to prepare strategic regional policy plans. One of the elements that the plan must address is emergency

preparedness. The TCRPC promotes mitigation initiatives within Section 5.0, Emergency Preparedness, of its Strategic Regional Policy Plan. Specific strategies that promote mitigation are summarized below. These strategies and the policies that implement them are listed in **Appendix A**.

Strategy 5.1.1 Direct development away from areas most vulnerable to the effects of natural and manmade disasters.

Strategy 5.2.1 Utilize land use, transportation, and community planning processes to address vulnerability issues.

Strategy 5.3.1 Provide shelter space for residents of areas susceptible to flooding from the effects of hurricanes and other storms.

Strategy 5.4.1 Develop the mechanisms necessary to ensure that emergency planning agencies have input into the local government decision-making process.

Strategy 5.5.1 Initiate disaster preparedness activities which will protect lives and property and reduce evacuation times.

Strategy 5.5.2 Establish mechanisms and regulations necessary for post-disaster reconstruction to occur in a consistent manner making future disasters less destructive to life and property.

3.4.2 South Florida Water Management District

The creation of the South Florida Water Management District (SFWMD) along with the four other water management districts was enabled under Section 373.069, F.S. Historically, water management districts were created primarily to mitigate the impacts of flooding. Over the years, the districts' roles have been expanded considerably. As required under Section 373.036(2), F.S., each district has prepared a district water management plan. The plan provides the overarching vision for the districts. The key elements of the plans are

- Environmental protection and enhancement;
- Water supply;
- Flood protection; and
- Water quality protection.

One of the purposes of the plan is to provide a framework for managing conditions of extreme drought, hurricanes, and flooding. The SFWMD administers several programs that achieve hazard mitigation relative to these events. These are supported by Strategic Goals and Policies found in the District Water Management Plan such as

Strategy 1.1.1 Needs and Sources, Planning

6. The District will prepare coordinated and standardized forecasts of future water demands, withdrawal impact, and future water levels by:

b. Utilizing statistical forecasting methods to evaluate ground and surface water resources, and to aid in the water shortage management process; and,

c. Utilizing numerical ground water flow models and surface water seasonal water balance models for prediction of future water resource availability under varying climatic and demand conditions.

7. The District will establish efficiency standards for routine urban demand management and conservation practices and criteria for implementing the same, including: Xeriscape, efficient plumbing in new construction, and minimum water conservation planned for utilities.

Strategy 1.1.2 Needs and Sources, Regulation

3. The District will require water conservation and efficient use of water supplies.

Strategy 2.1.1 Flood Protection, Planning

2. The District will assist local governments in the planning and implementation of appropriate solutions to local flood control problems and strategies for alleviating current problems and avoiding future problems.

3. The District will encourage retrofit projects to meet new development standards for flood protection and water quality, to the maximum extent feasible.

Strategy 2.1.3 Flood Protection, Operations and Maintenance

3. The District will, through its publications and external communications, seek to create a greater public awareness of the importance and availability of flood protection.

6. The District will communicate, in its *Emergency Management Plan*, District operations, intergovernmental coordination activities and resource management priorities that correspond to severe climatological events.

7. The District will perform emergency services, as necessary, to garnish available capacity of Central and Southern Florida Project works to other entities.

8. The District will perform other flood control services on an as needed or emergency basis as determined by the District.

Strategy 2.2.1 Floodplains, Planning

1. The District will encourage non-structural methods, including acquisition, regulation and application of appropriate land use and water management policies, to address or prevent water resource problems.

3. The District will assist local governments in the planning and implementation of appropriate solutions to local flood control problems and strategies for alleviating current problems and avoiding future problems.

Strategy 4.2.2 Minimum Flows and Levels, Regulation

3. The District will optimize surface water management control elevations in stormwater management systems to meet flood control standards, conserve water supply and protect natural systems.

In addition, the District has an emergency management program. The purpose of the program is to prevent or minimize, prepare for, respond to, and recover from emergencies or disasters that threaten life or property within the boundaries of the SFWMD.

The SFWMD operates and maintains the regional drainage system throughout its jurisdictional area. Local drainage systems are operated by a variety of special districts, private property owners, and local governments. The local systems typically convey water from individual projects to the regional system. The District's responsibilities for flood protection relate primarily to serving as the regional water conveyance and storage entity. To meet these responsibilities, the SFWMD maintains an ongoing "Canal Conveyance Capacity" evaluation program. The objectives of the program are

- To implement a systematic approach to the inspection of all SFWMD canals to determine the need for periodic dredging;
- To inspect all canals over a 5-year period;
- To establish standard canal survey criteria; and
- To develop construction plans and specifications to implement restoration of conveyance to the canals.

In addition to private applicants, local units of government involved in building new stormwater systems or retrofitting older ones are required to petition the District for a surface water management permit approval.

Besides flood control, the District is charged with the responsibility of protecting existing water resources from excessive drawdown during periods of drought, and protecting wellfields from contamination. Also, the District administers the "Save Our Rivers" program for the purpose of protecting environmentally sensitive lands. Some of the lands purchased under the program have been situated in the Coastal High Hazard Area (CHHA); thus, in addition to achieving the program's primary goal - the protection of environmentally sensitive resources - the intensity and density of development in coastal high hazard areas are reduced.

3.5 COUNTY GOVERNMENT

3.5.1 Listing of County Agencies

Within the existing County organizational structure, there are a number of departments that play key roles in hazard mitigation. They include the Department of Public Safety - Emergency Management Division, CDD, Utilities Department, Department of Public Works, Department of Human Services, Fire-Rescue District, and the Sheriff's Department.

Department of Public Safety (DPS). The DPS has three major functions: emergency management, 911, and 811. In terms of hazard mitigation, the Emergency Management Division has the lead role in dealing with hazard-related events. In that role, one of the Division's important functions involves overall coordination responsibility during

emergency events. The County Comprehensive Emergency Management Plan (CEMP) serves as the countywide operational management plan for emergency events. It defines the roles and functions of all local governmental agencies and non-profit and private sector entities (e.g., American Red Cross, Florida Power & Light).

CDD. The CDD comprises two divisions: Planning and Zoning, and Building and Code Enforcement. The Planning and Zoning Division has primary responsibility for administering the County Comprehensive Plan, and appraising and updating it from time to time. Also, CDD serves as the lead agency relative to economic development/redevelopment in addition to functioning as staff to the Metropolitan Planning Organization, the countywide transportation planning agency. The division also plays an important role in environmental matters. It evaluates and assesses all environmental projects (e.g., shoreline stabilization projects, beach erosion initiatives, private development site plans), as well as administers various environmental ordinances (i.e., Environmentally Sensitive Lands, Sand Mining, Wellfield Protection).

In addition to its long-range planning role, the planning and zoning division is responsible for processing development petitions (i.e., rezoning petitions, site plans). The building division issues and oversees compliance with all building permits.

Utilities Department. This department is responsible for managing all County-owned water and wastewater facilities systems. They also are responsible for customer billing.

Department of Public Works (DPW). The DPW is responsible for designing, constructing, and maintaining drainage projects, roads and bridges, and street improvements, as well as for facilities that control vehicular and pedestrian traffic.

Department of Human Services. The Department of Human Services (DHS) administers several functions that have relevance to the LMS. The DHS has been designated as St. Lucie County's Council on Aging (COA); therefore, one of its responsibilities is dealing with individuals with special medical needs. Further, as the COA, it operates a community transit system of vans and small buses that serve not only the elderly, but handicapped, as well. Another function that the Department is involved in is housing. They administer housing programs, such as Seniors Housing Information Program and housing weatherization, and work closely with Habitat for Humanity.

Fire-Rescue District. The County Fire-Rescue District provides fire suppression, emergency medical services, fire prevention, and community education countywide. During declared emergencies, Fire-Rescue fulfills all activities related to Emergency Support Function (ESF) #4, Fire Fighting as described in the County's Comprehensive Emergency Management Plan. Besides emergency services, the Department provides other types of services. The District is responsible for ensuring that buildings comply with appropriate fire codes. The Department also offers public education programs that focus on fire safety guidelines for schools, community groups, and individuals. In addition, the Department has responsibility for coordination of fire protection, hazardous materials mitigation, and advance life support services.

Sheriff's Office. Traffic control is an important function of the Sheriff's Department. In terms of hazard-related events, traffic control is important in times of floods, hurricanes, and hazardous material spills. Securing areas devastated by a tornado or

hurricane to protect the lives and properties of the residents impacted by the event, or providing security during a situation where a building may have been damaged as a result of terrorist activity, are examples of important roles the Sheriff's office performs in ensuring public safety. The Sheriff's Office General Order 25 outlines several emergency-related plans currently being implemented within the County. These plans include Crisis Situations and Response, Civil Disturbance/Mass Arrest, Emergency Management, Response to School Shootings, VIP Protection/Special Events, Headquarters Evacuation Plan, Bomb Disposal Team, Crisis Negotiations Team, Search and Rescue Plan, Underwater Search and Recovery Team, Special Operations and Tactics Team, and Emergency Access to Airport Runways and Taxi-Ways. The Sheriff's Office also maintains an Emergency Management and Mobilization Plan. According to the Corrections Manual, the St. Lucie County Sheriff's Department has developed Infectious Disease Preventative Measures, Blood Borne Pathogens Exposure Control Plan, and Tropical Storms, Hurricanes, and Civil Defense plans. The Sheriff's Office is currently developing a jail facility evacuation plan for events involving weapons of mass destruction. The Office also is in the process of developing a Continuity of Operations plan.

St. Lucie School District. The School District operates independently from County government; however, the District is a major provider of public shelter space. Also, the District operates a large fleet of school buses that could be an important resource should mass movement of the population away from the area or site impacted by the hazard be necessary.

St. Lucie County Health Department. The Health Department is responsible for Emergency Support Function #8 (Health and Medical Services) in all emergency events. The Health Department maintains the following plans: Pandemic Plan, All Hazards Operational Plan, Point Distribution Plan, Severe Acute Respiratory Syndrome (SARS) Response Plan, Emergency Operations Plan, Small Pox Response Plan, and Potassium Iodide Distribution Plan.

3.5.2 County Mitigation Policies and Ordinances

Policy Plans. The two key policy plans that address issues related to natural and technological hazards include the County Comprehensive Plan and the County Comprehensive Emergency Management Plan. They are described briefly below.

1) County Comprehensive Growth Management Plan

The Comprehensive Plan serves not only as a blueprint for St. Lucie County's future, but also as the County's policy document. It defines County positions as they relate to development and redevelopment. The Comprehensive Plan contains the nine required plan elements, as set out in Section 163.3161, F.S. They include Conservation, Coastal Management, Infrastructure (i.e., potable water, sanitary sewer, stormwater management, solid waste, natural aquifer recharge), Future Land Use, Housing, Recreation and Open Space, Transportation, Intergovernmental Coordination, and Capital Improvement. The issue of hazards is dealt with in five of the nine plan elements. A complete listing of all hazard mitigation relevant goals, objectives, and policies by plan element in the St. Lucie Comprehensive Plan is found in **Appendix A**.

Natural hazards, primarily flooding, hurricanes, drought, and beach erosion, are the focus of the Comprehensive Plan. Technological-type hazards such as aquifer contamination, wellfield contamination, and hazardous materials/waste accidents are addressed in several elements. The Future Land Use Element does not address increases in development intensity/density or directing population away from the CHHA; although the Coastal Management Element does state that ".. construction of County-funded public facilities in the coastal high hazard area shall be prohibited, unless the facility is necessary for public access, natural resource restoration or enhancement, or to provide for recreational facilities and other appropriate water dependent facilities." The Element does contain a policy that "New sanitary sewer facilities in the hurricane zone shall be floodproofed to prevent inflow and ensure that raw sewage does not leak from them during flood events." The County might consider making this a countywide requirement, not just applicable to a specific area. Both of the aforementioned issues need to be reassessed in light of redefinition of the CHHA. The Coastal Management Element also discusses the issue of emergency preparedness. Immediately following a hurricane, the County Commission appoints a Recovery Task Force that is responsible for reviewing and issuing emergency building permits; coordination with State and Federal disaster officials; and making recommendations concerning the reconstruction or relocation of damaged public facilities; and development of a redevelopment plan. While it may be implicit, there is no mention that the DPS, DEM would assume the lead role in directing and controlling activities during any disaster, including preparedness, response, and recovery.

A major focus of the Conservation Element is on development in the floodplain. Maintaining the functionality of the floodplain is emphasized. Also, the Element has a number of policies that center on protection from hazardous materials/waste.

The Comprehensive Plan in the Potable Water sub-element addresses issues related to drought: water conservation through xeriscaping, requiring use of irrigation quality (IQ) reclaimed water for irrigation, and requiring water saving devices in new construction.

2) St. Lucie County Comprehensive Emergency Management Plan

The Board of County Commissioners has an adopted CEMP. It is an operations-oriented document that establishes the framework for effective management by the County during emergencies and disasters. The CEMP addresses a broad range of hazards. They include

- hurricanes and tropical storms;
- flooding;
- freezes;
- wildland fires;
- tornadoes;
- droughts;
- property loss/agricultural hazards;
- hazardous materials;
- sinkholes and subsidence;

- fixed nuclear power facilities;
- coastal oil spill;
- dam failure;
- military ordnance from World War II;
- mass immigration; and
- armed violence (civil disturbance, terrorism, military conflict).

The CEMP addresses evacuation in terms of local and regional evacuation, public shelter, post-disaster response and recovery, rapid deployment of resources, communications and warning systems, training exercises, and agency responsibilities. These responsibilities are clearly delineated in 17 ESFs (**Table 3.1**). Each ESF is headed by a lead agency, which has been selected based on its authorities, resources, and capabilities in the functional area. The ESFs also serve as the primary mechanism through which outside assistance to St. Lucie County is coordinated.

3) Other Hazards Plans

Besides the CEMP, the St. Lucie County DPS has prepared a series of hazard plans that apply to unique situations. They include

- Coastal Oil Spill - Federal Region IV Oil & Hazardous Substances Regional Contingency Plan;
- Hazardous Materials - St. Lucie County Emergency Plan for Hazardous Materials;
- Nuclear Power Plants - State of Florida Radiological Emergency Management Plan;
- Emergency Notification - Emergency Alert System Plan (Operational Area 10);
- Military Support - Florida National Guard Operation Plan for Military Support to Civil Officials;
- Ports Contingency Plan - Coast Guard Contingency Plan for St. Lucie County;
- Airport Contingency Plan - St. Lucie County Airport Contingency Plan;
- LEPC - District 10 Local Emergency Planning Committee Hazardous Materials Plan; and
- St. Lucie County - Continuity of Operations Plan.

Ordinances/Regulations. Hazard-related ordinances are administered primarily by the CDD, or the St. Lucie County Fire-Rescue District. The list of relevant ordinances includes

- Flood Damage Prevention;
- Countywide Wellfield;
- Protection;
- Zoning;
- Building Code;
- Hutchinson Island - Building Height;
- Overlay Zone;
- Sand Mining;
- Fire Prevention Code;
- Environmentally Sensitive Lands;
- Shoreline Protection; and
- Coastal Area Protection

Table 3.1. Emergency support functions (ESFs) and their designations.

Emergency Support Function	Designation
Transportation	ESF - 1
Communications	ESF - 2
Public Works and Engineering	ESF - 3
Fire Fighting	ESF - 4
Information and Planning	ESF - 5
Mass Care	ESF - 6
Resource Management	ESF - 7
Health and Medical Services	ESF - 8
Search and Rescue	ESF - 9
Hazardous Materials	ESF - 10
Food and Water	ESF - 11
Energy and Utilities	ESF - 12
Military Support	ESF - 13
Public Information	ESF - 14
Volunteers and Donations	ESF - 15
Law Enforcement and Security	ESF - 16
Animal Protection	ESF - 17

Source: St. Lucie County Department of Public Safety, Division of Emergency Management, 1998.

The County follows the Standard Building Code. All builders must adhere to the adopted 140-mph wind load requirement. Gable bracing and hurricane clips are required.

3.5.3 County Mitigation Projects/Initiatives

St. Lucie County has taken steps to mitigate potential impacts resulting from various types of hazards. Although not all inclusive, the following discussion provides some examples of the types of projects undertaken. Also, in anticipation of the unified, countywide LMS Project Prioritization List to be developed as part of this effort, the St. Lucie County LMS Steering Committee members were provided information about potential mitigation projects implemented throughout the United States, and the availability of potential funding sources (see **Appendix C**).

There are a number of projects and initiatives the County has implemented to mitigate potential damage resulting from various hazards. The County has acquired a number of important parcels in the CHHA through a local bond issue. Most were purchased because they exhibited environmentally significant habitat; however, the County also gained by reducing the intensity and density of development in a high risk area, the CHHA.

St. Lucie County also has made a statement of the importance of hazard mitigation, by incorporating within its Comprehensive Plan policy statements regarding the development of a countywide LMS. In addition to its CEMP, there are special hazard plans that apply to unique situations. They address hazards such as coastal oil spills, hazardous

materials, and airport safety. In addition, in a County that experiences substantial development annually, the Fire-Rescue District participates in the review of development proposals. The Fire-Rescue staff reviews and comments on whether there is adequate access to buildings by both personnel and apparatus, and whether there is adequate vehicle ingress and egress.

The Fire-Rescue District has a significant role relative to hazardous materials. The Department staff pre-identifies hazardous chemical waste facilities and pre-plans emergency response. In addition, staff works with the facility managers by assisting in writing their emergency operations/evacuation plans.

Also, as many other counties have done since Hurricane Andrew, St. Lucie County has upgraded its building code. The code now requires a finished floor elevation at 6 inches above the minimum 100-year flood level. The County's building code also requires corrosion resistant hurricane clips, water resistant adhesives for shingles, trusses manufactured in accordance with local wind models, and shutters for all new single family homes.

The County's Environmentally Sensitive Land Ordinance was adopted in 1990 to mitigate erosion and enhance and restore the beaches and dunes along its coastal shorelines. The County avoids the use of shoreline armoring (except as a measure of last resort). Preferred alternatives include beach nourishment and dune restoration. Erosion along its inland waterways, (i.e., North Fork of the St. Lucie River, Five Mile Creek, Ten Mile Creek) has been a concern too and is addressed in the Environmentally Sensitive Ordinance, Section 6.02.02.

The St. Lucie County Health Department sponsors several hazard related programs including annual nuclear accident and hurricane drills. The Department also conducted a hazardous materials spill drill and a Small Pox Drill at the St. Lucie Medical Center. Since 2002, the Health Department has been involved in Operation Vaccinate Florida Phases I, II, and III.

Between 2002 and 2003, St. Lucie County completed a number of drainage and stormwater improvement projects. These projects include retrofits at Paradise Park, South 7th Street, Harmony Heights, Rouse Road, and Indian River Estates. The County also has acquired several properties associated with the White City drainage program.

3.6 MUNICIPALITIES

3.6.1 Listing of Municipal Agencies

The organizational structure of each municipality in the County differs in terms of organizational complexity and functional responsibility. A city like Port St. Lucie (population – 88,769 [2000 estimate]) has an organizational structure that is considerably more complex than St. Lucie Village.

The following is a brief discussion of typical agencies within the municipal organizational structure having hazard mitigation functional responsibilities.

Emergency Management. The responsibility for emergency management in Port St. Lucie falls under the Director of Public Works. While in Fort Pierce, a staff officer with

the Police Department is charged with the responsibility. Both jurisdictions have established Emergency Management Committees comprising key departments and have emergency operations plans. In St. Lucie Village, emergency management is handled more informally, as there are only 608 people in the community. The municipality has no emergency management plan; however, since the Village operates with no full-time staff, it is important that the Village have a emergency operations plan in place, in order to be able to respond effectively during a disaster. The Village depends, to a large extent, upon the County Division of Emergency Management.

Planning. Port St. Lucie and Fort Pierce have planning departments with professional staffs. The departments review zoning petitions, site plans, and other development orders (e.g., variances, special exceptions), and administer their local comprehensive plan. Planning in the Village is accomplished primarily by the Village Board of Aldermen. From time to time, they contract for planning services.

Building Departments. All the municipalities issue their own building permits. All operate under the Standard Building Code. Modifications are made to the various sections (e.g., building, plumbing, fire) of the Code from time to time; however, municipalities may or may not amend their local building code to reflect those changes.

Public Works Departments. Both Port St. Lucie and Fort Pierce have Public Works Departments. The primary responsibilities for the departments are engineering design, implementing structural improvements (e.g., stormwater facility retrofit, shuttering buildings, constructing new Emergency Operation Centers), and maintaining the facilities. The Village contracts for services. Historically, St. Lucie County has assisted the Village in maintaining its drainage system since the Village has no staff to perform the needed maintenance. St. Lucie County maintains drainage pipes and structures at the east end of the "Ray Lein-Pitch," and the Village employs contractors to perform all other maintenance on drainage facilities.

Fire Service. All cities contract with the County Fire-Rescue District for fire protection. In incidents where hazardous materials spills occur, both Fort Pierce and Port St. Lucie municipal police departments will support Fire-Rescue efforts by assisting with traffic control.

3.6.2 Municipal Mitigation Policies and Ordinances

Municipal Comprehensive Plans. Like the County, each city has an adopted Comprehensive Plan. They serve as a policy instrument for each city, and define the particular city's development and redevelopment policies. All plans contain the required nine plan elements: Conservation, Coastal Management, Infrastructure (i.e., potable water, sanitary sewer, stormwater management, solid waste, natural aquifer recharge), Future Land Use, Housing, Recreation and Open Space, Transportation, Intergovernmental Coordination, and Capital Improvement. Six of the nine plan elements address hazards. **Table 3.2** summarizes, in a matrix format by jurisdiction, type of hazards by plan element.

Each municipal comprehensive plan has been reviewed. Specific mitigation-related objectives and policies have been identified and have been described and cross-referenced in **Appendix A.**

Table 3.2. Comprehensive Growth Management Plan hazard mitigation inventory.

Comprehensive Plan Elements	St. Lucie County	Municipalities		
		Fort Pierce	Port St. Lucie	St. Lucie Village
Conservation	A,D,E,F,HZ,NT,W	A,D,E,HZ,W	A,D,E,F,H,NT,P,W	A,D,E,F,HZ,W
Coastal Management	E,F,H,HZ,NT,P	D,E,F,H,HZ,P	A,D,E,F,H,NT,P,W	E,F,H,NT,P
Infrastructure	D,F,HZ,W	D,F,HZ,P,W	D,F,FI,H,HZ,W	D,F,NT,W
Future Land Use	F,H,W	F,H,W	E,F,NT,W	F,H,NT,W
Housing				
Recreation and Open Spaces				
Transportation				
Intergovernmental Coordination				
Capital Improvement	E,F,H	E,F,H	NT	E,F,H
Ports, Aviation, and Associated Facilities				
Utilities				
Health and Human Services				
Public Education				
Fire Rescue				
Economic				
Library				
Historical Preservation				

Bold = Mandatory Comp Plan Element; A = Air Quality; D = Drought; E = Erosion; F = Flood; FI = Fire; H = Hurricane; HZ = Hazardous Materials; N = Nuclear Disaster; NT = Natural and Technological Disasters; P = Post-Disaster Redevelopment; W = Wellfield Contamination.

Regardless of municipality, most hazard-related issues are addressed in four plan elements of the Comprehensive Plan: Conservation, Future Land Use, Infrastructure, and Coastal Management. Any proposed capital projects identified in the plan elements also are identified in the Capital Improvement Element (CIE), the financial management component of the Comprehensive Plan. As recommended in Section 163.3177(3)(a), CIEs should be reviewed and updated annually. In practice, no local government in St. Lucie County updates their CIE except at the time they are statutorily required to prepare their Evaluation and Appraisal Report.

While local government comprehensive plans have a lot of similarities in their objectives and policies, there are variations. Some of the variations are highlighted below and read as follows:

1) City of Fort Pierce

- Coordinate with the South Florida Water Management District to plug abandoned, free flowing artesian wells;
- Increase public shelter space;
- Restrict development and direct the concentration away from the coast;
- Give high priority to critical evacuation road links in terms of annual maintenance and capital improvement expenditures; and
- Notify its residents annually of its hurricane procedures and shelters for those with special needs, such as the handicapped or infirmed.

2) City of Port St. Lucie

- Investigate the feasibility of expanding reuse of treated wastewater for irrigation and landscaping;
- Promote the use of IQ water for non-residential irrigation;
- Complete new road and improvements in the coastal planning area to increase the number of traffic lanes for hurricane evacuation; and
- Prepare and adopt an emergency water management conservation plan.

3) Village of St. Lucie

- Structures that suffer repeated damage to pilings, foundations, or loadbearing walls shall be modified to delete the areas most prone to damage.
- In accordance with Section 163.3202, F.S., the Village shall revise land development regulations to include requirements for the use of soil water tensiometers, or other similar devices, in all irrigation systems for all new development or redevelopment;
- The Village shall utilize the St. Lucie County Soil and Water Conservation District guidelines in the development of regulations for minimizing soil erosion; and
- The Town of St. Lucie Village will not expend public funds for infrastructure or service facilities in CHHAs, except to ensure public safety or to acquire or enhance natural resources.

Building Codes.

1) City of Fort Pierce

The City updated its building codes in regards to wind, water, and fire in December of 2001. The City building code requires structures east of U.S. Highway 1 to be built to a wind load requirement of 140 mph and structures west of U.S. Highway 1 to be built to 130 mph.

2) Port St. Lucie

The City's building code requires structures east of the North Fork of the St. Lucie River to withstand 140-mph wind loads and requires structures west of the river to withstand 130-mph wind loads.

3) St. Lucie Village

The Village has adopted by ordinance the Standard Building Code and all amendments. New construction east of U.S. Highway 1 in the Village must be built to meet the wind load requirement of 140 mph. In addition, hurricane clips and gable bracing also are required.

Other Ordinances.

1) City of Fort Pierce

In addition to its building code, the City has several other ordinances that regulate development within the City. They include its Flood Hazard Prevention Ordinance, which regulates the elevation of structures in the CHHA; filling, grading and dredging, and placement of manufactured housing. The City's utility code contains provisions that regulate the use of water during periods of drought.

The City also entered into an interlocal agreement with the County in 1998, which addresses local and regional emergency response capability for containing and cleaning up hazardous waste accidents occurring in area waterways. Based on the agreement, the City has agreed to store the oil spill cleanup equipment.

The City established a landscape and tree ordinance in 2002 that addresses hurricanes, tornadoes, and agricultural pests and diseases.

The City has addressed roads and evacuation routes with chronic flooding in the City Strategic Emergency Management Plan. The City Strategic Management Plan's Landscape and tree ordinance addresses the susceptibility of Australian Pine to heavy rain and wind events. The maintenance of drainage basins, redevelopment in hazard prone areas, and utility function on the barrier island are addressed in the City Comprehensive Plan. Utilities are addressed again along with critical facilities in the City Strategy Management Plan.

2) City of Port St. Lucie

The City has a number of ordinances other than the building code that address various hazard events. One is a flood damage prevention and drainage ordinance. Others include a wellfield protection ordinance, stormwater utility rules, and a burn ordinance. The City also has two unique disaster-related ordinances: emergency purchasing procedures, and an expedited permitting process following a major disaster.

3) Town of St. Lucie Village

For the past 20 years, the Village has had a flood damage prevention ordinance, which is administered by the St. Lucie Village Board of Aldermen.

3.6.3 Municipal Mitigation Projects/Initiatives

An LMS survey and update datasheet were prepared and distributed to all participating local governments as a means to inventory and assemble data on mitigation projects and initiatives each governmental entity had or is implementing. During the original LMS planning process, the surveys were distributed prior to conducting in-field interviews with each local government. The datasheets were used to update the information collected through the surveys in the original LMS planning process.

The LMS survey and datasheets requested information about projects (i.e., capital improvements) and initiatives (e.g., property acquisition, upgraded building codes, incentives, public information campaigns, preparedness training and drills, professional development seminars). The in-field visits were extremely important in verifying information contained in the LMS survey; however, the visits are very valuable in explaining the program to the various city departments, clarifying existing municipal hazard mitigation projects, and identifying new projects. There is variation among the municipalities. The following provides a brief discussion of the accomplishments of each jurisdiction.

City of Fort Pierce. Although not formalized as a hazard mitigation program, the City through various departments has implemented a number of mitigation-type projects. The following highlights some of them.

- Due to the age of the existing stormwater management system, improving the City's drainage system is a high priority. A major project underway is the Moore's Creek Retrofit. Phases I and II have been completed; however, additional phases remain to be completed.
- A key facility in the downtown area is the Fort Pierce Marina. The city reduced its exposure to damage by installing floating docks and new gas and water lines.
- Improvements to the Fort Pierce Jetty along with renourishing South Beach, have mitigated beach erosion. These improvements have been accomplished through the cooperative efforts of the City and County.
- The most important non-capital improvement project the City has implemented in recent years is the creation of the Emergency Management Committee established in 1997. This group is composed of all key City departments. From February to October, the staff meet on a bi-weekly basis.

Through the efforts of the Committee, the City now has an Emergency Management Operations Plan.

- The City distributes public information to its employees as well as residents. *City News* is a monthly employee newsletter the City uses to keep its employees informed on a wide variety of issues. Also, the City is able to put stuffers in the FPUA's monthly bills. The City also has prepared a pamphlet on pets and disasters, which it has made available to its residents.
- City staff attends the Annual Governor's Hurricane Conference, FEMA training sessions, and seminars on various building-related topics.
- The City completed an outfall project on Virginia Avenue in October of 1989 to improve stormwater drainage.

City of Port St. Lucie. The City of Port St. Lucie has completed or is in the process of completing a number of capital projects that have been built with mitigation in mind. Two new public structures were recently completed, the Police Department and Community Center. Both have been built to withstand 140-mph wind loads. The Community Center also functions as the City Emergency Operations Center and as a special needs shelter. Also, City Hall has undergone major expansion. It has been built to withstand 140-mph winds.

Other mitigation-type activities the City has accomplished in recent years include

- A reverse 911 emergency phone system;
- The Purchasing Department expanded its vendor list, and it continually updates the list to keep it current. Also, the City has joined the statewide network of purchasing departments;
- The City has an emergency agreement with several local gas stations in the event the City gas pumps located at the Public Works Department fail to operate;
- Prior to a hurricane, the Building Department officials notify all contractors operating within the City to secure their building sites;
- The City has worked with the County, implementing a countywide radio system known as 811;
- The City has purchased a floodplain along the North Fork of the St. Lucie River;
- Conducted a hurricane tabletop exercise;
- Developed public service announcements for drainage improvements on Port St. Lucie Television 20 (PSLTV 20);
- Developed a loop presentation on drainage activities for PSLTV 20;
- Conducts a hurricane preparation meeting with the emergency management team during hurricane season; and
- Developed hurricane preparedness public services announcements in preparation for Hurricane Isabel for PSLTV 20.

Town of St. Lucie Village. The Village has completed an inventory of its drainage facilities. The next phase will be to identify problems and solutions. However, the Village is not waiting until the study is complete before curing some of its drainage problems. There have been some ditch clearing and yard drainage improvements made. Also, the Town through assistance from the County carries out regularly scheduled maintenance of its stormwater drainage system.

The Village filed for and received approval of funds to purchase a 76.55-acre tract of land bordering the Indian River Lagoon. The site has both natural resource and historical significance. Because the site borders the Indian River Lagoon, shoreline protection and preservation of a resource that mitigates damage from coastal storms and hurricanes are additional benefits of the purchase.

3.7 COMMUNITY ORGANIZATIONS

Community organizations can range from faith-based organizations to Chambers of Commerce to the local historical society. These groups represent the diverse interests present within a community and provide vital services to the community as well. Many services provided by St. Lucie County's community organizations can help to achieve the goals of hazard mitigation identified in this mitigation strategy. The following lists provide information on services provided by organizations that work within St. Lucie County to reduce the risks posed by disasters.

3.7.1 University of Florida/St. Lucie County Cooperative Extension

The St. Lucie County Cooperative Extension is active in promoting hazard mitigation in St. Lucie County. The Extension's past mitigation-related activities include

- Hurricane Preparedness Handbooks;
- Hurricane Preparedness Public Presentations;
- Florida Building Code Research-based Revisions;
- Insurance Coverage Education;
- TV/Radio Storm Preparation Programs;
- Hurricane House Website;
- Hurricane House Tours/Educational Programs;
- West Nile Virus Protection Community Education;
- Invasive Plant Management Training;
- Fireant Control Training;
- Pesticide and the Environment Courses;
- Firewise/Fire Hazard Reduction Education;
- Aquatic Plant Management Training;
- Wildlife Management Education;
- Public Health Pesticide Training;
- Canker Education;
- Agricultural Insect/Disease Agent Information and Identification;
- Water Quality Protection Education;
- West Nile Virus Vaccination Recommendation Update;
- Best Management Practices Cattle Notebook;
- Hurricane Preparedness for Pets and Livestock; and
- Clean Marina Program.

3.7.2 FPUA

The FPUA has replaced 8 miles of vulnerable water mains located on South AIA on the barrier island. FPUA also has been engaged in the following activities:

- FPUA Storm Manual;
- Comprehensive Vulnerability Assessment of Water Systems for the FPUA; and
- Hurricane Awareness bill stuffers.

3.8 INTERGOVERNMENTAL COORDINATION

Disasters know no boundaries; governments and service providers must work together to strengthen communities against the loss of life and property. An essential element of the hazard mitigation process is intergovernmental coordination. Coordination is important not only horizontally at the local level between County, municipalities, non-profit organizations, and the private sector, but also vertically with key State and Federal agencies. Besides the potential of the LMS initiative, there are several other coordination mechanisms that already exist. They are described briefly below.

3.8.1 Metropolitan Planning Organization

The Metropolitan Planning Organization (MPO) coordinates local, State, and Federal funding for thoroughfare improvements. The policy board is comprised of elected officials from the County and the municipalities. Two key policy documents of the MPO is the long-range transportation plan, and the 5-year transportation improvement plan (TIP). The TIP identifies and schedules all future roadway improvements in the near-term.

3.8.2 Local Government Comprehensive Plans

One mechanism to achieve intergovernmental coordination is the local comprehensive plan. As described above, each comprehensive plan contains an intergovernmental coordination plan element. In St. Lucie County, there are several instances in which local governments are dependent upon another entity to provide services. Examples include the Fort Pierce Utilities Authority providing water and sewer to the City of Fort Pierce; also, all local governments contract with the St. Lucie County Fire District for fire protection and emergency medical services.

3.8.3 St. Lucie County Comprehensive Emergency Plan

A second mechanism that has relevance, is the County's CEMP. The CEMP must be integrated into and coordinated with emergency management plans and programs of the State and Federal government. It is operations-oriented and addresses evacuation in terms of local and regional evacuation, public shelter, post-disaster response and recovery, rapid deployment of resources, communications and warning systems, training exercises, and agency responsibilities. These responsibilities are clearly defined as 17 ESFs (**Table 3.1**; see page 3-16). Each ESF is headed by a lead agency, which has been selected based on its authorities, resources, and capabilities in the functional area. The ESFs also serve as the primary mechanism through which outside assistance to St. Lucie County is coordinated.

3.8.4 District X Local Emergency Planning Committee

The LEPC is an important vehicle to coordinate administering regional compliance with hazardous materials reporting and training laws. The TCRPC provides staff to administer the activities of the Committee.

3.8.5 State Emergency Management Plan

The State of Florida CEMP establishes the framework for a coordination system to ensure that the State of Florida will be prepared to respond to emergencies and disasters. The plan describes roles and responsibilities of State agencies, special districts, local governments, and voluntary organizations. The CEMP unites the efforts of these groups for a comprehensive approach. The plan is divided into three sections.

The Basic Plan:	Outlines how the State will assist counties in response, recovery, and mitigation of disasters; details responsibility at various levels of government; describes method of operations and financial management policies; ensures continuity of government; and addresses recovery issues.
Specific Response/Recovery Actions:	These actions are unique to a specific hazard and take the place of the Basic Plan and Response Functions sections.
Response Functional Annexes:	Presents the State's strategy for disaster response by outlining ESF. ESFs are structured from the Federal Response Plan.

3.9 STRENGTHENING THE ROLE OF LOCAL GOVERNMENTS

As has been described in the text, local governments in St. Lucie County have taken steps to strengthen themselves both in terms of capital facility improvements and ordinances, regulations, and programs. Becoming more disaster-resistant is not limited just to the hardening of public infrastructure. There are a number of activities that the County and municipalities can undertake to strengthen the role of local governments to lessen the impacts resulting from emergency events that do not require expending money on capital projects. Plans can be modified, laws and regulations can be amended, informational materials published and distributed, and professional training augmented. Ideas were generated from a variety of sources, interviews with local jurisdictions, and information generated from LMS survey forms, the LMS Steering Committee and subcommittees, and discussions with local governments. The suggestions resulting from the various discussions with local government include

1) Projects on the LMS Prioritized Project List should be incorporated in local government comprehensive plans, CIEs, at the time the CIEs are reviewed on an annual basis in accordance with Section 163.3177(3)(a), F.S.
2) As permitted under Section 163.3177(7)(h)&(l), F.S., local governments should seriously consider incorporating an optional comprehensive plan element for public safety that focuses on hazard mitigation issues.

3) Integrating the LMS into the St. Lucie County CEMP, and each municipal emergency management plan.
4) Making all communities CRS eligible (The Town of St. Lucie Village is in the NFIP program, but not in the CRS program).
5) Assessing existing CRS programs to determine ways to strengthen and improve the local jurisdiction's CRS rating.
6) Requesting technical assistance from the TCRPC to augment CRS.
7) Designing and implementing a hazard mitigation retrofit program.
8) Aiding local governments in community-wide grant applications and engineering assistance.
9) Retrofitting American Red Cross or other approved shelters.
10) Monitoring the outcome of the Florida Building Commission. Be prepared to evaluate the existing building code, identify deficiencies, and recommend desired changes to strengthen the existing building code.
11) The designing and bidding of all public building construction, whether it be new construction or renovation of older public structures, should incorporate hazard mitigation building practices, whenever financially feasible.
12) Requiring all mobile home parks to retrofit a community building engineered to withstand Category 3 hurricane windloads and an F2 tornado. An adequate warning system needs to be incorporated into the retrofit. Such a structure would then provide the mobile home park residents a safe haven refuge should such an event occur. Once constructed, the mobile home park administration should conduct mock drills to familiarize the residents with the procedure they need to follow should the occasion arise that they would need to evacuate to the safe haven refuge.
13) Implementing a safe room requirement in the local building codes that addresses not only new construction, but renovation as well.
14) Establishing a uniform records storage policy for all departments to follow, in order to ensure the safe protection of them from the impacts resulting from disasters.
15) Through the vehicle of the LMS Steering Committee, establish a countywide, unified wildland fire mitigation program drawing upon the expertise and knowledge of the FDOF, and the St. Lucie Fire District.
16) All jurisdictions should prepare and adopt post-disaster redevelopment plans.
17) Getting year-round coverage in the local media to get the message out to people, not only that it is important to have a plan should a disaster occur, but that taking steps to mitigate hazards before they occur saves dollars, not only for government, but for its residents and businesses, too.
18) Establishing a Private Sector Subcommittee to the LMS Steering Committee. Seek out, not only leaders of businesses and organizations that are interested in hazard mitigation, but are willing to commit time and resources to ensure an Action Plan defining specific tasks and/or projects that reduce the adverse effects of hazards is implemented.
19) Working with the Private Sector Subcommittee to develop procedures that ensure coordination and mutual support between the County and business community, before, during and after a disaster event.
20) Helping the Private Sector Subcommittee prepare a business contingency handbook and providing support in holding training workshops for local business owners.
21) Increasing involvement of businesses in the planning of the 2000 Disaster Preparedness Expo.

3.10 PRIVATE SECTOR BACKGROUND AND ANALYSIS

During events such as hurricanes, there can be massive disruption of the local economy. However, due to the lack of frequency over the past 20 years, even with Hurricane Andrew in 1992, people have become somewhat complacent about such events. This also is reflected in the business community, as well as community organizations, such as homeowner associations. Large firms like Florida Power & Light Company, Southern Bell, Piper Aircraft, Publix, as well as the banking community have prepared contingency plans in case of such an event. It is primarily among the smaller businesses where hazard mitigation and disaster preparedness has minimal attention. September 11th has certainly raised the awareness again among the business community of the need to be prepared.

As part of the LMS effort, the St. Lucie County CDD extended invitations to the businesses and community organizations to participate as a member of the LMS Steering Committee. The St. Lucie County Chamber of Commerce and Florida Light & Power Company were the only two entities that had any degree of participation in the original planning process. There is a definite need to augment private sector involvement, before the private sector can become a player in the communities' hazard mitigation efforts. The most important activity that needs to be implemented is the creation of a LMS Private Sector Subcommittee. Business owners speaking to business owners of the need to plan ahead and be prepared for the eventuality of a disaster is the most effective method of articulating the message that hazard mitigation is an issue that the private sector community needs to attend to seriously.

First and foremost, is energizing the interest of businesses to become involved in the process in the first place. In most communities, there are businesses that clearly understand that it is in their interest to develop a hazard mitigation plan prior to an actual event occurring. These are the organizations that need to become the core private sector groups that spread the word about the importance of "being prepared," taking steps and creating a plan before the disaster occurs. The Private Sector Subcommittee needs to develop materials that raise awareness and educate businesses of the need to be prepared for potential disasters. This also may include telling the story in a variety of forums, such as chamber of commerce meetings, ministerial association meetings, and homeowner associations. At the same time, the Subcommittee should have as a goal, the preparation of an Action Plan that defines specific tasks and deliverables to be undertaken during a set time frame.

Beyond awareness and education, other roles that private sector entities might undertake as a means to achieve a higher degree of sustainability might include developing a business contingency planning guide and follow-up technical workshops, and creating a private sector – emergency support function (a procedure to assist the business community during a disaster event), not only does the business community benefit, but the community as a whole benefits as well. Both activities would mitigate against the local economy becoming disrupted, making the community more disaster-resistant.

4.0 HAZARD IDENTIFICATION, VULNERABILITY, AND RISK

The purpose of this chapter is to describe the hazards facing St. Lucie County in terms of potential impact, vulnerability, and loss. The hazards faced in St. Lucie County fit into three general classifications – natural, technological, and societal hazards. Natural hazards include floods, hurricanes/tropical storms, tornadoes, thunderstorms, lightning, wildland fires, muck fires, extreme temperatures, soil/beach erosion, severe droughts, seismic hazards, agricultural pests and diseases, and epidemics. Tsunamis are not addressed in this plan because of the low probability of occurrence. According to the State Hazard Mitigation Plan, there have only been four occurrences of tsunamis in Florida since 1886. Technological hazards include radiological accidents, power failures, hazardous materials accidents, transportation system accidents, wellfield contaminations, communication failures, and military ordnance. Societal hazards include terrorism and sabotage, civil disturbance, immigration crises, societal alienation, substance abuse, and economic collapses.

The hazard identification subsections of this chapter describe each hazard and provide historical events and impacts if available. When available, maps are provided to illustrate the location and extent of the hazards.

Disasters are classified by the magnitude of their effect. The recognized classification system is as follows (Indian River County Department of Emergency Services, 2002):

- Minor Disaster: Any disaster that is likely to be within the response capabilities of local government and results in only minimal need for State or Federal assistance.
- Major Disaster: Any disaster that will likely exceed local capabilities and require a broad range of State and Federal assistance. The FEMA will be notified, and potential Federal assistance will be predominantly recovery-oriented.
- Catastrophic Disaster: Any disaster that will require massive State and Federal assistance, including immediate military involvement. Federal assistance will involve response as well as recovery needs.

The vulnerability assessment for each hazard describes the community assets and potential impact for each hazard. A community's vulnerability depends on the extent of hazard exposure and the value of potentially vulnerable assets. Higher risk areas with higher potential damage warrant mitigation practices that are more extensive. Communities in this situation may rely on land use and site design rather than on relatively simple measures such as building codes and hardening existing structures. Other factors that influence vulnerability and are important for communities to consider when selecting mitigation practices are for pre-disaster mitigation, the amount of undeveloped and underdeveloped land, and in the case of post-disaster mitigation, the amount of developed land within the community (FDCA, 2003). There are three types of vulnerability – individual, social, and biophysical. Individual vulnerability describes the susceptibility of a person or a structure to potential harm from hazards. Social vulnerability describes demographic characteristics of social groups that make them more or less susceptible to the adverse impacts of hazards. Biophysical vulnerability examines the distribution of hazardous

conditions arising from a variety of initiating events such as natural hazards, chemical contaminants, or industrial accidents (Cutter, 2001).

Factors influencing vulnerability include, but are not necessarily limited to a community's location, type of construction, demographics, and cultural characteristics. **Table 4.1** lists the general hazards to which St. Lucie County is vulnerable and indicates their projected impact potential across the entire spectrum of community exposure and services. The hazards identified in **Table 4.1** and discussed here are organized based on the maximum projected impact potential (i.e., hazards capable of producing the maximum community-wide impact, such as hurricanes and floods, are discussed first). This does not mean other identified hazards are less important or less worthy of mitigation, only that their potential to affect the total community is lower.

In order to effectively plan hazard mitigation projects and allocate scarce financial resources, a community's vulnerability to a specific hazard must be coupled with other critical factors to perform a risk assessment.

Risk, or the probability of loss depends on three elements:

- Frequency - How frequently does a known hazard produce an impact within the community?
- Vulnerability - How vulnerable is a community to the impacts produced by a known hazard? and
- Exposure - What is the community's exposure in terms of life and property to the impacts produced by a specific hazard?

Once these three factors are established, the risk level faced by a community with regard to any specific hazard can be calculated using the "Risk Triangle" approach (Crichton, 1999; see **Figure 4.1**).

In this approach, these three factors become the sides of a triangle, and the risk or probability of loss is represented by the triangle's area (**Figure 4.1a**). The larger the triangle, the higher the community's risk with respect to a given hazard. If a community reduces any of these three factors, they reduce their risk or probability of loss. For example, if a community reduces its exposure to hurricanes, as has actually happened historically, by moving from a barrier island to the mainland, they will reduce their exposure and therefore their risk of loss (**Figure 4.1b**). Likewise, if a community reduces its vulnerability to hurricanes by strengthening its buildings, it also will reduce its risk of loss (**Figure 4.1c**).

In St. Lucie County, the overall exposure was determined by a risk assessment model called MEMPHIS (Mapping for Emergency Management, Parallel Hazard Information System) developed by the FDCA. **Table 4.2** displays the structure types in St. Lucie County with the highest exposure.

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Table 4.1. Preliminary identification and projected impact potential for St. Lucie County hazards.

Hazard Category	Projected Impact Potential																			
	Excessive wind	Excessive water	Damaging hail	Soil/beach erosion	Electric power outage	Surface and air transportation disruption	Navigable waterway impairment	Potable water system loss or disruption	Sewer system outage	Telecommunications system outage	Human health and safety	Psychological hardship	Economic disruption	Disruption of community services	Agricultural/fisheries damages	Damage to critical environmental resources	Damage to identified historical resources	Fire	Toxic releases	Stormwater drainage impairment
Natural Hazards																				
Floods		X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
Hurricanes/tropical storms	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tornadoes	X				X	X				X	X	X	X							
Severe thunderstorms/lightning	X	X	X		X	X				X	X	X	X					X		X
Droughts													X		X	X		X		
Temperature extremes					X						X	X	X		X	X				
Agricultural pests and diseases											X	X	X		X	X				
Wildland/Urban Interface Zones					X	X				X	X	X	X	X	X	X		X	X	
Muck fires						X					X		X		X	X		X	X	
Soil/beach erosion				X			X						X			X				X
Seismic hazards						X													X	
Epidemics											X	X	X	X	X					
Technological Hazards																				
Hazardous materials accidents						X					X	X	X	X				X	X	

Table 4.1. (Continued).

Hazard Category	Projected Impact Potential																			
	Excessive wind	Excessive water	Damaging hail	Soil/beach erosion	Electric power outage	Surface and air transportation disruption	Navigable waterway impairment	Potable water system loss or disruption	Sewer system outage	Telecommunications system outage	Human health and safety	Psychological hardship	Economic disruption	Disruption of community services	Agricultural/fisheries damages	Damage to critical environmental resources	Damage to identified historical resources	Fire	Toxic releases	Stormwater drainage impairment
Radiological accidents including nuclear power plant accidents					X	X				X	X	X	X	X		X			X	
Communications failures										X			X	X						
Transportation system accidents						X	X				X		X	X				X		
Wellfield contamination								X	X		X	X	X	X						
Power failure (outages)					X	X		X	X	X	X	X	X	X						
Unexploded military ordnances											X	X				X			X	
Societal Hazards																				
Civil disturbances						X					X	X	X	X			X			
Terrorism and sabotage					X	X		X		X	X	X	X			X	X	X	X	
Immigration crises											X	X	X	X						
Societal alienation											X	X								
Substance abuse											X	X								
Economic collapses											X	X	X	X						

INSERT FIGURE 4.1

Table 4.2. Total exposure by structure type, St. Lucie County, 2004.

Rank	Structure Type	Exposure
1.	Single Family	$4,012,413,440
2.	Condominia	$1,120,845,440
3.	Orchard, Groves, Citrus	$555,168,768
4.	Grazing Land Soil Class I	$221,906,272
5.	Public Schools	$130,951,904

Source: Florida Department of Community Affairs, 2004a.

In terms of natural hazards, there is very little if anything that can be done to change the frequency with which they produce impacts in a community. Mitigation planning relative to natural hazards must therefore focus on reducing the community's vulnerability or exposure. In terms of technological and societal hazards, the most cost effective type of mitigation is to limit or reduce the frequency with which such hazards actually occur.

At the time of publication, detailed risk assessments were only available for the flood, hurricane, tornado, sinkhole, and wildland fire hazards. Data sources used to prepare the hazard vulnerability and risk assessments are documented in **Appendix D**.

4.1 NATURAL HAZARDS

St. Lucie County is susceptible to a number of natural hazards with the potential to cause extensive damage within the community. The cost of responding to and recovering from these disasters has proven to be significant. Planning for these events before they occur can significantly reduce costs in the future. This subsection will now discuss those hazards in more detail below.

Section 4.1.9.4 identifies vulnerability for each natural hazard by incorporated jurisdiction and population centers. Two of the hazards, seismic hazards and muck fires, are identified in light of the requirements FEMA has set for local mitigation plans; however, neither hazard has relevance in St. Lucie County. A brief synopsis provides a general description of the vulnerability of structures by hazard type that occur in St. Lucie County.

Flooding. There are a number of areas within the City of Fort Pierce that experience flooding. A number of them are limited to intersections. These occur for the most part in single family residential areas. Significant flooding is also experienced in three unincorporated areas, White City, Lakewood Park, and Indian River Estates. All three are primarily single family residential neighborhoods.

Hurricane/Tropical Storm. Hurricanes and tropical storms are major rain and wind events that affect the entire County. However, unique to hurricanes is surge. The St. Lucie County mainland is protected by Hutchinson Island, a barrier island extending the length of St. Lucie County. Most of the island is under the jurisdiction of St. Lucie County; although, a portion of the island, the area south of the St. Lucie Inlet, is within the City of Fort Pierce. Nearly all of the high rise residential development is located on Hutchinson Island; much of it is subject to the effects of storm surge. In addition, areas along the west shore of the Intracoastal Waterway are also subject to surge, but not to the degree of the areas that are adjacent to the Atlantic Ocean. However, in 2004, the effects of storm surge

resulting from Hurricanes Frances and Jeanne caused significant damage to many commercial structures in the downtown area. This included the destruction of the City's marina and damage to structures in the waterfront redevelopment area. Areas outside downtown Fort Pierce contain, for the most part, single family structures with a scattering of shopping centers along the major roadways.

Tornado. Areas within the County designated as having moderate vulnerability to tornadoes are primarily low density, single family home areas. However, there are a couple of areas, North Hutchinson Island and downtown Ft. Pierce, that consist of higher density development, primarily 20-story high rise condominiums and commercial structures.

Severe Thunderstorm/Lightning. In general, the entire county is at risk to severe thunderstorms and lightning. As indicated in **Section 4.1.9.4**, the City of Fort Pierce and City of Port St. Lucie have a high vulnerability to this hazard. Both communities for the most part, consist of low density residential neighborhoods comprised of single family structures. However, there have been some non-residential structures that have been damaged in the past, such as the St. Lucie County International Airport.

Drought. While most areas in the County exhibit low vulnerability to drought, the West County area has a moderate vulnerability to drought. The western areas of the County are primarily agricultural, either planted in citrus or serving as open range for cattle. Few structures exist in this area, ones that do are either homes associated with farms or agricultural structures such as barns.

Temperature Extremes. This hazard can have a dramatic effect on the agricultural industry in St. Lucie County. The citrus industry is affected by both heat/drought and freezing conditions. These western areas of the County consist of scattered farm residences, farmworker housing, and agricultural barns. Temperature extremes also impact the senior population since the elderly have less tolerance to temperature extremes than the general population. The elderly (retirees) live in a mix of housing, many in condominiums and others in single family structures.

Agricultural Pests and Disease. Again, the western areas of the County are primarily adversely impacted by agricultural pests and disease. As described above, this area of the County consists primarily of scattered farm residences, farmworker housing, and agricultural barns.

Wildland/Urban Interface Zone. As documented in **Section 4.1.9.4**, there are three areas in the County vulnerable to wildland fire, City of Port St. Lucie, Lakewood Park, and West County area. Both the City and Lakewood Park are predominantly single family, one-story homes. Single family homes on farms, barns, and farmworker housing characterize the West County area.

Soil/Beach Erosion. Beach erosion along the Atlantic Ocean has long been a major issue facing St. Lucie County. Critical erosion occurs primarily on South Hutchinson Island (see **Section 4.1.9.4**). One place is at the St. Lucie Inlet in Fort Pierce. This area is a mix of residential-type structures, some small two- and three-story condominiums, with most of the structures being single family homes with a sprinkling of duplexes. The other area where significant erosion has occurred is south of the Florida Power & Light power plant, extending south to the St. Lucie/Martin County line. This portion of the island is fairly

narrow and contains many high rise residential condominium structures that were permitted in the 1970's and 80's.

Epidemic. Not surprisingly, vulnerability to epidemics closely mirrors the County's major population centers. With the exception of the commercial development in downtown Fort Pierce and along the major roadways in the City of Port St. Lucie, White City, and Lakewood Park, most of the structures are detached single family homes.

4.1.1. Floods

4.1.1.1 Hazard Identification

In St. Lucie County, several variations of flood hazards occur due to the different effects of severe thunderstorms, hurricanes, seasonal rains, and other weather-related conditions. For the majority of the County, the primary causes of flooding are hurricanes or tropical storms. However, the County's low-lying topography, combined with its subtropical climate, make it vulnerable to riverine as well as storm associated flooding.

Flooding in St. Lucie County results from one or a combination of both of the following meteorological events:

1) Tidal surge associated with northeasters, hurricanes, and tropical storms; and
2) Overflow from streams and swamps associated with rain runoff.

When intense rainfall events occur, streams and drainage ditches tend to reach peak flood flow concurrently with tidal water conditions associated with coastal storm surge. This greatly increases the probability of flooding in the low-lying areas of the coastal zone. Areas along the Indian River are particularly susceptible to flooding under these conditions. The most flood prone areas in the eastern portion of the County feature poorly drained soils, a high water table, and relatively flat terrain, all of which contribute to flooding problems. Flat terrain and heavily wooded areas aggravate flood problems by preventing rapid drainage in some areas.

Riverine flooding occurs when the flow of rainwater runoff exceeds the carrying capacities of the natural drainage systems. During extended periods of heavy rainfall, certain low-lying neighborhoods within the County are subject to considerable flood damage and isolation caused by the inability of natural and mechanical drainage systems to effectively remove the water. Heavy rainfalls can cause considerable damage to County infrastructure including: roadbeds, bridges, drainage systems, and the water supply.

The buildup of uncontrolled sediment contributes to the problem of inadequate drainage in natural and mechanical drainage systems. When a storm produces an overwhelming amount of stormwater runoff, the accumulation of loose sediment causes flooding by clogging the drainage systems.

In comparison to riverine flooding, coastal flooding is usually the result of a severe weather system such as a tropical storm or hurricane. The damaging effects of coastal floods are caused by a combination of storm surge, wind, rain, erosion, and battering by debris. All coastal property and inhabitants are subject to severe damage and loss of life resulting from floods caused by hurricane-associated storm surge. Some coastal

properties, road arteries, and bridge approaches are subject to severe flooding caused by rare astronomical tides as well.

Frequencies from flooding associated with rain events other than tropical storms and hurricanes are more difficult to estimate. Eastern Florida shows an annual dry cycle stretching from early November through mid-May. During this part of the year, monthly rainfall rarely exceeds 3.5 to 4.0 inches per month. The wet season, beginning in mid-May and running through late October, shows monthly rainfall levels in the area to be between 6.0 to 8.5 inches. Heaviest rainfall usually occurs in June and September. In St. Lucie County, the eastern or coastal section of the County receives more rain than the western section. This rainfall pattern coupled with the hurricane season (June through November) makes St. Lucie County particularly vulnerable to flooding associated with tropical storms and hurricanes because they typically occur when the water table is high and the ground is saturated.

Historical Flooding Events. Hurricane of September 1903. This hurricane made landfall near West Palm Beach on 11 September 1903 and exited the state near Tampa Bay on 12 September. Maximum recorded winds were only 78 mph; however, 14 deaths were attributed to this storm, and one ship was wrecked near Jupiter, Florida. Damages specific to St. Lucie County are not recorded.

Hurricane of July 1926. A Category 1 hurricane with winds of 90 mph made landfall near Jupiter, Florida on the morning of 27 July 1926. This hurricane circled inland along Florida's east coast and exited the State at the Florida-Georgia border on 28 July; by that time it had been downgraded to a tropical storm. St. Lucie County experienced strong winds and flooding.

Hurricane of September 1928. This hurricane made Florida landfall near the City of Palm Beach as a strong Category 4 hurricane with one of the lowest barometric pressures ever recorded in this area (928.9 millibars [27.43 inches]). This was the fifth most intense hurricane ever to make landfall in U.S. territory. It reached Lake Okeechobee with very little decrease in intensity and moved across the lake's northern shoreline. This sent a massive storm surge southward, flooding lower areas on the southern and western edge of the lake. In all, 1,836 people were killed and another 1,870 injured during this storm's passage. Nearly all the loss of life was in the Okeechobee area and was caused by overflowing of the lake along its southwestern shore. While all central Florida was affected by this killer storm, St. Lucie County experienced mainly wind damage and flooding from the associated rains.

Hurricane of September 1933. This major Category 3 hurricane passed over Jupiter Island with a barometric pressure of 947.5 millibars (27.98 in). Maximum winds recorded were 127 mph. There was considerable property damage all along the Florida east coast, mostly in the area between Jupiter and Fort Pierce. Severe waterfront damage was reported in Stuart. Moderate damage was reported from St. Lucie County, including considerable flooding in the lower areas of the County.

Hurricane of August 1939. This weak hurricane made landfall near Fort Pierce on the morning of 11 August and crossed the state in a northwesterly direction, exiting to the Gulf of Mexico near Crystal River on 12 August. Minimal damage and flooding were experienced in St. Lucie County.

Hurricane of June 1945. This hurricane entered Florida from the Gulf of Mexico, making landfall near Cedar Key and moving east-northeast to exit the state near St. Augustine. St. Lucie County received rain and wind from this storm.

Flood of Fall 1947. This flood is generally considered to be the most severe flood recorded in southern Florida. Heavy rainfall, including the rains from two hurricanes, occurred over a period of 5 months. Many parts of St. Lucie County were flooded for months, and there was extensive damage to dairy pastures and agriculture in general. Such a flooding event would be much more significant today because of the increase in land development.

Hurricane of August 1949. This Category 3/Category 4 hurricane made landfall in Florida between Delray and Palm Beach with winds of 130 mph and a barometric pressure of 954.0 millibars (28.17 inches). As it moved inland, its center passed over the northern part of Lake Okeechobee. The levees in that area held, and no major flooding occurred. Damages in Florida were estimated at $45 million. Tides of 11.3 feet at Fort Pierce, 8.5 feet at Stuart, and 6.9 feet at Lake Worth were reported. Stuart sustained severe damage in this storm. Statewide, over 500 people lost their homes as a result of this storm.

Flood of October 1953. As in 1947, this flood was preceded by 5 months of heavier than normal rainfall, which included a tropical storm in October. June through October rainfall was approximately 48 inches. Damage was heaviest in the beef cattle industry, with extensive losses of improved pasture land, which required supplemental feeding of cattle. Vegetable growers and dairy farmers also suffered significant losses as a result of this flood.

Flood of June 1959. Heavy rains across most of central Florida associated with and following a tropical depression, caused extensive flooding in poorly drained and low-lying agricultural areas and some residential sections. Considerable pasture land and some citrus land in St. Lucie County was inundated. Some highways also sustained damage from these flood waters.

Hurricane (Donna) of September 1960. Hurricane Donna was the sixth most intense U.S. hurricane at landfall. This storm crossed the Florida Keys into the Gulf of Mexico and then turned back toward the northeast and struck the Florida mainland just south of Naples. It then turned north moved across Ft. Meyers, where it turned again to the northeast, moved across the state, and exited Florida just north of Daytona Beach. Rainfall ranged from 5 to 10 inches in an 80- to 100-mile wide belt following this storm's track. Lakes and streams overflowed their banks and forced the evacuation of many homes throughout central Florida. The high water closed many roads, including portions of Route 60 in Indian River County and Routes 78 and 70 in St. Lucie County, and inundated considerable agricultural land. At least 12 people were killed statewide, and more than 1,794 people were injured.

Hurricane (Agnes) of June 1972. Hurricane Agnes moved through the Gulf of Mexico off Florida's west coast. While it never struck the central Florida mainland, it spawned the worst severe weather outbreak in Florida history. The outer rainbands covered virtually the entire peninsula and spawned numerous tornadoes. There were 6 people killed and 40 injured in Okeechobee, 1 killed and 7 injured in LaBelle, 40 injured in Big Coppit Key, 2 injured in Bassinger, 3 injured in Haines City, 4 injured in Crystal Springs, 11 injured

in Malabar, and 12 injured in Cape Canaveral. Most of those injured lived in manufactured housing. Damage estimates totaled $5 million to public property and $36 million to private property.

Hurricane (David) of September 1979. Hurricane David moved over the Dominican Republic with winds of 165 mph, but weakened drastically before reaching Florida's east coast. David raked the eastern coast line of Florida from Palm Beach County northward. Officially classed as a minimal hurricane, its strongest winds were offshore when it made landfall approximately 20 miles south of Melbourne. Tides were 3 to 5 feet above normal along the eye track and 1 to 2 feet above normal elsewhere along the Florida east coast. Light to moderate erosion was reported along the St. Lucie County coastline. Storm rainfall was quite variable from location to location. Totals generally ranged from 6 to 9 inches, but some stations reported as much as 11 inches during the storm's passage.

The Great Thanksgiving Holiday East Coast Storm of 1984. A strong low pressure system developed east of Florida, and coupled with a high pressure system to the northwest produced an extremely strong pressure gradient leading to gale force winds and high seas along the entire Florida east coast. Heavy rains fell over most of central Florida, and this surface runoff, coupled with the wind packing of seawater along the coast resulted in extensive coastal erosion and flooding. Many coastal structures were damaged or destroyed including several in St. Lucie County.

Flood of September 1985. Between 20 and 24 September 1985, approximately 14 inches of rain fell in the City of Fort Pierce, 7 inches during a 7-hour period over the night of 20 September. Flooding of streets and houses was widespread, especially in the central areas around Five Mile Creek and Ten Mile Creek. Large numbers of people were evacuated from their homes. Flood elevations during this storm approximated the hundred year levels and were greater in many locations.

Flood of January 1989. On 21 and 22 January 1989, St. Lucie County experienced a gale with subtropical storm characteristics that caused extensive beach erosion and dropped 4 to 6 inches of rain across the County. This caused ponding of water in low-lying areas. Several homes were damaged. Road flooding caused several accidents.

Hurricane Andrew of August of 1992. Andrew was a small and ferocious Cape Verde hurricane that wrought unprecedented economic devastation along a path through the northwestern Bahamas, the southern Florida peninsula, and south-central Louisiana. Damage in the U.S. is estimated to be near 25 billion, making Andrew the most expensive natural disaster in U.S. history. The tropical cyclone struck southern Dade County, Florida, especially hard, with violent winds and storm surges characteristic of a Category 4 hurricane on the Saffir/Simpson Hurricane Scale, and with a central pressure (922 millibars) that is the third lowest this century for a hurricane at landfall in the U.S. In Dade County alone, the forces of Andrew resulted in 15 deaths and up to one-quarter million people left temporarily homeless. An additional 25 lives were lost in Dade County from the indirect effects of Andrew. The direct loss of life seems remarkably low considering the destruction caused by this hurricane.

Tropical Storm (Gordon) of October 1994. Following a similar track to Hurricane Donna of 1960, Tropical Storm Gordon crossed the Florida Keys into the Gulf of Mexico and then turned back to the northeast and struck the mainland Florida peninsula near Fort Myers on 13 October. It moved across the state and exited Florida into the Atlantic just north of

Vero Beach on 16 October. Although the maximum sustained winds reported from Gordon were only 53 mph, the storm caused 8 deaths and 43 injuries.

St. Lucie County had experienced a period of extensive growth during the 1970's and 1980's. Most of this growth took place in the form of residential and commercial land development in the eastern and southern portion of the County close to the Intracoastal Waterway and St. Lucie River. The rain event associated with Tropical Storm Gordon in October 1994 was the most significant rain event to occur after this period of development. Essentially, the County received 17+ inches of rain over a 3-day period. Rainfall was not evenly dispersed over the whole County.

Statewide, damages associated with Gordon totaled over $400 million. Agricultural interest sustained $275 million in damages primarily from the widespread flooding. Vegetable and citrus crops were damaged particularly hard. Exacerbating the flooding associated with Tropical Storm Gordon was the fact that prior to October 1994 St. Lucie County had a very wet year. Rainfall recorded through September of that year had reached 74 inches before the Gordon event occurred. Altogether, St. Lucie County received approximately 100 inches of rain in 1994, making that year the wettest year since 1913.

Hurricane (Erin) of August 1995. Hurricane Erin made landfall near the Sebastian Inlet on 2 August 1995. Brevard County bore the brunt of this storm with sustained winds of approximately 100 mph. While St. Lucie County was spared most of the damages associated with Erin's wind field, heavy rains of up to 8 inches in 3 hours were associated with the backside of this storm, and flooding occurred in low-lying areas along the County's northern edge.

The Unamed Storm of October 1995. Almost exactly 1 year after the Tropical Storm Gordon flooding incident in 1994, a stalled frontal system dropped over 15 inches of rain on St. Lucie County over a period of 39 hours. In the intervening year between these two events, some communities in the southern part of St. Lucie County had conducted a number of mitigation projects and initiatives designed to improve drainage and prevent flooding in known flood prone areas.

Tropical Storm (Mitch) of October 1998. Hurricane Mitch was one of the deadliest storms in Atlantic history. By the time it reached Florida on 4 and 5 November 1998, it had been downgraded to a tropical storm. St. Lucie County received significant rains from this storm, which passed almost directly over the southern part of the County. Extensive agricultural damage was reported throughout western St. Lucie County, and significant flooding again occurred in the Port St. Lucie area.

Hurricane Floyd of September 1999. This large Category 4 storm moved parallel to the southeast Florida coast. While the storm did not make landfall in Florida, it did impact Florida coastal communities. Peak gusts associated with the storm were estimated to be as high as 155 mph. Fifty-seven deaths and $1.3 billion in insured losses were attributed to the storm. Readings taken in Fort Pierce indicate that sustained winds were 33 mph, and peak wind gusts were up to 49 mph. The City of Fort Pierce experienced flooding and property damage during this event. The City of Port St. Lucie activated a special needs shelter and was federally declared. Damages in the City were estimated around $100,000.

Hurricane Irene of October 1999. This Category 2 hurricane made landfall in the Keys and moved north, heading back out to sea at the Jupiter Inlet. Insured property losses

in Dade, Broward, and Palm Beach counties exceeded $600 million. Total insured losses from the rest of the state totaled $200 million. Over 700,000 customers were left without power following the storm. Readings taken in Fort Pierce indicate that sustained winds were 42 mph, and peak wind gusts were up to 51 mph. The City of Fort Pierce sustained both flooding and wind damage during Irene. The FPUA incurred over $1.3 million in damage to a 12-inch water main on South AIA and a 36-inch sewer line at the wastewater treatment plant. The City of Port St. Lucie experienced flooding citywide and was federally declared with an estimated $100,000 in damage.

Tropical Storm Leslie of October of 2000. This tropical storm mainly impacted Miami-Dade and Broward counties, causing $700 million in damage, $500 million of which were agricultural crop losses.

Hurricane Gabrielle of September 2001. This hurricane made landfall on the west coast of Florida and traveled northeast across the state. The storm spawned a total of 18 tornadoes in the state. Insured losses associated with this storm totaled $115 million. Total damage is estimated to be nearly $230 million. Readings taken in Fort Pierce indicate that sustained winds reached 26 mph, and peak wind gusts were up to 37 mph. Rain meters in Fort Pierce indicated 1.97 inches of rainfall during this period.

The City of Port St. Lucie, directed by the City Council, has installed swale liners and supported the maintenance of roads that experience chronic flooding. The City also has a proactive drainage management program to maintain drainage basins.

4.1.1.2 Vulnerability Assessment

Flooding events can have the following potential impacts within a community:

- Excessive water;
- Soil/beach erosion;
- Electric power outage;
- Surface and air transportation disruption;
- Navigable waterway impairment;
- Potable water system loss or disruption;
- Sewer system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services;
- Agricultural/fisheries damage;
- Damage to critical environmental resources;
- Damage to identified historical resources;
- Fire;
- Toxic releases; and
- Stormwater drainage impairment.

In the Coastal Management Element of the Comprehensive Plan, St. Lucie County identified several areas subject to coastal and riverine flooding.

Hutchinson Island. In general, almost all of North Hutchinson Island would be vulnerable to a Category 1 storm, except for State Road A1A, which would be impacted by a Category 2 storm. On South Hutchinson Island, all of the island would be vulnerable to a

Category 1 storm including State Road A1A, except for discontinuous strands, which would be impacted by Category 2 storms, probably near higher dune elevations.

North of Fort Pierce. A majority of the land area between U.S. Highway 1 and the Indian River Lagoon would be vulnerable to a Category 1 storm. Each successively greater storm would extend the impact area further inland. U.S. Highway 1 would be the western limit from the area near St. Lucie Village south to Taylor Creek. The Category 3 storm also would extend inland several thousand feet along both sides of Taylor Creek, covering an area of less than one square mile (part of which would be in Fort Pierce).

South of Fort Pierce. Probably due to elevations, it would take storm-surges from Category 4 and 5 storm events to reach and cover Indian River Drive, respectively, for approximately the first 4 to 5 miles stretch south of the City. Apparently, the even greater elevation for the next several miles south is such that no storm surge from any category storm event would rise up the bluff. However, in the last few miles, it would only take a Category 1 storm surge to reach and cover the road, and successively greater storm surges would extend inland up to 1,500 feet.

Mainland Along the River. There would be some surge flowing inland along the North Fork of the St. Lucie River up to or near the 10-foot contour (National Geodetic Vertical Datum [NGVD] elevation).

NFIP. In response to mounting losses from flooding nationwide, the U.S. Congress initiated the NFIP in 1968. The program is administered through FEMA. Under this program, FEMA produces Flood Insurance Rate Maps (FIRMs), which show areas subject to various levels of flooding under different conditions (see **Figure 4.2**; see **Table 4.3** for key for figure). This flood risk information is based on historic, meteorological, hydrologic, and hydraulic data, as well as open-space conditions, flood control works, and development. The FIRMs for St. Lucie County were updated in July 1998. Flood plains designated on the FIRMs are based on the 1% annual flood chance or the 100-year flood event. The 500-year flood event with a 0.2% annual chance of occurrence is used to designate other areas of the community, which may have some vulnerability to flooding.

Table 4.3. Key for **Figure 4.2**.

Zone	Description
A	An area inundated by 1% annual chance flooding, for which no Base Flood Elevations (BFEs) have been determined.
AE	An area inundated by 1% annual chance flooding, for which BFEs have been determined.
AH	An area inundated by 1% annual chance flooding (usually an area of ponding), for which BFEs have been determined; flood depths range from 1 to 3 feet.
AO	An area inundated by 1% annual chance flooding, for which average depths and velocities have been determined; flood depths range from 1 to 3 feet.
UNDES	A body of water, such as a pond, lake, ocean, etc., located within a community's jurisdictional limits, that has no defined hazard.
VE	An area inundated by 1% annual chance flooding with velocity hazard (wave action); no BFEs have been determined.
X	An area that is determined to be outside the 1% and 0.2% annual chance flood plains.
X500	An area inundated by 0.2% annual chance flooding; an area inundated by 1% annual chance flooding with average depths of less than 1 foot or with drainage areas of less than 1 square mile; or an area protected by levees for 1% annual chance flooding.

Insert Figure 4.2

St. Lucie County's Flood Insurance Study was conducted in 1991 (FEMA, 1991). In that report, water discharge rates were determined for several flood sources throughout the County. **Table 4.4** lists the peak discharge in cubic feet per second (cfs) for the identified flood sources.

Table 4.4. Flooding source discharge, St. Lucie County, 1991.

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharge (cfs)			
		10-Year	50-Year	100-Year	500-Year
North Fork of St. Lucie River					
At Kitching Cove	260.5	8,960	14,370	17,580	25,580
At Mud Cove	150.3	4,560	7,420	9,090	13,520
At Prima Vista Blvd	117.0	4,620	7,490	9,150	13,490
Ten Mile Creek					
At Confluence of Five Mile Creek	87.8	3,940	6,410	7,820	11,560
At Sunshine State Parkway	61.4	3,070	5,010	6,110	9,010
At 11-Mile Road	56.3	2,890	4,710	5,750	8,470
At McCarty Road	36.3	2,010	3,300	4,020	5,5940
Ten Mile Creek Tributary					
At mouth	17.2	1,370	2,254	2,733	4,000
Taylor Creek					
At Canal C-1 (Fort Pierce Farms)	4.3	510	848	1,024	1,489
At St. Lucie Blvd	3.5	412	690	833	1,214
At Dirt Road	1.5	231	390	470	689
Moores Creek					
At mouth	3.4	786	1,276	1,536	2,186
At 17th Street	2.4	522	858	1,034	1,497
At 25th Street	1.8	450	741	890	1,283
Five Mile Creek					
At confluence with North Fork of St. Lucie River	11.4	1,325	2,178	2,634	3,808
At Edwards Road	9.5	1,182	1,944	2,634	3,808
At State Road 70	4.9	798	1,320	1,591	2,289
At Whiteway Dairy Road	3.4	626	1,054	1,268	1,823
At Peterson Road	1.8	401	670	805	1,160
Platts Branch					
At Sunrise Blvd.	1.6	324	537	645	925
At Oleander Blvd	4.4	281	470	564	809
At U.S. Highway 1	0.8	174	282	350	507
Blakeslee Creek					
At confluence with North Fork of St. Lucie River	*	2,163	N/A	3,405	
About 5,500 feet upstream from confluence	0.8	232	N/A	463	

Table 4.4. (Continued).

Flooding Source and Location	Drainage Area (sq. miles)	Peak Discharge (cfs)			
		10-Year	50-Year	100-Year	500-Year
Blakeslee Creek Tributary					
About 1,500 feet upstream of mouth	*	306	N/A	610	
Winters Creek					
At confluence with North Fork of St. Lucie River	*	1,185	N/A	1,865	N/A

* Total drainage area for Blakeslee Creek, Blakeslee Creek Tributary, and Winters Creek is approximately 18.6 square miles.

Source: Federal Emergency Management Agency, 1991.

According to LBFH, Inc. District Engineer for the Fort Pierce Farms Water Control District, 10 Mile Creek contains excess vegetation, which creates obstruction to flow as controlled by the District's Varn Structure at Gordy Road. There have been no recent damages; however, the creek has the potential for large-scale effects and damages during extreme events.

In addition to the FIRMs, there are two numerical models that predict the effects of storm surge in St. Lucie County. The older model, developed by NOAA, is called the Sea, Lake and Overland Surges from Hurricanes (SLOSH) model. **Table 4.5** estimates the potential storm surge water height in feet above NGVD 88 for specific locations within the County based on the SLOSH model.

Table 4.5. Potential storm surge water height in feet above National Geodetic Vertical Datum 88 for specific locations in St. Lucie County.*

Location	Storm Strength		
	Category 1	Category 3	Category 5
North Hutchinson Island across from Link Port	6.9	9.5	13.6
North Hutchinson Island at Queen's Cove	6.8	9.2	13.1
Fort Pierce Inlet	6.0	9.1	12.9
West side of the Indian River at the Indian River and St. Lucie County Line	5.6	8.8	14.2
West side of the Indian River east of Indrio Road	5.0	9.0	13.7
St. Lucie Village	5.0	9.0	13.2
Port of Fort Pierce	5.8	9.1	13.0
Seaway Drive Bridge - west side	5.8	9.1	13.0
A1A on South Hutchinson Island at Jennings Cove	6.8	9.2	12.9
West bank of the Indian River north of the Midway Boulevard and River Road intersection	4.9	10.0	13.6
North Fork of the St. Lucie River at White City	5.9	6.9	7.6
North Fork of the St. Lucie River south of Prima Vista Boulevard	5.4	6.4	7.0

* Based on Sea, Lake and Overland Surges from Hurricanes model projections.

Figure 4.3 shows the storm Category 3 Surge Zone as predicted by the TAOS model for St. Lucie County. According to the Florida Assessment of Coastal Trends, 52% of residents in St. Lucie County live in the Category 1 Surge Zone (FDEP, 2000).

The State of Florida is able to model hurricane storm surge as well as wind and property damage. This model, know as The Arbiter Of Storms (TAOS) model, predicts storm surge height and wind field intensity for Category 1 through Category 5 hurricanes. **Figure 4.4** shows St. Lucie County's storm surge vulnerability in a Category 5 hurricane based on the TAOS model. When evaluating these data, it is important to remember the TAOS projections are based on multiple model runs combining all the worst possible hurricane paths and strikes. Consequently, the TAOS projections presented here must be considered the Maximum of Maximums (MOM), or absolute worst-case scenario.

Documented Repetitive Losses. For this analysis, documented repetitive losses are restricted to the narrow FEMA definition and represent only those properties whose owners have made more than one claim on their flood insurance policies as recorded by the NFIP.

As of December 2003, the unincorporated area of St. Lucie County showed a total of 16 repetitive loss properties with a total of 51 repetitive losses and a Community Rating System (CRS) rating of 7. The City of Fort Pierce had four repetitive loss properties with a total of eight repetitive losses and a CRS rating of 9. There were no repetitive loss properties reported from the Town of St. Lucie Village, and at the time, the community was not a member of CRS. The City of Port St. Lucie showed a total of 1 repetitive loss property with a total of 2 repetitive losses, and a CRS rating of 8. **Table 4.6** documents the number of repetitive flood loss properties by jurisdiction.

Identified Problem Areas. The St. Lucie County Public Works Department has identified the following areas in St. Lucie County as flood prone areas due to storm surge:

- The entire North Fork of the St. Lucie River;
- Ten Mile Creek;
- Five Mile Creek;
- North Hutchinson Island and North A-1-A;
- South Hutchinson Island and South A-1-A;
- South Beach at Jetty Park;
- The North Savannas;
- The South Savannas;
- Hidden River Estates Subdivision;
- River Park Subdivision;
- Old Dixie Highway;
- Nuclear Power Plant on South Hutchinson Island; and
- Outfall Structures at the Lakewood Park Subdivision.

Roads that experience chronic flooding are addressed in St. Lucie County's Stormwater Master Plan and the Comprehensive Growth Management Plan. The County addresses the issue of maintaining drainage basins in the Stormwater Master Plan and Road and Bridge management plans.

INSERT FIGURE 4.3

INSERT FIGURE 4.4

Table 4.6. Repetitive loss properties for St. Lucie County and incorporated areas.*

Community No.	Community Name	No. of Repetitive Loss Properties	No. of Claimed Repetitive Losses	Total Building Payment	Total Content Payment	CRS Rating
120285	St. Lucie County	16	51	$609,194.38	$267,618.55	7
120286	City of Fort Pierce	4	8	N/A	N/A	9
120287	City of Port St. Lucie	1	2	$6,710.79	$6,900.70	8
120288	Town of St. Lucie Village	0	0	Community not in CRS program		

* Based on the Federal Emergency Management Agency's 1998 Florida Repetitive Loss List and 15 December 1998 data provided by Danny Hinson, National Flood Insurance Program/CRS Insurance Service Office, Inc.

CRS = Community Rating System.

N/A = not available.

St. Lucie County has identified 48 specific areas within the unincorporated portion of the County where storm water drainage is a known problem. Identified flood prone roadways consist of the following:

In the Indian River Estates area

- Easy Street;
- Savannah Street;
- Howard Street;
- Bradley Streeet;
- Myrtle Drive;
- Seagrape Drive;
- Palm Drive;
- Birch Drive;
- Hickory Drive;
- Sunset Drive;
- Raintree Trail;
- Tangelo Drive;
- Spruce Drive;
- Cassia Drive;
- Bamboo Drive;
- Balsam Drive;
- Papaya Drive; and
- Yucca Drive.

In the White City area

- Citrus Avenue;
- Oleander Avenue;
- Osceola Drive;
- Seminole Drive;
- Coral Street;
- Echo Street;
- Saeger Avenue;
- Flood Road;
- Buckeye Drive;
- Gopher Ridge Road;
- Fleetwood Lane;
- Kingswood Lane; and
- Driftwood Lane.

Other unincorporated areas

- Bell Avenue at South 25th Street;
- Lennard Road at Walton Road;
- Deerwood Lane; and
- Rosewood Lane.

Within the City of Fort Pierce, the following areas have been identified as flood prone:

- Oleander Boulevard and the streets east to U.S. Highway 1 between Georgia Avenue and Emil Drive;
- South 15th Street;
- South 16th Street;
- South 3rd Avenue;
- Shamrock Road;
- Kelly Court;
- Hispana Avenue;
- The intersection of Wyoming Avenue and South 13th Street;
- The intersection of 25th Street and Virginia Avenue;
- The intersection of South 33rd Street and Okeechobee Road;
- South 33rd Street between Dairy Road and Orange Avenue;
- The intersection of South 10th Street and Georgia Avenue;
- The intersection of South 10th Street and Florida Avenue;
- The intersection of South 10th Street and Delaware Avenue;
- The intersection of Delaware Avenue and Court Street;
- The intersection of Delaware Avenue and South 7th Street;
- The intersection of South 7th Street and Georgia Avenue;
- The intersection of South 6th Street and Georgia Avenue;
- The intersection of South 5th Street and Florida Avenue;
- The intersection of South 7th Street and Boston Avenue;
- The intersection of South 6th Street and Citrus Avenue;
- The intersection of South 5th Street and Boston Avenue;
- The intersection of South 5th Street and Orange Avenue;
- The intersection of 9th Street and Avenue D;
- The intersection of Means Court and Avenue D;
- The intersection of 13th Street and Avenue D;
- The intersection of Indian River Drive and Terminal Drive;
- Indian River Drive from 2nd Street to Seaway Drive;
- The intersection of 13th Street and Mobiles Terrace;
- The intersection of 18th Street and Avenue I;
- Avenue G from 22nd to 24th Street;
- Avenue I from 22nd to 24th Street;
- Avenue K from North 19th Street to North 24th Street;
- Avenue M from North 19th Street to North 21st Street; and
- The intersection of North 17th Street and Avenue M.

Within the City of Port St. Lucie, the following areas have been identified as flood prone:

- Zullo Street (Section 19);
- South of Section 39;
- Airoso Boulevard and Eyerly Avenue;
- Gatlin Boulevard;
- Westmoreland Boulevard;

- Walton Road (a major evacuation route from Hutchinson Island to I-95); and
- California and Savona Boulevard Intersection.

In addition to these identified flood prone areas, only two pump stations, the Tiffany Pump Station and the Blackwell Pump Station, handle storm water from all of Sections 29, 30, and 40, which encompass the Mid Port area. If either of these pump stations fail, there will be extensive flooding in the Mid Port area.

Flood Water Sources and Frequency of Occurrence. Sources of flood waters in St. Lucie County include

- The Atlantic Ocean;
- The Fort Pierce Inlet;
- The St. Lucie Inlet and North Fork of the St. Lucie River;
- Ten Mile Creek;
- Taylor Creek;
- Moores Creek;
- Five Mile Creek;
- Platts Branch;
- Blakes Lee Creek;
- Winters Creek;
- Canal C-25;
- Canal C-24; and
- Canal C-23.

4.1.1.3 Risk Assessment

Flooding is the single hazard producing the most recurrent impacts in St. Lucie County. All communities within St. Lucie County are vulnerable to both hurricanes and flooding, but they are not all vulnerable for the same reasons. The barrier island communities such as the Fort Pierce beach area and the unincorporated areas of Hutchinson Island obviously are highly vulnerable to both wind and storm surge damage from hurricanes. Due to the presence of the Fort Pierce Inlet, mainland Fort Pierce also is highly vulnerable to flooding associated with hurricane winds and storm surge. Central Port St. Lucie and the White City area are vulnerable to storm surge related flooding along the North Fork of the St. Lucie River and the canals in those areas. Wind packing of the water within the Indian River Lagoon also may produce substantial flooding along low-lying river front property away from the inlet. Communities away from the water such as St. Lucie West, Lakewood Park, and the unincorporated areas north of Fort Pierce along U.S. Highway 1, are more vulnerable to wind damage from hurricanes and flooding associated with rain rather than storm surge.

Flooding other than that associated with storm surge usually results from heavy rainfall events occurring in association with stalled fronts, tropical storms, and occasionally hurricanes. Not all of the area within any given jurisdiction is equally vulnerable to flooding, but all jurisdictions have specific areas where flooding is a recurring problem.

The following risk assessment data for flooding in St. Lucie County are based on data developed for the MEMPHIS model. **Table 4.7** illustrates the number and value of structures in each of the FEMA-identified flood zones. The zone with the highest number of

structures and structure value is the X zone, which is known as the 500-year flood zone. **Table 4.8** describes the definitions of each of the FEMA flood zones.

Table 4.7. Flooding exposure, St. Lucie County, 2004.

Flood Zone	Total Number of Structures	Total Value of Structures	Total Population in Flood Zone
AE	12,338	$1,105,037,440	14,603
X500	2,785	$243,436,368	0
X	65,092	$5,242,612,864	164,211
A	590	$63,665,612	649
VE	1,639	$126,114,592	2,412
UNDES	347	$61,235,168	2,434
AH	2,409	$145,427,232	7,180
OFF FIRM	25	$1,646,847	1,206

Source: Florida Department of Community Affairs, 2004a.

Table 4.8. Federal Emergency Management Agency flood zones.

Zone	Description
A	An area inundated by 1% annual chance flooding, for which no Base Flood Elevations (BFEs) have been determined.
AE	An area inundated by 1% annual chance flooding, for which BFEs have been determined.
AH	An area inundated by 1% annual chance flooding (usually an area of ponding), for which BFEs have been determined; flood depths range from 1 to 3 feet.
ANI	An area not included in mapping.
AO	An area inundated by 1% annual chance flooding, for which average depths and velocities have been determined; flood depths range from 1 to 3 feet.
OFFFIRM	An area located off of the Flood Insurance Rate Map.
UNDES	A body of water, such as a pond, lake, ocean, etc., located within a community's jurisdictional limits that has no defined hazard.
VE	An area inundated by 1% annual chance flooding with velocity hazard (wave action); no BFEs have been determined.
X	An area that is determined to be outside the 1% and 0.2% annual chance flood plains.
X500	An area inundated by 0.2% annual chance flooding; an area inundated by 1% annual chance flooding with average depths of less than 1 foot or with drainage areas of less than 1 square mile; or an area protected by levees for 1% annual chance flooding.

Table 4.9 illustrates the total number and value of structures as well as the population expected to be flooded given certain storm event levels. The following table provides information on structures either subject to wave or current action, flood, or neither.

Table 4.9. Flooding exposure, St. Lucie County, 2004.

Exposure	100-Year Flood	50-Year Flood	25-Year Flood	10-Year Flood
Total Number in Wave/Current	1,216	796	350	0
Total in Flood	12,177	11,614	10,005	8,830
Total in Neither	71,832	72,815	74,870	76,695
Total Value in Wave/Current	$74,993,704	$48,519,472	$15,557,274	0
Total Value in Flood	$1,148,998,528	$1,085,277,952	$950,687,424	$839,527,552
Total Value in Neither	$5,947,187,712	$6,037,379,072	$6,204,940,800	$6,331,675,648
Population in Wave/Current	990	0	0	0
Population in Flood	15,820	16,810	16,810	12,589
Population in Neither	175,885	175,885	175,885	180,106

Source: Florida Department of Community Affairs, 2004a.

Table 4.10 displays the flood exposure associated with the five different hurricane intensities in St. Lucie County. The table provides information on the number and value of structures subject to wave action and flooding.

Table 4.10. Hurricane flood exposure, St. Lucie County, 2004.

Exposure	Category 5	Category 4	Category 3	Category 2	Category 1
Total Number in Wave/Current	15,985	10.323	6,321	1,181	369
Total Number in Flood	42,526	32,593	21,909	11,590	10,164
Total Number in Neither	26,714	42,309	56,995	72,454	74,962
Total Value in Wave/Current	$1,400,671,872	$948,473,792	$583,848,704	$71,159,408	$16,551,156
Total Value in Flood	$3,249,192,960	$2,510,739,456	$1,723,959,936	$1,096,858,240	$968,325,184
Total Value in Neither	$2,521,348,096	$3,711,997,184	$4,863,406,080	$6,001,160,064	$6,186,306,048
Population in Wave/Current	22,996	16,246	3,674	990	0
Population in Flood	109,073	78,004	55,740	15,820	16,810
Population in Neither	60,626	98,445	133,281	175,885	175,885

Source: Florida Department of Community Affairs, 2004a.

The MEMPHIS data provide a calculation that will determine the savings in average annualized loss that can be experienced given 1 foot of flood mitigation. **Table 4.11** illustrates this calculation. The biggest mitigation gains would be mitigation of flood hazards in condominiums and single family houses.

Table 4.11. Mitigation savings by structure type.

Rank	Structure Type	Reduction in Average Annualized Loss
1.	Condominia	$11,115,624
2.	Single Family	$9,750,788
3.	Orchard, Groves, Citrus	$407,012
4.	Mobile Homes	$151,731
5.	Multi-Family Housing (<10 units)	$79,762

Source: Florida Department of Community Affairs, 2004a.

4.1.2 Hurricanes/Tropical Storms

4.1.2.1 Hazard Identification

Hurricanes are tropical cyclones with winds that exceed 74 mph and blow counter-clockwise about their centers in the Northern Hemisphere. They are essentially heat pumping mechanisms that transfer the sun's heat energy from the tropical to the temperate and polar regions. This helps to maintain the global heat budget and sustain life. Hurricanes are formed from thunderstorms that form over tropical oceans with surface temperatures warmer than 81° Fahrenheit (26.5° Celsius). The ambient heat in the sea's surface and moisture in the rising air column set up a low pressure center and convective conditions that allow formation of self sustaining circular wind patterns. Under the right conditions, these winds may continue to intensify until they reach hurricane strength. This heat and moisture from the warm ocean water is the energy source of a hurricane. Hurricanes weaken rapidly when deprived of their energy source by traveling over land or entering cooler waters.

When a hurricane threatens the coast, advisories are issued by the National Hurricane Center (NHC). The storm's current location and intensity are described along with its projected path. Advisories are issued at 6-hour intervals: 5:00 A.M., 11:00 A.M., 5:00 P.M., and 11:00 P.M., Eastern Time.

In addition to advisories, the NHC may issue a hurricane watch or warning. A hurricane watch indicates that hurricane conditions are a possibility and may threaten the area within 36 hours. A hurricane warning is issued when winds of at least 74 mph are to be expected in the area within 24 hours.

Advisories and hurricane watches and warnings will frequently refer to the category of the storm. Hurricanes are classified using the Saffir-Simpson scale as follows:

- Category 1: Winds 74 to 95 mph
- Category 2: Winds 96 to 110 mph

- Category 3: Winds 111 to 130 mph
- Category 4: Winds 131 to 155 mph
- Category 5: Winds more than 155 mph

For many years, the risk of significant loss of life and property due to hurricanes seemed small. Many, if not the majority of existing homes and businesses along the U.S. Atlantic and Gulf Coasts were located there during the 1970's and 1980's, a period of relatively inactive hurricane formation. Most of the people currently living and working in coastal areas have never experienced the impact of a major hurricane. Hurricanes that impacted Florida during the 1970's and 80's were infrequent and of relatively low intensity. Homeowners, business interest, and government officials grew to regard hurricane risk as manageable by private insurance supplemented occasionally by Federal disaster funding and subsidized flood insurance. The hurricane risk did not seem sufficient to warrant increased investment in mitigation. Two major hurricanes, Hugo in 1989 and Andrew in 1992, forced a re-evaluation of this risk assessment. While experts sometimes disagree on the annual cost, all sources agree that Hurricane Andrew was the most costly hurricane event ever to affect the U.S. Insured losses from Hurricane Andrew topped $17 billion, and most sources agree that the total cost of Hurricane Andrew exceeded $25 billion.

Florida is the most vulnerable state in the nation to the impacts of hurricanes and tropical storms. South central Florida is particularly exposed to the dangers presented by hurricanes due to its topography. The region is largely a flat, low-lying plain. The potential for property damage and human casualties in St. Lucie County has been increased by the rapid growth of the County over the last few decades, particularly along the coastline. Population risk also has been exacerbated by some complacency due to the recent period of reduced hurricane frequency.

Florida not only has the most people at risk from hurricanes, but it also has the most coastal property exposed to these storms. Over the 20-year period between 1980 and 2000, Florida's population increased by 68%, while the value of insured residential property rose from $178 billion in 1980 to $882 billion in 2002, an increase of 395%. Between 1980 and 1993, the insured value of commercial property rose from $155 billion to $453 billion, an increase of 192%.

Hurricane damage occurs through two means:

1) High winds; and
2) Storm surge.

Generally it is the wind that produces most of the property damage associated with hurricanes, while the greatest threat to life is from flooding and storm surge. Although hurricane winds can exert tremendous pressure against a structure, a large percentage of hurricane damage is caused not from the wind itself, but from flying debris. Tree limbs, signs and sign posts, roof tiles, metal siding, and other loose objects can become airborne missiles that penetrate the outer shells of buildings, destroying their structural integrity and allowing hurricane winds to act against interior walls not designed to withstand such forces. Once a structure's integrity is breached, the driving rains associated with hurricanes can enter the structure and completely destroy its contents.

Hurricane winds are unique in several ways:

1) They are more turbulent than winds in most other types of storms;
2) They are sustained for a longer period of time (several hours) than any other type of atmospheric disturbance;
3) They change slowly in direction, thus they are able to seek out the most critical angle of attack on a given structure; and
4) They generate large quantities of flying debris as the built environment is progressively damaged, thus amplifying their destructive power.

In hurricanes, gusts of wind can be expected to exceed the sustained wind velocity by 25% to 50%. This means a hurricane with sustained winds of 150 mph will have wind gusts exceeding 200 mph. The wind's pressure against a fixed structure increases with the square of the velocity. For example, a 100-mph wind will exert a pressure of approximately 40 pounds per square foot on a flat surface, while a 190-mph wind will exert a force of 122 pounds per square foot on that same structure. In terms of a 4- x 8-foot sheet of plywood nailed over a window, there would be 1,280 pounds of pressure against this sheet in a 100-mph wind, and 3,904 pounds or 1.95 tons of pressure against this sheet in a 190-mph wind.

The external and internal pressures generated against a structure vary greatly with increases in elevation, shapes of buildings, openings in the structures, and the surrounding buildings and terrain. Buildings at ground level experience some reductions in wind forces simply because of the drag exerted by the ground against the lowest levels of the air column. High-rise buildings, particularly those located along the beachfront will receive the full strength of a hurricane's winds on their upper stories. Recent studies estimate that wind speed increases by approximately 37% just 15 feet above ground level.

The wind stream generates uplift as it divides and flows around a structure. The stream following the longest path around a building, generally the path over the roof, speeds up to rejoin the wind streams following shorter paths, generally around the walls. This is the same phenomenon that generates uplift on a aircraft's wing. The roof in effect becomes an airfoil that is attempting to "take off" from the rest of the building. Roof vortexes generally concentrate the wind's uplift force at the corners of a roof. These key points can experience uplift forces two to five times greater than those exerted on other parts of the roof.

Once the envelope of the building has been breached through the loss of a window or door, or because of roof damage, wind pressure on internal surfaces becomes a factor. Openings may cause pressurizing or depressurizing of a building. Pressurizing pushes the walls out, while depressurizing will pull the walls in. Internal pressure coupled with external suction adds to the withdrawal force on sheathing fasteners. Damages from internal pressure fluctuations may range from blowouts of windows and doors to total building collapse due to structural failure.

During Hurricane Andrew, catastrophic failure of one- and two-story wood-frame buildings in residential areas was observed more than catastrophic failures in other types of buildings. Single-family residential construction is particularly vulnerable because less engineering oversight is applied to its design and construction. As opposed to hospitals and public buildings, which are considered "fully engineered," and office and industrial buildings, which are considered "marginally engineered," residential construction is considered "non-engineered." Historically, the bulk of wind damage experienced nationwide has

occurred to residential construction. Fully engineered construction usually performs well in high winds due to the attention given to connections and load paths. **Figure 4.5** graphically illustrates the expected wind fields across St. Lucie County during a Category 3 hurricane based on the TAOS model.

Hurricane winds generate massive quantities of debris that can easily exceed a community's entire solid waste capacity by three times or more. Debris removal is an integral first step toward recovery, and as such, must be a critical concern of all those tasked with emergency management and the restoration of community services.

A storm surge is a large dome of water often 50 to 100 miles wide and rising anywhere from 4 to 5 feet in a Category 1 hurricane up to 20 feet in a Category 5 storm. The storm surge arrives ahead of the storm's actual landfall, and the more intense the hurricane is, the sooner the surge arrives. Water rise can be very rapid, posing a serious threat to those who have waited to evacuate flood prone areas. A storm surge is a wave that has outrun its generating source and become a long period swell. The surge is always highest in the right-front quadrant of the direction the hurricane is moving in. As the storm approaches shore, the greatest storm surge will be to the north of the hurricane eye.

Such a surge of high water topped by waves driven by hurricane force winds can be devastating to coastal regions. The stronger the hurricane and the shallower the offshore water, the higher the surge will be. In addition, if the storm surge arrives at the same time as the high tide, the water height will be even greater. The storm tide is the combination of the storm surge and the normal astronomical tide.

Damage during hurricanes may also result from possible spawned tornadoes, and inland flooding associated with heavy rainfall that usually accompany these storms. Hurricane Andrew, a relatively "dry" hurricane, dumped 10 inches of rain on south Florida and left many buildings extensively water damaged. Rainwater may seep into gaps in roof sheathing and saturate insulation and ceiling drywall, in some cases causing ceilings to collapse.

Crop damage is another powerful effect of hurricanes and tropical storms. Recently, Tropical Storm Mitch dropped as much as 10 inches of rain in some south Florida areas, which resulted in approximately $20 million in crop damage in Palm Beach County alone (Associated Press, 1998). According to the 2001 Florida Statistical Abstract, of St. Lucie County's 366,400 total land acreage, 227,414 acres are farmland. With 62% of its land area being farmed, St. Lucie County is particularly vulnerable to crop damage resulting from the wind and rain from hurricanes and tropical storms.

The Coastal Management Element of the Comprehensive Plan identified the following critical hurricane evacuation links:

- North Bridge;
- South Bridge;
- South A1A;
- Indian River Drive;
- Jensen Beach Bridge (for South Island County residents);
- Indrio Road;

INSERT FIGURE 4.5

- SR 70;
- Walton Road;
- Port St. Lucie Boulevard;
- Prima Vista Boulevard;
- Midway Road;
- Florida Turnpike; and
- I-95.

Historic Events. From 1930 through 1959, a total of 58 hurricanes struck the U.S. mainland; 25 of which were Category 3 or higher (major storms). Between 1960 and 1989, 43 hurricanes struck the U.S. of which only 16 were Category 3 or stronger. Most hurricane experts feel we are entering a period of increased hurricane formation similar to the levels seen in the 1930's and 1940's. Current hurricane risk calculations are complicated by climatic factors suggesting the potential for even greater hurricane frequency and severity in all of the world's hurricane spawning grounds. Since 1995, there have been 33 Atlantic hurricanes, and there were 10 in 1998 alone. Global warming may cause changes in storm frequency and the precipitation rates associated with storms. A modest 0.9º Fahrenheit (0.5º Celsius) increase in the mean global temperature will add 20 days to the annual hurricane season, and increase the chances of a storm making landfall on the U.S. mainland by 33%. The warmer ocean surface also will allow storms to increase in intensity, survive in higher latitudes, and develop storm tracts that could shift farther north, producing more U.S. landfalls.

Currently, an average of 1.6 hurricanes strike the U.S. every year. Severe (Category 4 or 5 on the Saffir-Simpson scale) hurricanes strike the U.S. on the average of one every 5.75 years. Annually, hurricanes are estimated to cause approximately $1.2 billion in damages. The proximity of dense population to the Atlantic Ocean, as well as the generally low coastal elevations, significantly increase the County's vulnerability. The potential for property damage and human casualties in St. Lucie County has increased over the last several decades, primarily because of the rapid growth this County has experienced since 1970, particularly along the vulnerable coastline areas.

Since 1886, 51 storms of hurricane intensity have passed within 125 miles of St. Lucie County. This represents an average of one hurricane every 2 years. The number of direct hits on the southeastern Florida coastline between 1899 and 1999 has been as follows:

- Category 1 Storms (winds 74 to 95 mph) = 5 storms (4% annual probability);
- Category 2 Storms (winds 96 to 110 mph) = 10 storms (10% annual probability);
- Category 3 Storms (winds 111 to 130 mph) = 7 storms (7% annual probability);
- Category 4 Storms (winds 131 to 155 mph) = 6 storms (6% annual probability); and
- Category 5 Storms (>155 mph) = 1 storm (1% annual probability).

The St. Lucie County Health Department provides Special Medical Needs Shelters during the response phase of major hurricane events. The County has addressed the issue of Australian pine susceptibility to heavy rain and wind events in the Land Development Code – Environmental Preservation.

4.1.2.2 Vulnerability Assessment

Hurricane events can have the following potential impacts within a community:

- Excessive wind;
- Excessive water;
- Soil/beach erosion;
- Electric power outage;
- Surface and air transportation disruption;
- Navigable waterway impairment;
- Potable water system loss or disruption;
- Sewer system outage;
- Telecommunications system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services;
- Agricultural/fisheries damage;
- Damage to critical environmental resources;
- Damage to identified historical resources;
- Fire;
- Toxic releases; and
- Stormwater drainage impairment.

Table 4.12 illustrates the expected debris accumulation in St. Lucie County in cubic yards per acre. The St. Lucie County Comprehensive Emergency Management Plan identifies designated debris drop-off locations throughout the County.

Table 4.12. Debris accumulation in St. Lucie County in cubic yards per acre.

Jurisdiction	Tropical Storm	Category 1	Category 2	Category 3	Category 4	Category 5
St. Lucie County	54,871	338,924	1,036,934	2,646,440	6,207,163	20,337,420
Fort Pierce	1,342	9,261	26,576	115,525	408,418	848,515
Port St. Lucie	1,037	6,694	24,056	57,236	119,698	249,443
St. Lucie Village	274	1,851	6,245	14,871	36,143	81,474

Source: The Arbiter of Storms model.

4.1.2.3 Risk Assessment

All communities within St. Lucie County are highly vulnerable to hurricanes, but they are not all vulnerable for the same reasons. The barrier island communities (Hutchinson Island) are obviously highly vulnerable to both wind and storm surge damage from hurricanes. The communities fronting on St. Lucie County's estuaries and rivers are

also highly vulnerable to flooding associated with hurricane winds and storm surge. Communities away from the water may be more vulnerable to wind damage from hurricanes. Inland communities may have less hurricane vulnerability from flooding but more hurricane vulnerability from wind damage due to their older or less substantial type of construction.

Both the City of Fort Pierce and St. Lucie Village are old, historical communities of Florida's east coast. Their age alone makes them particularly vulnerable to hurricane damage. Both cities have old, historically significant structures, whose loss would represent the loss of irreplaceable cultural resources. The age and construction type of much of the housing in Fort Pierce, and to a lesser extent St. Lucie Village, indicate that both communities would be very hard hit by a major storm. The City of Port St. Lucie is located at a greater distance from the ocean, and most of the construction there is relatively recent.

The risk assessment data for hurricanes in St. Lucie County are based on the MEMPHIS model. **Table 4.13** illustrates the total exposure to wind damage for four different event categories.

Table 4.13. Wind damage exposure, St. Lucie County, 2004.

Exposure	100-Year Event	50-Year Event	25-Year Event	10-Year Event
Total Number Moderate Damage	6,676	8	0	0
Total Number Light Damage	78,549	85,217	85,225	22,540
Total Number No Damage	0	0	0	62,685
Total Value Moderate Damage	$579,513,024	$266,317	0	0
Total Value Light Damage	$6,591,734,272	$7,170,982,400	$7,171,248,640	$1,910,658,048
Total Value No Damage	0	0	0	$5,260,524,032
Population Moderate Damage	17,783	0	0	0
Population Light Damage	174,912	192,695	192,695	59,239
Population No Damage	0	0	0	133,456

Source: Florida Department of Community Affairs, 2004a.

Table 4.14 illustrates the total exposure to wind damage for the five hurricane intensity categories.

Table 4.14. Hurricane wind damage exposure, St. Lucie County, 2004.

Exposure	Category 5	Category 4	Category 3	Category 2	Category 1
Total Number Destroyed	53,937	0	0	0	0
Total Number Severely Damaged	30,114	21,800	0	0	0
Total Number Heavy Damage	1,174	58,312	0	0	0
Total Number Moderate Damage	0	5,113	83,938	2,264	0
Total Number Light Damage	0	0	1,287	82,961	85,225
Total Value Destroyed	$4,110,738,944	0	0	0	0
Total Value Severely Damaged	$2,758,868,992	$1,617,078,144	0	0	0
Total Value Heavy Damage	$301,612,704	$4,804,990,464	0	0	0
Total Value Moderate Damage	0	$749,148,928	$6,822,398,464	$240,065,024	0
Total Value Light Damage	0	0	$348,841,952	$6,931,181,056	$7,171,248,640
Population in Destroyed	124,199	0	0	0	0
Population in Severely Damaged	68,496	36,639	0	0	0
Population in Heavy Damage	0	146,824	0	0	0
Population in Moderate Damage	0	9,232	191,616	1,203	0
Population in Light Damage	0	0	1,079	191,489	192,695

Source: Florida Department of Community Affairs, 2004a.

A calculation was made to determine the reduction in wind losses when mitigation is implemented. **Table 4.15** illustrates the reduction in average annual loss when structures are mitigated for an additional 5 miles per hour.

Table 4.15. Wind mitigation savings, St. Lucie County, 2004.

Rank	Structure Type	Reduction in Average Annual Loss
1.	Single Family	$3,837,293
2.	Condominia	$1,255,685
3.	Orchards, Groves, Citrus	$407,012
4.	Grazing Land Soil Class I	$157,461
5.	Mobile Homes	$151,731

Source: Florida Department of Community Affairs, 2004a.

Table 4.16 depicts the mitigation savings that can be achieved for wind-related hazards by each hurricane intensity category.

Table 4.16. Wind related exposure and mitigation savings, St. Lucie County, 2004.

Hurricane Category	Total Exposure	Exposure After Mitigation	Mitigation Savings
Category 1	$223,479,984	$143,013,040	$80,466,944
Category 2	$711,780,736	$528,862,560	$182,918,176
Category 3	$1,748,163,072	$1,406,076,032	$342,087,040
Category 4	$3,850,668,000	$3,274,736,640	$575,951,360
Category 5	$6,669,348,864	$6,213,571,680	$455,777,184

Source: Florida Department of Community Affairs, 2004a.

Table 4.17 depicts the mitigation savings that can be achieved for the flood hazard by each hurricane intensity category.

Table 4.17. Flood related exposure and mitigation savings, St. Lucie County, 2004.

Hurricane Category	Exposure	Exposure After Mitigation	Mitigation Savings
Category 1	$195,802,448	$118,454,384	$77,348,064
Category 2	$349,640,160	$268,874,944	$80,765,216
Category 3	$725,756,416	$591,502,976	$134,253,400
Category 4	$1,982,937,984	$1,614,153,632	$368,804,352
Category 5	$2,918,851,072	$2,497,979,392	$420,871,680

Source: Florida Department of Community Affairs, 2004a.

4.1.3 Tornadoes

4.1.3.1 Hazard Identification

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. It is generated by a thunderstorm or hurricane when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The most common type of tornado, the relatively weak and short-lived type, occurs in the warm season, with June being the peak month. The strongest, most deadly tornadoes occur in the cool season, from December through April (FDCA, 2004b). Occasional windstorms accompanied by tornadoes, such as the winter storm of 1993, also are widespread and destructive.

When a tornado threatens, only a short amount of time is available for life-or-death decisions. The NWS issues two types of alerts:

- A tornado watch, which means that conditions are favorable for tornadoes to develop.
- A tornado warning, which means that a tornado has actually been sighted.

Tornadoes are classified using the Fujita-Pearson scale depicted in **Table 4.18**.

Table 4.18. Fujita-Pearson scale.

F = Intensity	P = Path Length	W = Mean Width
F0 = Light Damage	P0 = less than 1 mile	W0 = less than 0.01 mile
F1 = Moderate Damage	P1 = 1.0 to 3.1 miles	W1 = 0.01 to 0.03 mile
F2 = Considerable Damage	P2 = 3.2 to 9.9 miles	W2 = 0.04 to 0.09 mile
F3 = Severe Damage	P3 = 10.0 to 31.0 miles	W3 = 0.10 to 0.31 mile
F4 = Devastating Damage	P4 = 32.0 to 99.0 miles	W4 = 0.32 to 0.99 mile
F5 = Catastrophic Damage	P5 = 100 miles or greater	W5 = 1.00 miles or wider

Historic Events. Florida ranks third in the U.S. in the number of tornado strikes, and the first in the number of tornadoes per square mile. The odds of a tornado striking any specific point in southeastern Florida are 0.04, or once per 250 years.

The damage from a tornado is a result of the high wind velocity and wind-blown debris. Florida's average is 75 tornadoes annually since 1950, causing an average of 3 fatalities and 60 injuries each year (FDCA, 2004c). According to FDCA on-line hazard maps, there have been 8 light-damage, 1 moderate-damage, and 1 significant-damage tornadoes in St. Lucie County between 1961 and 1990. **Table 4.19** below illustrates the associated wind speeds with each of the tornado damage categories used in the FDCA map.

Table 4.19. Wind speed category.

Category	Wind Speed (mph)
Light	40-72
Moderate	73-112
Significant	113-157
Severe	158-206
Devastating	207-260
Incredible	261-318

Source: Florida Department of Community Affairs, 2003.

The National Climatic Data Center (NCDC) indicates that there have been a total of 36 tornado incidents in St. Lucie County since 1953. The majority of the events have been F0 and F1, but one F3 on April 15, 1958 cut a path 15 miles long and 33 yards wide and caused an estimated $250,000 in property damage. NCDC data also indicate that there have been 27 tornado-related injuries, 2 deaths, and $4,313,000 in property damage associated with tornado events in the County. **Table 4.20** describes some of the tornado events that have occurred within the County.

Table 4.20. Tornado incidents, St. Lucie County, 1953 – 2003.

Date	Magnitude	Path Length (miles)	Path Width (yards)	Description
April 15, 1958	F3	15	33	None available
May 8, 1979	F0	5	30	None available
April 11, 1982	F0	5	50	None available
July 10, 1995	F0	0	10	Minor damage in Spanish Lakes mobile home community - $50,000 property damage (FP)
February 2, 1998	F0	0	50	Touched down on Hutchinson Island - $30,000 property damage (FP)
March 9, 1998	F1	1	50	Caused damage at St. Lucie County Fairgrounds and overturned airplanes at the airport - $3.2 million property damage (FP)
June 4, 2001	N/A	N/A	N/A	$10,000 property damage (FP)
May 14, 2002	F0	0	20	7 miles north of FP -$20,000 property damage
July 27, 2002	F1	0	30	Touched down in FP and damaged 70 cars - $100,000 property damage

FP = Fort Pierce.
Source: National Climatic Data Center, 2004.

4.1.3.2 Vulnerability Assessment

Tornado events can have the following potential impacts within a community:

- Excessive wind;
- Electric power outage;
- Surface and air transportation disruption;
- Telecommunications system outage;
- Human health and safety;
- Psychological hardship; and
- Economic disruption.

St. Lucie County's vulnerability to tornadoes is compounded by the high concentration of mobile home residents in large mobile home communities. According to the 2000 Census, there are 11,595 mobile homes in St. Lucie County, representing 12.7% of the total housing units in the County. Five municipalities within St. Lucie County have significant concentrations of mobile homes. River Park has a total of 740 mobile homes, representing 28.4% of the total housing units. Fort Pierce North has a total of 827 mobile homes, representing 26.7% of the total housing units. Fort Pierce has a total of 1,107 mobile homes, representing 6.4% of the total housing units, and, Fort Pierce South has a total of 143 mobile homes, representing 6.4% of the total housing units (U.S. Census, 2004).

4.1.3.3 Risk Assessment

Historical data indicate the frequency of tornadoes in St. Lucie County is relatively low, but some specific communities have a moderate to high vulnerability to this hazard due to the type of construction or numbers of mobile homes (manufactured housing units) within their boundaries. These communities include the greater Fort Pierce area and River Park. At the time of publication, no data were available to model loss in St. Lucie County from tornadoes.

According to the MEMPHIS risk assessment model, all of St. Lucie County lies in the 1 in 500 probability category for tornado risk. There are a total of 85,225 structures valued at $7,171,248,640 and 192,695 residents in the County.

4.1.4 Severe Thunderstorms

4.1.4.1 Hazard Identification

A severe thunderstorm is defined as a thunderstorm containing one or more of the following phenomena: hail ¾ inches or greater, winds gusting in excess of 57.5 mph, and/or a tornado (NOAA, NWS, 1994). Severe weather can include lightning, tornadoes, damaging straight-line winds, and large hail. Most individual thunderstorms only last several minutes; however, some can last several hours.

Long-lived thunderstorms are called super cell thunderstorms. A super cell is a thunderstorm that has a persistent rotating updraft. This rotation maintains the energy release of the thunderstorm over a much longer time than typical, pulse-type thunderstorms, which occur in the summer months. Super cell thunderstorms are responsible for producing the majority of severe weather, such as large hail and tornadoes (NOAA, NWS, 2003). Downbursts also are occasionally associated with severe thunderstorms. A downburst is a strong downdraft resulting in an outward burst of damaging winds on or near the ground. Downburst winds can produce damage similar to a strong tornado. Although usually associated with thunderstorms, downbursts can occur with showers too weak to produce thunder (NOAA, NWS, 2003). Strong squall lines can also produce widespread severe weather, primarily very strong winds, and/or microbursts. A squall is a sudden violent gust of wind often associated with rain or snow (Merriam-Webster Dictionary, 2003).

When a severe thunderstorm approaches, the NWS will issue an advisory. According to NOAA, NWS (1994), two possible advisories are as follows:

Severe Thunderstorm Watch: Conditions are favorable for the development of severe thunderstorms.

Severe Thunderstorm Warning: Severe weather is imminent or occurring in the area.

Historic Events. In 1997, thunderstorms spawned 103 tornadoes, injured 121 people, and produced over $38 million in property damage statewide. According to FDCA's on-line hazard maps, St. Lucie County averages more than 70 days with thunderstorms per year, with the most frequent occurrences being between the months of July and September. NCDC indicates that there have been 26 thunderstorm incidents in St. Lucie County since 1953, causing $56,000 in property damage. On 26 June 1996,

81 mile an hour wind gusts were recorded at the Fort Pierce Airport, causing $120,000 in property damage. On 20 August 1999, thunderstorm winds caused $1,000 in property damage. On 27 August 2002, thunderstorm associated wind damaged several mobile homes in the Spanish Lakes community. Thunderstorm wind caused $1,000 in property damage on 18 March 2003. NCDC has recorded 24 incidents of hail in St. Lucie County since 1953. The average accumulation for these events in the County is 1.2 inches.

4.1.4.2 Vulnerability Assessment

Thunderstorm events can have the following potential impacts within a community:

- Excessive wind;
- Excessive water;
- Damaging hail;
- Electric power outage;
- Surface and air transportation disruption;
- Telecommunications system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Fire; and
- Stormwater drainage impairment.

Vulnerability to severe thunderstorms and lightning is high in St. Lucie County, but many jurisdictions and population centers have only moderate vulnerabilities relative to these hazards. This variation in relative levels of vulnerability is again due primarily to construction practices and community characteristics. Working communities have a higher vulnerability to economic impacts by lightning than residential or retirement communities. All other factors being equal, residential and retirement communities have a historically higher vulnerability in terms of lightning fatalities.

4.1.4.3 Risk Assessment

At the time of publication, no model was available to determine potential loss in St. Lucie County due to severe thunderstorms. The County can expect losses similar to those in the past. Typical storms in the past have caused around $2,000 in property damage.

4.1.5 Lightning

4.1.5.1 Hazard Identification

Perhaps the most dangerous and costly effect of thunderstorms is lightning. As a thunderstorm grows, electrical charges build up within the thunder cloud. Oppositely charged particles gather at the ground below. The attraction between positive and negative charges quickly grows strong enough to overcome the air's resistance to electrical flow. Racing toward each other, the charges connect and complete the electrical circuit. Charge then surges upward from the ground at nearly one-third the speed of light and produces a bright flash of lightning (Cappella, 1997).

Historic Events. On average, lightning kills more people than any other weather event. Florida leads in the nation in lightning related deaths and injuries (Alachua County Office of Emergency Management, 2004). Most lightning strike fatalities occur in June, July, and August. Between 1959 and 1994, there have been 345 lightning-related deaths in Florida (National Lightning Safety Institute, 2004c). Florida also has the most strikes, about 12 strikes per square kilometer per year in some places (National Lightning Safety Institute, 2004b). Nationwide, lightning-related economic losses amount to over $5 billion per year, and the airline industry alone loses approximately $2 billion a year in operating costs and passenger delays from lightning (National Lightning Safety Institute, 2004a).

According to FDCA's on-line hazard maps, between 1959 and 1996, St. Lucie County recorded 7 lightning-related deaths and 11 injuries. The NCDC, however, indicates that there were 5 major lightning events causing $70,000 in property damage and causing 4 injuries. On October 26, 1994, lightning struck a switchyard at the St. Lucie nuclear power plant, causing a small fire and damaging a transformer. On August 3, 1998, lightning caused an explosion and fireball when a natural gas pipeline station was struck.

4.1.5.2 Vulnerability Assessment

Working communities have a higher vulnerability to economic impacts from lightning than residential or retirement communities. All other factors being equal, residential and retirement communities have a historically higher vulnerability in terms of lightning fatalities.

Lightning events can have the following potential impacts within a community:

- Excessive wind;
- Excessive water;
- Damaging hail;
- Electric power outage;
- Surface and air transportation disruption;
- Telecommunications system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Fire; and
- Stormwater drainage impairment.

4.1.5.3 Risk Assessment

At the time of publication, no model was available to predict loss associated with lightning. The County can expect losses similar to those experienced in the past.

4.1.6 Wildland/Urban Interface Zone

4.1.6.1 Hazard Identification

Recent wildland fires that burned throughout Florida, specifically central Florida, are examples of the increasing wildland fire threat, which results from the Wildland/Urban

Interface. The Wildland/Urban Interface is defined as the area where structures and other human development meet with undeveloped wildland or vegetative fuels (FEMA, 1996). As residential areas expand into relatively untouched wild lands, forest fires increasingly threaten people living in these communities. Most wildland fires in the County occur in Florida's dry season, from January through May.

There are three different classes of wildland fires: surface, ground, and crown. A surface fire is the most common type and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire is usually started by lightning and burns on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees. Wildland fires are usually identified by dense smoke that fills the area for miles around.

Rural and large tracts of unimproved lands are susceptible to brush and forest fires capable of threatening life, safety, and property in adjacent developed areas if not effectively controlled. Wildland fires are caused by numerous sources including arson, smoker carelessness, individuals burning debris, equipment throwing sparks, and children playing with matches. However, more fires are caused by lightning strikes and coincide with the height of the thunderstorm season. A major wildland fire can leave a large amount of scorched and barren land, and these areas may not return to pre-fire conditions for decades. If the wildland fire destroys the ground cover, other potential hazards may develop (e.g., erosion) (FEMA, 1996).

Structures in the Wildland/Urban Interface Zone are vulnerable to ignition by three different sources: radiation, convection, and firebrands (National Wildland/Urban Interface Fire Protection Program, 1997). Radiating heat from a wildland fire can cause ignition by exposure to the structure. The chances of ignition increase as the size of the flames increases, surface area exposed to flames increases, length of exposure time increases, and distance between the structure and the flames decreases. Ignition of a structure by convection requires the flame to come in contact with the structure. Contact with the convection column is generally not hot enough to ignite a structure. Clearing to prevent flame contact with the structure must include any materials capable of producing even small flames. Wind will tilt the flame and the convection column uphill, increasing the chance of igniting a structure. Firebrands also pose a threat to structures in the Wildland/Urban Interface Zone. A firebrand is a piece of burning material that detaches from a fire due to strong convection drafts in the burning area. A firebrand can be carried a long distance (around 1 mile) by fire drafts and winds. The chance of a firebrand igniting a structure depends on the size of the firebrand, how long it burns after contact, and the materials, design, and construction of the structure.

Some plant and animal communities in south central Florida have come to depend on frequent lightning-ignited wildland fires for their continued existence. Many threatened and endangered species depend on the periodic burning of dense scrub. Fire suppression and landscape fragmentation have disrupted this natural cycle, but a long-term policy of prescribed burns might help restore balance to the system.

Historic Events. From 1981 through 1996, an average of 6,080 wildland fires occurred per year, burning 219,725 acres. Because of changing weather conditions, the yearly figures range from a low of 3,985 wildland fires (with 86,944 acres burned) in 1991 to a record high of 14,042 wildland fires (with 587,400 acres burned) in 1981.

Since 1998, more than 21,000 wildland fires have devastated over 1.3 million acres and destroyed more than 1,000 structures. In 1998, the previous El Niño conditions subsided, causing drought conditions and 4,890 wildland fires, which burned 506,350 acres. The drought continued in 1999, with 5,636 wildland fires destroying 355,197 acres. In 2000, another drought stricken year, 212,415 acres were burned from 6,718 wildland fires. In 2001, the drought continued with 403,740 acres burned from 4,804 wildland fires (FDOF, 2003). These fires resulted in numerous fire complexes being developed each of those 4 years. This taxed the State's firefighting resources and those of other agencies in the state, and required assistance from other states. The largest contingent of air firefighting resources ever collected responded to the wildland fires of 1998 in Florida. The Mallory Swamp fire, one of the single largest and most costly wildland fire in Florida history, burned 57,200 acres near Perry, Florida in May 2001, costing an estimated $6.7 million. **Table 4.21** illustrates the number and total acreage of wildland fires in St. Lucie County in 2002 by ignition type.

Table 4.21. Wildland fire occurrence, St. Lucie County, 2002.

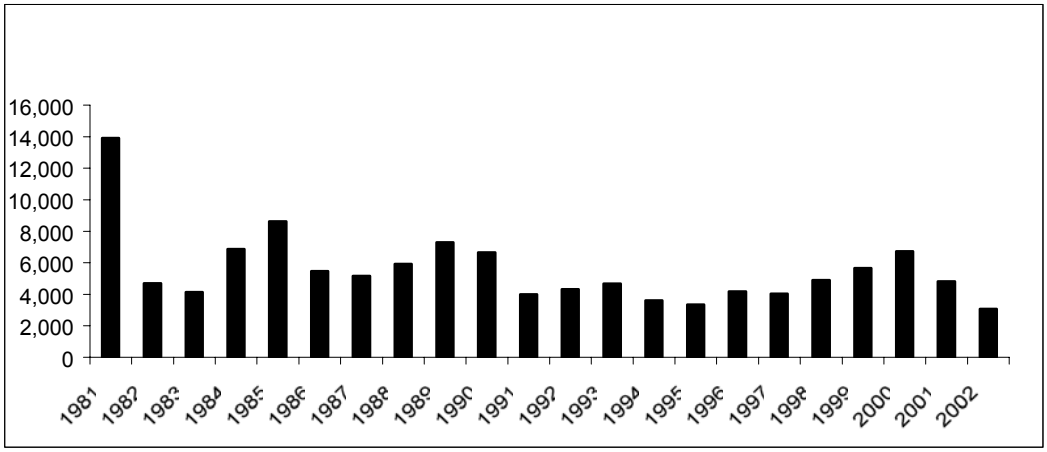
Type of Wildland fire	Number	Acres
Railroad	46	1,320
Smoking	47	127
Campfire	60	1,106
Children	164	7,266
Equipment	205	2,022
Miscellaneous	321	5,166
Unknown	423	4,574
Incendiary	457	10,683
Lightning	625	17,643
Debris	717	6,934
Total	3,065	56,841

Source: Florida Division of Forestry, 2003.

Figures 4.6 and **4.7** illustrate the number of wildland fires and the acres burned statewide between 1981 and 2002, respectively.

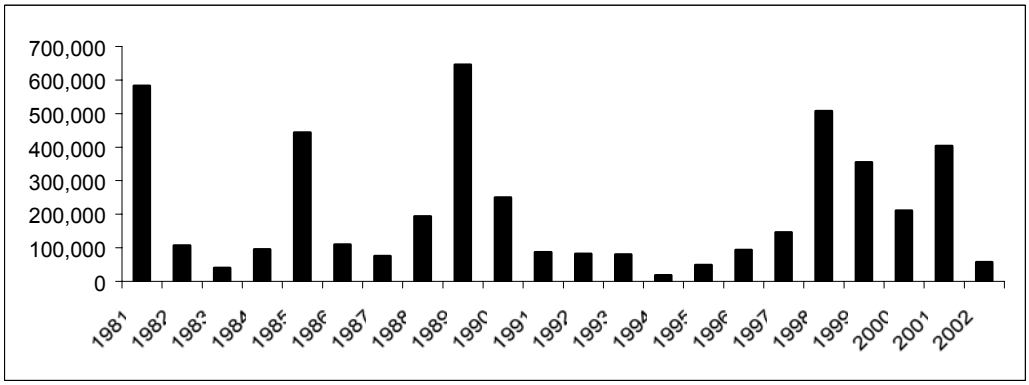
Data on wildland fire for St. Lucie County indicate that between 1993 and 2003, there has been a total of 263 wildland fires, which have burned 42,964 acres. Lightning, debris, or children were the most common ignition source for wildland fires in St. Lucie County (FDOF, 2004). In 1999, a wildland fire in Port St. Lucie burned nearly 2,400 acres, destroyed nearly 50 homes, and damaged 30 others. This disaster received a Federal Disaster Declaration with damages totaling $950,000.

Figure 4.6. Number of wildland fires, State of Florida, 1981-2002.



Source: Florida Division of Forestry, 2004.

Figure 4.7. Wildland fire acres burned, State of Florida, 1981-2002.



Source: Florida Division of Forestry, 2004.

4.1.6.2 Vulnerability Assessment

Wildland fires can have the following potential impacts within a community:

- Electric power outage;
- Surface and air transportation disruption;
- Telecommunications system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services;
- Agricultural/fisheries damage;
- Damage to critical environmental resources;
- Fire; and
- Toxic releases.

According to the 2001 Florida Statistical Abstract, approximately 366,400 acres, or one quarter (25.4%) of land in St. Lucie County is forested. Locations where these forested lands and homes or businesses intermingle create potential risk areas for wildland fire. Less urbanized communities and areas within the County are more vulnerable to wildland fire than the more developed communities. The City of Port St. Lucie, the Lakewood Park Area, and western St. Lucie County have a higher risk from wildland fires than other locations within the County.

4.1.6.3 Risk Assessment

The City of Port St. Lucie and the unincorporated areas north and west of Fort Pierce are particularly vulnerable to wildland fire at the Wildland/Urban Interface Zone. In the spring of 1999, three days of wildland fires destroyed a total of 54 homes in Port St. Lucie and damaged an additional 76. Total estimated damages to the 130 structures were $5,066,776, with uninsured losses estimated at more than $1 million. Direct expenses incurred by St. Lucie County in fighting these fires were $795,556, and additional $40,597 were incurred by Martin and Palm Beach counties as they helped St. Lucie.

Less urbanized communities and areas within the County are more vulnerable to wildland fire than the more developed communities. Large areas in the western part of the County and many isolated unincorporated pockets of residential development are quite vulnerable to wildland fire in St. Lucie County. The City of Port St. Lucie, the Lakewood Park area, and virtually all of St. Lucie County's unincorporated areas have a high vulnerability to wildland fire during the dry season each year. The problems in the City of Port St. Lucie and in the unincorporated pockets of development such as Lakewood Park arise from the following conditions:

- An extensive canopy of slash pine (*Pinus elliotii*), and in some areas sand pines (*Pinus clausa*); and
- Numerous undeveloped lots interspersed with residences.

Upland pine communities in south Florida are adapted for periodic episodes of fire and burn very easily. They also generate large quantities of flammable leaf litter and other combustible by-products, which catch fire easily and generate a very hot, if short-lived, fire. Clearing of vacant lots, periodic removal of accumulated leaf litter, maintained fire breaks, and controlled burns in the undeveloped or rangeland areas of the County are the best mitigative measures that can be applied for this hazard.

The risk assessment data for wildland fires for St. Lucie County are based on the MEMPHIS risk assessment model. **Table 4.22** displays the wildland fire exposure for structures in St. Lucie County.

Table 4.22. Wildland fire exposure, St. Lucie County, 2004.

Risk Level	Number of Structures	Value of Structures	Population
Low	66,097	$5,332,901,376	155,651
Medium	8,241	$806,260,928	13,283
High	10,887	$1,032,030,528	23,761

Source: Florida Department of Community Affairs, 2004a.

4.1.7 Muck Fires

4.1.7.1 Hazard Identification

A muck fire is a fire that consumes all the organic material of the forest floor and also burns into the underlying soil. It differs from a surface fire by being invulnerable to wind. If the fire gets deep into the ground, it could smolder for several years. In a surface fire, the flames are visible and burning is accelerated by wind, whereas in a muck fire, wind is not generally a serious factor (Canadian Soil Information System, 1996). Another extraordinary fact about muck fires has to do with their release of carbon dioxide. A peat bog that is on fire can release more carbon dioxide into the atmosphere than all the power stations and car engines emit in Western Europe in one year (Pearce, 1997). This type of fire could have a significant impact on global warming.

Historic Events. Muck fires are not a frequent threat to Florida. However, during a drought in the 1980's, fires in the Everglades consumed the rich, dried out muck that had once been the bottom of the swamp. These fires burned deep into the ground and required alternative firefighting techniques. Muck fires occur very infrequently in St. Lucie County, and the only areas where this hazard might produce impacts are in the western and southern portions of the County. At the present time, muck fires are not considered a significant threat.

4.1.8 Extreme Temperatures

4.1.8.1 Freezing Temperatures

Hazard Identification. According to the Department of Agriculture and Consumer Services, a moderate freeze may be expected every 1 to 2 years. Severe freezes may be expected on an average of once every 15 to 20 years. Freezes pose a major hazard to the agriculture industry in St. Lucie County on a recurring basis, and are a significant threat to the economic vitality of the State's vital agriculture industry. Agricultural lands represent nearly one-half of all land in St. Lucie County (University of Florida, 2001a). St. Lucie County has experienced seven significant freezes between 1970 and the present.

Historic Events. Florida has experienced a number of severe or disastrous freezes, where the majority of the winter crops are lost. The lowest temperature ever recorded in the state of Florida is -2º F (NCDC, 1998b). Since December 1889, there have been at least 22 recorded severe freezes; the most recent being in 1996, when a Presidential Disaster Declaration was issued for crop losses exceeding $90 billion. During this event, there was extensive loss of citrus trees, and the majority has not been replanted. Freezes in January of 1977 had severe impacts on agriculture around the state. A United States Department of Agriculture report indicated the following crop loss: citrus, 35%; vegetables, 95% to 100%; commercial flowers, 50% to 75%; permanent pasture land, 50%; and sugar cane, 40%. In addition, there was a severe loss to the tropical fish industry. It is estimated the freeze cost the Florida economy $2 billion in 1977 dollars (NWS, 1999a).

4.1.8.2 Extreme Heat

Hazard Identification. Temperatures that remain 10º or more above the average high temperature for a region and last for several weeks are defined as extreme heat

(FEMA, 2003a). Humid conditions, which add to the discomfort of high temperatures, occur when an area of high atmospheric pressure traps hazy, damp air near the ground.

Human bodies dissipate heat in one of three ways: by varying the rate and depth of blood circulation; by losing water through the skin and sweat glands; and by panting. As the blood is heated to above 98.6º, the heart begins to pump more blood, blood vessels dilate to accommodate the increased flow, and bundles of tiny capillaries penetrating through the upper layers of skin are put into operation. The body's blood is circulated closer to the surface, and excess heat is released into the cooler atmosphere. At the same time, water diffuses through the skin as perspiration. The skin handles about 90% of the body's heat dissipating function.

Heat disorders generally have to do with a reduction or collapse of the body's ability to cool itself by circulatory changes and sweating, or a chemical (salt) imbalance caused by too much sweating. When the body cannot cool itself, or when it cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise, and heat-related illness may develop. Studies indicate that, other things being equal, the severity of heat disorders tends to increase with age. Heat cramps in a 17-year old may be heat exhaustion in a 40-year old, and heat stroke in a person over 60.

When the temperature gets extremely high, the NWS has increased its efforts to alert the general public as well as the appropriate authorities by issuing Special Weather Statements. Residents should heed these warnings to prevent heat-related medical complications. As a result of the latest research findings, the NWS has devised the "Heat Index" (HI). The HI, given in degrees Fahrenheit, is an accurate measure of how hot it really feels when relative humidity is added to the actual air temperature. The NWS will initiate alert procedures when the HI is expected to exceed 105º F for at least two consecutive days. Possible heat disorders related to the corresponding HIs are listed below.

- HI of 130ºF or higher – Heatstroke/sunstroke with exposure for people in higher risk groups
- HI of 105ºF-130ºF – Sunstroke, heat cramps, and heat exhaustion likely and heatstroke possible with prolonged physical activity
- HI of 90ºF-105ºF – Sunstroke, heat cramps with prolonged exposure
- HI of 80ºF-90ºF – Fatigue possible with prolonged exposure and physical activity (NWS, 1999b)

Historic Events. The highest temperature ever recorded in the state was on June 29, 1931 at 103º F in Monticello at an elevation of 207 feet. (NCDC, 1998a). In a normal year, approximately 175 Americans die from extreme heat. However, in 1995, the death toll was 1,021 (NWS, 1997).

4.1.8.3 Vulnerability Assessment

Extreme temperature events can have the following potential impacts within a community:

- Electric power outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption;

- Agricultural/fisheries damage; and
- Damage to critical environmental resources.

Temperature extremes, both freezes and periods of excessive heat impact communities with a larger population of older people to a greater extent than those with younger populations. According to the 2000 Census, 34% of residents in St. Lucie County are over the age of 60. Freezing conditions primarily affect agriculture and homeless indigents. When conditions are predicted to be below freezing, shelters are opened. As stated earlier, over 60% of land in St. Lucie County is currently designated as agricultural land. A survey of the County's homeless population was conducted in 2002 indicating that there are approximately 490 homeless individuals within the County (Florida Department of Children and Families, 2003). Inland communities away from the moderating influence of the ocean or the estuary are more vulnerable to temperature extremes as are areas with significant agricultural assets. According to the FDCA, between 1979 and 1998, there have been 230 extreme temperature-related deaths in the state. This number is greater than the number of deaths caused by hurricanes and tornadoes combined. The west County area is considered to have a high risk for losses associated with extreme temperatures, especially freezes, due to the prominence of agricultural land uses in that area.

4.1.8.4 Risk Assessment

At the time of publication, data were not available to determine potential loss in St. Lucie County due to extreme temperatures.

4.1.9 Erosion

4.1.9.1 Soil Erosion

Hazard Identification. Soil erosion is the deterioration of soil by the physical movement of soil particles from a given site. Wind, water, animals, and the use of tools by man may all be reasons for erosion. The two most powerful erosion agents are wind and water, but in most cases, these are damaging only after man, animals, insects, diseases, or fire have removed or depleted natural vegetation. Accelerated erosion caused by human activity is the most serious form of soil erosion, and can occur so rapidly that surface soil may sometimes be blown or washed away down to the bedrock.

Undisturbed by man, soil is usually covered by shrubs and trees, dead and decaying leaves, or a thick mat of grass. Whatever the vegetation, it protects the soil when rain falls or wind blows. Root systems of plants hold soil together. Even in drought, the roots of native grasses, which extend several feet into the ground, help tie down the soil and keep it from blowing away. With its covering of vegetation stripped away, soil is vulnerable to damage. Whether through cultivation, grazing, deforestation, burning, or bulldozing, once the soil is bare to the erosive action of wind and water, the slow rate of natural erosion is greatly increased. Losses of soil take place much faster than new soil can be created. With the destruction of soil structure, eroded land is even more susceptible to erosion.

The occurrence of erosion has greatly increased, generally at a rate at which soils cannot be sustained by natural soil regeneration. This is because of the activities of modern development and population growth, particularly agricultural intensification. It also is in the field of agriculture that most efforts have been made to conserve soils, with mixed success (Union of International Associations, 1999).

Particles scattered by erosion also can cause problems elsewhere. Stormwater drainage systems, both natural and mechanical, are frequently clogged by loose sediment. If drainage systems are not cleared of uncontrolled sediment on a regular basis, they lose function.

4.1.9.2 Beach Erosion

Hazard Identification. Wind, waves, and long shore currents are the driving forces behind coastal erosion. This removal and deposition of sand permanently changes beach shape and structure (Sea Grant Haznet, 1998). Most beaches, if left alone to natural processes, experience natural shoreline retreat. As houses, highways, seawalls, and other structures are constructed on or close to the beach, the natural shoreline retreat processes are interrupted. The beach jams up against these man-made obstacles and narrows considerably as the built-up structures prevent the beach from moving naturally inland. When buildings are constructed close to the shoreline, coastal property soon becomes threatened by erosion. The need for shore protection often results in “hardening” the coast with a structure such as a seawall or revetment.

A seawall is a large concrete wall designed to protect buildings or other man-made structures from beach erosion. A revetment is a cheaper option constructed with “rip rap” such as large boulders, concrete rubble, or even old tires. Although these structures may serve to protect beachfront property for a while, the resulting disruption of the natural coastal processes has serious consequences for all beaches in the area. Seawalls inhibit the natural ability of the beach to adjust its slope to the ever-changing ocean wave conditions. Large waves wash up against the seawall and rebound back out to sea carrying large quantities of beach sand with them. With each storm, the beach narrows, sand is lost to deeper water, and the long shore current scours the base of the wall. Eventually large waves impact the seawall with such force that a bigger structure becomes necessary to continue to resist the forces of the ocean (Pilkey and Dixon, 1996).

According to the Coastal Management Element of the County’s Comprehensive Plan, there have been several beach restoration projects in St. Lucie County, the first of which was a Federal project undertaken in 1971, followed by a second in 1983. Between 1971 and 1990, 1.2 million yd^3 of material was replaced 1.3 miles south of the Inlet. The average projected erosion rate for the 10,000 feet of shoreline south of the inlet is 4.3 feet annually, while the average projected accretion rate for the 10,000 feet of shoreline north of the inlet is 5.4 feet per year.

4.1.9.3 Vulnerability Assessment

Erosion can have the following potential impacts within a community:

- Soil/beach erosion;
- Navigable waterway impairment;
- Economic disruption;
- Damage to critical environmental resources; and
- Stormwater drainage impairment.

St. Lucie County's vulnerability to soil collapse and beach erosion is moderate along its entire coastline. The most significant area of beach erosion in the County is along Fort Pierce Beach, immediately south of the Fort Pierce Inlet. This area has just been the subject of a major beach renourishment project sponsored jointly by the County and U.S. Army Corps of Engineers. Other beachfront communities report low to moderate erosion problems. Erosion also is a potential vulnerability for the communities located on both the Indian River and the North Fork of the St. Lucie River, and along many of the various canals in the eastern part of the County.

4.1.9.4 Risk Assessment

FDEP updated a statewide assessment of beach erosion in 2002. In that assessment, FDEP defined the "critical erosion area" as a segment of shoreline where natural processes or human activity have caused or contributed to erosion and recession of the beach or dune system to such a degree that upland development, recreation interests, wildlife habitat, or important cultural resources are threatened or lost.

Figure 4.8 shows the two critical erosion areas (5.6 miles) and one non-critical erosion area (2.8 miles) in St. Lucie County. The critical erosion area (R34 - R46) extends south from the Fort Pierce Inlet threatening recreation and development interests. Most of this area is a State and Federal beach restoration project. Further south along central Hutchinson Island is a 2.8-mile stretch of non-critical eroding shoreline (R65 - R80), which lacks any current threats. The south 3.4 miles of the County shoreline (R98 - R115 +1,000) are now designated critical with development interests threatened (FDEP, 2004).

Historically, St. Lucie County has experienced beach erosion along its Atlantic coastline, with much of it concentrated in the South Beach area, which is located immediately south of the Ft. Pierce Inlet. **Table 4.23** clearly shows that there have been multiple attempts to nourish the beach. In a recent study, the 2004 Hurricane Recovery Plan for Florida's Beach and Dune System, completed by the Florida Department of Environmental Protection, the Department recommends that shore protection and dune restoration projects are warranted and that it would take an approximate cost of $6,350,000 to restore the eroded beaches.

Table 4.23. Nourishment effects.

Ft. Pierce South Beach					
Year	Purpose	Cubic Yards	Length (ft)	Actual Cost	2003 Cost
1971	Storm & Erosion	718,000	6,864	621,288	2,649,021
1974	Navigation	36,000	Not provided	68,441	228,396
1978	Navigation	49,800	6,864	315,591	766,354
1980	Storm & Erosion	426,000	Not provided	1,428,000	2,973,787
1983	Storm & Erosion	346,000	6,864	1,559,431	2,585,372
1987	Navigation	29,800	6,864	259,561	397,118
1989	Navigation	47,800	6,864	394,400	576,089
1990	Navigation	55,700	6,864	236,017	336,219
1994	Navigation	7,190	Not provided	33,915	42,275
1995	Navigation	166,650	Not provided	808,981	996,772
1999		908,000	6,864	6,200,000	6,897,871

Source: Duke University Program for the Study of Developed Shorelines, 2003.

INSERT FIGURE 4.8

4.1.10 Drought

4.1.10.1 Hazard Identification

Drought is a normal, recurrent feature of climate, although many perceive it as a rare and random event. In fact, each year some part of the U.S. has severe or extreme drought. Although it has many definitions, drought originates from a deficiency of precipitation over an extended period of time, usually a season or more (National Drought Mitigation Center, 2003). It produces a complex web of impacts that spans many sectors of the economy and reaches well beyond the area producing physical drought. This complexity exists because water is essential to our ability to produce goods and provide services (National Drought Mitigation Center, 2003).

A few examples of direct impacts of drought are reduced crop, rangeland, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality rates; and damage to wildlife and fish habitat. Social impacts include public safety, health, conflicts between water users, reduced quality of life, and inequities in the distribution of impacts and disaster relief. Income loss is another indicator used in assessing the impacts of drought; reduced income for farmers has a ripple effect throughout the region's economy (National Drought Mitigation Center, 2003).

The web of impacts is so diffuse that it is very difficult to come up with financial estimates of damages. However, the FEMA estimates $6 to $8 billion in losses as the annual average (FEMA, 1995). The worst drought in recent history occurred in 1987-1989, and the NCDC reports the estimated cost as $40 billion (National Drought Mitigation Center, 2003).

In St. Lucie County, the primary sources of water are watershed areas, Lake Okeechobee, and the County's wellfields. Excess water from an interconnected series of lakes, rivers, canals, and marshes flows either north to the St. Johns River or east to the Indian River Lagoon (Indian River County Department of Emergency Services, 1998). When this cycle is disrupted by periods of drought, one of the potentially most damaging effects is substantial crop loss in the western agricultural areas of the County. In addition to obvious losses in yields in both crop and livestock production, drought in St. Lucie County is associated with increases in insect infestations, plant disease, and wind erosion. In addition, the incidence of forest fires increases substantially during extended droughts, which in turn places both human and wildlife populations at higher levels of risk.

The South Florida and St. Johns River Water Management Districts and County staff manage the County's water resources. Complementing the District's water management efforts during periods of critical water shortage, a countywide, uniform, forceful, contingency plan is in place to effectively restrict the use of water.

Rainfall patterns vary greatly both seasonally and annually in Florida. Therefore, periods of low rainfall are a common occurrence but still may have significant impacts. This especially can be the case if there are several periods of low rainfall in the same year or series of years, as seen in **Figure 4.9**. Based on daily rainfall records from the Indian River Research and Education Center at Fort Pierce from 1953-2002, periods of 3 weeks or more with cumulative rainfall of less than 0.25, 0.50, and 1.0 inches were identified by researchers from the University of Florida. There have been seven occurrences since 1953 where there were periods of 6 or more weeks with less than 0.25 inch of cumulative rainfall and

33 periods of 4 or more weeks with less than 0.25 inch. There also have been 34 periods of 4 or more weeks with less than 0.50 inch of rain and 52 periods with less than 1.0 inch. These periods of drought frequently coincided with the season of late March to mid-October, when citrus crops require intense irrigation. There were 26 occurences of drought for 5 weeks or more during this season (Boman and Shukla, 2004).

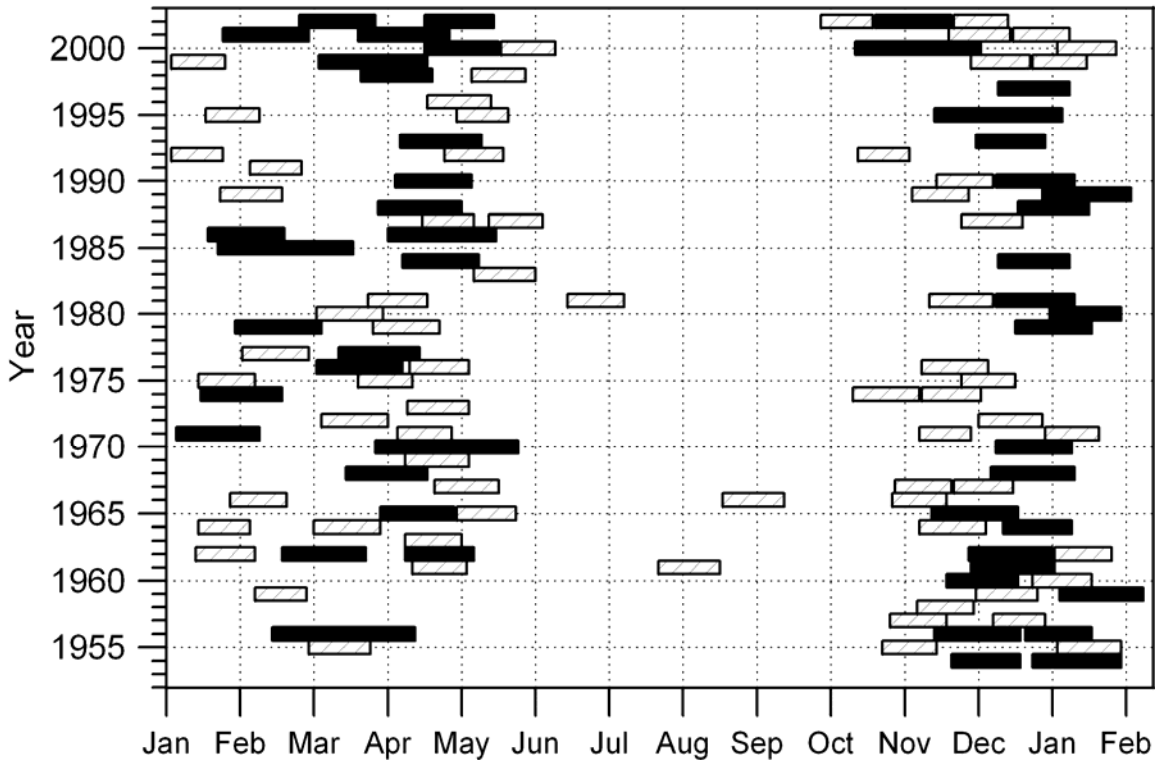


Figure 4.9. Periods of 3 to 4 weeks (hatched bars) or more than 4 weeks (solid bars) for 1953-2002 with less than 0.25 inch of cumulative rainfall (data from the Indian River Research and Education Center as reported in Boman and Shukla, 2004).

4.1.10.2 Vulnerability Assessment

Drought can have the following potential impacts within a community:

- Economic disruption;
- Agricultural/fisheries damage;
- Damage to critical environmental resources; and
- Fire.

St. Lucie County overall has a moderate vulnerability to the impacts from drought due to the County's large agricultural land use. The western area of the County is most vulnerable to the impacts of drought because this area is extensively involved in farming and ranching. The urbanized communities along the County's coast are less vulnerable due to their location and non-agricultural economic base. Potential impacts to St. Lucie County's potable water supply during drought conditions appear to be slight at this time.

4.1.10.3 Risk Assessment

At the time of publication, no model was available to determine the potential loss associated with drought in St. Lucie County. The best datum available to determine potential loss is the market value of farms in St. Lucie County, which in 1997 totaled $1.1 million.

4.1.11 Seismic Hazards

4.1.11.1 Dam/Levee Failure

Hazard Identification. Dam/levee failure poses a minor threat to population and property in St. Lucie County. All dams and levees are earthen structures and are State, regional, local, or privately controlled. The most significant risk related to dam/levee failure is flooding due to substantial rainfall and its eastward migration to final discharge in the Indian River Lagoon. Structural and non-structural techniques to slow and contain this runoff incorporate several drainage systems. Rainfall in excess of designed capacities could cause erosion of constructed drainage facilities and flooding of many areas including primary roadway evacuation routes (Indian River County Department of Emergency Services, 1998). According to the National Inventory of Dams, there are 6 dams in St. Lucie County (Structure 97, Control Structure 3, Control Structure 2, Structure 99, Structure 50, and Control Structure 1 [USACE, 1999]).

4.1.11.2 Earthquakes

Hazard Identification. Although Florida is not usually considered to be a state subject to earthquakes, several minor shocks have occurred over time, but only one caused any damage (USDOI, USGS, 2004).

Historic Events.

- In January 1879, an earthquake occurred near St. Augustine that is reported to have knocked plaster from walls and articles from shelves. Similar effects were reported in Daytona Beach. The earthquake was felt in Tampa, throughout central Florida, and in Savannah, Georgia as well (USDOI, USGS, 2004).
- In January 1880, another earthquake occurred, this time with Cuba as the focal point. Shock waves were sent as far north as the town of Key West (USDOI, USGS, 2004).
- In August 1886, Charleston, South Carolina was the center of a shock that was felt throughout northern Florida. It rang church bells in St. Augustine and severely jolted other towns along sections of Florida's east coast. Jacksonville residents felt many of the strong aftershocks that occurred in September, October, and November 1886 (USDOI, USGS, 2004).
- In June 1893, Jacksonville experienced a minor shock that lasted about 10 seconds. Another earthquake occurred in October 1893, which also did not cause any damage (USDOI, USGS, 2004).

- In November 1948, doors and windows rattled in Captiva Island, west of Ft. Myers. It was reportedly accompanied by sounds like distant heavy explosions (USDOI, USGS, 2004).
- In November 1952, a slight tremor was felt in Quincy, a town located 20 miles northwest of Tallahassee. Windows and doors rattled, but no damage was reported (USDOI, USGS, 2004).

4.1.11.3 Sinkholes and Subsidence

Hazard Identification. Sinkholes are a common feature of Florida's landscape. They are only one of many kinds of karst landforms, which include caves, disappearing streams, springs, and underground drainage systems, all of which occur in Florida. Karst is a generic term that refers to the characteristic terrain produced by erosional processes associated with the chemical weathering and dissolution of limestone or dolomite, the two most common carbonate rocks in Florida. Dissolution of carbonate rocks begins when they are exposed to acidic water. Most rainwater is slightly acidic and usually becomes more acidic as it moves through decaying plant debris. Limestones in Florida are porous, allowing the acidic water to percolate through them, dissolving some limestone and carrying it away in solution. Over time, this persistent erosion process has created extensive underground voids and drainage systems in much of the carbonate rocks throughout the state. Collapse of overlying sediments into the underground cavities produces sinkholes (Florida Geological Survey, 1998).

4.1.11.4 Vulnerability Assessment

Seismic events can have the following potential impacts within a community:

- Surface and air transportation disruption; and
- Toxic releases.

There are areas in western St. Lucie County where canal bank failures could cause or exacerbate flooding during heavy rain events or storms. This problem is, however, more related to soil erosion than to actual levee failure. There has never been any seismic activity, soil failures, or sinkhole activity in St. Lucie County. While these hazards may exist, County vulnerability to them at this time must be considered very low.

4.1.11.5 Risk Assessment

The USDOI, USGS and the Florida Department of Natural Resources Bureau of Geology have created a map illustrating sinkhole type, development, and distribution for the state of Florida. Sinkhole risk is categorized using four categories. According to this map, St. Lucie County lies in Area II, which is classified as having coverage between 30 and 200 feet thick, consisting of incohesive and permeable sand. Sinkholes are few, shallow, of small diameter, and develop gradually. Cover-subsidence sinkholes dominate in this area.

According to the MEMPHIS risk assessment model, all structures in St. Lucie County fall into the very low risk category for sinkholes.

4.1.12 Agricultural Pests and Diseases

Florida is among the top three agriculture-producing states in the nation. Agriculture generates farm cash receipts of nearly $6 billion annually, of which citrus and vegetable crops contribute more than 40%. The industry is susceptible to many hazards including freezes, droughts, and exotic pests or diseases. Agricultural crops are grown throughout the state, and every region is vulnerable to the effects of an exotic pest or disease infestation. As a result, Florida uses the second highest volume of pesticides in the nation.

Agriculture and citrus production play a key role in the St. Lucie County economy; 52% of the County is farmland. The main threats to the St. Lucie County agriculture industry are 1) citrus canker; 2) Mediterranean fruit fly (Medfly); 3) sugarcane pests; and 4) Tomato Yellow Leaf Curl Virus (TYLCV).

4.1.12.1 Citrus Canker

Citrus canker has been found in Dade County, and the potential for its spread to other counties is high. Citrus canker is a bacterial disease of citrus that causes premature leaf and fruit drop. It affects all types of citrus, including oranges, sour oranges, grapefruit, tangerines, lemons, and limes. Symptoms found on leaves and fruit are brown, raised lesions surrounded by an oily, water-soaked area and a yellow ring or halo (Florida Department of Agriculture and Consumer Services, 1998a).

There is no known chemical compound that will destroy the citrus canker bacteria. In order to eradicate the disease, infected trees must be cut down and disposed of properly. It is a highly contagious disease that can be spread rapidly by windborne rain, lawnmowers and other landscaping equipment, animals and birds, people carrying the infection on their hands or clothing, and moving infected or exposed plants or plant parts (Florida Department of Agriculture and Consumer Services, 1998b).

4.1.12.2 Mediterranean fruit fly (Medfly)

Another threat to St. Lucie County's agriculture industry is the Medfly. It is one of the world's most destructive pests and infests more than 250 different plants that are important for U.S. food producers, homeowners, and wildlife. It is considered the greatest pest threat to Florida's $1.5 billion citrus crop, as well as endangering many other economically significant crops (Florida Department of Agriculture and Consumer Services, 1998d). For example, a Medfly outbreak in 1997 cost an estimated $32 million to eradicate in Manatee, Marion, Orange, Polk, and Sarasota counties (USDA, 1999). If a long-term or widespread Medfly infestation were to occur, Florida growers would not be permitted to ship numerous fruit and vegetable crops to many foreign and domestic markets. The movement of fruits and vegetables, even within the state, would be disrupted, which could lead to higher prices in the supermarket. Costly post-harvest treatment of fruits and vegetables to meet quarantine restrictions of domestic and foreign markets would also be required. If the Medfly is not eradicated in Florida, ongoing pesticide treatments by homeowners and commercial growers will be necessary.

Adult Med flies are up to ¼" long, black with yellow abdomens, and have yellow marks on their thoraxes. Their wings are banded with yellow. The female Med fly damages produce by laying eggs in the host fruit or vegetable. The resulting larvae feed on the pulp,

rendering the produce unfit for human consumption. In addition to citrus, med flies will feed on hundreds of other commercial and backyard fruit and vegetable crops.

Because med flies are not strong fliers, the pest is spread by the transport of larval-infested fruit. The major threats come from travelers, the U.S. mail, and commercial fruit smugglers. Several steps have been taken to prevent new infestations. State and federal officials are working with postal authorities to develop ways to inspect packages suspected of carrying infested fruit. In addition, public education efforts carrying the message "Don't Spread Med" are being expanded (Florida Department of Agriculture and Consumer Services, 1998d).

4.1.12.3 Sugarcane Pests

Changes in sugarcane agriculture, including new diseases and insect pests, have seriously impacted the quality of cane and juice delivered to the mill for processing. These changing developments affect the level of sucrose, purity, fiber, and color of cane resulting in a loss of sugar and decrease in the quantity and quality of sugar produced (Legendre et al., 1998).

4.1.12.4 TYLCV

The TYLCV is believed to have entered the state in Dade County sometime in early 1997 (Florida Department of Agriculture and Consumer Services, 1999). Symptoms vary among tomato types, but in general, leaves produced shortly after infection are reduced in size, distorted, cupped inward or downward, and have a yellow mottle. Fewer than 1 in 10 flowers will produce fruit after TYLCV infection, severely reducing yields.

The virus is transmitted by adult silverleaf whiteflies. Although frequent applications of pesticides help to decrease whitefly populations and suppress the spread of TYLCV, virus management through whitefly control is not possible in years where whitefly populations are high. Fortunately, the virus is not transmitted through seed or casual contact with infected plants.

4.1.12.5 Vulnerability Assessment

Agricultural pests and diseases can have the following potential impacts within a community:

- Human health and safety;
- Psychological hardship
- Economic disruption;
- Agricultural/fisheries damage; and
- Damage to critical environmental resources.

Agricultural pests and diseases are more significant hazards in those areas of the County where agriculture is a more significant element in the economic base. In 2001, St. Lucie County produced 98,899,000 boxes of citrus. The State of Florida has the second highest tomato sales, bringing in $392 million in 1999 (University of Florida, 2001a). The western portion of St. Lucie County is a major ranching and citrus area, and there are numerous nurseries and smaller agriculture-related businesses located through the County.

Overall, the County's vulnerability to agricultural pests and diseases is considered to be moderate except in the western portions of the County where it is considered to be high.

4.1.12.6 Risk Assessment

At the time of publication, no model was available to determine the potential loss associated with agricultural pests and diseases in St. Lucie County. The best datum available to determine potential loss is the market value of farms in St. Lucie County, which in 1997 totaled $1.1 million.

4.1.13 Epidemics

4.1.13.1 Hazard Identification

Infectious diseases emerging throughout history have included some of the most feared plagues of the past. New infections continue to emerge today, while many of the old plagues are still with us. As demonstrated by influenza epidemics, under suitable circumstances, a new infection first appearing anywhere in the world could travel across entire continents within days or weeks (Morse, 1995). Due to the potential of complex health and medical conditions that can threaten the general population, Florida's vulnerability to an epidemic is continually being monitored. With millions of tourists arriving and departing the state annually, disease and disease exposure (airborne, vector, and ingestion) are constantly evaluated and analyzed.

Primarily as a result of the entrance of undocumented aliens into south Florida, and the large number of small wildlife, previously controlled or eradicated diseases have surfaced. Health officials closely monitor this potential threat to the public health. The emphasis upon preventive medical measures such as school inoculation, pet licensing, rodent/insect eradication, water purification, sanitary waste disposal, health inspections, and public health education mitigates this potential disaster.

Another potential threat to south Florida's population is food contamination. Frequent news stories document that *E. coli* and botulism breakouts throughout the country are not that uncommon. In 1997, millions of pounds of possibly contaminated beef from Arkansas-based Hudson Foods Company were seized by the Department of Agriculture and destroyed.

The County addresses Anthrax and west Nile issues through the Health Department and mosquito control.

4.1.13.2 Vulnerability Assessment

Epidemics can have the following potential impacts within a community:

- Human Health & Safety;
- Psychological Hardship;
- Economic Disruption;
- Disruption of Community Services; and
- Agricultural/Fisheries Damages.

Florida is more vulnerable than many other states to possible outbreaks of infectious diseases due to the large number of international and U.S. tourists it attracts. The number of illegal aliens reaching U.S. shores also increases vulnerability to disease hazards. St. Lucie County's vulnerability to epidemic outbreaks, while higher than some other Florida counties due to its large immigrant population, is still considered only moderate. Medical facilities are adequate for current needs, but would be stressed if forced to deal with a major disease outbreak.

4.1.13.3 Risk Assessment

At the time of publication, no model was available to determine the potential loss associated with epidemics in St. Lucie County.

4.2 TECHNOLOGICAL HAZARDS

This subsection will now identify those hazards in St. Lucie County identified as being technological hazards.

4.2.1 Radiological Accidents

4.2.1.1 Hazard Identification

While an actual release of radioactive material is extremely unlikely and the immediate threat to life extremely low, vulnerability to a nuclear plant disaster could consist of long range health effects with temporary and permanent displacement of population from affected areas. The potential danger from an accident at a nuclear power plant is exposure to radiation. This exposure could come from the release of radioactive material from the plant into the environment, usually characterized by a plume (cloudlike) formation. The area the radioactive release may affect is determined by the amount released from the plant, wind direction and speed, and weather conditions (e.g., rain), which would quickly drive the radioactive material into the ground, hence causing increased deposition of radionuclides.

Thirty of the 67 counties in the State of Florida are involved in preparedness planning for a commercial nuclear power plant emergency. Emergency Planning Zones (EPZs) have been designated for each power plant to enhance planning efforts for an emergency. An EPZ is comprised of two zones, the 10-mile plume exposure zone and the 50-mile ingestion exposure zone (Nuclear Energy Institute, 2004). Specific coordinating procedures for response to a General Emergency at a nuclear power plant have been prepared in the form of Standard Operating Procedures. These include Emergency Classification Levels, which assist in notifying the public if a problem occurs at a plant. They are defined by four categories (FEMA, 2004):

- Notification of Unusual Event - The event poses no threat to plant employees, but emergency officials are notified. No action by the public is necessary.
- Alert - An event has occurred that could reduce the plant's level of safety, but back-up systems still work. Emergency agencies are notified and kept informed, but no action by the public is necessary.
- Site Area Emergency - The event involves major problems with the plant's safety and has progressed to the point that a release of some radioactivity into the air or water is possible, but is not expected to exceed EPA Protective Action Guidelines (PAGs). Thus, no action by the public is necessary.

- General Emergency - The event has caused a loss of safety systems. If such an event occurs, radiation could be released that would penetrate the site boundary. State and local authorities will take action to protect the residents living near the plant. The alert and notification system will be sounded. People in the affected areas could be advised to evacuate, or in some situations, to shelter in place. When the sirens are sounded, radio and television alerts will have site-specific information and instructions.

The St. Lucie nuclear power generation plant is located 12 miles southeast of the City of Fort Pierce on Hutchinson Island in St. Lucie County. The facility contains two reactors and is owned and operated by the Florida Power & Light Company. Counties within the 50-mile EPZ include all or portions of St. Lucie, Martin, Glades, Osceola, Okeechobee, Brevard, Highlands, Palm Beach, and Indian River.

The Florida Power & Light St. Lucie Nuclear Power Plant is located on south Hutchinson Island, and all of St. Lucie County falls within the 50-mile radius EPZ for that plant. This means that virtually all of St. Lucie County is extremely vulnerable to a nuclear power plant accident. Fortunately, the frequency with which nuclear power plant accidents occur is very low, and the overall risk to the citizens of St. Lucie County is therefore considered low.

4.2.1.2 Vulnerability Assessment

Nuclear emergency is perhaps the single hazard facing St. Lucie County that has received massive emergency management attention at all levels of government. Emergency management planning and regulation relative to nuclear power plant accidents exists at the Federal, State, local, and corporate levels. Drills are held routinely, and the Nuclear Regulatory Commission as well as several other Federal agencies require extensive documentation. Contingency planning for nuclear accidents at the plant itself appears to be well in hand. Of more risk to the citizens of St. Lucie County is the transport of fissionable material to and from the plant. Such material transfers are handled with a great deal of care, and there has never been a significant accident during such transfers. Again, while St. Lucie County's vulnerability to such accidents is high, the risk that this hazard will produce an impact within the community appears to be low.

Radiological accidents can have the following potential impacts on a community:

- Electric power outage;
- Surface and air transportation disruption;
- Telecommunications system outage;
- Human and health safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services;
- Damage to critical environmental resources; and
- Toxic releases.

4.2.1.3 Risk Assessment

At the time of publication, no data were available to determine the potential loss associated with a radiological accident in St. Lucie County.

4.2.2 Power Failures (Outages)

4.2.2.1 Hazard Identification

Power failure can result from a variety of related causes, including sagging lines due to hot weather, flashovers from transmission lines to nearby trees, and incorrect relay settings. According to the electric utility industry's trade association, the potential for such disturbances is expected to increase with the profound changes now sweeping the electric utility industry.

To address times when generating capacity is tight, or falls below consumer demand due to State or local emergencies, the Florida Electrical Emergency Contingency Plan was developed. Alerts have been created to give early warning of potential electricity shortfalls and bring utilities, emergency management officials, and the general public to a state of preparedness. The Contingency Plan has four stages (Florida Reliability Coordinating Council, 2004):

- Generating Capacity Advisory - A Generating Capacity Advisory is primarily for information purposes. It starts utility tracking activities, and it initiates inter-utility and inter-agency communication. No action by the public is required. General information may be distributed to consumers to forewarn them of conditions if necessary.
- Generating Capacity Alert - A Generating Capacity Alert starts actions to increase reserves. Available emergency supply options will be explored. When reserves fall below the size of the largest generating unit in the state, loss of that size unit to an unexpected mechanical failure could lead to blackouts somewhere since insufficient backup is available.
- Generating Capacity Emergency - A Generating Capacity Emergency occurs when blackouts are inevitable somewhere in Florida. Every available means of balancing supply and demand will be exhausted. Rolling blackouts, manually activated by utilities, are a last resort to avoid system overload and possible equipment damage. Frequent status reports are provided to agencies and the media. The Division of Emergency Management will consider using the Emergency Broadcast System to inform citizens of events and to direct them to available shelters if conditions warrant. Recognizing the consequences of a loss of electricity, individual utility emergency plans include provisions for special facilities critical to the safety and welfare of citizens.
- System Load Restoration - System Load Restoration is instituted when rolling blackouts have been terminated and power supply is adequate. It is the recovery stage, and efforts are made to provide frequent system status reports.

Historic Events. In the U.S., from July 2 to August 10, 1996, the Western States Utility Power Grid reported widespread power outages that affected millions of customers in several western states and adjacent areas of Canada and Mexico.

A massive power outage struck the northeast on Thursday, August 14, 2003. Areas affected by the outage included: New York City and Albany, New York; Cleveland and Toledo, Ohio; Detroit and Lansing, Michigan; parts of New Jersey and Connecticut; as well as Toronto and Ontario, Canada. The most extensive power failure in history, it shut down 10 major airports, 9 power plants, affected 50 million people, and led to a declared State of Emergency in New York City. The Ford Motor Company lost production capability at 21 of its facilities. Two deaths and 71 fires were attributed to the outage in New York City alone (Gellman and Milbank, 2003). The preliminary economic impacts of this event are large. It is estimated that the power failure cost approximately $1 billion including $800 million in unsold goods and services and $250 million in spoiled food.

4.2.2.2 Vulnerability Assessment

Power failures have the same potential impacts in all St. Lucie County communities. The vulnerability of all communities to power failures is considered low. The power grid throughout St. Lucie County is diversified, and there are no single choke points or distribution nodes whose failure would disrupt power distribution to the entire community.

Power failure can have the following potential impacts on a community:

- Electric power outage;
- Surface and air transportation distribution;
- Potable water system loss or disruption;
- Sewer system outage;
- Telecommunications system outage;
- Human and health safety;
- Psychological hardship;
- Economic disruption; and
- Disruption of community services.

4.2.2.3 Risk Assessment

At the time of publication, no model was available to determine the potential loss associated with power failure in St. Lucie County.

4.2.3 Hazardous Materials Accidents

4.2.3.1 Hazard Identification

Hazardous materials accidents can occur anywhere there is a road, rail line, pipeline, or fixed facility storing hazardous materials. Virtually the entire state is at risk to an unpredictable accident of some type. Most accidents are small spills and leaks, but some result in injuries, property damage, environmental contamination, and other consequences. These materials can be poisonous, corrosive, flammable, radioactive, or pose other hazards and are regulated by the Department of Transportation. However, out of approximately

1,663 hazardous materials incidents reported statewide in 1997, no known fatalities were reported, less than 4% resulted in injuries, and less than 6% resulted in evacuation.

Emergencies involving hazardous materials can be expected to range from a minor accident with no off-site effects to a major accident that may result in an off-site release of hazardous or toxic materials. The overall objective of chemical emergency response planning and preparedness is to minimize exposure for a wide range of accidents that could produce off-site levels of contamination in excess of Levels of Concern established by the EPA. Minimizing this exposure will reduce the consequences of an emergency to people in the area near to facilities that manufacture, store, or process hazardous materials (Treasure Coast Regional Planning Council, 1998).

A large volume of hazardous materials is transported to and through the County by railroad and highway, air, water, and pipeline daily. Within St. Lucie County, there are a number of both public and private fixed facilities that produce or use hazardous materials. Coordinating procedures for hazardous material response are found within the County's Emergency Plan for Hazardous Materials.

In addition to the County's Emergency Plan for Hazardous Materials, Local Emergency Planning Committee officials have prepared a plan for use in responding to and recovering from a release of hazardous or toxic materials. This plan addresses the range of potential emergency situations and the appropriate measures to be implemented to minimize exposure through inhalation, ingestion, or direct exposure (Treasure Coast Regional Planning Council, 1998).

Mishandling and improper disposal or storage of medical wastes and low-level radioactive products from medical use also are a hazard to St. Lucie County. For example, a few years ago an incident occurred in New Jersey where improper disposal of medical wastes resulted in some of the used products ending up on Atlantic Ocean beaches.

Historical Events. In September of 1999, a sewage spill released 8,500,000 gallons of sewage into the Indian River Lagoon. In July of 2000, a fertilizer fire at the Lykes Manufacturing Plant created a chemical fire. In October of 2001, the Health Department organized and coordinated the County's response to potential anthrax incidents. The estimated cost of response for the department is estimated at $46,481.

4.2.3.2 Vulnerability Assessment

Hazardous materials events can have the following potential impacts within a community:

- Surface and air transportation disruption;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services;
- Fire; and
- Toxic releases.

A community's vulnerability to hazardous materials accidents depends on three factors. These are:

1) The major transportation routes that pass through the community;
2) The hazardous material generators located in or near the community; and
3) The resources in terms of people and property are in an area of possible impact from a hazardous materials release.

Overall, unincorporated St. Lucie County has a low vulnerability to impacts from hazardous materials releases. There are relatively few major generators within the County, and those that do exist are generally away from major population centers.

Specific areas with higher vulnerability for hazardous materials accidents are along the transportation network (both highway and rail) that pass through the County. The jurisdictions of Fort Pierce and St. Lucie Village are extremely vulnerable to toxic material spills and releases from transportation system accidents, primarily rail accidents, as is the unincorporated area along South Indian River Drive. The Florida East Coast Rail Road runs through downtown Fort Pierce and directly adjacent to South Indian River Drive and St. Lucie Village. Toxic material spills have occurred along the rail line, and given the right set of circumstances, such releases could produce significant detrimental effects on life and property.

Because of its location relative to the St. Lucie nuclear power plant, all of St. Lucie County has a high vulnerability to a nuclear power plant accident or nuclear materials release. While the County's level of vulnerability is high, the frequency with which nuclear power plant accidents occur is very low, and the overall risk to the citizens of St. Lucie County is therefore considered low. Nuclear emergency is perhaps the single hazard facing St. Lucie County, which has received massive emergency management attention at all levels of government. Emergency management planning and regulation relative to nuclear power plant accidents exists at all levels, Federal, State, local, and corporate. This hazard has not been extensively addressed in St. Lucie County.

4.2.3.3 Risk Assessment

At the time of publication, no model was available to determine the potential loss associated with hazardous materials accidents in St. Lucie County.

4.2.4 Transportation System Accidents

4.2.4.1 Hazard Identification

Florida has a large transportation network consisting of major highways, airports, marine ports, and passenger railroads. The heavily populated areas of St. Lucie County are particularly vulnerable to serious accidents, which are capable of producing mass casualties. With the linear configuration of several major highways in St. Lucie County, such as interstate highways and the Florida Turnpike, major transportation accidents could occur in a relatively rural area, severely stressing the capabilities of local resources to respond effectively. A recent notorious example is the crash in the Everglades of ValuJet Flight 597 on May 11, 1996, which resulted in 109 fatalities and cost of millions of dollars, severely taxing the financial and public safety resources of Dade County. Similarly, a major transportation accident could involve a large number of tourists and visitors from other

countries, given Florida's popularity as a vacation destination, further complicating the emergency response to such an event.

As a major industrial nation, the U.S. produces, distributes, and consumes large quantities of oil. Petroleum-based oil is used as a major power source to fuel factories and various modes of transportation, and in many everyday products, such as plastics, nylon, paints, tires, cosmetics, and detergents (EPA, 1998). At every point in the production, distribution, and consumption process, oil is stored in tanks. With billions of gallons of oil being stored throughout the country, the potential for an oil spill is significant, and the effects of spilled oil can pose serious threats to the environment.

In addition to petroleum-based oil, the U.S. consumes millions of gallons of non-petroleum oils, such as silicone and mineral-based oils and animal and vegetable oils. Like petroleum products, these non-petroleum oils are often stored in tanks that have the potential to spill, causing environmental damages that are just as serious as those caused by petroleum-based oils. To address the potential environmental threat posed by petroleum and non-petroleum oils, the EPA has established a program designed to prevent oil spills. The program has reduced the number of spills to less than 1% of the total volume handled each year (EPA, 1998).

St. Lucie County has about 22 miles of Atlantic Ocean coastline that is subject to contamination caused by an oil spill. By Executive Order, the responsibility for preparing response plans for coastal oil spills is designated to the DEP, Division of Florida Marine Patrol (Indian River County Department of Emergency Services, 1998). The Florida Coastal Pollutant Spill Plan has been prepared to coordinate response procedures and recovery efforts after a spill. There are two active oil field regions in Florida: in Escambia and Santa Rosa counties in the Panhandle, and Collier, Dade, Hendry, and Lee counties in southwest Florida.

4.2.4.2 Vulnerability Assessment

Transportation system accidents can have the following potential impacts within a community:

- Surface and air transportation disruption;
- Navigable waterway impairment;
- Human health and safety;
- Economic disruption;
- Disruption of community services; and
- Fire.

There are no longer any commercial airlines flying into the St. Lucie Municipal Airport, but the airport is a major general aviation facility for the region. There are two large flight schools, a number of commercial aircraft construction and maintenance operations, and a considerable amount of private and charter air traffic. The airport is located directly to the north of the City of Fort Pierce, and the runway approaches pass directly over St. Lucie Village. Aviation is an important element of the economy in St. Lucie County, and this activity raises the County's vulnerability to aviation associated accidents.

Vulnerability to transportation system accidents is also associated with the highway and rail systems that run through the County. Individual community and population center vulnerabilities to this hazard are entirely dependent upon location. The City of Fort Pierce is the County's major transportation hub, with rail yards, trucking centers, and a port. Transportation accidents have created blockages of highways within the City. Due to their locations along the rail line, both St. Lucie Village and unincorporated South Indian River Drive have higher vulnerabilities to rail system accidents. St. Lucie Village also is more vulnerable to plane crashes due to its location relative to the St. Lucie airport. The western, unincorporated portion of the County and City of Port St. Lucie has higher vulnerability to major highway accidents due to the presence of I-95 and the Florida Turnpike.

The Port of Fort Pierce is located within the Indian River Lagoon, a designated National Estuary under the EPA's National Estuary Program (Section 320 - 33 USC 1330) of the Clean Water Act. As such, this Port is by definition located within an environmentally sensitive area. Spills of any type in such areas are of more significance due to the sensitive nature of the environmental resources seen there.

4.2.4.3 Risk Assessment

At the time of publication, data were not available to determine the potential loss in St. Lucie County due to transportation system accidents.

4.2.5 Wellfield Contaminations

4.2.5.1 Hazard Identification

The development of wellfield protection programs is a major preventative approach for the protection of community drinking water supplies. Wellfield protection is a means of safeguarding public water supply wells by preventing contaminants from entering the area that contributes water to the well or wellfield over a period of time. Management plans are developed for the wellfield protection area that include inventorying potential sources of ground water contamination, monitoring for the presence of specific contaminants, and managing existing and proposed land and water uses that pose a threat to ground water quality.

Ground water is an essential natural resource. It is a source of drinking water for more than half of the U.S. population and more than 95% of the rural population (Browning, 1998). In addition, ground water is a support system for sensitive ecosystems, such as wetlands or wildlife habitats.

Between 1971 and 1985, there were 245 ground water related outbreaks of disease, resulting in more than 52,000 individuals being affected by associated illnesses (Browning, 1998). While most of these diseases were short-term digestive disorders caused by bacteria and viruses, hazardous chemicals found in wells nationwide also pose risks to public health.

The 1986 Amendments to the Federal Safe Drinking Water Act require states to implement wellfield protection programs for public water wells. Prevention strategies include maintaining isolation distances from potential contamination sources, reporting to the state violations of the isolation distance, and asking a local governmental unit to regulate these sources.

Cleaning up contaminated ground water can be technically difficult, extremely expensive, and sometimes simply cannot be done. Contaminated ground water also affects the community by discouraging new businesses or residents from locating in that community.

4.2.5.2 Vulnerability Assessment

Wellfield contamination can have the following potential impacts within a community:

- Potable water system loss or disruption;
- Sewer system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption; and
- Disruption of community services.

St. Lucie County's Conservation Element of the Comprehensive Growth Management Plan contains a policy regarding wellfield protection. The policy (8.1.5.1) outlines the following standards for wellfield protection within the County:

1) Assure adequate and safe water supplies to present and future citizens of the County;
2) Comply with Federal and State regulations in the best interests of the County and its future growth and development;
3) Avoid crisis water supply situations through careful groundwater resources planning and conservation;
4) Identify and protect the functions of public wellfield areas, including recharge of those areas, and provide incentives to keep the present and future public well fields compatible with the needs expressed in 1) above;
5) Ensure that new development is compatible with existing local and regional water supply capabilities; and
6) Protect present and future public well fields against depletion and contamination through appropriate regulation, incentives, and cooperative agreements.

Section 6.03.00 of the St. Lucie County Land Development Code also outlines requirements for protecting wellfields within the County. Wellfield contamination has not been a major problem for most of St. Lucie County. There is some potential exposure to this hazard in the eastern portion of the County, but overall the County vulnerability to this hazard is considered low.

4.2.5.3 Risk Assessment

At the time of publication, no data were available to determine the potential loss associated with wellfield contamination in St. Lucie County.

4.2.6 Communications Failures

4.2.6.1 Hazard Identification

As society emerges from industrial production into the age of information, we are seeing new kinds of technological accidents/disasters. Recently, a communications failure occurred that was the worst in 37 years of satellite service. Some major problems with the telecommunications satellite Galaxy IV drastically affected 120 companies in the paging industry (Rubin, 1998). Radio and other forms of news broadcasts also were affected. The pager failure not only affected personal and business communications, but emergency managers and medical personnel as well.

4.2.6.2 Vulnerability Assessment

Communications failures can have the following potential impacts within a community:

- Telecommunications system outage;
- Economic disruption; and
- Disruption of community services.

Communications failures have a greater potential to produce adverse economic impacts in business-based rather than retirement or residential communities. On the other hand, communications system failures in residential and retirement communities may put more human lives at risk. St. Lucie County's vulnerability to communications systems failures is generally considered moderate. The City of Fort Pierce and U.S. Highway 1 corridor throughout the County have higher vulnerabilities to this hazard. Fort Pierce is the center of government and business within the County, and there is an extensive concentration of business activity along the U.S. Highway 1 corridor throughout the County. Other concentrations of business and financial activity include Port St. Lucie Boulevard in the City of Port St. Lucie, and certain areas of Prima Vista Boulevard, also in the City of Port St. Lucie. Basically, St. Lucie County's vulnerability to this hazard is no greater or less than most other Florida coastal counties.

4.2.6.3 Risk Assessment

At the time of publication, no data were available to determine the potential loss in St. Lucie County due to communications failure.

4.2.7 Military Ordnance

4.2.7.1 Hazard Identification

Unexploded military ordnance is a hazard unique to St. Lucie and Indian River counties. The former Fort Pierce Naval Amphibious Training Base was established in 1942, and its training exercises were conducted on outlying areas of North and South Hutchinson Islands. Training at the base included testing of bombs, rockets, and mines. Several explosive devices left over from these training missions have been found along the shores of Vero Beach and Fort Pierce. Public exposure to unexploded ordnance could occur primarily as a result of three types of activities: earth moving (building construction, pool construction, and major landscaping), recreational diving, and use of beach areas.

Unexploded ordnance also may wash ashore or be exposed after storms (Indian River County Department of Emergency Services, 1998). Prior clean up operations have been coordinated by the U.S. Army Corps of Engineers (Jacksonville office) with the full cooperation of the St. Lucie County Department of Emergency Management.

4.2.7.2 Vulnerability Assessment

Unexploded military ordnance can have the following potential impacts within a community:

- Human and health safety;
- Psychological hardship;
- Damage to critical environmental resources; and
- Toxic releases.

There is some exposure to risk from unexploded military ordnance along St. Lucie County beaches, but the overall vulnerability of County residents to this hazard is very low. The communities most vulnerable to this hazard are those immediately north of the Fort Pierce Inlet on Hutchinson Island. While old military ordnance does occasionally surface along these beaches, there has never been a case where the ordnance was still live.

4.2.7.3 Risk Assessment

At the time of publication, no data were available to determine the potential loss in St. Lucie County due to unexploded military ordnance.

4.3 SOCIETAL HAZARDS

This subsection will now identify those hazards in St. Lucie County identified as being societal hazards.

4.3.1 Terrorism and Sabotage

4.3.1.1 Terrorism

Terrorist attacks may take the form of induced dam or levee failures, the use of hazardous materials to injure or kill, or the use of biological weapons to create an epidemic. While there have not been any successful acts of terrorism committed in Florida in recent years, it is recognized that the state has many critical and high-profile facilities, high concentration of population, and other potentially attractive venues for terrorist activity that are inherently vulnerable to a variety of terrorist methods. Governmental/political, transportation, commercial, infrastructure, cultural, academic, research, military, athletic, and other activities and facilities constitute ideal targets for terrorist attacks, which may cause catastrophic levels of property and environmental damage, injury, and loss of life. Furthermore, a variety of extremist groups are known to operate within Florida, and potential terrorist attacks have been investigated and averted in recent years (Indian River County Department of Emergency Services, 2002).

Acts of terrorism are capable of creating disasters, which threaten the safety of a large number of citizens. The U.S. has been relatively untouched by the storm of terrorist activities experienced in other parts of the world; however, in recent years, an increasing incidence of terrorism has been recorded in this nation.

The Federal government has recognized that the U.S. has entered the post-Cold War era. As a result, Federal planning guidelines regarding military threats are in transition. However, nuclear weapons continue to be a serious planning concern especially in areas surrounding military installations (Indian River County Department of Emergency Services, 1998). Those involved with the emergency management of government monitor the influx of undocumented aliens into south Florida from areas unfriendly to the interest of the U.S.

Historical Events. On September 11, 2001, terrorists attacked the World Trade Center in New York City and the Pentagon in Washington, DC, crashing hijacked commercial airplanes into the structures. All told, approximately 3,000 civilians and emergency response personnel perished in the attack. The long-term economic and psychological impacts of this event are astounding. New York City alone experienced capital losses totaling $34 million. The attack on the World Trade Center resulted in a loss of 12.5 million ft^2 of office space and damaged 7.7 million more. The insured losses associated with the event totaled $52 million. The City estimates that 125,300 jobs were lost because of the attack (National Conference of State Legislatures, 2003). The September 11th attacks also had local connections to Indian River County as some of the New York City terrorists received flight training at the Vero Beach Municipal Airport.

4.3.1.2 Computer Accidents and Sabotage

The President's Commission on Critical Infrastructure Protection (PCCIP) recently reported that there is increasing threat that the U.S. could suffer something similar to an "Electronic Pearl Harbor" (Rubin, 1998). Networked information systems present new security challenges in addition to the benefits they offer. Long-term power outages could cause massive computer outages, with severe economic impacts such as loss of sales, credit checking, banking transactions, and ability to communicate and exchange information and data. "Today, the right command sent over a network to a power generating station's control computer could be just as effective as a backpack full of explosives, and the perpetrator would be harder to identify and apprehend," states the PCCIP's report.

With the growth of a computer-literate population, increasing numbers of people possess the skills necessary to attempt such an attack. The resources to conduct a cyber attack are now easily accessible everywhere. A personal computer and an Internet service provider anywhere in the world are enough to cause a great deal of harm. Threats include (Rubin, 1998):

- Human error;
- Insider use of authorized access for unauthorized disruptive purposes;
- Recreational hackers - with or without hostile intent;
- Criminal activity - for financial gain, to steal information or services, or organized crime;
- Industrial espionage;

- Terrorism - including various disruptive operations; and
- National intelligence - information warfare, intended disruption of military operations.

The effects of such activities may take the form of disruption of air traffic controls, train switches, banking transfers, police investigations, commercial transactions, defense plans, power line controls, and other essential functions. As the Internet becomes more and more important, the loss of its services, whether by accident or intent, becomes a greater hardship for those relying on this new form of communication. Computer failures could affect emergency communications as well as routine civilian applications, such as telephone service, brokerage transactions, credit card payments, Social Security payments, pharmacy transactions, airline schedules, etc.

4.3.1.3 Vulnerability Assessment

Terrorism and sabotage events can have the following potential impacts within a community:

- Electric power outage;
- Surface and air transportation disruption;
- Potable water system loss or disruption;
- Telecommunications system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Damage to critical environmental resources;
- Damage to identified historical resources;
- Fire; and
- Toxic releases.

The possibilities for terrorism and sabotage in St. Lucie County are limited, and the County's vulnerability to this hazard is low. The City of Fort Pierce has a slightly higher vulnerability to terrorism as it is the center of government and also because of the role played by aviation in the local economy, but this vulnerability is still considered low.

4.3.1.4 Risk Assessment

At the time of publication, no data were available to determine the potential loss in St. Lucie County due to terrorism.

4.3.2 Civil Disturbance

4.3.2.1 Hazard Identification

As in any other area, St. Lucie County is subject to civil disturbances in the form of riots, mob violence, and a breakdown of law and order in a focalized area. Communities with racial mixtures, gang violence, and drug trafficking are increasingly aware of the need to plan for civil disturbance emergencies (Indian River County Department of Emergency Services, 1998). Although they can occur at any time, civil disturbances are often preceded by periods of increased tension caused by questionable social and/or political events such

as controversial jury trials or law enforcement actions. Police services are responsible for the restoration of law and order in any area of the County.

4.3.2.2 Vulnerability Assessment

Civil disturbance can have the following potential impacts within a community:

- Surface and air transportation disruption;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services; and
- Damage to identified historical resources.

The overall potential for civil disturbance in St. Lucie County is considered low. The City of Fort Pierce, however has a relatively high vulnerability to this hazard. There has been significant civil unrest in certain areas of this City in the past, and a significant potential for such unrest remains. Recently (within the last 3 years), the potential for civil disturbance appears to have been reduced as a result of community-based police activities.

4.3.2.3 Risk Assessment

At the time of publication, no data were available to determine the potential loss in St. Lucie County due to civil unrest.

4.3.3 Immigration Crises

4.3.3.1 Hazard Identification

Florida's location as the nearest U.S. landmass bordering the Caribbean basin makes it a chosen point of entry for many migrants attempting to enter the country illegally. A mass arrival of illegal immigrants to a community could be disruptive to the routine functioning of the impacted community, resulting in significant expenditures related to the situation. An example of this threat occurred in 1994, when the state responded to two mass migration incidents. In May 1994, there was an unexpected migration of approximately 100 Haitian refugees; while in August 1994, there was an influx of 700 Cubans. These events are typically preceded by periods of increasing tension abroad, which can be detected and monitored. Enforcement of immigration laws is a Federal government responsibility. However, it is anticipated that joint jurisdictional support of any operation will be required from the State and local governments.

The Atlantic shore of St. Lucie County is the frequent scene of the arrival of undocumented aliens, usually Haitian or Cuban (Indian River County Emergency Management Division, 2002). The County has both the history and the potential for the unannounced arrival of a large number of aliens. Until relieved of the responsibility by the State and Federal governments, St. Lucie County must be capable of providing mass refugee care to include shelter, food, water, transportation, medical, police protection, and other social services.

4.3.3.2 Vulnerability Assessment

Immigration crises can have the following potential impacts within a community:

- Human health and safety;
- Psychological hardship;
- Economic disruption; and
- Disruption of community services.

Reviewing the data on past illegal immigration and mass population movements such as the Haitian influx and Cuban raft incidents of the 1980s indicates that illegal immigration has never reached a crisis state for the local authorities in St. Lucie County. St. Lucie County's vulnerability to this hazard is moderate, however, due to demographic features. The City of Fort Pierce has a slightly higher vulnerability to illegal immigration impacts due to its large population of Latin American and Caribbean immigrants.

4.3.3.3 Risk Assessment

At the time of publication, no data were available to determine the potential loss in St. Lucie County due to immigration crises.

4.3.4 Societal Alienation

4.3.4.1 Hazard Identification

The term "societal alienation" as used here applies to a variety of social problems including homelessness, behavioral problems, and mental health issues. St. Lucie County is a relatively poor County by Florida east coast standards, and many of its citizens are more vulnerable to these types of societal alienation problems than the citizens of neighboring, more affluent jurisdictions.

4.3.4.2 Vulnerability Assessment

St. Lucie County has a higher vulnerability to the complex of problems caused by "societal alienation" than more affluent counties along Florida's east coast. If crime rate is used as an indicator, St. Lucie County's vulnerability in these areas has been reduced over the last few years. This reduction may be attributed to some social programs and grants.

Social alienation can have the following impacts on a community:

- Human health and safety; and
- Psychological hardship.

4.3.4.3 Risk Assessment

At the time of publication, no data were available to determine the potential loss in St. Lucie County due to societal alienation.

4.3.5 Substance Abuse

4.3.5.1 Hazard Identification

Substance abuse as described here includes drug and alcohol problems, as well as child, spouse, and elder person abuse. Again, the relatively lower household income of St. Lucie County citizens renders them more vulnerable to these societal hazards than some of their more affluent neighbors. The social net in terms of both public and private financial reserves is thin here, and any additional stress rapidly exacerbates societal problems.

4.3.5.2 Vulnerability Assessment

Traditionally St. Lucie County has had a high vulnerability to both drug and alcohol abuse and the associated social problems of spouse and child abuse. Again, based on police records, it appears that progress is being made in improving this situation, but the County margin for this hazard is still thin, and vulnerability remains high even though the frequency of occurrence has been reduced.

Substance abuse can have the following impacts on a community:

- Human health and safety; and
- Psychological hardship.

4.3.5.3 Risk Assessment

At the time of publication, no data were available to determine the potential loss in St. Lucie County due to substance abuse.

4.3.6 Economic Collapse (Recession/Depression)

4.3.6.1 Hazard Identification

St. Lucie County has three main sources of income and employment: agriculture, tourism, and construction. These industries are notoriously susceptible to the vagaries of the national and international economic situation. There is no manufacturing and very little service industry economic base, and while St. Lucie County does have its share of retired citizens, these individuals tend to be living on fixed incomes without large personal retirement plans. All these socioeconomic and demographic features combine to make St. Lucie County particularly vulnerable to the effects of economic downturn.

4.3.6.2 Vulnerability Assessment

St. Lucie County is more vulnerable to the impacts of economic fluctuations than many counties in south Florida because it is dependent on a relatively narrow economic base. Some of the economic base's key components such as agriculture, tourism, and construction are heavily impacted by economic downturns. Unfortunately, recognizing a problem and being able to correct it are two very different things. There is very little St. Lucie County can do to control national or global economic fluctuation. The most effective steps the County can take to harden itself against the effects of recession or depression are to continue its efforts to diversify the economic base as much as possible. Long-term planning in the area of public health and safety should take into consideration

that an economic downturn will exacerbate all of the social and societal problems faced by the County. Police and social service agencies need to be prepared for this eventuality.

Social alienation can have the following impacts on a community:

- Human health and safety;
- Psychological hardship;
- Economic disruption; and
- Disruption of community services.

4.3.6.3 Risk Assessment

At the time of publication, no data were available to determine the potential loss in St. Lucie County due to economic collapse.

4.4 HAZARDS SUMMARY

St. Lucie County's proximity to water and large population concentrations contribute to the heightened potential for property and content damage, loss of life, community and emergency service disruption, and economic losses due to flooding and storm surge. Another key vulnerability factor making St. Lucie County at risk to wildland fire is the current pattern of "patchwork" development. This development pattern leaves undeveloped parcels scattered throughout developments creating the opportunity for fire to move throughout a neighborhood.

St. Lucie County is a large and diversified County and while all County residents are exposed to some degree to the hazards identified in **Table 4.24**, geographic location as well as other factors greatly affects individual vulnerabilities to specific hazards. While there are only three incorporated jurisdictions in St. Lucie County, there are several geographically distinct urbanized population centers, and their relative vulnerabilities also have been indicated in **Table 4.24**.

Table 4.25 summarizes St. Lucie County's risk or potential for loss relative to each of the hazards identified.

Table 4.24. St. Lucie County hazard vulnerability by incorporated jurisdiction and population centers.

Hazard Category	Incorporated Jurisdictions			Unincorporated Population Centers						
	St. Lucie Village	City of Fort Pierce	City of Port St. Lucie	Unincorporated Hutchinson Island	South Indian River Drive	North Beach Area	White City Area	Lakewood Park Area	West County Area	Overall County Vulnerability
Natural Disasters										
Floods	●	●	●	●	_	●	●	●	●	●
Hurricane/tropical storm	●	●	●	●	●	●	●	●	●	●
Tornado	⊖	_	⊖	⊖	⊖	_	⊖	_	⊖	⊖
Severe thunderstorm/lightning	_	●	●	_	_	_	_	_	⊖	_
Drought	⊖	⊖	⊖	⊖	⊖	⊖	⊖	⊖	_	_
Temperature extremes	⊖	_	⊖	⊖	⊖	⊖	_	_	●	_
Agricultural pests and disease	⊖	⊖	⊖	⊖	⊖	⊖	_	_	●	_
Wildland/Urban Interface Zone	_	_	●	⊖	_	⊖	_	●	●	_

● = High, _ = Moderate, ⊖ = Low, ○ = Very Low

Table 4.24. (Continued).

Hazard Category	Incorporated Jurisdictions			Unincorporated Population Centers						
	St. Lucie Village	City of Fort Pierce	City of Port St. Lucie	Unincorporated Hutchinson Island	South Indian River Drive	North Beach Area	White City Area	Lakewood Park Area	West County Area	Overall County Vulnerability
Muck fires	○	○	○	○	○	○	○	○	○	○
Soil/beach erosion	⊖	●	⊖	_	_	_	○	○	○	_
Epidemic	⊖	_	_	⊖	_	⊖	_	_	○	_
Seismic hazards	○	○	○	○	○	○	○	○	○	○
Technological Hazards										
Hazardous materials accident	_	●	_	○	⊖	○	⊖	⊖	_	⊖
Radiological accidents including nuclear power plant accidents	●	●	●	●	●	●	●	●	●	●
Communications failure	⊖	_	_	⊖	⊖	⊖	⊖	⊖	○	⊖
Transportation system accidents	●	●	_	○	_	○	⊖	⊖	⊖	⊖

● = High, _ = Moderate, ⊖ = Low, ○ = Very Low

Table 4.24. (Continued).

Hazard Category	Incorporated Jurisdictions			Unincorporated Population Centers						
	St. Lucie Village	City of Fort Pierce	City of Port St. Lucie	Unincorporated Hutchinson Island	South Indian River Drive	North Beach Area	White City Area	Lakewood Park Area	West County Area	Overall County Vulnerability
Wellfield contamination	⊖	_	⊖	⊖	⊖	⊖	⊖	⊖	○	⊖
Power failure (outages)	_	_	_	⊖	⊖	⊖	⊖	⊖	○	⊖
Unexploded military ordnance	○	⊖	○	⊖	○	_	○	○	○	○
Societal Hazards										
Civil disturbance	○	_	⊖	○	○	○	⊖	⊖	○	○
Terrorism and sabotage	○	⊖	⊖	○	○	○	○	○	○	○
Immigration crisis	○	_	⊖	○	○	○	○	○	○	○

● = High, _ = Moderate, ⊖ = Low, ○ = Very Low

Table 4.24. (Continued).

Hazard Category	Incorporated Jurisdictions			Unincorporated Population Centers						
	St. Lucie Village	City of Fort Pierce	City of Port St. Lucie	Unincorporated Hutchinson Island	South Indian River Drive	North Beach Area	White City Area	Lakewood Park Area	West County Area	Overall County Vulnerability
Societal alienation	⊖	_	_	⊖	○	⊖	⊖	⊖	⊖	⊖
Abuse	⊖	_	_	⊖	_	⊖	⊖	⊖	⊖	⊖
Economic collapse	_	○	_	_	_	⊖	_	_	_	_

● = High, _ = Moderate, ⊖ = Low, ○ = Very Low

Table 4.25. Risk assessment and hazard evaluation for St. Lucie County.

Hazard Category	Hazard Evaluation			
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)
Natural Hazards				
Floods	Flooding significant enough to damage property occurs regularly in St. Lucie County. This is particularly true in unincorporated areas and in the City of Fort Pierce.	Countywide vulnerability is high but area specific.	Property damage along the coast of St. Lucie County occurs most often in the late winter or early spring and is associated with winter storms and northeasters. Flooding in the inland portions of the County occurs most often in the fall and is often associated with tropical depressions and tropical storms. Incidences of flooding in specific areas of St. Lucie County seem to be on the increase. Total flooding exposure based on data from the Mapping for Emergency Management, Parallel Hazard Information System (MEMPHIS) database is $1,440,244,876	Frequency = High Vulnerability = High Exposure = High Risk = High
Hurricanes/Tropical Storms				
Tropical Storms	Pass within 100 nmi of St. Lucie County once or twice every year.	High from rain-associated flooding damages; relatively low from wind damage.	The major causes of damage associated with tropical storms are heavy rain and flooding. Many communities within St. Lucie County have particularly high vulnerabilities to flooding associated with these storms. Total tropical storm exposure for St. Lucie County based on 1999 The Arbiter of Storms (TAOS) is $615,451,161	Frequency = High Vulnerability = High Exposure = Moderate Risk = High

Table 4.25. (Continued).

Hazard Category	Hazard Evaluation			
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)
Category 1 Hurricanes	Pass within 100 nmi of St. Lucie County once every 3.1 years.	High from rain-associated flooding; moderate from wind damage.	The continental shelf off St. Lucie County is beginning to widen. Consequently, St. Lucie County's vulnerability to storm surges from the Atlantic is relatively higher when compared to counties to the south. Total Category 1 hurricane exposure for St. Lucie County based on MEMPHIS is Water: $984,876,340 Wind: Light Damage - $7,171,248,640	Frequency = High Vulnerability = High Exposure = High Risk = High
Category 2 Hurricanes	Pass within 100 nmi of St. Lucie County once every 5.3 years.	High from rain-associated flooding; significant from wind damage.	Winds in Category 2 storms range from 96 to 110 mph. Significant damage is possible in older wood frame residential construction. Total Category 2 hurricane exposure for St. Lucie County based on MEMPHIS is Water: $1,168,017,648 Wind: Light Damage - $6,931,181,056 Moderate Damage - $240,065,024	Frequency = High Vulnerability = High Exposure = High Risk = High

Table 4.25. (Continued).

Hazard Category	Hazard Evaluation			
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)
Category 3 Hurricanes	Pass within 100 nmi of St. Lucie County once every 11.5 years.	Very high from rain-associated flooding coupled with storm surge; major from wind damage.	Winds in Category 3 storms range from 111 to 130 mph. These winds can do major damage to most residential construction. Total Category 3 hurricane exposure for St. Lucie County based on MEMPHIS is Water: $2,307,808,640 Wind: Light Damage - $348,841,952 Moderate Damage - $6,822,398,464	Frequency = Moderate Vulnerability = High Exposure = High Risk = High
Category 4 Hurricanes	Pass within 100 nmi of St. Lucie County once every 202 years.	Very high from rain-associated flooding coupled with storm surge; massive from wind damage.	Sustained winds in a Category 4 hurricane range from 131 to 155 mph. There are very few commercial structures in St. Lucie County engineered to withstand such winds. Total Category 4 hurricane exposure for St. Lucie County based on MEMPHIS is Water: $3,459,213,248 Wind: Moderate Damage - $749,148,928 Heavy Damage - $4,804,990,464 Severe Damage - $1,617,078,144	Frequency = Low Vulnerability = High Exposure = High Risk = Moderate

Table 4.25. (Continued).

Hazard Category	Hazard Evaluation			
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)
Category 5 Hurricanes	Pass within 100 nmi of St. Lucie County once every 1,500 years.	High from rain-associated flooding; catastrophic in terms of wind damage.	Sustained winds in a Category 5 hurricane range upward from 155 mph. Very few structures can withstand these winds. Massive flooding may occur in the western part of the County resulting from the storm surge in Lake Okeechobee. Total Category 5 hurricane exposure for St. Lucie County based on MEMPHIS is Water: $4,649,864,832 Wind: Heavy Damage - $301,612,704 Severe Damage - $2,758,868,992 Destroyed - $4,110,738,944	Frequency = Low Vulnerability = High Exposure = High Risk = Low
Tornadoes	Between 1950 and 1998, there were 135 tornadoes, waterspouts, and funnel clouds reported from the Treasure Coast area. Of these, 91 touched down on land and were officially classified as tornadoes (1.90 tornadoes per year). In tornado prone southeast Florida, the odds of a tornado striking any specific location are once every 250 years.	During the 48 years from 1950 to 1998, 73 people have been killed by tornadoes (1.52 deaths per year). Total property damage by tornadoes over this same time period has been estimated at $21 million or approximately $440,000 per year. Since 1953, tornadoes in St. Lucie County have caused a total of $43 million in property damage (2 deaths and 26 injured).	Tornadoes are rated from 0 to 5 based on their path length and mean width (Fujita-Pearson Scale). F0 tornados cause light damage, and F5 tornadoes cause incredible or catastrophic damage. Of the 91 tornadoes recorded from the Treasure Coast area between 1950 and 1998, 54 were classified as F0 (59%), 28 (31%) were classified as F1, 8 (9%) were classified as F2, and 1 (1%) was classified as an F3 tornado.	Frequency = Moderate Vulnerability = Moderate Exposure = Low Risk = Low

Table 4.25. (Continued).

Hazard Category	Hazard Evaluation			
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)
Severe Thunderstorms and Lightning	Since October 1975 and 2003, 31 severe thunder and lightning storms were reported in St. Lucie County (St. Lucie County averages greater than 70.4 days with thunderstorms per year).	Since 1994, these storms resulted in 4 injuries (from lightning), and a total of $246,000 in reported property damage (also from lightning). This represents an average of $2,500 in damages per month.	Thunderstorms with strong wind, downbursts, hail, and lightning are very common on Florida's southeast coast. Property losses due to lightning are poorly documented. We estimate that the actual property damage from lightning is closer to $390,000 or $32,500 per month based on statewide insurance claims.	Frequency = High Vulnerability = Moderate Exposure = Moderate Risk = Moderate
Drought	Every year, some portion of the U.S. endures drought conditions. Florida recently has experienced drought conditions annually in the spring and early summer.	St. Lucie County's vulnerability to drought-related damage and economic loss can occur in many areas. Direct impacts include reduced crop yield, increased fire hazard, reduced water levels, increased livestock and wildlife mortality rates, and damage to wildlife and fish habitat. Social impacts include public safety, health, conflicts between water users, and general reduction in the quality of life.	St. Lucie County's most direct exposure to drought is the economic loss endured by its agricultural community. The average annual market value of agricultural products from St. Lucie County is approximately $625 million.	Frequency = High Vulnerability = Moderate Exposure = High Risk = Moderate

Table 4.25. (Continued).

Hazard Category	Hazard Evaluation			
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)
Temperature Extremes	Between 1970 and 1999, seven significant freezes have affected St. Lucie County. Prolonged periods of extremely high temperatures are relatively rare in St. Lucie County; however, due to the consistently high humidity, the local "heat index" is often significantly above the actual temperature during the summer months.	St. Lucie County as a whole has a high economic vulnerability to freezing temperatures. The most significant area of impact is the commercial agricultural segment of the community, but countywide cold-sensitive ornamental landscaping also leaves many entities, public and private, open for significant economic loss. While the frequency of "heat waves" is low, the frequency of heat indexes within the range of causing health problems is moderate to high during the summer months.	While the loss of life from either extreme low or high temperatures in St. Lucie County is not great compared to national statistics, St. Lucie County does have a significant economic exposure to low temperatures in both the public and private sectors. The average annual market value of agricultural products for St. Lucie County is approximately $625 million.	Frequency = Moderate Vulnerability = Moderate Exposure = Moderate Risk = Moderate
Agricultural Pests and Diseases	To date, infestations of agricultural plant diseases in St. Lucie County have been rare. Livestock diseases and wild animal vector diseases such as rabies continue to be a problem.	St. Lucie County is highly vulnerable to agricultural diseases and pests due to its location and the amount of traffic that passes through it.	Exposure to agricultural pests, particularly livestock diseases, is high in terms of the County's agricultural community. The average annual market value of agricultural products for St. Lucie County is approximately $625 million.	Frequency = Moderate Vulnerability = Moderate Exposure = High Risk = Moderate

Table 4.25. (Continued).

Hazard Category	Hazard Evaluation			
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)
Wildland/Urban Interface Zone	Wildland fires have become a common annual occurrence in wooded areas during Florida's dry season.	Wildfire is a significant and frequent hazard in specific areas of St. Lucie County. Vulnerability varies extensively with location.	Exposure to wildland fire varies greatly across St. Lucie County. While exposure is relatively low along the County's urbanized coastline, it is quite high in some of the landlocked interior communities. A wildland fire in Port St. Lucie in April 1999, caused an estimated $10 million in damage. Mitigation projects addressing this issue need to be evaluated on a case by case basis. Wildland fire exposure in St. Lucie County based on the MEMPHIS is as follows: Low Risk: $5,332,901,376 Medium Risk: $806,260,928 High Risk: $1,032,030,528	Frequency = Moderate Vulnerability = Moderate Exposure = Moderate Risk = Moderate
Muck Fires	Muck fires are not a frequent threat to St. Lucie County. They occur during periods of extreme drought, when the swamp muck becomes dried out and is ignited. Once ignited, these fires burn deep within the muck and are extremely difficult to extinguish.	Areas with the highest vulnerability to this hazard are on the western side of the County.	There have been no significant muck fires in St. Lucie County in the last 30 years, and this hazard is considered to be a limited danger. There were significant muck fires in the Everglades in the 1980's. Because the fires are so difficult to extinguish, they become significant air quality problems. Specific mitigation projects must be evaluated based on location and potential danger.	Frequency = Low Vulnerability = Low Exposure = Low Risk = Low

Table 4.25. (Continued).

Hazard Category	Hazard Evaluation			
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)
Soil/Beach Erosion	Beach erosion constantly occurs along St. Lucie County's coastline. In some areas, specific structures are threatened. Other specific sites where erosion is a persistent problem are along stormwater drainage points into the Intracoastal Waterway and along canals.	All the coastal communities have high vulnerability relative to beach erosion. Public and private cooperation is required to address beach erosion problems. Potential long-term mitigation will focus on overall sand budgets and sand transport rates. Mitigation projects in this area should be evaluated carefully by experienced coastal engineers. The erosion vulnerability is associated with stormwater outfalls and canals is limited and site-specific in nature.	Some specific locations have a higher "immediate exposure" than others. Overall, St. Lucie County's exposure to direct economic losses from erosion is moderate. Within the City of Fort Pierce, this exposure is high. Stormwater drainage outfall and canal bank stabilization projects should be evaluated based on site specifics.	Frequency = High Vulnerability = Moderate Exposure = Moderate Risk = Moderate
Epidemic	There has never been an outbreak of a serious disease epidemic in St. Lucie County. Annual occurrences of flu and periodic outbreaks of so-called children's diseases have not reached epidemic proportions.	St. Lucie County's vulnerability to disease outbreak is higher than many areas of the nation simply because of the amount of tourist traffic that passes through the County.	Due to the large number of retired and elderly people living in St. Lucie County, the countywide exposure to serious impacts from disease outbreaks must be considered moderate.	Frequency = Low Vulnerability = Moderate Exposure = Moderate Risk = Low

Table 4.25. (Continued).

Hazard Category	Hazard Evaluation			
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)
Seismic Hazards (Sinkhole/Soil Failure)	Sinkholes are not considered to be a significant hazard in St. Lucie County. Soil failure or collapse is rare in St. Lucie County and is generally related to some other natural hazard, such as canal bank or levee failure during a period of flooding.	Countywide vulnerability to this type of hazard is low; however, areas that might be affected by dam or levee failure need to be evaluated carefully.	Overall, the community exposure to these types of hazards is low other than in specific locations and under specific circumstances. Sinkhole exposure according to the MEMPHIS data places all of St. Lucie County in the very low risk category.	Frequency = Low Vulnerability = Low Exposure = Low Risk = Low
Technological				
Hazardous Materials Accident	The frequency with which hazardous materials incidents occur in St. Lucie County is essentially the same as for other counties located along the major Florida east coast transportation corridor. Minor spills occur with a moderate frequency. St. Lucie County has some 305 reported (Section 302) hazardous material sites, some of which are located in urban areas. To date, the frequency of releases from these facilities have been low compared to the number of releases from transportation accidents.	Countywide, St. Lucie County has a low vulnerability with respect to hazardous materials releases. Some areas such as The City of Fort Pierce has moderate vulnerability to this hazard due to specific circumstances.	Countywide, the exposure relative to a site-specific hazardous materials release is low.	Frequency = Moderate Vulnerability = Low Exposure = Low Risk = Moderate

Table 4.25. (Continued).

Hazard Category	Hazard Evaluation			
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)
Radiological Accidents Including Nuclear Power Plant Accidents	To date, the frequency of radiological accidents and releases has been very low.	St. Lucie County is highly vulnerable to radiological accidents due to its location with respect to the St. Lucie Nuclear Power Plant.	Countywide, the exposure to a nuclear power plant accident must be considered high while exposure to other types of radioactive materials releases is considered low.	Frequency = Very Low Vulnerability = High Exposure = High Risk = Low
Communications Failure	Major communications failures have occurred infrequently in St. Lucie County to date.	St. Lucie County as a whole has a relatively low vulnerability to communications system breakdown. In some areas, such as the Cities of Fort Pierce and Port St. Lucie, this vulnerability is higher.	St. Lucie County's exposure in the event of a major communications system failure is relatively low due to its agricultural economic base.	Frequency = Low Vulnerability = Low Exposure = Low Risk = Low
Transportation System Accidents	St. Lucie County has major rail lines, north-south highway corridors, and an airport. Ground transportation accidents occur relatively frequently. Major transportation accidents such as rail and plane crashes have been rare to date.	The concentration of transportation industries and activities in the eastern portion of the County along the sand ridge, has made the City of Fort Pierce and St. Lucie Village particularly vulnerable to transportation accidents.	Countywide exposure is low, but is considered high in specific locations.	Frequency = Low Vulnerability = Low Exposure = Low (Countywide) Risk = Low

Table 4.25. (Continued).

Hazard Category	Hazard Evaluation			
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)
Wellfield Contamination	St. Lucie County maintains a program designed to monitor this risk. To date, instances of wellfield contamination in St. Lucie County have been rare.	The eastern part of the County along the coastline is more vulnerable to this hazard. This is the area with the greatest population and the most industrialization. During times of drought, this area also is vulnerable to wellfield contamination from salt water intrusion.	Exposure in terms of property value is moderate with regard to this hazard.	Frequency = Low Vulnerability = Low Exposure = Moderate Risk = Low
Power Failure (Outages)	Business and industry in St. Lucie County are affected regularly by power fluctuation and short-term power outages. Major, long-term outages are rare.	All modern societies are highly vulnerable to prolonged power failures. Even power failures of 12 to 24 hours would have significant impacts on both the County's economy and on human health and safety.	Short-term power loss has a significant, but hard to quantify economic impact in terms of equipment damage and lost productivity. Prolonged power failures lasting days or weeks would be a major disaster for St. Lucie County both economically and in terms of human health and safety.	Frequency = Low for major power disruptions Vulnerability = Moderate Exposure = High Risk = Moderate
Unexploded Military Ordnance	Old military ordnance has turned up on the beaches on St. Lucie County, but this occurs very infrequently.	Very low countywide.	Very low.	Frequency = Low Vulnerability = Very Low Exposure = Very Low Risk = Low
Societal				
Civil Disturbance	There have been incidents on civil disturbances in St. Lucie County. Minor civil disturbances occur with moderate frequency in specific jurisdictions.	Overall vulnerability to civil disturbance in St. Lucie County is low; however, there are specific areas and jurisdictions that are moderately if not highly vulnerable to this hazard.	Exposure in terms of dollars to the effects of civil disturbances must be considered low within the overall perspective of the County. Exposure in terms of human health and safety is moderate.	Frequency = Low Vulnerability = Low (Countywide) Exposure = Moderate Risk = Low

Table 4.25. (Continued).

Hazard Category	Hazard Evaluation			
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)
Terrorism and Sabotage	Other than random "hate crimes," there have never been any significant acts of terrorism or sabotage in St. Lucie County.	St. Lucie County has a low vulnerability for acts of terrorism and sabotage.	St. Lucie County's exposure to this hazard must be considered very low. There are several climatological, geographic, and infrastructural aspects to St. Lucie County that reduce its attractiveness to large scale acts of terrorism.	Frequency = Low Vulnerability = Low Exposure = Low Risk = Low
Immigration Crisis	Illegal immigration has, and continues to impact St. Lucie County. While major immigration crises are rare, St. Lucie County has been affected by most of those that have occurred.	Because of its demographics and large agricultural industry, St. Lucie County has a moderate vulnerability to immigration crises arising from anywhere in the Caribbean, Latin America, or South America.	Exposure in terms of dollars from an immigration crisis would result mainly from the stress on local police and health services. Exposure in terms of human health and safety would result from the possible introduction of diseases and stress on the existing health care network.	Frequency = Moderate over the last decade Vulnerability = Moderate Exposure = Moderate Risk = Moderate
Societal Alienation	St. Lucie County has a larger population of the disenfranchise than many of its neighbors. Reported frequencies of social alienation may be higher in this area.	St. Lucie County is more vulnerable to this problem due to the relatively lower income levels of many of its citizens.	Exposure in terms of property to this hazard is low. Alienation affects lives not property.	Frequency = Moderate Vulnerability = Moderate Exposure = Low Risk = Low for property, moderate for social problems
Substance Abuse	Substance abuse in St. Lucie County may be higher than many of its more affluent neighbors, but it is equally possible this may just be a more hidden problem in other jurisdictions.	St. Lucie County is highly vulnerable to this social problem primarily because it has fewer resources to deal with the problem.	Exposure in terms of lives and property is considered moderate in terms of this social problem.	Frequency = Moderate Vulnerability = High Exposure = Moderate Risk = Moderate

Table 4.25. (Continued).

Hazard Category	Hazard Evaluation			
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)
Economic Collapse	Economic fluctuation happens at greater frequencies in the St. Lucie County economy because it is dependent on a relatively narrow base.	St. Lucie County's vulnerability to this modern hazard is high because the majority of its citizens have relative little economic reserve.	Exposure to this hazard is no higher in St. Lucie County than in other southeastern Florida counties, but this exposure must be considered significant.	Frequency = Moderate Vulnerability = High Exposure = High Risk = Moderate

5.0 MITIGATION OPTIONS

This section of the St. Lucie County LMS outlines a menu of mitigation options available to reduce the risks posed by natural disasters.

5.1 MITIGATION DEFINITION AND INTRODUCTION

Mitigation activities are those activities that aim to reduce the risks from natural and man-made hazards in a community. Mitigation is not a "one size fits all" process; a successful risk reduction activity in one community may not work in another. Several factors play a role in the decision on which mitigation activities to pursue including – frequency and severity of the hazard, the community's ability to address the problem, ease of implementation, costs and benefits, availability of funding, and a local champion to spearhead the activity, among others. There are several different types of mitigation activities that a community can undertake to reduce the risk posed by natural and man-made hazards. FEMA has identified six broad categories of mitigation actions including prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects.

5.2 MITIGATION CATEGORIES

The following definitions were included in the FEMA How To Guide 3: Developing the Mitigation Plan (FEMA, 2003b).

- Prevention – Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses.
- Property Protection – Actions that involve the modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area.
- Public Education and Awareness – Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them.
- Natural Resource Protection – Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems.
- Emergency Services – Actions that protect people and property during and immediately after a disaster or hazard event.
- Structural Projects – Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

5.3 MITIGATION OPTIONS BY CATEGORY

The following mitigation options are categorized using the categories identified above. While these lists are not comprehensive, they serve to provide examples of what can be done to reduce risk.

Prevention.

- planning and zoning;
- building codes;
- capital improvement programs;
- coastal zone management regulations;
- density controls;
- design review standards;
- easements;
- environmental review standards;
- floodplain development regulations;
- forest fire fuels reduction;
- open space preservation;
- performance standards;
- shoreline setback regulations;
- special use permits;
- stormwater management regulations;
- subdivision and development regulations; and
- transfer of development rights.

Property Protection.

- acquisition;
- construction of barriers around structures;
- elevation;
- relocation;
- structural retrofits;
- storm shutters; and
- shatter-resistant glass.

Public Education and Awareness.

- outreach projects;
- real estate disclosure;
- hazard information centers; and
- school-age and adult education programs.

Natural Resource Protection.

- best management practices;
- dune and beach restoration;
- forest and vegetation management;
- sediment and erosion control;
- stream corridor restoration;
- stream dumping regulations;
- watershed management;
- forest and vegetation management; and
- wetland restoration and preservation.

Emergency Services.

- warning systems;
- emergency response services; and
- protection of critical facilities.

Structural Projects.

- channel maintenance;
- construction of dams/reservoirs;
- construction of levees and floodwalls;
- construction of seawalls/bulkheads; and
- construction of safe rooms.

5.4 MITIGATION OPTIONS BY HAZARD

The following mitigation options broken down by specific hazard, were found mainly in North Carolina Emergency Management's Tools and Techniques: An Encyclopedia of Strategies to Mitigate the Impacts of Natural Hazards (North Carolina Division of Emergency Management, 2002) and FEMA's How to Guide: Integrating Human-Caused Hazards into Mitigation Planning (FEMA, 2002). They represent only a small fraction of the total possible mitigation options available to a community. For additional resources on mitigation options, see **Appendix B**.

All Hazard.

- acquisition and land banking;
- citizen outreach programs;
- community awareness programs;
- development impact tax/improvement tax;
- floating zones;
- home inspection programs;
- purchase of development rights;
- smart growth principles;
- structural retrofit;
- subdivision ordinance; and
- tax abatement, subsidies, low-interest loans, and other incentives.

Drought.

- contingency planning;
- fire breaks;
- housing code;
- new construction;
- water conservation programs
- monitoring and warning programs;
- drought tolerant vegetation; and
- wildland fire mitigation.

Erosion.

- beach nourishment;
- dune protection and shoreline setbacks;
- green infrastructure;
- structural relocation;
- open space preservation;
- revetments for beach management; and
- vegetation.

Flooding.

- acquisition;
- elevation;
- floodplain management plans
- floodproofing;
- flood insurance education;
- stormwater management;
- green infrastructure;
- porous pavement;
- retention ponds;
- sewage treatment plant retrofit; and
- tie downs.

Hurricane.

- acquisition;
- floodplain management plans;
- floodproofing;
- shuttering;
- enhanced building codes;
- preparedness outreach;
- tree and limb maintenance;
- mobile home parks storm shelter;
- safe rooms; and
- stormwater drain maintenance.

Thunderstorm.

- drainage system maintenance;
- impervious surface limits;
- tree and limb maintenance;
- encourage flood insurance;
- mobile home parks storm shelter;
- stormwater drain maintenance; and
- traffic light and other traffic controls.

Tornado.

- mobile home parks storm shelter;
- protecting natural environmental features;
- warning systems;
- enhanced building codes;
- safe room;
- tie downs;
- traffic lights and other traffic controls;
- utility lines; and
- windproofing.

Wildland Fire.

- fire breaks;
- fuel loads;
- housing code;
- new construction;
- open space acquisition;
- BEHAVE Fire Behavior Prediction and Fuel Modeling System;
- prescribed burns;
- tree limb removal; and
- wildland fire mitigation planning.

Terrorism.

- site planning and landscape design;
- architectural and interior space planning;
- structural engineering;
- mechanical engineering;
- electrical engineering;
- public education;
- drills;
- fire protection engineering;
- security; and
- parking.

Table 5.1 displays various mitigation activities by both mitigation category and hazard. Only select hazards are compared in the table.

5.5 MITIGATION OPTIONS ADDRESSING SPECIAL ISSUES

This section identifies several risk reduction strategies for three special issues of relevance in St. Lucie County – Repetitive Flood Loss Properties, Barrier Islands, and the CRS.

Table 5.1. Mitigation options by category and hazard.

Category	Mitigation Alternatives	Hazard			
		Flood	Hurricane	Tornado	Wildland Fire
Prevention	building codes	X	X	X	
	coastal zone management regulation	X	X		
	density controls	X	X		X
	design review standards	X	X	X	X
	easements	X	X		X
	environmental review standards	X	X	X	X
	floodplain development regulations	X	X		
	floodplain zoning	X	X		
	forest fire fuel reduction				X
	hillside development regulation				X
	open space preservation	X	X		X
	performance standards	X	X	X	X
	shoreline setback regulation	X	X		
	special use permits	X	X		X
	stormwater management regulations	X			
	subdivision and development regulations	X	X	X	X
	transfer of development rights	X	X		X
Property Protection	acquisition of hazard-prone structures	X	X		X
	construction of barriers around structures	X	X		
	elevation of structures	X	X		
	relocation out of hazard areas	X	X		X
	structural retrofits	X	X	X	
Public Education and Awareness	hazard information center	X	X	X	X
	public educational and outreach programs	X	X	X	X
	real estate disclosure	X	X	X	X
Natural Resource Protection	best management practices	X	X		X
	dune and beach restoration		X		
	forest and vegetation management	X			X
	sediment and erosion control regulations	X	X		
	stream corridor restoration	X			
	stream dumping regulations	X			
	urban forestry and landscape management	X			X
	wetlands development regulations	X	X		X
Emergency Services	critical family protection	X	X	X	X
	emergency response services	X	X	X	X
	hazard threat recognition	X	X	X	X
	health and safety maintenance	X	X	X	X
	post-disaster mitigation	X	X	X	X
Structural Projects	channel maintenance	X	X		
	dams/reservoirs	X			
	levees and floodwalls	X	X		
	safe rooms/shelters		X	X	
	seawalls/bulkheads		X		

Source: Federal Emergency Management Agency's (FEMA's) How To Guide 3: Developing the Mitigation Plan (FEMA, 2003b).

5.5.1 Repetitive Flood Loss Properties

FEMA has placed special emphasis on addressing repetitive flood loss properties through the mitigation planning process; therefore, it is important to identify strategies to lower the number of repetitive loss properties within the County. The following are examples of actions that can be taken to lower or eliminate both the number of repetitive loss claims and properties in the County.

- acquisition;
- building codes; detention basins;
- drainage culverts;
- drainage system maintenance;
- dune protection and shoreline setbacks;
- elevation;
- firebreaks;
- floating zones;
- floodplain management plans;
- floodproofing;
- moratoria;
- real estate disclosure requirements;
- relocation;
- sewage lift stations; and
- stormwater drainage maintenance.

5.5.2 Barrier Islands

Geologic and meteorological processes associated with barrier islands create a number of potential hazards. The following actions are examples of mitigation activities that can be implemented to protect the people, buildings, and infrastructure on barrier islands before and during natural hazard events.

- acquisition;
- beach management plans;
- beach nourishment;
- carrying capacity;
- dredging;
- dune protection and shoreline setbacks;
- floating zones;
- groins;
- jetties;
- offshore breakwaters;
- revetments;
- roadway realignment;
- sand dunes;
- sand scraping;
- seawalls and bulkheads; and
- coastal sediment trapping and vegetation.

5.5.3 CRS Projects

Participation in the CRS program can help to lower flood insurance premiums for residents within St. Lucie County. The more flood mitigation actions that are initiated, the lower the premiums will be. The following subsection outlines example mitigation activities that qualify for potential premium-reducing CRS points.

- *310 Elevation Certificates* – elevation;
- *330 Outreach Projects* – audits of small business, community awareness programs, education and training, home inspection programs, and notification of location of hazards;
- *340 Hazard Disclosure* – real estate disclosure requirements;
- *400SH Special Hazard Areas* – beach management plans, dune protection and shoreline setbacks, sand dunes, sediment trapping vegetation, and wetland preservation and riparian habitat protection;
- *410 Additional Flood Data* – hazard identification, mapping hazards, risk assessment, and vulnerability assessment;
- *420 Open Space Preservation* – acquisition and comprehensive plans;
- 430 Higher Regulatory Standards – building codes, government expenditure limitation in high hazard areas, moratoria, sewage lift station, and sewer manholes;
- *430 LZ Low Density Zoning* – development density;
- *450 Stormwater Management* – grassy swales, impervious surface limits, onsite sediment retention, performance or impact zoning, retention ponds, stormwater management, and vegetation;
- *510 Floodplain Management Planning* – floodplain management plans, hazard mitigation and post-disaster reconstruction, porous pavement, and stormwater basins;
- *520 Acquisition and Relocation* – acquisition, capital facilities plans, commercial parks, critical facilities, emergency shelters, parks, public housing, public records, relocation, safe site, and school facilities;
- *530 Retrofitting* – dikes, levees, floodwalls and berms, elevation, floodproofing, public housing, public records, public school buildings, retrofit of fire stations and police stations, and sewage treatment plan retrofit;
- *540 Drainage System Maintenance* – drainage culverts, drainage system maintenance, retention ponds, and stormwater drain maintenance;
- *610 Flood Warning Program* – capability analysis and disaster warning;
- *620 Levee Safety* – dikes, levees, floodwalls, and berms; and
- *630 Dune Safety* – dams and reservoirs.

5.6 MITIGATION IN DEPTH

As the Community Profile (**Section 2.0**) indicated, the Treasure Coast region has and will continue to experience increased population growth. Population growth has a major impact on how and where development takes place in the County. As new development moves outward from the urbanized core and corridors, the potential for natural hazards to impact life and property increases. Because growth issues are so prevalent in the County, select development related mitigation activities have been identified and are described below. These activities are provided as examples only, and they are not reflective of the broad spectrum of mitigation options available. The mitigation activities and the accompanying information were developed from North Carolina Division of Emergency

Management in the Tools and Techniques document (North Carolina Division of Emergency Management, 2002).

5.6.1 Floating Zoning

5.6.1.1 Definition

Floating zones are written into the zoning code but “float” above the map until triggered by a set of conditions. Unlike overlay zones, floating zones replace the existing code for the places in which they are implemented. Once certain conditions (usually development-related) are met, the ordinance becomes affixed to a particular site. Floating zones are typically used when a community knows that it wants to apply a set of regulations to certain uses (such as a shopping center), but is waiting for events to decide the location for those uses.

5.6.1.2 Implementation

One of the best uses of floating zones is to reduce the density in areas that have been hit by a natural disaster. For example, areas where structures have suffered, on average, a certain degree of damage could anchor a floating zone that reduces the allowable density in that area. The damage zones where these regulations would be applied could be identified during the recovery phase.

5.6.1.3 Critique

Since one or several lots are subject to different regulations than their neighbors, floating zones are often attacked as being a form of spot zoning. While the location of floating zones can be subject to special interests and politics, they are usually based on facts, as opposed to speculated future needs.

5.6.2 Impact Fees/System Development Charges

5.6.2.1 Definition

Impact fees require new developments to share in the financial burden that their arrival imposes on a town. These assessments are typically one-time, up-front charges (although some jurisdictions allow payments over time) against new development to pay for off-site improvements. The fees also can be set up to allow new development to buy into existing services with excess capacity. Impact fees are typically based on ratios that show what services the average new resident will require.

5.6.2.2 Implementation

Every impact fee must meet a three part legal test. First, the need for improvements funded by the fee must be created by the new development. Second, the amount charged the new development must be proportionate to the cost of its use. Third, all revenues must be spent in proximity to the new development and within a reasonable period of time. If any of these are not met, the community may face legal action. Communities should have a comprehensive plan and capital improvements program in place to defend their use of impact fees or exactions.

Impact fees can be linked to environmental impact analyses in order to charge proportionate fees for projects that will have broader or lesser impacts. While there are several methods for analyzing impacts (checklists or spreadsheet models, for example), most look only at individual project impacts. An alternative is a cumulative impact assessment, which looks at the total effect of all development in a particular environment. This approach might allow planners to estimate the combined effects of several potential developments on reducing the flood storage capacity of a single watershed. The fee in this case would go toward mitigating increased flood heights, perhaps by creating flood storage elsewhere in the floodplain.

5.6.2.3 Critique

Impact fees can be applied to a wider variety of services than either exactions or special assessment districts. Unlike land dedications, these can be payments that cover the full costs of needed improvements. They are typically used in place of negotiated exactions because they take less time and are more predictable and equitable. Impact fees do not help with maintenance costs.

5.6.3 Porous Pavement

5.6.3.1 Definition

Substitute porous or open-grid pavement for impervious pavement to limit the amount of stormwater runoff that contributes to localized flooding.

5.6.3.2 Implementation

Pavement will ideally be pervious enough to absorb rainfall but with pores small enough not to clog with debris or cause problems for pedestrian traffic. Some brands of asphalt or concrete that lack the finer sediment of conventional cement hold promise. Several websites containing photographs and/or useful information regarding porous and open-grid pavement include

- http://www.gcpa.org/pervious_concrete_pavement.htm; and
- http://www.greenbuilder.com/sourcebook/PerviousMaterials.html.

5.6.3.3 Critique

Reservations apply to the use of open-grid, or open-cell, pavement: it is treacherous for those with mobility challenges (and those in high heels) and also is expensive to install. However, open-grid pavement is appropriate for limited-use access routes or overflow parking lots.

5.6.4 Transfer of Development Rights (TDR)

5.6.4.1 Definition

Like Purchase of Development Rights (PDR), TDR programs treat development as a commodity separate from the land itself. The local government first awards each property owner in a sending area a set of development rights based on the value or acreage of land. Sending areas contain land the local authority seeks to protect. The government

then establishes a receiving area for these rights that is a preferred site for development. Landowners in the sending area are typically prohibited from developing their land; however, they can sell their rights to developers in the receiving areas. Developers who acquire these development rights can build to higher densities than would otherwise be permissible.

5.6.4.2 Implementation

TDR could be used for mitigation purposes by designating high hazard areas as sending zones. The development rights for parcels within this zone would be targeted at a receiving zone located outside the hazard area. The zone would need to have sufficient room to accommodate the sending rights. In jurisdictions with limited available space, the program could be aimed at redevelopment rather than new development. Alternatively, the community could completely downzone itself. Both options could help create a market for development rights.

One way to ensure that people participate in the program is to make it mandatory; although, the legality of mandatory TDR programs is currently under challenge. In a mandatory program, the marketability of the rights would have to be guaranteed. One way to do so would be to create a municipal land bank that would purchase the rights and resell them when demand was sufficient to generate value. Suitable receiving areas outside the hazard area must be available for TDR to be successful. TDR can be used to achieve a variety of associated community goals, including promoting compact development with less impervious surfaces and preserving agricultural, rural, or open spaces. Since TDR can be applied to areas of a community, rather than individual parcels, it can be more thoroughly effective than acquisition or cluster development techniques.

5.6.4.3 Critique

TDR is a complex system, which makes it difficult for planning staffs to implement and for landowners to understand and accept. It is frequently unpopular with residents in the receiving zone, who are subject to development that exceeds the apparent zoning limits. Perhaps most importantly, a region must have a significant amount of development pressure to make the rights marketable.

5.6.4.4 Example

Collier County, Florida, began a TDR program in the 1980's to protect 40,000 acres of coastal barrier islands, mangroves, salt marshes, and beaches. These areas were designated as sending zones. The receiving zones were already set for multi-family housing, but could be built to a higher density using the development rights. Parcels for which the development rights have been sold must be protected by a restrictive covenant or by donation to the County or a conservation organization. A moratorium was placed on the program when the transfer resulted in density concentrating in only one receiving site and overwhelming it.

6.0 IMPLEMENTATION STRATEGY

6.1 INTRODUCTION

Plan implementation is a vitally important aspect of the overall program. Without an implementation program, the Plan either "gathers dust on the shelf" or lags along implementing projects incrementally based more on agencies' or individuals' interest than on a prioritized need basis. Discussed below are issues related to the organizational arrangement and administrative responsibility, the role of the Steering Committee, plan monitoring, plan funding, and plan update process.

6.2 INSTITUTIONAL ARRANGEMENT

The creation of a disaster-resistant community is achieved once the concept becomes part of the mindset and fabric of the private and public sectors of a community. Effective implementation requires the strong support of the locally elected body. In addition, it requires an advocate. Someone or group who believes the issue to be essential to the long-term sustainability of the community. This individual or group of individuals continually is reassessing the vulnerabilities of the community, and identifying potential strategies and partners to address the vulnerabilities and means to affecting change whether it be a bricks and mortar project or implementing a new programmatic initiative or modification to existing codes or plans.

This section describes the comprehensive organizational arrangement required to effectively implement the countywide LMS program. It also describes the administrative framework that defines the roles and responsibilities of those at the staff level who carry out activities on a daily basis that lead to the implementation of the LMS.

6.2.1 Organizational Structure

The LMS organizational structure consists of several levels (see **Figure 6.1**, LMS Organization Structure). Heading the effort is the LMS Steering Committee. This group must have broad representation to be effective. It should embrace all stakeholder groups in the County from both the public and private sectors. Therefore when the St. Lucie County Steering Committee was originally established in 1998, representatives were selected so that all affected groups would have representation in the planning process and in the ongoing implementation of the LMS. The Steering Committee interacts directly with the County Commission and the general public. The St. Lucie CDD staff has provided direct support to the Steering Committee. In addition, the CDD has been the liaison to the Florida Division of Emergency Management within the FDCA, and the FEMA Department of Homeland Security.

6.2.2 Administrative - Lead Responsibility

As described in **Section 6.2.1**, the lead individual having primary responsibility for overseeing the implementation of the LMS program has been a staff planner from the CDD Planning Division. As depicted in **Figure 6.1**, to be effective in implementing the LMS, the the LMS Coordinator will need the full support of their department's director and County Administrator; thus, it is important that the LMS Coordinator have an opportunity to interact

INSERT FIGURE 6.1

with their Department Director and the County Administrator on a frequent basis, reporting on the progress of the implementation program, obstacles or problems that have delayed the implementation program, and ideas or alternative options to overcome the obstacles and/or problems being encountered.

Responsibilities of the staff planner will be

- To be the hazard mitigation advocate at staff level;
- To keep current with all changes in LMS/DMA2K programs;
- To interact frequently with the Florida Division of Emergency Management County Liaison;
- To work closely with the LMS Chairperson;To organize meetings of the Working Group;
- To coordinate with and contact all members of the Working Group on a regular basis;
- To maintain avenues of communication with the general public;
- To set up and maintain files documenting progress of LMS program;
- To update the PPL as needed; and
- To coordinate 5-year LMS update.

6.2.3 Administrative - Support Responsibility

Successfully implementing the LMS is not the sole responsibility of one department – it is the responsibility of all participating organizations. Participating organizations from both the public and private sectors can fulfill administrative responsibility in a number of ways including

- Promote and educate others about the significance of local hazard mitigation;
- Interact and coordinate frequently with LMS Coordinator;
- Manage mitigation projects or activities;
- Provide support, helping other organizations implement their mitigation projects or activities;
- Disseminate hazard mitigation-related information to constituents;
- Document the progress of one's organization's hazard mitigation activities; and
- Make available to LMS Coordinator new data and information relevant to the LMS process.

An example of providing support to other organizations could involve assisting in an all-hazard public awareness/education program. While it may be the responsibility of a specific department to see that the project is implemented, other organizations such as the County Fire Rescue, American Red Cross, St. Lucie County School District, and even homeowner associations could serve in a support role designing such a program. Supporting organizations can assist in making sure that its members or member organizations publicize and disseminate the program information generated as a result of the development of the public awareness/education program.

Who should assume lead responsibility was discussed by the LMS Steering Committee at its 25 March 2004 meeting. It was felt that either the County CDD and/or County Division of Emergency Management would be appropriate entities to house the LMS Coordinator; however, both agencies lack the staff resources to devote to the LMS program

at this time. The LMS Steering Committee members concluded that they needed to establish a strategy that would enable them to continue the program until the time the County can assign an individual to manage the project. Therefore, it was suggested that a contractor be hired to assume the responsibilities as the LMS Coordinator temporarily.

6.3 IMPLEMENTATION STRATEGY

The implementation strategy is based on information gathered from the Steering Committee as well as key community stakeholders and citizens. The hazards and community issues identified as well as the community's institutional analysis are used to determine the best means to implement mitigation strategies in St. Lucie County. The implementation strategy includes the goals and objectives identified by the Steering Committee as well as a list of prioritized mitigation activities.

6.3.1 Goals and Objectives

In formulating the goals and objectives, appropriate plans, policy statements, laws, codes, and ordinances from each participating local government have been reviewed. With multiple local governmental entities involved in defining a community-wide vision, this becomes a complex process. To help clarify the process, a facilitated discussion with the Steering Committee was conducted, and a comprehensive list of the areas where disasters affect the community was developed. The list included the following:

- Loss of life;
- Loss of property;
- Community sustainability;
- Health/medical needs;
- Temporary sheltering;
- Food and water;
- Communication;
- Housing;
- Historical structures;
- Adverse impacts to natural resources (e.g., beaches, water quality);
- Economic disruption;
- Fiscal impact;
- Recurring damage;
- Damage to repair to public infrastructure (e.g., roads, water systems, sewer systems, stormwater systems, electrical power);
- Debris removal;
- Redevelopment/reconstruction;
- Development practices;
- Environmental damage;
- Intergovernmental coordination; and
- Mental health counseling.

Along with these general hazard impacts, specific issues related to preparing for, mitigating against, responding to, and recovering from disasters were identified by the Steering Committee. The issues identified are summarized as follows.

The following issues were identified during the second and third meetings of the LMS in St. Lucie County on 12 December 2003 and 8 January 2004. The first sets of issues are considered to be All-Hazard. The second sets of issues are broken out by hazards.

All-Hazards Issues.

Lack of Street Signs. Creates problems for first responders who may be unfamiliar with the area.

Automatic Vehicle Locator (AVL) Transponders. AVL transponders in emergency vehicles can help locate sites faster.

Medical Facilities Access to Emergency Communication System. Can the hospital be connected to the emergency communication system for monitoring purposes to prepare for mass victim situations.

Expanded Communication System. Can the current system be expanded to accommodate important community organizations?

Communication System Test. The current communication system has yet to be tested during a large-scale event.

Special Needs (SN) Shelters. More special needs shelters are needed in the County. More equipment is needed at the current SN shelters. The current shelters need more staff available. The public needs to be better aware of the purpose of the SN shelter. There have been several incidents of leaving elderly individuals without food or proper medication.

Generators. New buildings should be built to accept generators.

Population Growth. Growth within the County has created an awareness issue among new residents. Many have not experienced the type of hazards in Florida and have limited knowledge of how to prepare for them. Education programs are needed to address this issue.

Risk Communication. Need to educate the public without creating fear or anxiety, which can overwhelm emergency responders.

Transportation. The growth in the County will have impacts on transportation systems and evacuation times.

Community Emergency Response Team (CERT). The County has had trouble getting the program off the ground.

Influence of the Media. The mass media has a tendency to sensationalize events. Need to partner with them to communicate effectively the impacts of the event and how to prepare and respond to it.

Hazardous Materials Compliance. There is not enough enforcement of hazardous materials identification requirements in the County.

Catholic Charities. This organization is trying to start a program similar to CERT that might be effective in preparing citizens for events.

Food at Shelters. Possibility of providing meals ready to eat at shelters for quick evacuation scenarios.

Emergency Purchases. Create arrangements pre-disaster to allow organization to acquire resources. Have purchase orders on file.

Flooding. Many areas of flooding are being addressed. A majority are in the study phases now.

Evacuation Routes. Are evacuation routes in areas subject to flooding?

GIS. There is a need to tie County, municipal, and other organizational GIS data together.

Non-English Speaking Residents. Many residents in the County do not speak English. There is a need to provide information (public service announcements [PSAs]) in languages other than English.

Landscaping. FEMA will not reimburse landscaping following a disaster.

Training. Continued training for emergency responders and services providers is important.

Shelter Deficit/Overcrowding. With the growth the County has experienced, a major event could result in overcrowding at shelters.

Trauma Center. The County currently does not have a trauma center. Growth in the County could create a need for such a facility locally.

Automated External Defibrillator (AED). There is a need for AED in public areas.

Intergovernmental Coordination. Remove political barriers to planned bureaucratic response, increase teamwork in minor events, and de-politicize countywide responses.

New Construction. Securing construction sites from oncoming events.

Natural Gas Lines. Are there emergency plans in place for these lines? In some areas, above ground valves could cause secondary impacts.

Health Department Awareness. Residents need to be made aware of the programs and activities offered by the County Health Department.

Hazard-Specific Issues

Flooding.

- More planning is needed to identify flooding hazards;

- Need to identify areas where FIRM map revisions or amendments are needed because of either mitigation or development;
- Limited mobility – need 4x4 vehicles to facilitate sampling and assessments; and
- Gas stations inundated with floodwaters.

Hurricane.

- Evacuation planning;
- Evacuation mapping;
- Evacuation education;
- Need more special needs shelters;
- Tree failure causes utility line breakage and power outages;
- Lessons learned from Hurricane Charley need to be passed on to the local jurisdictions;
- Road clearance is a major issue following a hurricane;
- Need more trained special needs shelter staff; and
- Need more trained environmental staff for post-event assessments.

Thunderstorm and Lightning.

- Public awareness

Wildland Fire.

- Need to reduce human caused fires;
- Limited health resources – need respirators, masks, and oxygen in special needs shelters;
- City of Port St. Lucie has a pattern of scattered growth, increasing the potential for wildland fire;
- Fuel build-up;
- Roof type and construction; and
- PGA and the Reserve are potentially at risk.

Tornado.

- Public awareness.

Extreme Temperature.

- Need for more special needs shelters; and
- Need for more special needs shelter staff.

Soil Erosion.

- Encourage multi-objective, multi-disciplinary approaches to hazard mitigation.

Agricultural Pest and Disease.

- Public awareness;

- More training in anthrax, brucelosis, and Bovine Spongiform Encephalopathy (Mad Cow); and
- Agriculture is a major component of the County economy; a loss in crops could severely impact the local economy.

Drought.

- Public awareness; and
- Contamination of wells from increased drawdown.

Epidemic.

- Team with Center for Disease Control;
- Public awareness;
- Limited health resources;
- Need for inter-municipal cooperation;
- Need additional beds to meet potential capacity; and
- Better training for health care staff.

Radiological Accident.

- Evacuation planning; and
- Emergency response training.

Power Failure.

- Public awareness;
- Shelter education; and
- Shelter mapping.

Hazardous Materials Accident.

- Evacuation planning;
- Public awareness;
- Need for personal protective equipment;
- Training;
- Railroad carries hazardous materials through multiple jurisdictions;
- Potential impacts in the river where the line crosses Taylor Creek;
- Small business owners need method of legally disposing of small quantity waste;
- Limited awareness of what materials are being transported in and through the County; and
- School's ability to respond to an event, lack of proper resources.

Transportation Accident.

- Public awareness;
- Level of preparedness at the Port Authority;
- Coordination between Airport and Port Authority, local authorities, State authorities, and Coast Guard;

- Significant accidents on I-95 or the Turnpike can create major traffic flow problems;
- New Walmart Distribution Center will create increased truck traffic;
- Lack of mapping technology and resources to map hazardous materials storage; and
- Compatibility of parcels with hazardous materials and neighboring parcels.

Communication Failure.

- Public awareness.

Unexploded Military Ordnance.

- Public awareness.

Terrorism.

- Training for local emergency responders; and
- Establish emergency communication system.

Immigration Crisis.

- Develop a communication plan;
- Increased need for medical care – need expanded facilities;
- Increased need to monitor living conditions – need environmental staff;
- Increased need for active disease surveillance – need epidemiology staff;
- Increased need for physicals – need clinical staff;
- Increased probability of disease – need mass isolation area;
- Increased sanitary surveillance of watercraft – need more environmental response staff; and
- Increased communication with Coast Guard and law enforcement.

Societal Alienation.

- Develop a communication plan; and
- Public awareness.

Substance Abuse.

- Public awareness.

Economic Collapse.

- Regulations;
- Increased need for public medical care – need expanded facilities;
- Increased need for public medical care – need for additional clinic parking;
- Increased need for shelter care – need public health staff;
- Increased need to monitor living conditions – need environmental staff; and
- Increased need for active disease surveillance – need epidemiology staff.

These concerns, along with information generated from the inventory of local planning documents and ordinances, resulted in the following goals and objectives for all-hazard mitigation planning in St. Lucie County.

The St. Lucie County LMS Steering Committee identified the following goals and objectives. The goals and objectives were selected because of their ability to address community issues that were identified earlier in the mitigation planning process. Goals as defined by FEMA are general guidelines that explain what you want to achieve. They are usually broad policy statements and are long-term in nature. Objectives as defined by FEMA are strategies or implementation steps to attain the identified goals. Unlike goals, objectives are specific and measurable. The goals and objectives define the broad direction of the mitigation strategy and provide the focus for developing and adopting mitigation projects and activities.

Goal 1. Reduce the loss of life and property and potential reoccurrence in areas vulnerable to the effects of natural, societal, and technological hazards.

- Objective 1.1 Reduce flooding and/or wind damage.
- Objective 1.2 Eliminate or retrofit repetitive loss properties.
- Objective 1.3 Retrofit and/or construct new critical facilities.
- Objective 1.4 Protect and restore areas susceptible to erosion.
- Objective 1.5 Improve local roadways to ensure safe, efficient, evacuation.
- Objective 1.6 Reduce the potential threat of fires, wildland and structural.
- Objective 1.7 Increase public awareness of hazards and their impacts.
- Objective 1.8 Evaluate codes, policies, ordinances, and regulations dealing with natural hazards.
- Objective 1.9 Reduce exposure to potential environmental hazards.

Goal 2. Minimize public and private exposure and economic disruption resulting from natural or technological disasters.

- Objective 2.1 Prepare a post-disaster redevelopment plan.
- Objective 2.2 Create disaster-resistant businesses.
- Objective 2.3 Ensure the economic viability of the local business community following a disaster event.

Goal 3. Achieve safe and fiscally sound, sustainable communities.

- Objective 3.1 Ensure that local planning and development matters address hazard mitigation.
- Objective 3.2 Enhance environmental quality and/or function of natural resource.
- Objective 3.3 Prepare informational materials explaining the positive relationship between sustainable communities and disaster-resistant communities.
- Objective 3.4 Create and maintain current an all-hazards database.
- Objective 3.5 Enhance GIS capabilities for use in hazard analysis.

Goal 4. Ensure orderly, effective short-term post-disaster recovery and redevelopment by establishing a program that provides adequate provision of shelters, community health services, food and water, debris removal, and promotes rapid economic recovery following a disaster.

Objective 4.1 Ensure continuity of government.
Objective 4.2 Develop a post-disaster redevelopment plan to ensure orderly recovery and redevelopment from a disaster event.
Objective 4.3 Expand existing shelter inventory and manpower to operate such facilities during disaster events.
Objective 4.4 Test and modify as needed the city and County comprehensive emergency management plans through the use of mock drills.

Goal 5. Optimize the effective use of all available resources.

Objective 5.1 Establish public/private partnerships.
Objective 5.2 Establish procedures that strengthen intergovernmental coordination and cooperation.

6.4 INTEGRATION INTO LOCAL PLANS

Hazards are pervasive throughout our local communities. While it is understood that the issue of hazard mitigation is a central focus of the unified LMS, there are other planning mechanisms where this important issue should be addressed. Issues of land use, infrastructure, and environment have been addressed in local comprehensive plans; however, few plans properly address the impact disasters may have on existing and future development. Disasters have enormous physical and social impacts on the community. Other types of planning mechanisms where hazards should be addressed include County and city CEMPs, Continuity of Operations Plans, (COOPs), flood mitigation plans, State Housing Initiative Partnership Program (SHIP), and Local Development Regulations. Disaster planning is relevant to historic resources, waterfront development, community redevelopment, and low income neighborhoods where substandard housing is typically found has resulted due to use of poor construction methods and materials, and/or lack of adequate maintenance by the homeowner.

From a regulatory standpoint, the local government comprehensive plans administered under the provisions of Section 163.3161, F.S. are the cornerstone of growth management in Florida. Being supported by force of law, local comprehensive plans are extremely important vehicles to implement hazard mitigation. Local governments under Section 163.3161, F.S. are required to update their capital improvement lists annually. The projects included on the LMS PPL also should be incorporated into the local comprehensive plan capital improvement elements. This should be accomplished annually in keeping with the annual update of the jurisdiction's CIE list of projects.

As described in **Section 6.7**, **Continuing Public Involvement**, the LMS Steering Committee will meet quarterly. It is anticipated that one of the quarterly meetings will focus on integrating hazard mitigation into comprehensive plans. At that meeting, ideas will be shared about how successes were achieved and obstacles overcome.

6.4.1 The Integration Process

The following process will be followed to ensure widespread integration of hazard mitigation into local planning mechanisms in St. Lucie County.

1) A letter from the LMS chair, along with a letter of support from the chair of the elected body will be transmitted to local planning directors inviting each to attend an LMS Steering Committee meeting to discuss ways in which hazard mitigation can be best integrated into planning matters.
2) Meeting of the LMS Steering Committee is held. This phase could be said to be the institutionalization of hazard mitigation into the local planning and development.
3) Each director will be asked to work with their planning staff to develop a strategy to integrate hazard mitigation into their planning programs and to evaluate whether their regulations address hazard mitigation, and if found to be lacking, identify several possible alternatives.
4) At the next meeting of the LMS, each director will report their situation to the LMS Steering Committee.
5) Identified changes will be made through the plan amendment process. Refer to Section 163.3187, F.S. and Chapter 9J-11, F.A.C. Local governments can seek plan amendments twice each year. This is the preferred approach because the formal, legally-mandated Evaluation and Appraisal Report process in which local comprehensive plans undergo extensive review and scrutiny and modification will not be triggered until 2008 for St. Lucie County and 2010 for the municipalities.

A similar process as described in points 1-4 above will be taken by the LMS Steering Committee to study the feasibility and implementation mechanics relative to other planning processes active in the County such as the Metropolitan Planning Organization, important in addressing transportation matters, and SHIP, which is active with low-income housing issues. Historical resources also will be evaluated since there are a number of historical structures in risk areas in the County.

6.5 PLAN MONITORING

Once the LMS is adopted by participating local governments, monitoring the progress of plan implementation is extremely important. It is through the monitoring process that the Steering Committee can determine whether or not implementation is occurring as originally envisioned. Determining whether or not the implementation timeframes are being met is critical. The monitoring process may be more important in identifying why actions/initiatives are not occurring. The identification of obstacles to implementation also is important. Funding cutbacks, unsuccessful competitive grant applications, and staff changes (e.g., key individual resigns or reassigned to new job, unexpected design problems, unexpected complexity in securing permits, lose commitment of partner agencies/organizations) can have significant impacts on implementing the LMS. Certain events or circumstances can alter the traditional means of operation, as was the case following September 11th. Changes such as this make plan monitoring important in keeping the LMS current.

6.5.1 Process

Step 1 Each quarter, the designated contact for all mitigation projects or initiatives identified on the PPL will report progress to the LMS Coordinator. For the first and third quarter, the point of contact will complete an Individual Project Progress Report (**Form #1**) and submit it to the LMS Coordinator. For the second and fourth quarters, an informal progress check-in will take place between the project point of contact and the LMS Coordinator. The point of contact also will be responsible for submitting any supporting documentation such as newspaper articles or other relevant media. Step 2 Based on the submitted progress report forms and progress check-ins, the LMS Coordinator will complete quarterly progress reports for the overall LMS program and present it to the elected boards of the County and municipalities.

Step 3 At the end of each year, the LMS Coordinator will prepare an Annual LMS Report based on (**Form #2**). The Annual Report will be presented to the elected boards of the County and municipalities. It is important that the Annual Report, not just be placed on the consent agenda of each local government, but a formal presentation be made where, not only is the status reported, but the elected officials have an opportunity to ask questions about the program.

Step 4 Besides reporting to local governments, the LMS Coordinator and/or Chair of the LMS Steering Committee will be available to make similar presentations to private sector organizations, non-profit organizations (e.g., Council on Aging, chambers of commerce) and community organizations (e.g., Kiwanis, Rotary, Lions).

6.6 UPDATING THE PLAN

There are two updating processes connected to the LMS. One describes how the PPL is updated annually. A detailed description of the PPL updating procedure is provided below. The second updating process, involves the 5-year update of the entire LMS.

6.6.1 Project Prioritization List

At the heart of the LMS is the PPL (see **Table 6.1**). The PPL is a rank order of priority projects that if implemented will result in a more disaster-resistant community. Because projects are completed, new needs surface, new funding opportunities arise, and dramatic events occur that affect priorities, it is important that the PPL be a dynamic document. For this reason, the window to submit projects to the PPL will always be open. All applicants desiring to have their project on the PPL must submit their proposed project utilizing **Form #3**. The following sections identify the multi-step prioritization methodology. Potential LMS mitigation projects and activities were evaluated based on the following four criteria:

1) Which goal(s) the project addresses;
2) Which hazard(s) the project addresses;

FORM #1

ST. LUCIE COUNTY
UNIFIED LOCAL MITIGATION STRATEGY

INDIVIDUAL PROJECT
PROGRESS REPORT

Project Title:_____ PPL Ranking:_____ Date: _____

Project/Initiative Description:

Status of Progress:

_____

_____

_____

_____

_____

Problems/Obstacles & Proposed Corrective Action:

_____

_____

_____

_____

_____

Name of Report Preparer: _____ Email Address: _____Telephone #: _____

Send to:
LMS Project Coordinator
St. Lucie County Community Development Department
2300 Virginia Avenue
Fort Pierce, Florida 34982-5652

E-mail Address:_____

FORM #2

ANNUAL
LOCAL MITIGATION STRATEGY (LMS)
REPORT

From: LMS Coordinator
To: Elected Officials
Date:
Subject: Annual Report of LMS Implementation Status

This report is prepared to inform locally elected officials in St. Lucie County of the progress being made to make our community more disaster-resistant. The following briefly summarizes the status of **Existing Projects** presently being developed and identifies **New Projects** expected to be undertaken in the upcoming year.

*EXISTING PROJECTS (**1/1/04 – 12/31/04**)*

Rank on PPL	Project Title	Purpose of Project	Status of Completion	Obstacles/Problems/ Solutions

FORM #2 (Continued).

NEW PROJECTS (**1/1/05 – 12/31/05**)

PPL Ranking	Project Title	Purpose of Project	Funding Source(s)	Anticipated Problems/ Solutions	Start/End Dates

Table 6.1. St. Lucie County Local Mitigation Strategy Project Prioritization List.

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.1	1	Virginia Avenue Basin (Mayflower Canal & U.S. Highway 1 crossing) – Upgrade/replace culvert crossing of the Mayflower Canal and U.S. Highway 1 drainage	750,000	• Special Taxing District • Community Development Block Grant (CDBG) • Disaster Recovery Initiative (DRI) • Emergency Rehabilitation of Flood Control Works • Florida Emergency Management Preparedness Assistance Grant • Flood Mitigation Assistance Program (FMA) • Hazard Mitigation Grant Program (HMGP) • Local General Revenues • National Flood Mitigation Fund • Pre-Disaster Mitigation Grant • Federal Emergency Management Agency (FEMA) Public Assistance		Fort Pierce	
1.1	2	Phase 2, St. Lucie Gardens Stormwater Improvement – Permits and land acquisition	100,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	3	Phase 1, St. Lucie Gardens Stormwater Improvement – Design of stormwater system	100,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	4	Lakewood Park – Pipe Retrofit – Replacing various pipes within roadways that are currently deficient	175,000	• Potential funding sources same as Project #1		St. Lucie County	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.1	5	Avenue Q/12th Street Basin – Replace and upgrade 12th Street outfall and other main conveyance systems	300,000	• Potential funding sources same as Project #1		Fort Pierce	
1.3 & 4.3	6	Special Needs Shelter Retrofit – Roof repairs for Civic Center, which is designated as a special needs shelter for St. Lucie County	500,000	• Florida Emergency Management Preparedness Assistance Grant • HMGP • Pre-Disaster Mitigation Grant • Public Assistance		St. Lucie County	
1.3 & 4.3	7	Structural Improvements to School Shelters – Installing shutters on designated windows, pre-wiring for generators and construction of enclosures to protect generators from high winds and debris	180,000	• Potential funding sources same as Project #6		St. Lucie County	
1.1	8	N-6 (Header Canal – Pump Station No. 2) – Install automatic operation controls on Pump Station No. 2 at the south end of Header Canal	12,000	• CDBG • DRI • Emergency Rehabilitation of Flood Control Works • FMA • Flood Control Projects • HMGP • National Flood Mitigation Fund • Public Assistance		North St. Lucie Water Control District	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.1	9	N-5 (Header Canal – Pump Station No. 1) – Install automatic operation controls on Pump Station No. 1 at the north end of Header Canal	12,000	• Potential funding sources same as Project #8		North St. Lucie Water Control District	
1.1	10	(Moore's Creek Canal Basin) – Replacement/upgrading of storm system and expansion of the canal to provide additional flooding protection by increasing conveyance capacity	6,900,000	• CDBG • DRI • Emergency Rehabilitation of Flood Control Works • HMGP • National Flood Mitigation Fund • Public Assistance		Fort Pierce	
1.1	11	Phase 1, St. Lucie Plaza Drainage Improvements – Design of stormwater project	100,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	12	Phase 1, Harmony Heights Plaza Drainage Improvements – Design of stormwater project	100,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	13	Phase 2, St. Lucie Plaza Drainage Improvements – Permits and land acquisition for stormwater project	250,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	14	Phase 2, Sunland Gardens Plaza Drainage Improvements – Permits and land acquisition for stormwater project	250,000	• Potential funding sources same as Project #1		St. Lucie County	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.3	15	N-4 (Fitting Structure Gates) – Install automatic controls on the "Fitting Structures" gates	95,000.00	• Potential funding sources same as Project #8		North St. Lucie Water Control District	
1.1	16	Phase 1, Sunland Gardens Drainage Improvements – Design of stormwater project	100,000	• Potential funding sources same as Project #1		St. Lucie County	
1.3	17	Emergency Operation Center Renovation – Continued structural and contents upgrade to the City's Emergency Operation Center	80,000.00	• CDBG • DRI • Flood Control Projects • HMGP • Hurricane Program • Public Assistance		Fort Pierce	
1.7 & 1.10	18	Emergency Communication Vehicle – Purchase and equip an emergency communication vehicle in order to provide continual broadcast on television during an emergency event	300,000	• Local Revenue Sources • HMGP • Pre-Disaster Mitigation Program Grant		St. Lucie County	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.1	19	Sunrise Mitigation Site – Provides stormwater storage and treatment for a thousand-plus acre drainage basin. Provides environmental benefit to the estuary of the North St. Lucie River and flood control to the drainage basin	3,800,000	• Challenge 21, Floodplain • CDBG • Conservation Technical Assistance • DRI • Emergency Rehabilitation of Flood Control Works • HMGP • National Flood Mitigation Fund • Public Assistance		St. Lucie County	
1.1	20	Phase 3, St. Lucie Gardens Stormwater Improvements – Construction of stormwater project	3,900,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	21	Phase 2, Harmony Heights Drainage Improvements – Permits and land acquisition for stormwater project	250,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	22	N-3 (Gordy Road Structure Gates) – Install automatic controls on the "Gordy Road Structure" gates	130,000	• Potential funding sources same as Project #8		St. Lucie County	
1.1	23	Phase 2, South 7th Street Drainage Improvements – Permits and land acquisition for stormwater project	25,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	24	Phase 1, Carlton Road Drainage Improvements – Design of stormwater project	50,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	25	Phase 1, Paradise Park Drainage Improvements – Design stormwater project	100,000	• Potential funding sources same as Project #1		St. Lucie County	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.1	26	Phase 2, Carlton Road Drainage Improvements – Permits and land acquisitions for stormwater project	25,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	27	Phase 1, Silver Lake Park Drainage Improvements – Design of stormwater project	75,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	28	Phase 1, Wilbure Subdivision Drainage Improvements – Design of stormwater project	75,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	29	Phase 2, Paradise Park Drainage Improvements – Permits and land acquisition for stormwater project	250,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	30	Phase 2, Silver Lake Park Drainage Improvements – Permits and land acquisition for stormwater project	50,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	31	Phase 3, South 7th Street Drainage Improvements – Construction of stormwater project	175,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	32	Phase 1, Bluefield Road Drainage Improvements – Design of stormwater project	50,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	33	Phase 2, Bluefield Road Drainage Improvements – Permits and land acquisition for stormwater project	25,000	• Potential funding sources same as Project #1		St. Lucie County	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.1	34	White City/Citrus Avenue Drainage Study – Drainage improvements for a severely flood prone subdivision of fifty homesites, on septic tank and well system	1,500,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	35	Phase 1, South 7th Street Drainage Improvements – Design of stormwater project	50,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	36	Phase 2, Wilbure Subdivision Drainage Improvements – Permits and land acquisition for stormwater project	50,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	37	Phase 2, Trowbridge Road Drainage Improvements – Permits and land acquisition for stormwater project	200,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	38	Phase 3, Harmony Heights Drainage Improvements – Construction of stormwater project	2,650,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	39	Westmoreland Blvd./Gatlin Culvert – Drainage improvements to a section of Westmoreland Blvd. that is subject to flooding during heavy rains	50,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	40	Phase 1, Trowbridge Road Drainage Improvements – Design of stormwater project	50,000	• Potential funding sources same as Project #1		St. Lucie County	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.1	41	Indian River Estates Drainage Improvements – Drainage improvements for a severely flood prone subdivision of 1,800 single family homesites, on septic tanks and wells	4,800,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	42	Phase 3, Wilbure Subdivision Drainage Improvements – Construction of stormwater project	875,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	43	Ten Mile Creek (Regional Attenuation Facility) – joint project between St. Lucie County, U.S. Army Corps of Engineers, and South Florida Water Management District to construct a regional storage reservoir for stormwater within a flood prone river flood plain area affecting approximately 50 homesites	30,000,000	• Challenge 21, Floodplain • CDBG • DRI • Emergency Rehabilitation of Flood Control Works • Florida Communities Trust • HMGP • National Flood Mitigation Fund • Pre-Disaster Mitigation Grant • Public Assistance		St. Lucie County	
1.1	44	Phase 3, Paradise Park Drainage Improvements – Construction of stormwater project	2,650,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	45	Phase 3, Silver Lake Park Drainage Improvements – Construction of stormwater project	875,000	• Potential funding sources same as Project #1		St. Lucie County	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.1	46	Phase 3, St. Lucie Plaza Drainage Improvements – Construction of stormwater project	2,650,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	47	Phase 3, Sunland Gardens Drainage Improvements – Construction of stormwater project	2,650,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	48	N-2 (North Emergency Relief Canal [NERC]) – Install a 72-inch diameter culvert and control gate between the NERC and C-25 of the South Florida Water Management District to allow gravity discharge from the NERC to C-25	40,000	• Potential funding sources same as Project #8		North St. Lucie Water Control District	
1.1	49	N-1 (Canal No. 86) – Install an 84-inch diameter culvert and control gate between the south end of the North St. Lucie River Water Control District Canal No. 86 to C-24 for gravity discharge	50,000	• Potential funding sources same as Project #8		North St. Lucie Water Control District	
1.1	50	Gatlin Blvd. Box Culvert – Installation of a box culvert at the E-8 Canal in an area subject to constant flooding	500,000	• Potential funding sources same as Project #1		Port St. Lucie	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.3	51	Renovation to EOC Building – Remodeling and increasing the capacity of the St. Lucie County Emergency Operations Center	7,500,000	• CDBG • DRI • Emergency Operations Center Grant – FEMA • Florida Emergency Management Preparedness Assistance Grant • HMGP • Hurricane Program • Pre-Disaster Mitigation Grant • Public Assistance		St. Lucie County	
1.1 & 1.5	52	Elevation of Walton Road – Elevate Walton Road between the Fire Station and shopping center to alleviate flood during heavy rains	200,000	• Potential funding sources same as Project #1		Port St. Lucie	
1.1 & 1.3	53	Zullo Street Pump Storage Facility – Installation of a pump station in an area that is subject to flood during heavy rains causing, access problems	1,000,000	• Potential funding sources same as Project #1		Port St. Lucie	
1.5	54	Roundabout Feasibility Study – south Indian River Drive/Midway Rd. – Fund study to determine necessity for a roundabout to serve as traffic control and bank stabilization and evacuation route	500,000	• CDBG • Florida Emergency Management Preparedness Assistance Grant • HMGP • Local General Revenues • National Flood Mitigation Fund • Pre-Disaster Mitigation Grant • FEMA Public Assistance		St. Lucie County	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.5	55	South 25th Street – Phase II (Edwards to Midway) – Road widening from Edwards to Midway, a north/south evacuation corridor	1,764,000	• DRI • Emergency Rehabilitation of Flood Control Works • HMGP • National Flood Mitigation Fund • Public Assistance		St. Lucie County	
1.1	56	F-2 (Canal No. 21 culvert replacement) – Replace the existing 36-inch diameter gated culvert connection between Canal No. 21 and C-25 of the South Florida Water Management District with a 72-inch diameter weir-control gate	40,000	• Potential funding sources same as Project #8		Fort Pierce Farms Water Control District	
1.1	57	Phase 3, Trowbridge Road Drainage Improvements – Construction of stormwater project	750,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	58	Relief Culvert in Section 39 – Installation of a gated culvert between two drainage ponds	250,000	• Potential funding sources same as Project #1		Port St. Lucie	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.5	59	Roundabout Feasibility Study – south Indian River Drive/Savanna Road – Study on necessity for roundabout for traffic control and bank stabilization	500,000	• CDBG • Potential funding sources same as Project #1 • HMGP • Local General Revenues • National Flood Mitigation Fund • Pre-Disaster Mitigation Grant • FEMA Public Assistance		St. Lucie County	
1.5	60	Roundabout Feasibility Study – south Indian River Drive/Walton Road – Study on necessity for roundabout for traffic control and bank stabilization	500,000	• Same as Project #59		St. Lucie County	
1.1	61	Phase 3, Bluefield Road Drainage Improvements – Construction of stormwater project	425,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	62	Phase 3, Carlton Road Drainage Improvements – Construction of stormwater project	425,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1	63	Airoso Culverts at Eyerly – Replacement of culverts at Airoso & Eyerly to a larger sized culvert due to severe flood after heavy rains	100,000	• Potential funding sources same as Project #1		Port St. Lucie	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.1	64	F-1 (Water Control Structure No. 1) – Installation of electric-powered openers for the radial gates on Water Control Structure No. 1	45,000	• Potential funding sources same as Project #8		Fort Pierce Farms Water Control District	
1.1	65	Turnpike Diversion Ditch – Creation of a diversion ditch along the west side of the Florida Turnpike, creating an outfall from the E-5 Canal to the C-24 Canal	750,000	• Potential funding sources same as Project #1		Port St. Lucie	
1.3 & 4.3	66	School Shelter Retrofit – Retrofitting current school hurricane shelters with generators, hardening facilities, increasing capacity	25,000,000	• Potential funding sources same as Project #6		St. Lucie County	
1.1	67	Comprehensive Drainage Plan – Identify the sub-basin, determine necessary improvements, and long-term maintenance of stormwater within the Village	100,000	• CDBG • DRI • Emergency Rehabilitation of Flood Control Works • Flood Plain Management Services • HMGP • National Flood Mitigation Fund • Planning Assistance to States (Section 22) • Public Assistance		St. Lucie Village	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.3	68	Traffic Operations Hurricane Shutters – Installation of hurricane shutters at the Traffic Operations building	15,000	• DRI • Florida Emergency Management Preparedness Assistance Grant • HMGP • Pre-Disaster Mitigation Grant • Public Assistance		St. Lucie County	
1.3	69	Road & Bridge Office Hurricane Shutters – Installation of hurricane shutters for the main office at Road & Bridges	15,000	• Potential funding sources same as Project #68		St. Lucie County	
1.6	70	Acquisition of two Heavy Rescue Vehicles – Acquire and equip two heavy rescue vehicles	380,000	• DRI • HMGP • Public Assistance		St. Lucie County Fire District	
1.3	71	N-7 (Radial Gates) – Replace the radial gates on the “Fitting Structure” with stainless steel gates	110,000	• Potential funding sources same as Project #8		North St. Lucie Water Control District	
1.3 & 4.3	72	Special Needs Shelter – Design and construct an additional Special Needs Shelter for the citizens of St. Lucie County	2,500,000	• Potential funding sources same as Project #68		St. Lucie County	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.3	73	Lein Ditch Pipe Replacement – Replace the pipes within the Lein Ditch	100,000	• Potential funding sources same as Project #1		St. Lucie Village	
1.5	74	West Virginia Corridor – Design and construct an additional roadway corridor for evacuation and relief of Prima Vista Blvd. traffic congestion	50,000,000	• Emergency Relief Program • Economic Development Public Works Impact Program – Economic Development Administration (EDA) • DRI • HMGP • General Fund Revenue • Public Assistance		Port St. Lucie	
1.1	75	Easy Street – Replacement of all cross pipes at Buchanan Dr., Pinetree Dr., Palmetto Dr., Silver Oak Dr., Seagrape Dr., Myrtle Dr., Birch Dr., Hickory Dr., Raintree Trail, Tangelo Dr., Spruce Dr., Cassia Dr., Bamboo Dr., Balsam Dr., Papaya Dr., and Yucca Dr.	150,000	• Potential funding sources same as Project #1		St. Lucie County	
1.1 & 1.5	76	Rouse Road - Installation of paving and drainage improvements to Rouse Road	N/A	• CDBG • DRI • Emergency Rehabilitation of Flood Control Works • HMGP • National Flood Mitigation Fund • Public Assistance		St. Lucie Village	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.3	77	South 35th Street & Cortez Blvd. – Replacement of failing pipes	120,000	• Potential funding sources same as Project #1		St. Lucie County	
1.5	78	Road Restoration and Improvement - Initiation of a study to evaluate the condition of roads within the Village and then prioritize road restoration projects to ensure the most deteriorated facilities are brought into conformance	N/A	• Emergency Relief Program • Economic Development Public Works Impact Program – EDA • DRI • General Fund Revenue • HMGP • Public Assistance		St. Lucie Village	
1.1	79	Merritt Ditch (U.S. Highway 1 @ Burger King) – Retrofitting failing cross pipes	350,000	• Potential funding sources same as Project #1		St. Lucie County	
1.3	80	Mobile Command Center – Acquire and equip a mobile command center that can be moved to safety and ensure response team availability	300,000	• DRI • HMGP • Hurricane Program • Public Assistance		Fort Pierce	
1.3	81	Verada Ditch & Lucero Drive Crossing – Replacement of twin 60-inch pipes	210,000	• Potential funding sources same as Project #1		St. Lucie County	
1.3	82	Merritt Ditch & Sunrise Blvd. Crossing – Replacement of 60-inch pipe	75,000	• Potential funding sources same as Project #1		St. Lucie County	
1.3	83	Merritt Ditch & Elm Street Crossing – Replacement of 60-inch pipe	75,000	• Potential funding sources same as Project #1		St. Lucie County	
1.3	84	Airoso Ditch Crossing & Lucero Drive – Replacement of twin 48-inch pipes	175,000	• Potential funding sources same as Project #1		St. Lucie County	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.3	85	Mariposa Ditch – Redesign and reroute of failing ditch	750,000	• Potential funding sources same as Project #1		St. Lucie County	
4.1	86	Large Scale Disaster Drill Exercises – Acquire funds to conduct large scale exercises	100,000	• DRI • HMGP • Hurricane Program • Public Assistance • State Disaster Preparedness Grants		St. Lucie County	
1.3	87	Lakewood Park (Remove Control Structures) – Remove control structures so water can drain into the Fort Pierce Farms canal system as well as increase the drainage rate into the canal system from 1 inch per hour to 3 inches per hour	150,000	• Potential funding sources same as Project #1		St. Lucie County	
1.3	88	Orange Avenue & Pulitzer Road (Culvert Replacement) – Replacement of failing cross pipes	125,000	• Potential funding sources same as Project #1		St. Lucie County	
3.2	89	Natural Heritage Reserve – Establish the Natural Heritage Reserve utilizing grant funds to purchase approximately 76.55 acres of land	1,895,000	• Challenge 21, Floodplain • Florida Communities Trust Program • DRI • HMGP • Public Assistance		St. Lucie Village	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.10	90	AM Radios for Communication – Acquire AM radio transmitters for information dispersal	300,000	• DRI • HMGP • Hurricane Program • Pre-Disaster Mitigation Grant • Public Assistance		St. Lucie County	
1.3	91	South Indian River Drive (Drainage Improvements) – Replace existing pipes with new pipes and catch basins	100,000	• CDBG • DRI • Emergency Rehabilitation of Flood Control Works • HMGP • National Flood Mitigation Fund • Public Assistance		St. Lucie County	
1.6 & 1.9	92	Municipal Water Service – Provide municipal water services to the residents of St. Lucie Village	N/A	• CDBG • DRI • HMGP • Public Assistance		St. Lucie Village	
1.3	93	Acquisition of Emergency Generators and Pumps – Acquire funding to purchase emergency generators and pumps (6 to 12 inches)	240,000	• DRI • HMGP • Public Assistance		St. Lucie County	
1.6	94	Infrared Technology – Purchase infrared technology for fire district	300,000	• Florida Emergency Management Preparedness Assistance Grant • Firefighters Assistance Grant			

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.9	95	Municipal Sewer Service - Install a municipal sewer service into the Village	N/A	• DRI • Hazard Mitigation Grant Program • Public Assistance		St. Lucie Village	
1.1	96	National Register Properties Damage Assessment – Assess the exposure to damage by any type of disaster for properties located within the Village's Historic District	N/A	• DRI • HMGP • Historic Preservation Fund Grants-in-Aid • Hurricane Program • Public Assistance		St. Lucie Village	
3.1	97	Comprehensive Emergency Management Plan – Complete a study to determine the appropriate process to handle emergency management in the Village	N/A	• HMGP • Hurricane Program • Public Assistance • State Disaster Preparedness Grants		St. Lucie Village	
1.3	98	Mobile Command Post – Acquire and equip a mobile command center that can be immobilized to any area within the County	80,000	• DRI • HMGP • Hurricane Program • Public Assistance		St. Lucie County	
1.3	99	5-year survey – Survey and replace the equipment on the 5-year replacement list	500,000	• DRI • HMGP • Public Assistance		St. Lucie County	
1.3	100	Right of Way Culvert Replacement Project – Replace drainage right-of-way culverts with corrugated metal pipes on failing cross roads	2,800,000	• Potential funding sources same as Project #1		Port St. Lucie	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.6	101	Wildland Fire Mitigation Plan – Research and prepare a wildland fire mitigation plan	N/A	• HMGP • Public Assistance • Florida Emergency Management Preparedness Assistance Grant • Fire Grant Program – FEMA		St. Lucie Village	
1.6	102	Wildland Fire Mitigation Plan – City of Port St. Lucie – Preparation of a Wildland Fire Mitigation Plan as part of the Comprehensive Emergency Operations Plan	100,000	• HMGP • Public Assistance • Florida Emergency Management Preparedness Assistance Grant • Fire Grant Program - FEMA		Port St. Lucie	
4.1	103	Transfer of Public Records – Transfer of public records from paper to an optical disc	40,000	• DRI • HMGP • Public Assistance		Fort Pierce	
1.10	104	Acquire Radio Communication Equipment – Acquire (two hand-held and one base unit) radio communication equipment	2,300	• DRI • Florida Emergency Management Preparedness Assistance Grant • HMGP • Hurricane Program • Public Assistance		Port St. Lucie	
3.1	105	Comprehensive Plan – Review and prepare revisions to the Village's Comprehensive Plan	N/A	• Flood Plain Management Services • HMGP • Planning Assistance to States (Section 22) • Public Assistance • State Disaster Preparedness Grants		St. Lucie Village	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.3	106	Pet/Small Animal Shelter – Design and construct a pet/small animal shelter	1,500,000	• HMGP • Hurricane Program • Public Assistance • Wallace Global Fund		St. Lucie County	
4.1	107	Microfilming – Microfilming municipal records and one-of-a-kind drawings	N/A	• Hazard Mitigation Grant Program • Hurricane Program • Public Assistance		Port St. Lucie	
1.4	108	Rivergate (Erosion Control Devices) – Develop and install erosion control barriers along the entire shore of Rivergate Waterway	N/A	• CDBG • Conservation Plant Material Centers • DRI • HMGP • Public Assistance		Port St. Lucie	
1.3	109	Recreation Building Upgrades – Retrofit current buildings in parks to current codes (garages, doors)	N/A	• HMGP • Hurricane Program • Public Assistance		Port St. Lucie	
1.6	110	Prescribed Burns	N/A	• HMGP • Public Assistance		Port St. Lucie	
4.1	111	Vital Records Protection	N/A	• HMGP • Hurricane Program • Public Assistance		Port St. Lucie	
1.6	112	Lightning Devices in Parks	N/A	• DRI • HMGP • Public Assistance		Port St. Lucie	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
4.1	113	ID Badges for all City Employees – Incorporate a side for "Priority One Clearing" for immediate access to any type of disaster area	4,075	• CDBG • DRI • HMGP • Hurricane Program • Public Assistance • State Disaster Preparedness Grants		Port St. Lucie	
3.1	114	Community Rating System Designation – Apply and establish the Village as a participant of the Community Rating System for insurance reductions	N/A	• Florida Emergency Management Preparedness Assistance Trust Fund • Local General Revenue		St. Lucie Village	
1.1	115	Employee Hurricane Shutters – Coordinate loans for the acquisition of hurricane shutters for city employees' personal homes	N/A	• DRI • HMGP • Hurricane Program • Property Improvement Loan Insurance for Improving All Existing Structures and Building of New Nonresidential Structures (Title I) • Public Assistance		Port St. Lucie	
1.1	116	Stormwater Master Plan – design and implement a city-wide stormwater master plan to address flooding concerns and plan for future projects	185,000	• Potential funding sources same as Project #1		City of Fort Pierce	
1.6	117	Horizontal Wells – Provide horizontal wells throughout the County in order to provide access to water during emergencies	500,000	• South Florida Water Management District		St. Lucie County	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
3.2	118	North Fork – St. Lucie River Acquisition and Restoration – Acquire properties along the North Fork of the St. Lucie River and its tributaries to restore the natural flood plain in St. Lucie County	13,000,000	• CDBG • DRI • Emergency Rehabilitation of Flood Control Works • Florida Communities Trust • HMGP • National Flood Mitigation Fund • Pre-Disaster Mitigation Grant Public Assistance		St. Lucie County	
1.2	119	Repetitive Loss Inventory Buyout – Acquire properties located on the repetitive loss inventory to eliminate future flooding of structure	2,500,000	• Pre-Disaster Mitigation Program Grant		St. Lucie County	
1.1	120	Citrus Avenue Basin Retrofit – Construct a stormwater treatment facility for an 80-acre drainage basin	1,500,000	• Potential funding sources same as Project #1		City of Fort Pierce	
1.1 & 3.2	121	Indrio Blueway Buffer Acquisition – St. Lucie County – Acquisition of a 105-acre site located adjacent to the Indian River Lagoon and Wilcox Road and provide for access and restoration of the site to decrease future flooding hazards	1,800,000	• CDBG • DRI • Emergency Rehabilitation of Flood Control Works • Florida Communities Trust • HMGP • National Flood Mitigation Fund • Pre-Disaster Mitigation Grant • Public Assistance		St. Lucie County	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.1 & 3.2	122	10 Mile Creek Acquisition and Restoration – Acquire properties along 10 Mile Creek to restore the natural flood plain in St. Lucie County	4,000,000	• Potential funding sources same as Project #120		St. Lucie County	
1.1	123	Watershed "B" – Construct improvements to the E-8 Canal System and E-8 drainage basin to reduce flooding hazard	940,000	• Potential funding sources same as Project #1		City of Port St. Lucie	
1.3	124	Public Works Facility – Construct a new Public Works Facility adjacent to the Florida Turnpike	3,500,000	• Florida Emergency Management Preparedness Assistance Trust Fund • Pre-Disaster Mitigation Program Grant		City of Port St. Lucie	
1.1	125	Watershed "A" – West E-5 Improvements	500,000	• Potential funding sources same as Project #1		City of Port St. Lucie	
1.1	126	Watershed "A" – West E-84 Improvements – Improvements to the E-5 and E-84 drainage canals and E-84 drainage basin to reduce flooding hazard	1,210,000	• Potential funding sources same as Project #1		City of Port St. Lucie	
1.1	127	Watershed "A" – East – Installation of culverts, sluice gates, and retaining wall to connect the A-1 lake to A-7 lake in the Watershed "A" – East Drainage Basin	600,000	• Potential funding sources same as Project #1		City of Port St. Lucie	
1.1	128	St. Lucie North – Construct improvements to the C-104, C-105, C-106, C-107, and C-108 drainage canals to reduce flooding hazards	250,000	• Potential funding sources same as Project #1		City of Port St. Lucie	

Table 6.1. (Continued).

Supports Objective	Project Identification Number	Project Description	Project Cost ($)	Potential Funding Source[1]	Estimated Date of Completion	Implementation Responsibility	Action
1.3	129	Cameo Boulevard/Turtle Run Park Debris Storage Area – Develop/Identify an area for emergency management debris removal and storage, including construction of infrastructure to reach site	40,000	• Florida Emergency Management • General Local Revenue • Preparedness Assistance Trust Fund		City of Port St. Lucie	
2.3	unranked	Collect data for infrastructure and critical facilities	N/A	• PDM • EMPA	2010	St. Lucie County	
2.3	unranked	Collect data to improve future loss estimation efforts	N/A	• PDM • EMPA	2006	St. Lucie County	
1.7	unranked	Purchase and equip an outreach van	To be added later	• PDM • EMPA • HMGP	2006	St. Lucie County Health Department	
1.9	unranked	Work with solid waste to create small business hazardous materials disposal amnesty day	N/A	• Local Emergency Planning Committee Funding	2006	St. Lucie County	
1.1	unranked	Identify trees that may fail during high winds	To be added later	• PDM • EMPA • HMGP	2010	City of Fort Pierce	
1.1	unranked	Identify areas that may require Flood Insurance Rate Map (FIRM) revisions or amendments due to mitigation or development	To be added later	• PDM • EMPA • HMGP • FMA	2010	St. Lucie County	

[1] Availability of funding depends upon funding cycles, and prerequisites such as a disaster event.

CDBG = Community Development Block Grant.
DRI = Disaster Recovery Initiative.
EMPA = Emergency Management Preparedness Assistance.
FEMA = Federal Emergency Management Agency.
FMA = Flood Mitigation Assistance.
HMGP = Hazard Mitigation Grant Program.
N/A = not available.
PDM = Pre-Disaster Mitigation.

FORM #3

St. Lucie County Local Mitigation Strategy (LMS)
Mitigation Measure (Project or Initiative) Proposal Form

Municipality(s) or Agency(s): _____

Contact Person: _____

Office Phone: _____

Fax #: _____

E-mail: _____

Estimated Cost of Project or Initiative $_____

Describe the proposed mitigation measure as well as the population that will benefit:

_____

_____

_____

_____

What is the community's loss exposure **before** this mitigation effort? $_____

What will be the community's loss exposure **after** this mitigation effort? $_____

What is the estimated cost per benefited individual? $_____
(project cost/# of benefited individuals)

What is the project's benefit cost ratio? $_____

Which LMS goal(s) does the mitigation project address? Mark with an ✕.

Goal	✕
To reduce the loss of life and property and potential reoccurrence in areas vulnerable to the effects of natural, technological, and societal hazards	
To minimize public and private exposure and economic disruption in the event of natural, technological, and societal hazards	
To achieve safe and fiscally sound, sustainable communities through thoughtful long-range planning of the natural and man-made environment	
To ensure orderly, effective short-term recovery and redevelopment by establishing a program that provides adequate provision of shelters, community health services, food and water, debris removal, and promotes rapid economic recovery following a disaster	
To optimize the effective use of all available resources by establishing public/private partnerships, and promote intergovernmental coordination and cooperation	

Please return completed forms to: Cyndi Snay, LMS Coordinator
2300 Virginia Avenue, Fort Pierce, Florida 34982-5652
Phone: (772) 462-2822, Fax: (772) 462-1581
Snayc@stlucieco.gov

Date created: April 14, 2004

FORM #3 (Continued).

St. Lucie County Local Mitigation Strategy (LMS)
Mitigation Measure (Project or Initiative) Proposal Form

Which LMS hazard(s) does the mitigation project address? Mark with an ✕.

HAZARD	✕	HAZARD	✕	HAZARD	✕
Agricultural Pest & Disease		Civil Disturbance		Communication Failure	
Drought		Economic Collapse		Epidemic	
Erosion		Extreme Temperature		Flooding	
Hazardous Materials Accident		Hurricane		Immigration Crisis	
Lightning		Power Failure		Radiological Accident	
Seismic		Substance Abuse		Terrorism	
Thunderstorm		Tornado		Transportation System Accident	
Unexploded Military Ordnance		Wellfield Contamination		Wildland Fire	

Contained within:

The Jurisdiction's Comprehensive Growth Management Plan? yes no

Specific Location_____

Jurisdiction's Comprehensive Emergency Management Plan? yes no

Specific Location_____

Other local planning document (which one?)_____)yes no

Other local budgeting document (which one?)_____)yes no

Does this project address issues related to public health, safety, and welfare? yes no

Nature of critical facility benefited by this mitigation measure?

Primary Secondary Not Applicable

What is the life expectancy of the proposed mitigation measure? _____years

Is there demonstrated public support for this measure? (attach documentation)

Has a public meeting or hearing been held (attach documentation)

Amount of match (funds or in-kind services) $_____ from _____.
(Source of Match)

Date funding will be available?_____

Sponsor(s)_____

NAME ALL SPONSORS OF THIS PROJECT, WHETHER OR NOT THEY WILL CONTRIBUTE FUNDS

If funding were immediately available, how long would it take until the community began receiving benefits from this mitigative measure?_____years.

Respond as completely as possible; attach additional pages as required.

Please return completed forms to: Cyndi Snay, LMS Coordinator
2300 Virginia Avenue, Fort Pierce, Florida 34982-5652
Phone: (772) 462-2822, Fax: (772) 462-1581
Snayc@stlucieco.gov

Date created: April 14, 2004

3) Whether or not the project is supported in a plan or policy of the jurisdiction (i.e., Comprehensive Growth Management Plan, Comprehensive Emergency Management Plan, Stormwater Management Plan, etc.);
4) Does the project address an immediate threat to public health, safety, and welfare; and
5) Is the project's benefit cost ratio greater than 1?

In order to evaluate the projects, the Steering Committee had to first establish the priority goals and hazards using the following methodology. The process listed below will be followed during each update of the LMS.

Each Steering Committee member ranks the goals and hazards below using the ranking methodology described below.

6.6.1.1 Prioritization Process

Please prioritize the following LMS goals using the following methodology. Rank St. Lucie County LMS goals, by placing a 1, 2, 3, 4, or 5 next to the goals according to the following priority ranking. Place a 1 next to the goal with the highest priority in the County. Place a 2 next to the goal with the second highest priority in the County. Place a 3 next to the goal with the third highest priority, etc.

Goal	Rank
Reduce the loss of life and property and potential reoccurrence in areas vulnerable to the effects of natural, technological, and societal hazards	
Plan ahead to facilitate orderly and timely recovery of a community following a disaster event	
Achieve safe and fiscally sound, sustainable communities	
Ensure orderly, effective short-term post-disaster recovery and redevelopment by establishing a program that provides adequate provision of shelters, community health services, food and water, debris removal, and promotes rapid economic recovery following a disaster	
Optimize the effective use of all available resources	

Please prioritize the following hazards using the following methodology. Rank the top five hazards facing St. Lucie County by placing a 1, 2, 3, 4, or 5 next to the hazard according to the following priority ranking. Place a 1 next to the hazard with the highest priority in the County. Place a 2 next to the hazard with the second highest priority in the County. Place a 3 next to the hazard with the third highest priority. Place a 4 next to the hazard with the fourth highest priority. Place a 5 next to the hazard with the fifth highest priority. Leave all other hazards blank.

Hazards	Rank
Agricultural Pest & Disease	
Civil Disturbance	
Communication Failure	
Drought	

Hazards	Rank
Economic Collapse	
Epidemic	
Erosion	
Extreme Temperature	
Flooding	
Hazardous Materials Accident	
Hurricane/Tropical Storm	
Immigration Crisis	
Military Ordnance	
Power Failure	
Radiological Hazards	
Seismic (Sinkholes, Earthquakes, Dam/Levee Failure)	
Societal Alienation	
Substance Abuse	
Terrorism/Sabotage	
Thunderstorm/Lightning	
Tornado	
Transportation System Accident	
Wellfield Contamination	
Wildland Fire	

6.6.1.2 Prioritization Scoring

The rankings above will be translated into scores so that priority can be determined. Once the Steering Committee has ranked the goals and hazards, staff will convert the rankings into numerical scores as follows:

Goals
Rank #1 – 5 points
Rank #2 – 4 points
Rank #3 – 3 points
Rank #4 – 2 points
Rank #5 – 1 point

The goal with the most points will be the highest priority goal, the goal with the second highest points will be the second highest priority goal, and the goal with the lowest points will be the third priority goal.

Hazards
Rank #1 – 50 points
Rank #2 – 40 points
Rank #3 – 30 points
Rank #4 – 20 points
Rank #5 – 10 points

The rankings given to each hazard will be converted into the points listed above. The total points for each hazard will be added. The hazard with the highest score, will be

the highest priority hazard and so on. Those hazards that do not receive any rankings will be grouped together as “non-immediate” priority hazards.

6.6.1.3 Project Evaluation

The process above results in a prioritized list of goals and hazards; from here, the projects or mitigation activities can be evaluated and ranked based on the following criteria:

1) Which goal(s) the project addresses;
2) Which hazard(s) the project addresses;
3) Whether or not the project is supported in a plan or policy of the jurisdiction (i.e., Comprehensive Growth Management Plan, Comprehensive Emergency Management Plan, Stormwater Management Plan, etc.);
4) Does the project address an immediate threat to public health, safety, and welfare; and
5) Is the project's benefit cost ratio greater than 1?

Any organization interested in submitting a project for the PPL must complete a project submission form. The form will include questions regarding the above criteria. Proposers will be asked to identify which goal(s) the project addresses, which hazard(s) the project addresses, cite supporting evidence from other plans, and document how the project addresses the issues of public health, safety, and welfare. CDD staff will apply the criteria listed above to projects that are up for consideration for the LMS PPL. Each project will be scored according to the following point system. Projects will be listed on the PPL ranked according to their total evaluation score. The project with the most points will be ranked first.

The Steering Committee prioritized the plan goals as follows:

1) To reduce the loss of life and property and potential reoccurrence in areas vulnerable to the effects of natural, technological, and societal hazards.
2) To ensure orderly, effective short-term recovery and redevelopment by establishing a program that provides adequate provision of shelters, community health services, food and water, debris removal, and promotes rapid economic recovery following a disaster.
3) To minimize public and private exposure to and economic disruption in the event of natural, technological, and societal hazards.
4) To achieve safe and fiscally sound, sustainable communities through thoughtful long-range planning of the natural and man-made environment.
5) To optimize the effectiveness use of all available resource by establishing public/private partnerships, and promote intergovernmental coordination and cooperation.

The Steering Committee prioritized the hazards as follows:

1) Hurricane/Tropical Storm
2) Radiological Hazard
3) Flooding
4) Tornado
4) Wellfield Contamination
5) Hazardous Materials Accident

5) Power Failure
6) Wildland Fire
7) Communication Failure
7) Epidemic
7) Transportation System Accident
8) Drought
8) Erosion
8) Terrorism/Sabotage

- Agricultural Pest & Disease;
- Civil Disturbance;
- Economic Collapse;
- Extreme Temperatures;
- Immigration Crisis;
- Military Ordnance;
- Seismic (Sinkholes, Earthquakes, Dam/Levee Failure);
- Societal Alienation;
- Substance Abuse; and
- Thunderstorm/Lightning.

Bulleted hazards indicate that no priority score was given, therefore, the hazard is a "non-immediate priority" hazard.

Project Scoring.

Project addresses:

Multiple goals	= 10 points
Highest priority goal	= 5 points
2nd highest priority goal	= 4 points
3rd highest priority goal	= 3 points
4th highest priority goal	= 2 points
5th highest priority goal	= 1 point

Project addresses:

Multi-hazard project	= 10 points
1st Highest priority hazard	= 5 points
2nd Highest priority hazard= 4 points	
3rd Highest priority hazard	= 3 points
4th Highest priority hazard	= 2 points
5th Highest priority hazard	= 1 point
Addresses a "non immediate" hazard priority	= 0 points

Project is:

Supported in multiple plans or policies	= 10 points
Supported in a plan or policy	= 5 points
Not supported in any plan or policy	= 0 points

Addresses Issues of Public Health, Safety, and Welfare (PHSW)

Project addresses PHSW	= 5 points
Project does not address PHSW	= 0 points

Project's benefit cost ratio is greater than 1:

Project ratio is greater than 2	= 10 points
Project ratio is greater than 1 but less than 2	= 5 points
Project ratio is less than 1	= project is no longer considered for listing on the PPL

The maximum score for a project is 45 points, which would be received by a project that addresses multiple goals and hazards, is supported by multiple plans and policies, addresses issues related to PHSW, and has a benefit cost ratio greater than 2.

The scores for the five criteria will be added together. The total scores for each of the five criteria will be the bases of the ranked list of projects. The projects with the highest scores will be ranked highest on the PPL.

After the total scores have been determined, a revised PPL will be developed by listing the projects in ranked order according to score.

6.6.1.4 Tie Break Methodology

This project prioritization methodology will most likely result in tie scores for projects that address the same hazards. For instance, most stormwater management projects will address the same goals and hazards, resulting in tie ranking scores. Because of this, it is important to develop a tie-break methodology.

For projects with identical ranking scores that address different hazards, the project that addresses the highest priority hazard shall be ranked higher. For instance, if a tornado project and a hazardous materials accident project received identical ranking scores, the tornado project would be ranked higher because it's overall hazard priority is higher than hazardous materials accidents.

For projects with identical ranking scores that address the same hazards, the benefit cost ratio will be used to break the tie.

6.6.2 Comprehensive Update

The LMS planning process is dynamic and results in the development of a set of prioritized projects and initiatives with the aim of mitigating hazard impacts. To ensure this Local Hazard Mitigation Strategy remains consistent with current community issues and characteristics, it is important that it be periodically reviewed and updated.

In developing this updating process, three key sources were consulted to shape the process and procedures developed herein: Section 163.3191, F.S.; the evaluation and appraisal process of local government comprehensive plans; the American Red Cross, Ten-Step Informative Model; and the Federal Emergency Management Agency's DMA2K local mitigation planning requirements. A key objective in the development of the process was to keep it from being excessively bureaucratic and cumbersome.

The LMS update process will occur on a 5-year cycle as is recommended by FEMA's DMA2K. The Steering Committee indicated that there needed to be some abbreviated reassessment of the strategy following a Disaster Declaration.

The LMS update procedures will be initiated and carried out by the LMS Coordinator. Both the regular 5-year strategy update processes, as well as the abbreviated review process applicable following a Disaster Declaration, are depicted in **Figure 6.2**.

6.6.2.1 Regular LMS Update Procedures

The regular updating process will occur every 5 years. The administrative steps, as described below, constitute the procedures that will be followed.

Step 1 The LMS Coordinator will activate the update process in January of the fourth year of the update cycle by notifying each member of the Steering Committee of an initial organizational meeting. At that time, the CDD requests information updates on those serving on the Steering Committee (name of person, address, telephone and fax number, and e-mail address, if available).

Step 2 The LMS Coordinator prepares meeting agenda in coordination with the Chairman of the Steering Committee to be distributed in advance of the meeting to members of the Steering Committee.

Step 3 Steering Committee meeting held. A brief review of the updating process is discussed. A discussion of whether the evaluation criteria are still appropriate or whether modifications or additions are needed due to changing conditions over the period since the last update process occurred. The data needs will be reviewed, data sources identified, and responsibility for collecting information assigned to members.

Step 4 A draft report prepared. Evaluation criteria to be addressed include the following:

A. Changes in the community and government processes, which are hazard-related and have occurred since the last Strategy review;

1. Community change
   a. Growth and development in vulnerable areas;
   b. Impact of actions resulting from growth that adversely affect natural resources in vulnerable areas, such as seawalling, beach erosion, heightening deposition in inlets;
   c. Demographic changes;
   d. New hazards identified;
   e. Changes in community economic structure; and
   f. Special needs population changes.

2. Government process changes
   a. New or changing laws, policies, and regulations;
   b. Changes in funding sources or requirements;
   c. Change in priorities for implementation;
   d. Changes in government structure; and
   e. Shifts in responsibility and mitigation committee resources.

INSERT FIGURE 6.2

B. Progress in implementing LMS initiatives and projects - the Strategy initiatives and projects as compared with actual results at the date of the report;

C. Effectiveness of the implemented initiatives and projects;

D. Evaluation of unanticipated problems and opportunities that have occurred between the date of adoption and date of report;

E. Evaluation of hazard-related public policies, initiatives, and projects;

F. Assess the effectiveness of public and private sector coordination and cooperation.

Step 5 The LMS Coordinator determines best method to solicit public input. The LMS Coordinator is responsible for public noticing/advertising requirements. All Steering Committee members are informed and requested to attend public meeting.

Step 6 A public meeting is held. The LMS Coordinator or a representative of the Steering Committee presents findings, conclusions, and recommendations of Strategy effort. Public comments are recorded.

Step 7 The LMS Coordinator distills and synthesizes public comments in memorandum.

Step 8 The LMS Coordinator coordinates and organizes second meeting of Steering Committee. The draft Strategy update report is distributed to each participant 7 days prior to the meeting. The Steering Committee meeting is held. Consensus is reached on changes to the draft. If agreement can not be reached by certain local governments on certain issue(s) and/or project prioritization(s), the conflict resolution process (**Section 6.8**) may be triggered for those specific items parties cannot agree upon. A vote is taken securing approval of the draft Strategy Update Report, contingent upon integrating Steering Committee comments into draft report.

Step 9 The LMS Coordinator incorporates modifications/additions resulting from Steering Committee meeting.

Step 10 The LMS Coordinator finalizes the Strategy Update Report. Copies are distributed to Steering Committee members.

Step 11 Each jurisdictional representative presents the updated Strategy to their respective governing body, and other interested parties. If there are new or modified recommendations that their local government could implement to further the countywide Strategy, member seeks direction from governing body to implement appropriate strategies.

Step 12 The final updated LMS is formally adopted by all of the participating jurisdictions.

Step 13 The final updated LMS is forwarded on to the State Hazard Mitigation Officer at the Florida Division of Emergency Management and then to FEMA Region IV for review.

6.6.2.2 Declared Emergency Assessment

Step 1 Within 6 months following a Disaster Declaration, the LMS Coordinator will initiate a post disaster review and assessment. The LMS Coordinator will activate the assessment by appointing a Strategy Update Subcommittee. Each member of the Strategy Update Subcommittee will be notified that the assessment process is being commenced.

Step 2 The LMS Coordinator, through the Strategy Update Subcommittee will draft a Technical Report. The purpose of the report is to document the facts of the event and assess whether the Strategy effectively addressed the hazard. The Report should contain, at a minimum, the following:

A. Identification of whether the hazard creating the declared emergency has been addressed in the Strategy;

B. Documentation of the event: the magnitude of the event, areal extent of damages, specific damages sustained (public infrastructure [e.g., potable water and wastewater treatment plants and collection systems] and private infrastructure [e.g., utilities, power]);

C. Discussion of impacts to the private sector, such as obstacles to recovery, utilization of local vendors, deficits in types of products needed, accessibility of vendor suppliers, demand for space for temporary relocation, local business contingency plans, etc.;

D. Analysis of effectiveness of coordination among institutional entities (e.g., local governments, Council on Aging, St. Lucie County Health Department, medical facilities, Florida Power & Light Company, Southern Bell, American Red Cross, Salvation Army, South Florida and St. Johns River Water Management Districts, FDCA, Florida Department of Transportation), and make recommendations, as necessary;

E. Evaluation of the accuracy of the hazard vulnerability and risk assessment in Strategy relative to actual event;

F. Identification of Strategy initiatives/projects that had been implemented to mitigate impacts of the type of flooding hazard creating the emergency event, and evaluate effectiveness.

G. Discussion of unanticipated impacts and identification of potential mitigation measures; and

H. Synthesis of information and prepare conclusions. Recommendation of whether the Strategy needs to be amended.

Step 3 The LMS Coordinator schedules a meeting of Steering Committee and distributes copies of the draft Technical Report prior to the meeting.

Step 4 A meeting of the Steering Committee is held. Members discuss the Report findings, conclusions, and recommendations, and determine whether the Strategy needs to be modified.

Step 5 If the conclusion is that no modification is needed for the Strategy, the Report is approved and transmitted to local governments.

Step 6 If it is determined that the Strategy is to be amended, the Steering Committee prepares Draft Amended Strategy. The Amended Strategy should do the following:

A. Utilize information from the Technical Report;
B. Provide justification of the need to amend the Strategy;
C. Contain a review and analysis of existing Strategy Initiatives/Projects in light of new Initiatives/Projects recommended in Technical Report; and
D. Include a re-prioritization of Initiatives/Projects.

Step 7 A draft Amended Strategy is provided to each member of the Steering Committee 1 week in advance of the scheduled meeting.

Step 8 A meeting of Steering Committee held. Draft Amended Strategy is discussed. Modifications suggested.

Step 9 The LMS Coordinator, in consultation with Steering Committee, establishes appropriate method(s) to solicit public input. The LMS Coordinator is responsible for public noticing/advertising requirements. Steering Committee members informed and requested to attend public meeting.

Step 10 Public meeting held. The LMS Coordinator or a representative of the Steering Committee presents findings, conclusions, and recommendations of Draft Amended Strategy.

Step 11 The LMS Coordinator distills and synthesizes public comments, and circulates them among the Steering Committee for comment. If comments are extensive and/or controversial, a meeting of the Steering Committee is scheduled and organized by the LMS Coordinator. If no meeting of Steering Committee is warranted, skip to Step 13.

Step 12 A meeting of the Steering Committee is held. Public comments are discussed. Consensus reached as to how comments are to be reflected in the Amended Strategy. If agreement can not be reached by certain local governments on certain issue(s) and/or project prioritization(s), the conflict resolution process (**Section 6.8**) may be triggered for those specific items parties cannot agree upon. A vote is taken securing approval of the draft Strategy Update Report, contingent upon integrating Steering Committee comments into draft report.

Step 13 The LMS Coordinator modifies the draft report based on the outcome of the results of Steering Committee meetings (STEPS 8 & 12), or makes modifications resulting from public comments generated during Step 10.

Step 14 The LMS Coordinator finalizes the Amended Strategy. Copies of Amended Strategy are distributed to the Steering Committee for review.

Step 15 Each jurisdictional representative presents the Amended Strategy to their local governing body, and other interested parties. If there are new or modified recommendations that their local government could implement to further the countywide Strategy, the member seeks direction from governing body to implement appropriate strategies.

Step 16 The final updated LMS is formally adopted by all participating jurisdictions

Step 17 The final updated LMS is forwarded to the State Hazard Mitigation Officer at the Florida Division of Emergency Management and FEMA Region IV for review.

6.7 CONTINUING PUBLIC INVOLVEMENT

The St. Lucie County LMS Steering Committee recognizes the importance of public involvement in the LMS planning process. The Committee is committed to providing opportunities for the public to become and remain engaged in the LMS process in the future. The Committee will ensure continued public involvement through the following methods:

1) Advertising quarterly meetings of the LMS Steering Committee in local newspapers and websites to invite the public to attend;
2) Posting updated LMS information and data on County and municipal websites when available;
3) Engaging in public hazard awareness programs to make residents more aware of the hazards that St. Lucie County faces; and
4) Providing copies of the final LMS at local library branches for the public to view.

The LMS Coordinator shall have the responsibility of ensuring that these activities are being implemented.

6.8 CONFLICT RESOLUTION

6.8.1 Background

With multiple local governments involved in the development of the St. Lucie County LMS, differences of opinions may arise over the course of the program with regard to goals, objectives, policies, and projects. Governments often have different interests, priorities, and needs as well as distinct constituents. In cases where an impasse occurs, there needs to be a procedure that can be activated to resolve such conflicts. This section describes the procedure that will be used to resolve conflicts arising among the participating entities in the development of the St. Lucie County LMS. The conflict resolution process is depicted in **Figure 6.3**. The specific steps are described in detail below.

Prior to developing the process, other dispute resolution processes were investigated. They included the Treasure Coast Regional Planning Council Dispute Resolution Process, the Palm Beach County Multi-jurisdictional Issues Coordination Forum, the South Florida Growth Management Conflict Resolution Consortium, the Volusia County Coastal Management Element Conflict Resolution Program, and the Monroe County procedures for resolving disputes during the planning, design, construction, and operation of wastewater collection/treatment and effluent disposal facilities.

The two types of conflicts that may arise are issues and disputes. Issues are technical problems that are susceptible to informal solution by emergency management or planning office staff. Disputes are problems that escalate to levels requiring formal resolution by neutral third parties. In either case, resolution or settlement will not be binding, but a mutual, agreed to understanding among the disputing parties.

Developing an LMS is a cooperative, collaborative process, and local governments should be able to reach consensus on most issues and problems that arise during the development period. When occasions arise where local governments cannot reach agreement on a particular issue or project, they will be able to petition a hearing of the issues before the Steering Committee.

The LMS Coordinator would provide staff support.

6.8.2 Conflict Resolution Procedure

The following provides a detailed, step-by-step procedure that would be followed should a dispute arise during the study.

Objective: To institute a fair, effective, and efficient process to resolve conflicts among local governments during the development of the single, Countywide LMS.

During the development of the LMS, local governments may reach an impasse on a particular issue or position. The local government has an opportunity to elect to exercise the following LMS Conflict Resolution Procedure.

Step 1 The local government would submit a letter of dispute (LOD) to the LMS Coordinator explaining in as much detail as possible, their

INSERT FIGURE 6.3

concern and position along with documentation to support their position. Also, they would outline potential alternative solutions.

Step 2 The LMS Coordinator would review the LOD, making sure that it clearly outlined the position of the local government(s) and provided sufficient information supporting their position so the dispute at question could be easily understood by the members of the Steering Committee. If necessary, the LMS Coordinator would contact the disputing party and ask for additional information/data necessary to clarify the position.

Step 3 The LMS Coordinator will schedule a meeting of the LMS Steering Committee. In an effort to continue to try to resolve the impasse expeditiously, the LMS Coordinator will make every attempt to schedule the meeting within two calendar weeks from the date once the LMS Coordinator determines that there are sufficient data available to proceed to the Steering Committee. Each member will be sent a copy of the LOD and any supportive materials provided by the disputing party. The disputing party will be notified of the meeting date and time.

Step 4 A meeting of the Steering Committee will be held. The representative of the disputing party will present their positions to the Steering Committee. Based on the ensuing discussion, hopefully resolution will be achieved. At the end of the meeting, if no mutually acceptable compromise is achieved, the position of the Steering Committee will be final. Whatever the outcome of the meeting, a memorandum of understanding will be prepared by the LMS Coordinator. To be official, the memorandum must have the concurrence of the Steering Committee Chair, and a representative of the disputing party.

6.9 FUNDING

Whether projects are implemented in many instances is dependent on whether or not funding is available or whether a grant application was awarded. Potential funding sources are listed in **Appendix C**. However, because funding programs are so fluid (funding some years, cutback other years, or completely eliminated) the County and its municipalities maintain contact with their Florida Department of Community Affairs liaison and the Treasure Coast Regional Planning Council, who are familiar with available grants. Also, Region IV, Federal Emergency Management Agency – Pre-disaster Mitigation Senior Coordinator and the Hazard Mitigation Grant Program Coordinator for Florida are excellent resources.

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APPENDICES

APPENDIX A

POLICIES

Table A.1. Existing hazard mitigation in the St. Lucie County Comprehensive Growth Management Plan.

Policy/Objective/Goal	Source	Notes
By 1990, apply for Florida Department of Environmental Resources (FDER) grant assistance which they have available for the following programs: recycling and education, home owner used oil collection, waste tire processing, and home owner and small quantity generator hazardous waste storage.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6B.2.1.4, pp. 6-B-36.	Hazardous Materials Disaster Mitigation
Develop and implement a hazardous waste management plan for the County.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Goal 6B.3, pp. 6-B-37.	Hazardous Materials Disaster Mitigation
By the year 1995, the County will have designated a site and a hazardous waste storage/transfer facility will be constructed for use by public emergency management agencies, the household generator, and small quantity generators.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Objective 6B.3.1, pp. 6-B-37.	Hazardous Materials Disaster Mitigation
Determine the feasibility and cost effectiveness of funding the Hazardous Waste Verification Program by an Occupational License Hazardous Waste Verification Assessment Fee.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6B.3.1.4, pp. 6-B-37.	Hazardous Materials Disaster Mitigation
Determine the feasibility and cost effectiveness of a County-wide cooperative education program focusing on informing the public about household hazardous waste, proper disposal methods and less environmentally harmful substitutes for these products. This could be done in conjunction with Amnesty Day awareness notification.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6B.3.1.5, pp. 6-B-37.	Hazardous Materials Disaster Mitigation
Consider and explore alternate funding sources for the construction/operation of a hazardous waste storage/transfer facility including the use of a state-certified hazardous waste contractor.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6B.3.1.6, pp. 6-B-38.	Hazardous Materials Disaster Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
By the year 1991, the County will have developed and implemented the methodologies to exclude hazardous waste from the Glades Road landfill.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Objective 6B.3.2, pp. 6-B-38.	Hazardous Materials Disaster Mitigation
Use an inspection of screening system to exclude obviously suspect items from the landfill. Drums, tanks from unknown sources, waste pesticides, or chemicals and residues from spill clean-ups are a few of the normally suspect items.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6B.3.2.1, pp. 6-B-38.	Hazardous Materials Disaster Mitigation
Continue regularly scheduled "Amnesty Days" collection programs for household hazardous wastes that may include other public or private small quantity generators.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6B.3.2.2, pp. 6-B-38.	Hazardous Materials Disaster Mitigation
By January 31, 1991 the County shall have commenced the development, to be completed by January 31, 1992, of County-wide stormwater Master Plan, the purpose of which is to identify problems, propose solutions, and determine costs.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6B.3.2.2, pp. 6-B-38.	Flood Mitigation
By January 31, 1991, the County will have defined the flood prone areas within its jurisdiction.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Objective 6C.1.2, pp. 6-C-40.	Flood Mitigation
The County Engineer shall maintain an inventory of flooding complaints, and each January 1st provide a report to the Board of County Commissioners identifying any problem areas and include any recommended corrective actions.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6C.1.2.1, pp. 6-C-40.	Flood Mitigation
By August 1, 1990, the County shall enact Land Development Regulations which support the protection and maintenance of the natural functions of the 100-year floodplain and other natural drainage features.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Objective 6C.1.3, pp. 6-C-40.	Flood Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
The County shall incorporate into its Land Development Regulations specific criteria regulating construction standards within the 100-year floodplain.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6C.1.3.1, pp. 6-C-41.	Flood Mitigation
The County shall, as an appendix to the Land Development Regulations, prepare a public informational handout explaining the purpose for the regulations set forth in Policy 6C.1.3.3.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6C.1.3.2, pp. 6-C-41.	Flood Mitigation
The County, in conjunction with the South Florida Water Management District (SFWMD), shall begin to review and evaluate existing drainage studies and plan within the County's jurisdictions to determine their relevance to the current stormwater regulations.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Objective 6C.1.4, pp. 6-C-41.	Flood Mitigation
It is the goal of St. Lucie County to implement a County-wide drainage system for urban and non-urban areas.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Objective 6C.2, pp. 6-C-41.	Flood Mitigation
Seek funding from State/federal grants and/or assessments in the area served by drainage improvements.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Objective 6C.2.1.1, pp. 6-C-42.	Flood Mitigation
As a part of the Land Development Regulations, include regulations governing the protection of potable wellfields from possible sources of contamination.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6C.3.1.1, pp. 6-C-42.	Wellfield Contamination Mitigation
To encourage the development of a series of agricultural reservoir areas to reduce the impacts of agricultural fertilizers and other related chemical applicants on the existing potable wellfields in the eastern portions of the County.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6C.3.1.4, pp. 6-C-42.	Wellfield Contamination Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
To continue to cooperate with the SFWMD in the identification and closure of free flowing artesian wells.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6C.3.1.5, pp. 6-C-43.	Drought Mitigation
The County will protect the function of natural groundwater aquifer recharge of designated public potable water supply wells by adopting a permanent Wellfield Protection Ordinance by August 1, 1992.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6C.3.2.1, pp. 6-C-43.	Wellfield Contamination Mitigation
The County will continue to assist the St. Lucie County Public Health Unit, Environmental Health Section, with the Hazardous Waste Verification Program by continuing to require all Occupational License applicants receive Public Health Unit approval prior to issuance of an Occupational License.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6C.3.2.3, pp. 6-C-43.	Hazardous Materials Disaster Mitigation
Aggressively identify, protect, conserve, and best utilize the County's available water supply resources.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Goal 6D.2, Policy. 6-Drought Mitigation-21.	Drought Mitigation
The County will develop a wellfield protection plan for public potable water supply.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6D.2.1, pp. 6-21.	Wellfield Contamination Mitigation
The County shall evaluate the feasibility of a comprehensive water conservation program incorporating, at a minimum, the following policies.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Objective 6D.2.2, pp. 6-22.	Drought Mitigation
The County shall continue to require water saving devices in new construction, adding additional requirements to the building code as technological advances occur.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6D.2.2.1, pp. 6-22.	Drought Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
The County shall evaluate the landscaping portion of the existing zoning ordinance to determine the feasibility of requiring more exacting provisions for native landscaping plants and xeriscaping.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6D.2.2.2, pp. 6-22.	Drought Mitigation
The Land Development Regulations shall require wastewater reuse plans for new sewage treatment plans operating above 250,000 gallons per day. Any new reuse plan shall be approved by the FDER.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6D.2.2.3, pp. 6-22.	Drought Mitigation
Encourage reuse and reclamation of water for irrigation, agriculture, and industry as an alternative to use of potable water supplies.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6D.2.2.4, pp. 6-23.	Drought Mitigation
Provide for education of the public concerning the need for water conservation.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Infrastructure Element, Policy 6D.2.2.5, pp. 6-23.	Drought Mitigation
Air quality with St. Lucie County shall meet or surpass National Ambient Air Quality Standards (NAAQS) for all pollutants measured by Florida Department of Environmental Protection.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Objective 8.1.1, pp. 8-37.	Air Pollution Mitigation
The County shall request from the SFWMD with appropriate administrative and/or fiscal support, a project which evaluates the economic and environmental feasibility of a reservoir in the western parts of the County for the purposes of water conservation, as well as stormwater management and improved surface water quality.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.2.4, pp. 8-38.	Drought Mitigation
The County shall continue to enforce land development regulations, which require the protection and maintenance of the natural function of the 100-year floodplain.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Objective 8.1.3, pp. 8-40.	Flood Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
The County's land development regulation shall include the use of programs to protect or maintain floodplains, such as reduced parking, conservation easements, cluster site planning and micrositing of buildings. The County shall continue to strictly enforce regulations that direct development away from floodplains and provide upland buffers along the floodplain.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.3.1, pp. 8-40.	Flood Mitigation
The County shall continue to acquire floodplain through the Environmentally Significant Lands Program and cooperative agreements with state and federal acquisition programs.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.3.2, pp. 8-40.	Flood Mitigation
Appropriate floodplain management initiatives for unincorporated areas which may impact or be beneficial to other areas within the watersheds shall be developed.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.3.3, pp. 8-40.	Flood Mitigation
The County shall continue to enforce land development regulations which require the conservation, appropriate use and protection of the quality and quantity of groundwater.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Objective 8.1.5, pp. 8-43.	Wellfield Contamination Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
The County shall enforce the Wellfield Protection program standards, including: a. Assure adequate and safe water supplies to present and future citizens of the County; b. Comply with Federal and State regulations in the best interests of the County and its future growth and development; c. Avoid crisis water supply situations through careful groundwater resource planning and conservation; d. Identify and protect the functions of public wellfield areas, including recharge of those areas, and provide incentives to keep the present and future public wellfields compatible with the needs expressed in a. above; e. Ensure that new development is compatible with existing local and regional water supply capabilities; and f. Protect present and future public wellfields against depletion and contamination through appropriate regulation, incentives, and cooperative agreements.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.5.1, pp. 8-43.	Wellfield Contamination Mitigation
St. Lucie County shall continue to cooperate with SFWMD to properly seal unpermitted active drainage wells and abandoned free-flowing artesian wells.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.5.4, pp. 8-44.	Drought Mitigation
The County shall conduct a study to identify existing and potential threats to the quality of waters within the Taylor Creek Wellfield Protection Area. The study shall be forwarded to the Board of County Commissioners with recommendations for any corrective measures required to safeguard the Taylor Creek Wellfield Protection Area.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.5.5, pp. 8-44.	Wellfield Contamination Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
Assist the St. Lucie County Soil and Water Conservation District in those activities directed towards minimizing soil erosion.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.6.3, pp. 8-45.	Erosion Mitigation
The County shall coordinate with other agencies and organization to initiate a data collection program to acquire water quality and turbidity information at five year intervals, as it relates to soil erosion.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.6.4, pp. 8-45.	Soil Erosion
The County shall require the use of native or drought tolerant vegetation adapted to existing soil and climatic conditions in landscaping.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.8.6, pp. 8-47.	Drought
The County shall continue to request assistance in public acquisition of natural areas under federal, state, and regional programs including, but not limited to Preservation 2000, Florida Forever, Florida Communities Trust, Conservation and Recreation Lands, and Save Our Rivers programs.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.8.13, pp. 8-49.	Natural and Technological Disaster Mitigation
The County shall provide multiple use opportunities on County-owned natural preserve areas consistent with natural resource protection and conservation, to provide for passive recreation, wildlife habitat, watershed protection, erosion control, maintenance or enhancement of water quality, aquifer recharge protection, or other such functions.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.8.14, pp. 8-49.	Natural and Technological Disaster Mitigation
The County shall develop a hazardous waste management program for the proper recycling, storage, collection, and disposal or transfer of hazardous materials and wastes.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Objective 8.1.9, pp. 8-50.	Hazardous Materials Disaster Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
The County shall establish a storage transfer facility for household and small quantity generators of hazardous wastes.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.9.1, pp. 8-50.	Hazardous Materials Disaster Mitigation
The County shall develop emergency response plans to handle accidents involving hazardous materials or wastes.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.9.2, pp. 8-50.	Hazardous Materials Disaster Mitigation
The County shall institute a recycling program which includes public education on the beneficial use of hazardous wastes using publicized lists of approved recyclers and by subscription to the Southern Waste Information Exchange.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.9.3, pp. 8-50.	Hazardous Materials Disaster Mitigation
The County shall continue to support State sponsored Amnesty Days to collect hazardous wastes in the County and shall evaluate the need for scheduling local Amnesty Days.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.9.4, pp. 8-50.	Hazardous Materials Disaster Mitigation
The County shall implement an employee training program to properly identify and inspect wastes before they enter the landfill and implement an inspection or screening program to exclude hazardous items such as drums, tanks from unknown sources, waste pesticides, or chemicals for spill cleanups.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.9.5, pp. 8-51.	Hazardous Materials Disaster Mitigation
The County shall participate with the FDEP and other local governments in the region to develop a regional hazardous waste transfer and storage facility and collection network, if appropriate.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.9.6, pp. 8-51.	Hazardous Materials Disaster Mitigation
The County shall seek funding from FDER's Local Hazardous Waste Collection Grants Program to manage hazardous wastes.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.9.7, pp. 8-51.	Hazardous Materials Disaster Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
The County shall conduct a Countywide underground storage tank assessment and assist any owner in seeking funding to respond to any groundwater contamination resulting from leaking tanks.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.9.8, pp. 8-51.	Hazardous Materials Disaster Mitigation
The County shall enact a public education program regarding household hazardous wastes, the proper methods of their disposal and alternative non-hazardous substitutes, in cooperation with schools, news media, and civic organizations, and in conjunction with Amnesty Day awareness programs.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.9.9, pp. 8-51.	Hazardous Materials Disaster Mitigation
The County land development regulations shall require the conservation, appropriate use and protection of current and projected potable water sources.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Objective 8.1.10, pp. 8-51.	Drought Mitigation
The County shall prepare and adopt an emergency water management conservation plan in cooperation with SFWMD.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.10.1, pp. 8-51.	Drought Mitigation
The County shall implement a public education program regarding various methods of water conservation at the household and small business level.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Conservation Element, Policy 8.1.10.3, pp. 8-52.	Drought Mitigation
Calculated needs for public facilities in coastal high hazard areas (CHHA) are subject to all limits and conditions in the Conservation and Coastal Management and Future Land Use Elements of this Plan.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Capital Improvements Element, Policy 11.1.1.6A, pp. 11-46.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
The standards for levels of service for Category Public Facilities, County Stormwater Management Systems and other major stormwater conveyance systems, shall be the 10 year/1 day storm event.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Capital Improvements Element, Policy 11.1.1.15, pp. 11-53.	

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
Regulate areas subject to seasonal and periodic flooding and provide for drainage and stormwater management; protect potable water wellfields and aquifer recharge areas.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Future Land Use Element, Policy 1.1.3.1d and e, pp. 1-36.	Flood Mitigation, Wellfield Contamination Mitigation
Enforce Section 7.07.07 of the land development regulations which require the developer of any site to be responsible for the on-site management of runoff in a manner so that post-development runoff rates, volumes, and pollutant loads do not exceed pre-development conditions.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Future Land Use Element, Policy 1.1.9.9, pp. 1-57.	Flood Mitigation
Future land development activities within the identified Hurricane Vulnerability Zone, shall be consistent with Goal 7.2, its Objectives and Policies, as identified in the Coastal Management Element of the St. Lucie Comprehensive Plan.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Future Land Use Element, Policy 1.1.10.3, pp. 1-58.	Hurricane Mitigation
Erosion control measures shall be limited to those that do not interfere with the natural resources and processes of the coastal area.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.1.1.3, pp. 7-54.	Erosion Mitigation
Future development or redevelopment within the coastal areas shall provide infrastructure to service the development or redevelopment at the Level of Service standards adopted in the appropriate elements of this Comprehensive Plan, and which is consistent with the coastal resource protection, access, and safe evacuation requirement of this Comprehensive Plan, and as further provided for in the Capital Improvements Element.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.1.1.4, pp. 7-55.	Hurricane Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
The County shall continue to evaluate erosion control measures along Indian River Drive south of Ft. Pierce. Erosion control measures shall be consistent with Policy 7.1.2.1.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.1.2.7, pp. 7-57.	Erosion Mitigation
The County shall support and implement programs, in line with the administrative and fiscal constraints of the County, to restore, enhance, and maintain the functions and values of natural waterways and adjacent upland habitats within the coastal area. Through state and local programs, St. Lucie County will continue to encourage the preservation and enhancement of floodplain wetland functions through public purchase and restoration of the floodplain wetlands and adjacent upland buffers along the North Fork of the St. Lucie River and the Indian River Lagoon, including their natural tributaries.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.1.2.9, pp. 7-57.	Flood Mitigation
Beaches and Dunes. St. Lucie County shall provide for the protection and restoration of beaches and dunes. A comprehensive beach and dune management program shall be adopted by 1995 which enhances the natural functioning of the beach-dune system while reducing unnatural disturbances of the primary dune.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Objective 7.1.5, pp. 7-112.	Erosion Mitigation
The County prohibits construction seaward of the Coastal Construction Control Line (CCCL) including construction of coastal or shore protection structures, except where the Florida Department of Natural Resources has issued the applicable permit authorizing that construction.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.1.5.1, pp. 7-62.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
Techniques for inlet maintenance which provide for long-term beach stability through facilitation of normal littoral processes shall be supported.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.1.5.2, pp. 7-62.	Erosion Mitigation
Adequate and effective measures shall be taken to prevent contamination of area waters from spillage or storage tank leakage. A fuel spill operations and contingency plan will be prepared for all new fueling operations in St. Lucie County. The plan will include operation and safety procedures and contingency plans for clean-up of a potential spill.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.1.7.5, pp. 7-66.	Hazardous Materials Mitigation
Reducing vulnerability to hurricanes. St. Lucie County shall strive to protect the people and property in St. Lucie County from the effects of hurricane storm damage. St. Lucie County shall weigh future development as to the impact it would have on the county's ability to protect the people and property in St. Lucie County from the effects of hurricane storm damage.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Goal 7.2, pp. 7-66.	Hurricane Mitigation
The County shall address development and redevelopment in the coastal area in the County's Hurricane Evacuation Plan.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Objective 7.2.1, pp. 7-66.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
The coastal high hazard area shall be defined as all of those properties located within a category one evacuation area. This areas includes all mobile home parks, the barrier islands, and any areas shown on the Army Corp or Engineers Hurricane Surge Maps as being susceptible in a category one storm surge.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.1.1, pp. 7-67.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
New sanitary sewer facilities in the hurricane vulnerability zone shall be flood proofed to prevent inflow and ensure that raw sewage does not leak from them during flood events.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.1.2, pp. 7-67.	Flood Mitigation, Hurricane Mitigation
The construction of County-funded public facilities in the CHHA shall be prohibited, unless the facility is necessary for public access, natural resource restoration or enhancement, or to provide for recreational facilities and other appropriate water dependent facilities.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.1.3, pp. 7-67.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
New development and redevelopment within V or A flood zones as designated by FEMA shall employ building construction techniques which are consistent with the requirements of FEMA's Flood Insurance Program and the County's Coastal Construction Code.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.1.4, pp. 7-67.	Flood Mitigation
The County shall prohibit the use of public funds for infrastructure expansion or improvements in coastal high hazard areas unless such funds are necessary to: a. provide services to existing development; b. provide adequate evacuation in the event of emergency; or c. provide for appropriate water dependent uses including the restoration or enhancement of natural resources within the coastal areas.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.1.5, pp. 7-67.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
The County shall promote the construction of publicly owned buildings that can be safely utilized as public hurricane shelters.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Objective 7.2.2, pp. 7-67.	Hurricane Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
County-funded building shall include the function of public hurricane shelter in their design. Some of the elements to be considered in the design are: flooding potential, accessibility, rain surcharge on roofs, window/door glass exposures, the use of dedicated roll up/down hurricane shutters, adequate sanitary facilities, emergency power supply, emergency water supply.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.2.1, pp. 7-68.	Hurricane Mitigation
Request in writing that other governmental entities in the County use Policy 7.2.2.1 in the design of new buildings when practicable and that they ask the County's Emergency Management Director to review and comment on proposals for new public buildings.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.2.2, pp. 7-68.	Hurricane Mitigation
Structural and functional designs of County buildings shall be reviewed and retrofitted for public shelters where it is cost effective and/or practical.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.2.3, pp. 7-68.	Hurricane Mitigation
All new residential development in excess of fifty units in areas subject to coastal flooding shall provide shelter space for 20 percent of the residents at spacing requirement of 40 square feet per person, or demonstrate the availability of the shelter space.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.2.4, pp. 7-68.	Flood Mitigation, Hurricane Mitigation
The County shall maintain the worst case 22.5 hour hurricane evacuation time.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Objective 7.2.3, pp. 7-68.	Hurricane Mitigation
Prior to the completion of the improvements described in Policy 7.2.3.1, the direction of traffic flow for one eastbound lane of each of these roadways shall be reversed during periods of emergency evacuation.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.3.2, pp. 7-69.	Hurricane Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
St. Lucie County shall continue to implement the Treasure Coast Hurricane Evacuation Plan	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.3.3, pp. 7-69.	Flood Mitigation, Hurricane Mitigation
All hurricane evacuation studies and plans conducted by or for the County shall be provided to the Treasure Coast Regional Planning Council (TCRPC), nearby counties, and all municipalities within St. Lucie County for review for consistency with regional and local plans. Conversely, St. Lucie County shall request for purposes of review, all hurricane evacuation studies and plans for nearby counties, municipalities within St. Lucie County, and the TCRPC.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.3.5, pp. 7-69.	Hurricane Mitigation
If the FDOT in conjunction with Martin County, decides to widen the Jensen Beach Bridge to South Hutchinson Island, discuss possible St. Lucie County participation in the project with the appropriate parties.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.3.6, pp. 7-69.	Hurricane Mitigation
The County shall provide immediate response to post-hurricane situations through the implementation of post-disaster response and redevelopment plans as set forth in the Treasure Coast Hurricane Evacuation Plan.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Objective 7.2.4, pp. 7-69.	Hurricane Mitigation
After a hurricane, but prior to re-entry of the population into evacuated areas, a special meeting of the Board of County Commissioners shall be convened to hear preliminary damage assessments, appoint a Recovery Task Force, and consider a temporary moratorium on building activities not necessary for the public health, safety, and general welfare.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.4.1, pp. 7-70.	Hurricane Mitigation Post-Disaster Redevelopment

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
A Recovery Task Force shall be named to include the Community Development Director, Emergency Management Director, County Engineer, and Sheriff, and other members as directed by the Chairman of the County Commission. Staff shall be provided by the departments whose directors sit on the Task Force. The Task Force shall be disbanded after implementing its responsibility.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.4.2, pp. 7-70.	
The responsibilities of the Recovery Task Force shall include: review and issuance of emergency building permits; coordination with state and federal officials to prepare disaster assistance applications; analysis and recommendation of hazard mitigation options to the County Commission, including reconstruction or relocation of damaged public facilities; development of a redevelopment plan; and recommendation or amendments to the Comprehensive Plan, Local Peacetime Emergency Plan, and other appropriate policies and procedures.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.4.3, pp. 7-70.	
If appropriate to rebuild structures which suffer damage in excess of fifty percent of their appraised value, current requirements shall be met including those enacted since construction of the structure including the CCCL.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.4.5, pp. 7-70.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
Structures which suffer repeated damage to pilings, foundations, or loadbearing walls and are proposed to be rebuilt shall be required to rebuild landward of their current location or modify the structure to delete the areas most prone to damage.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.4.6, pp. 7-70.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
Repair or reconstruction of seawalls shall be accompanied by beach fill or other appropriate material authorized by the appropriate Federal or State permitting agencies.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.4.7, pp. 7-71.	Erosion Mitigation
The County shall assess the value of all structures in the CHHA and the utility of the land for public access, and evaluate the potential for acquisition, relocation, or other appropriate measures in line with fiscal constraints when post-disaster opportunities arise.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.4.8, pp. 7-71.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
The Recovery Task Force shall review all interagency hazard mitigation reports as they are produced and make recommendations for amendments to the comprehensive plan accordingly.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.2.4.9, ppp. 7-71.	Hurricane Mitigation
The County shall prohibit the use of public funds for infrastructure expansion or improvement in coastal high hazard areas unless such funds are necessary to: provide services to existing development, provide adequate evacuation in the event of emergency, or provide for appropriate water dependent uses including the restoration or enhancement of natural resources within the coastal area.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.4.1.1, pp. 7-72.	Hurricane Mitigation
The County shall require turn lands, parking lanes, or other paved areas, particularly at appropriate intersections, for new or improved roads, which can be used to increase the number of traffic lanes for hurricane evacuation.	St. Lucie County Comprehensive Growth Management Plan, Mar. 2002, Coastal Management Element, Policy 7.4.1.6, pp. 7-73.	

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
The public safety director will assign the individual responsible for establishing and monitoring all Emergency Management training programs and exercises for which the County is responsible. The person assigned this task, in consultation with the Emergency Management Coordinator, will establish an exercise schedule in a manner required by the Florida Division of Emergency Management. All appropriate County and municipal agency personnel will be trained in the implementation of this plan and supporting SOPs to include guidance for the completion and disposition of financial reports.	St. Lucie County Comprehensive Emergency Management Plan, Mar. 1998, Basic Plan, Section VI.A, pp. 66, 67.	Natural and Technological Disaster Mitigation
The Emergency Management Coordinator will keep abreast of and request training form the state on all matters that relate to state and federal programs that would enhance the preparedness of St. Lucie County.	St. Lucie County Comprehensive Emergency Management Plan, Mar. 1998, Basic Plan, Section VI.A, p. 67.	Natural and Technological Disaster Mitigation
The Emergency Management staff will remain current with the highest training credentials possible. They will cooperate with and assist other County and municipal agencies in the conduct of exercises.	St. Lucie County Comprehensive Emergency Management Plan, Mar. 1998, Basic Plan, Section VI.A, p. 67.	Natural and Technological Disaster Mitigation
St. Lucie County, and each of its municipalities, are participants in the National Flood Insurance Program. Citizens cannot buy flood insurance if their local jurisdictional government does not participate in the program. Communities participate in the Community Rating System (CRS), which allows communities to have an impact on the rates paid by their citizens for flood insurance. Communities are classified as Class 1 (most premium reduction allowed) through Class 10 (no reduction allowed). St. Lucie County is currently certified as a Class 9 community under the FEMA CRS classification program.	St. Lucie County Comprehensive Emergency Management Plan, Mar. 1998, Annex II, Section VI.A, p. 16.	Flood Mitigation, Hurricane Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
St. Lucie County has mutual aid agreements with Indian River, Okeechobee, Martin, and Palm Beach Counties, and is a participant in the Statewide Mutual Aid Agreement for Catastrophic Response and Recovery to provide expanded resource capability. These agreements will be developed, coordinated and amended by the Emergency Management Coordinator.	St. Lucie County Comprehensive Emergency Management Plan, Mar. 1998, Annex II, Section VI.B, p. 17.	Natural and Technological Disaster Mitigation
The St. Lucie County Emergency Management Division will determine the impacted areas to be surveyed by the I-Team. The I-Team will then identify opportunities for hazard mitigation within the disaster area, focusing on those areas that are addressed primarily in the state hazard mitigation, and identify possible measures that are funded under the hazard mitigation grant program.	St. Lucie County Comprehensive Emergency Management Plan, Mar. 1998, Annex II, Section VI.B.1, p. 18.	Post-Disaster Redevelopment, Natural and Technological Disaster Mitigation
The adoption of County Ordinance No. 87-12 (as amended) entitled "Storm Water Management and Flood Protection", which provides for the regulation of development in the 100-year floodplains as identified by FEMA Flood Insurance Rate Maps (FIRM). The purpose of the ordinance is to allow development to occur while maintaining the functions of the floodplain to the maximum extent feasible, while providing for protection of life and property.	St. Lucie County Comprehensive Emergency Management Plan, Mar. 1998, Annex II, Section VI.C.1.b, p. 19.	Flood Mitigation, Hurricane Mitigation
The adoption of County Ordinance No. 86-21, entitled "Coastal Construction Code", to provide minimum standards for the design and construction of buildings and structures (other than coastal protective structures) and to reduce the harmful effects of hurricanes and other natural disasters occurring along the coastal areas of the County.	St. Lucie County Comprehensive Emergency Management Plan, Mar. 1998, Annex II, Section VI.C.1.c, p. 19.	Natural and Technological Disaster Mitigation, Hurricane Mitigation

Table A.1. (Continued).

Policy/Objective/Goal	Source	Notes
The Emergency Management staff attending meetings (Public Service Advisory Council, Planning and Zoning Board, Metropolitan Planning Organization, DRI reviews, etc.) to provide input for building issues relative to public safety as well as assisting with the guidance of long-term redevelopment.	St. Lucie County Comprehensive Emergency Management Plan, Mar. 1998, Annex II, Section VI.C.1.f, p. 20.	Natural and Technological Disaster Mitigation
The Land Acquisition Advisory Committee purchases environmentally sensitive lands formerly zoned and/or platted as buildable properties. This initiative is a mitigation strategy used to prevent community growth in areas determined as environmentally sensitive, not in the public interest and those known to be subject to repetitive weather phenomenon.	St. Lucie County Comprehensive Emergency Management Plan, Mar. 1998, Annex II, Section VI.C.1.h, p. 20.	Flood Mitigation, Hurricane Mitigation
To protect human life and health; To minimize expenditure of public money for costly flood projects; To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public; To minimize prolonged business interruptions; To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in the floodplains; To help maintain a stable tax base by providing for the sound use of development of flood-prone areas in such a manner as to minimize flood blight areas; and To ensure that potential home buyers are notified that property is in a flood area.	St. Lucie County Land Development Code, Aug. 2000, Chapter 6.05.00.	Flood Mitigation

CCCL = Coastal Construction Control Line.
CHHA = Coastal High Hazard Area.
CRS = Community Rating System.
DRI = Disaster Recovery Initiative.
FDEP = Florida Department of Environmental Protection.
FDER = Florida Department of Environmental Resources.
FDOT = Florida Department of Transportation.
FEMA = Federal Emergency Management Agency.
NAAQS = National Ambient Air Quality Standards.
SFWMD = South Florida Water Management District.
TCRPC = Treasure Coast Regional Planning Council.

Table A.2. Existing hazard mitigation in the City of Ft. Pierce Comprehensive Growth Management Plan.

Policy/Objective/Project	Source	Notes
Air quality in the city shall continue to meet or exceed the minimum air quality levels established by the Florida Department of Environmental Regulation (FDER).	City of Ft. Pierce Comprehensive Growth Management Plan, Conservation Element, Objective 6.1.1, p. 6-45; EAR, 1996, p. M-14.	Air Pollution Mitigation Air quality is at same level as before.
The city shall cooperate with other local and state agencies to reduce air pollutants on a regional level.	City of Ft. Pierce Comprehensive Growth Management Plan, Conservation Element, Policy 6.1.1.3, p. 6-45.	Air Pollution Mitigation
Surface and sub-surface water resources in the city shall be managed in a manner which ensures their viability as natural habitats and utility for recreational and potable water uses.	City of Ft. Pierce Comprehensive Growth Management Plan, Conservation Element, Objective 6.1.2, p. 6-45.	Wellfield Contamination
The city shall amend, adopt, and implement land development regulations to ensure that proposed developments comply with the County-wide Wellfield Protection Program once adopted by the County.	City of Ft. Pierce Comprehensive Growth Management Plan, Conservation Element, Objective 6.1.2.2, p. 6-45.	Wellfield Contamination
The city shall continue to work with the County to establish a Wellfield Protection Program.	City of Ft. Pierce Comprehensive Growth Management Plan, Conservation Element, Policy 6.1.2.7, p. 6-46.	Wellfield Contamination
The city, in conjunction with the South Florida Water Management District, shall develop, adopt, and enforce provisions for monitoring and regulating water use as necessary by 1991 in order to prolong freshwater availability.	City of Ft. Pierce Comprehensive Growth Management Plan, Conservation Element, Objective 6.1.3, p. 6-46.	Drought Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
The city shall work closely with the SFWMD in preparing and adopting an emergency water management conservation plan.	City of Ft. Pierce Comprehensive Growth Management Plan, Conservation Element, Policy 6.1.3.1, p. 6-46.	Drought Mitigation
The city shall implement land development regulations to ensure: wastewater reuse for irrigation where practicable; separate metering for irrigation with potable water; a reduction in use of potable water for irrigation; and a more efficient operation of irrigation systems including the incorporation of such devices as soil water tensiometers and xeric landscaping where appropriate.	City of Ft. Pierce Comprehensive Growth Management Plan, Conservation Element, Policy 6.1.3.2, p. 6-47.	Drought Mitigation
The city shall work towards the further education of the public regarding various methods of water conservation at the household and small business level.	City of Ft. Pierce Comprehensive Growth Management Plan, Conservation Element, Policy 6.1.3.3, p. 6-47.	Drought Mitigation
By 1991, the city shall adopt provisions to control soil erosion.	City of Ft. Pierce Comprehensive Growth Management Plan, Conservation Element, Objective 6.1.4, p. 6-47; EAR, 1996, p. M-14.	Erosion Mitigation Erostion continues, but beach renourishment is underway.
Hazardous waste issues shall be addressed and enforced through a coordinated effort.	City of Ft. Pierce Comprehensive Growth Management Plan, Conservation Element, Objective 6.1.6, p. 6-48; EAR, 1996, p. M-14.	Hazardous Materials Disaster Mitigation County facility has helped as a storage site for household hazardous waste.
The city shall work closely with the DER and the County to identify small quantity hazardous waste generators and develop programs to dispose of the wastes properly.	City of Ft. Pierce Comprehensive Growth Management Plan, Conservation Element, Policy 6.1.6.1, p. 6-48.	Hazardous Materials Disaster Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
The city shall assist the County in implementing programs for the proper storage, collection, recycling, and disposal of hazardous waste.	City of Ft. Pierce Comprehensive Growth Management Plan, Conservation Element, Policy 6.1.6.2, p. 6-48.	Hazardous Materials Disaster Mitigation
Public expenditures that subsidize development in CHHAs should be limited to those improvements included in the Coastal Management Element.	City of Ft. Pierce Comprehensive Growth Management Plan, Capital Improvements Element, Objective 9.1.2, p. 9-24.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
The city should not expend funds in CHHAs unless the facility is for public access or resource restoration/maintenance.	City of Ft. Pierce Comprehensive Growth Management Plan, Capital Improvements Element, Policy 9.1.2.1, p. 9-24.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
The City should continue to provide or require provision of recreational facilities within CHHAs.	City of Ft. Pierce Comprehensive Growth Management Plan, Capital Improvements Element, Policy 9.1.2.2, p. 9-25.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
Erosion control measures on Hutchinson Island should be limited to those that do not interfere with normal littoral processes, sea turtle nesting and hatching activities, or negatively impact coastal natural resources.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.1.4, p. 5-56.	Erosion Mitigation
Within one year of the Comprehensive Plan adoption, the City shall revise its Land Development Regulations to require the use of native vegetation in landscaping all new developments or major redevelopments.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.1.5, p. 5-56.	Drought Mitigation, Erosion Mitigation
The city should support the Army Corps of Engineers (ACOE) or other appropriate agencies providing for inlet maintenance which provide for long-term beach stability through facilitation and management of normal littoral processes.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.1.6, p. 5-56.	Erosion Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
The city shall encourage the use of pilings to elevate structures and other low impact methods in areas with native vegetation by providing information, site plan review and design assistance to developers.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.1.10, p. 5-56.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
The following criteria should be applied to all proposed marinas and should be considered during the preparation of a marina siting plan including:	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.1.11, p. 5-56, 5-57.	Hazardous Materials Disaster Mitigation
9. In the event marina fueling facilities are developed, adequate and effective measures shall be taken to prevent contamination of area waters from spillage or storage tank leakage.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.1.11, p. 5-56, 5-57.	Hazardous Materials Disaster Mitigation
10. Prior to operation of marina fueling facilities, the developer shall concurrently submit to the city a copy of the application for a terminal facility and the applicable portion of the FDNR AFlorida Coastal Pollutant Spill Contingency Plan@. The plan shall describe the methods of fuel storage, personnel training, methods to be used to dispense fuel, and all the procedures, methods, materials, and emergency response contractors to be used in the event of a spill.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.1.11, p. 5-56, 5-57.	Hazardous Materials Disaster Mitigation
Marinas shall include a hurricane contingency plan which shall include those methods to be taken to secure property and facilities at the marina, the time period necessary to complete the security preparations and the safe evacuation of all marina personnel and those who rent or own space at the marina.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.1.11, p. 5-57.	Hurricane Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
By August 1, 1995 enact ordinances that require public, commercial, and private marinas with more than ten wetslips to prepare a marina hurricane evacuation plan and submit said plain to the St. Lucie County Office of Emergency Management. The County will advise the marina operator as to the plan=s sufficiency.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.1.15, p. 5-58.	Hurricane Mitigation
The city shall revise its Land Development Regulations to provide for the protection and restoration of beaches and dunes and establish construction standards which will minimize the impacts of man-made structures on beaches and dunes.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Objective 5.1.4, p. 5-59.	Erosion Mitigation
Construction seaward of the Coastal Construction Control Line (CCCL) should be prohibited, including construction of coastal or shore protection structures, except as approved by the city or FDNR, or for public access or resource restoration.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.4.1, p. 5-59.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
The city will request that the FDNR re-establish the CCCL every five years.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.4.4, p. 5-60.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
The city shall revise its land development regulations to ensure that construction and development activities are carried out in a manner which will minimize the danger to life and property from hurricanes, restrict development and direct population concentration away from Coastal High Hazard Areas (CHHA) and limit public expenditures in such areas or which encourage development of such areas.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Objective 5.1.6, p. 5-60; EAR, 1996, p. M-12.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation LDRs revised
New sanitary sewer facilities in the hurricane vulnerability zone should be evaluated for possible flooding to prevent inflow and equipment damage. Raw sewage should not leak from sanitary sewer facilities during flood events.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.6.1, p. 5-60.	Flood Mitigation, Hurricane Mitigation
The drinking water storage and repump facility at Jaycee Park should be examined and evaluated for hardening towards storm surge and flooding.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.6.2, p. 5-60.	Flood Mitigation, Hurricane Mitigation
City-funded public facilities should not be built in the coastal high-hazard areas, unless the facility is for public access or resource restoration/maintenance or serving existing development.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.6.3, p. 5-61.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
Ensure that new development and redevelopment with V or A flood zones as designated by the Federal Emergency Management Agency employs building construction techniques which are consistent with the requirements of the Federal Emergency Management Agency Flood Insurance Program.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.6.4, p. 5-61.	Flood Mitigation, Hurricane Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
The city, in cooperation with County and other Emergency Preparedness Officials, shall undertake an ongoing program to ensure adequate emergency shelters spaces are available and maintained to meet the needs of general evacuation and special needs population.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Objective 5.1.7, p. 5-61; EAR, 1996, p. M-12.	Hurricane Mitigation Program adopted, more shelters are present than in 1990.
The city shall require that all future municipality-owned buildings be constructed in such a manner that they can be safely utilized as public hurricane shelters.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.7.1, p. 5-61.	Hurricane Mitigation
By 1991, the city shall review all commercial and public development plans for use as potential emergency shelters.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.7.2, p. 5-61.	Hurricane Mitigation
Critical evacuation roadway links shall receive high priority for annual maintenance and capital improvement expenditures.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.8.4, p. 5-62.	Hurricane Mitigation
The city shall by the year 2000, with the financial assistance of the County and other appropriate agencies, improve the accesses to South Hutchinson Island within the city to decrease the probability of pre-landfall storm surge flooding.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.8.5, p. 5-62.	Flood Mitigation, Hurricane Mitigation
The city shall annually notify all residents of hurricane evacuation procedures and shelters for those with special needs, such as the handicap and the infirmed.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.8.6, p. 5-62.	Hurricane Mitigation
The city shall request all residents to evacuate immediately once an evacuation order has been issued.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.8.7, p.5-62.	Hurricane Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
The city shall immediately respond to post-hurricane situations through the implementation of post-disaster response and redevelopment plans to be prepared and adopted by October 1, 1992.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Objective 5.1.9, p.5-62; EAR, 1996, p. M-12.	Hurricane Mitigation, Post-Disaster Redevelopment Plans prepared and will be used.
If rebuilt, structures which suffer damage in excess of fifty percent of their appraised value shall be rebuilt to meet all current requirements including those enacted since construction of the structure.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.9.6, p. 5-63.	Flood Mitigation, Hurricane Mitigation, Post-Disaster Redevelopment
Structures which suffer repeated damage to pilings, foundations, or loadbearing walls shall be required to rebuild landward of their current location or to modify the structure to delete the areas most prone to damage.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.9.7, p. 5-63.	Flood Mitigation, Hurricane Mitigation, Post-Disaster Redevelopment
The Recovery Task Force shall review all interagency hazard mitigation reports as they are produced and make recommendations for amendments to the Comprehensive Plans accordingly.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.9.8, p. 5-63.	Hurricane Mitigation, Post-Disaster Redevelopment
The service area shall be consistent with the goals, objectives, and policies of this and all other elements of this comprehensive plan and shall take place in a manner which is financially acceptable, ensures the health, safety, and welfare of the residents, and limits the use of public funds in high-hazard coastal areas.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Objective 5.1.11, p. 5-64.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
Public funds shall not be used for infrastructure expansion or improvements in high-hazard coastal areas unless such funds are necessary to: provide services to existing development; provide adequate evacuation in the event of an emergency; or provide for recreational needs and other appropriate water dependent uses.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.11.1, p. 5-64.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
Beach renourishment projects shall meet the following level of service standards: Beach fill must include a protective berm high enough to prevent flooding by a ten-year storm event, and beach renourishment project shall have a design life of at least five years.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.11.4, p. 5-64.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
Developments must demonstrate that they will not affect a renourished beach in a manner which would reduce the level of service provided by the renourished beach.	City of Ft. Pierce Comprehensive Growth Management Plan, Coastal Management Element, Policy 5.1.11.5, p. 5-64.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
Potable water wellfields and prime aquifer recharge areas as described in the infrastructure element should be protected from the adverse impacts of development.	City of Ft. Pierce Comprehensive Growth Management Plan, Future Land Use Element, Policy 1.1.4.2, p. 1-70.	Wellfield Contamination Mitigation
Site developers should be responsible for meeting local and SFWMD storm water runoff and pollutant loads.	City of Ft. Pierce Comprehensive Growth Management Plan, Future Land Use Element, Policy 1.1.4.4, p. 1-70.	Flood Mitigation
Development within the 100-year floodplain should be allowed if such development will not have a hindering effect upon the overall storm drainage system or underground aquifers.	City of Ft. Pierce Comprehensive Growth Management Plan, Future Land Use Element, Policy 1.1.4.5, p. 1-70.	Flood Mitigation, Wellfield Contamination Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
Land use regulations shall be developed which regulate areas subject to seasonal and periodic flooding and provide for drainage and stormwater management consistent with the Infrastructure Element of this Comprehensive Plan.	City of Ft. Pierce Comprehensive Growth Management Plan, Future Land Use Element, Policy 1.1.4.11, p. 1-70.	Flood Mitigation
Population densities within the city's coastal area shall be coordinated with St. Lucie County and the Treasure Coast Regional Planning Council hurricane evacuation plans.	City of Ft. Pierce Comprehensive Growth Management Plan, Future Land Use Element, Objective 1.1.5, p. 1-70.	Hurricane Mitigation
Local and regional hurricane evacuation planning should be reviewed in order that island residential densities may be adjusted accordingly.	City of Ft. Pierce Comprehensive Growth Management Plan, Future Land Use Element, Policy 1.1.5.1, p. 1-70.	Hurricane Mitigation
Improvements to the island transportation network as identified in hurricane evacuation studies should be coordinated with impactive residential development.	City of Ft. Pierce Comprehensive Growth Management Plan, Future Land Use Element, Policy 1.1.5.2, p. 1-70.	Hurricane Mitigation
The city shall review, and revise where necessary, land development regulations to ensure that they contain specified and detailed provisions intended to implement the adopted Comprehensive Plan, and which as a minimum: regulates development which has a potential to contaminate water, soil, or crops; regulates areas subject to seasonal and periodic flooding and provides for drainage and stormwater management consistent with the Infrastructure Element of this Comprehensive Plan; and protects potable water wellfields and aquifer recharge areas.	City of Ft. Pierce Comprehensive Growth Management Plan, Future Land Use Element, Policy 1.1.12.1.d,e,f, p. 1-73.	Flood Mitigation, Wellfield Contamination Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
By 1991, the city shall establish an interlocal agreement with the County for coordination of the monitoring and disposal of hazardous waste. As a result of the agreement, a hazardous waste management program shall be developed that includes, at a minimum, the following components:	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.6, p. 70; EAR, 1996, p. M-10.	Hazardous Materials Disaster Mitigation Programs expanded, but percentage decrease not met.
A procedure to update and inventory the number of waste generators and the type and quantity of waste and materials generated within the city.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.6, p. 70.	Hazardous Materials Disaster Mitigation
Registration of generators within the city through the use of Standard Industrial Classification (SIC) codes on city and County occupational license applications.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.6, p. 71.	Hazardous Materials Disaster Mitigation
Periodic inspections of the facilities of waste generators and handlers to ensure that proper procedures are being followed.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.6, p. 71.	Hazardous Materials Disaster Mitigation
Procedures for emergency response and cleanup in the event of a hazardous waste spill, including provisions that can be attached as conditions to site plan approval, when appropriate.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.6, p. 71.	Hazardous Materials Disaster Mitigation
Periodic collection of household and small quantity generator hazardous waste and materials.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.6, p. 71.	Hazardous Materials Disaster Mitigation
Establishment of a public education program on the proper handling and disposal of hazardous waste and materials.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.6, p. 71.	Hazardous Materials Disaster Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
A resolution from the City Commission supporting the establishment of a hazardous waste storage/transfer facility within St. Lucie County.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.6, p. 71.	Hazardous Materials Disaster Mitigation
The city shall coordinate with St. Lucie County in adopting an interim wellfield protection ordinance by 1990. It should be designed to regulate land use activities within the cones of depression of the wellheads. This ordinance shall include, at a minimum, the following:	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.7, p. 71.	Wellfield Contamination Mitigation
Determination of appropriate and inappropriate land uses within the zones of influence.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.7.a, p. 71.	Wellfield Contamination Mitigation
Procedures for condemnation and elimination of existing and inappropriate land uses.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.7.b, p. 71.	Wellfield Contamination Mitigation
Structural containment standards for regulated materials.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.7.c, p. 71.	Wellfield Contamination Mitigation
Requirements for installation of monitoring wells.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.7.d, p. 71.	Wellfield Contamination Mitigation
Procedures for emergency reporting, cleanup, personnel training and material inventory.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.7.e, p. 71.	Wellfield Contamination Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
Establishment of financial responsibility.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.1.7.f, p. 71.	Wellfield Contamination Mitigation
The city shall continue to coordinate and cooperate with St. Lucie County in updating and implementing the County-wide Solid Waste Master Plan. To this end, the city puts special emphasis on the following: Development of a hazardous waste management program.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.3.2, p. 72.	Hazardous Materials Disaster Mitigation
By 1991, expand existing programs for the conservation of potable water resources within the city including the adoption of a new development and redevelopment per capita level of service standard which is 10% less than that used in the 1988 FPUA Master Plan. By the year 2000, these conservation efforts shall result in a water demand reduction of 2% or greater than that determined by using the 1998 FPUA Master Plan level of services of 170 gallons per capita per day.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Objective 4.1.5, p. 74.	Drought Mitigation
The Fort Pierce City Commission and the Utilities Authority shall develop a water conservation program which will include the following components:	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.5.1, p. 75.	Drought Mitigation
A landscape ordinance which requires xeriscape or the use of native vegetation for a portion of all new development and redevelopment landscape plans.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.5.1.a, p. 75.	Drought Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
Reduction in the use of potable water for irrigation purposes.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.5.1.b, p. 75.	Drought Mitigation
An education program to inform the public of various water conservation techniques and devices.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.5.1.c, p. 75.	Drought Mitigation
An ordinance requiring the use of water saving plumbing devices in new development and redevelopment.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.5.1.d, p. 75.	Drought Mitigation
The city shall meet annually with the Utilities Authority to assess the effectiveness of conservation programs and to identify additional conservation methods that can be utilized.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.5.2, p. 75.	Drought Mitigation
New potable water wells and wellfields shall be located in areas where not regulated materials will be used, handled, stored, or produced within the projected cones of depression of such wells or wellfields. At the time future wellfield locations are identified, establishment of incompatible land uses withing the cones of depression of such wells shall be prohibited.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.6.3, p. 75.	Wellfield Contamination Mitigation
The City shall continue to actively enforce new development stormwater drainage requirements with the requirements of the South Florida Water Management District.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.6.5, p. 76.	Flood Mitigation

Table A.2. (Continued).

Policy/Objective/Project	Source	Notes
During redevelopment activities, the city shall, where feasible, retrofit the existing stormwater outfall system to provide for greater retention/detention capability.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.6.6, p. 76.	Flood Mitigation Post-Disaster Redevelopment
The city and the utilities authority shall actively seek and secure new potable water wells and wellfields in the city and County in order that a continuing supply of potable water will be available for existing and future areas served by the FPUA.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.6.7, p. 76.	Drought Mitigation
The city shall adopt land development regulations for the protection of natural drainage features.	City of Ft. Pierce Comprehensive Growth Management Plan, Infrastructure Element, Policy 4.1.6.8, p. 76.	Flood Mitigation

ACOE = Army Corps of Engineers.
CCCL = Coastal Construction Control Line.
CHHA = Coastal High Hazard Area.
DER = Department of Environmental Resources.
FDER = Florida Department of Environmental Resources.
FDNR = Florida Department of Natural Resources.
FPUA = Fort Pierce Utility Authority.
SFWMD = South Florida Water Management District.
SIC = Standard Industrial Classification.

Table A.3. Existing hazard mitigation in the City of Port St. Lucie Comprehensive Growth Management Plan.

Policy/Objective/Goal	Source	Notes
The City shall protect potable water wellfields and prime aquifer recharge areas through the implementation of a Wellfield Protection Ordinance. The ordinance shall include types of permitted uses and buffer area requirements around such sites in order to protect water supplies.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Future Land Use Element, Policy 1.1.1.3, p. 1-38.	Wellfield Contamination Mitigation
Proposals for development within the 100-year floodplain as identified by the Federal Emergency Management Agency shall conform with local regulations for development in such areas.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Future Land Use Element, Policy 1.1.1.4, p. 1-38.	Flood Mitigation
Through the site plan review process the developer/owner of any site shall be responsible for the on-site management of stormwater runoff so that post development runoff rates, volumes, and pollutant loads do not exceed adopted level of service standards.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Future Land Use Element, Policy 1.1.1.5, p. 1-38.	Flood Mitigation
A soil erosion and sedimentation control plan shall be required as part of an application for a building permit or grading and excavating permit whenever a development will involve any clearing, grading, transportation, or other form of disturbing land by the movement of earth, including the mining of minerals, sand and gravel.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Future Land Use Element, Policy 1.1.1.6, p. 1-38.	Erosion Mitigation
Future growth and development will be managed through the preparation, adoption, implementation and enforcement of land development regulations, including the use of PUDs, mixed use projects and to ensure coordination and consistency with interagency hazard mitigation plans of resource planning and management plans pursuant to Chapter 380, F.S.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Future Land Use Element, Objective 1.1.6, p. 1-45.	Natural and Technological Disaster Mitigation

Table A.3. (Continued).

Policy/Objective/Goal	Source	Notes
Regulate areas subject to seasonal and periodic flooding and provide for drainage and stormwater management in order to reduce likelihood of future flooding problems.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Future Land Use Element, Policy 1.1.6.1, p. 1-45.	Flood Mitigation
Protect potable water wellfields and aquifer recharge areas from incompatible uses and degradation of water quality.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Future Land Use Element, Policy 1.1.6.1, p. 1-45.	Wellfield Contamination Mitigation
Platted areas that will be sewered shall be reviewed by PSLUSD according to the following criteria: Areas subject to flooding in the 100-year flood.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.A.1.2.1, p. 4A-21.	Flood Mitigation
The City will continue to investigate the feasibility of expanded reuse of treated wastewater for irrigation and landscaping.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.A.1.2.4, p. 4A-22.	Drought Mitigation
The use for irrigation quality (IQ) water from reclaimed domestic wastewater shall be required for nonresidential irrigation where not expressly prohibited by statute, rule or ordinance.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Goal 4.A.2, p. 4A-23.	Drought Mitigation
By the year 1999, the city will develop an IQ water master plan to service parks, golf courses, and commercial properties within the city.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Objective 4.A.2.1, p. 4A-23.	Drought Mitigation
Develop and implement a hazardous material management plan for the city.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Goal 4.B.2, p. 4B-8.	Hazardous Materials Disaster Mitigation
The city will continue to support the county emergency response plan in accordance with the Superfund Amendments and Reauthorization Act 1 (SARA), of 1986, Title III, 50 CFR Part 370.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Objective 4.B.2.1, p. 4B-8.	Hazardous Materials Disaster Mitigation

Table A.3. (Continued).

Policy/Objective/Goal	Source	Notes
The city will meet with representatives of St. Lucie County, the Treasure Coast Regional Planning Council, the St. Lucie County Health Unit, and the regulated members of the business community to update the countywide hazardous materials management plan as necessary.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.B.2.1.1, p. 4B-9.	Hazardous Materials Disaster Mitigation
The city will utilize data from the County Government Hazardous Waste Assessment for St. Lucie County along with occupational license data collected by the St. Lucie County Health Unit, to identify the potential locations of hazardous waste or hazardous materials.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.B.2.1.2, p. 4B-9.	Hazardous Materials Disaster Mitigation
By the year 2000, the city will review, revise, and adopt new regulations as needed regarding a hazardous materials management plan for the city in accordance with Objective 4.B.2.1.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Objective 4.B.2.2, p. 4B-9.	Hazardous Materials Disaster Mitigation
The plan will continue to include elements for protection of wellfields and watersheds.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.B.2.2.1, p. 4B-9.	Wellfield Contamination Mitigation
The plan will include provisions for spill prevention control and countermeasures (SPCC) plans at regulated business.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.B.2.2.2, p. 4B-9.	Hazardous Materials Disaster Mitigation
The plan will include provision for periodic inspection by code enforcement officers.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.B.2.2.3, p. 4B-9.	Hazardous Materials Disaster Mitigation
The city shall continue to support St. Lucie County with its educational program to inform the city's residents of effective methods to safely store and dispose of household and commercial hazardous material, and procedures to follow in emergencies.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.B.2.2.4, p. 4B-9.	Hazardous Materials Disaster Mitigation

Table A.3. (Continued).

Policy/Objective/Goal	Source	Notes
The city will continue to cooperate with the County in "Amnesty Days" and other methods to be used to encourage the collection and disposal of household and commercial hazardous waste material.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.B.2.2.5, p. 4B-9.	Hazardous Materials Disaster Mitigation
The city will document efforts to review and refine citywide flood mitigation program.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Objective 4.C.1.2, p. 4C-7.	Flood Mitigation
The city will continue to maintain an inventory of flooding complaints.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.C.1.2.1, p. 4C-7.	Flood Mitigation
The city will continue to investigate and plan for correcting flooding problems.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.C.1.2.2, p. 4C-7.	Flood Mitigation
The city will continue to update the recently completed survey of elevations of street culvert drainage rights-of-ways.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.C.1.2.4, p. 4C-7.	Flood Mitigation
The city will document efforts to continue to review and refine drainage improvements as needed.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Objective 4.C.1.3, p. 4C-7.	Flood Mitigation
The city will continue to inventory and map problem areas and determine the adequacy of existing drainage plans in protecting life, property, and the environment.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.C.1.3.1, p. 4C-7.	Flood Mitigation
The city will maintain the computer data bases connected with the topographical maps.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.C.1.3.2, p. 4C-7.	Flood Mitigation

Table A.3. (Continued).

Policy/Objective/Goal	Source	Notes
The city will maintain existing base maps for the sub-basin areas, according to existing and future land use and maintain the existing levels of service.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.C.1.3.3, p. 4C-7.	Flood Mitigation
The city will continue to limit development in the floodplain of the NFSLR to preservation, conservation, and public recreation uses and public interest projects of overriding public benefit, such as roads, hurricane evacuation routes, marinas, etc.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.C.1.3.4, p. 4C-7.	Flood Mitigation, Hurricane Mitigation
At a minimum, the land development regulations have addressed the following management techniques as part of the interim drainage plan, and will continue to do so: The monitoring, inspection, and maintenance of all existing and future stormwater facilities.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.C.1.6.1, p. 4C-8.	Flood Mitigation
Property in flood prone areas that is damaged to 50% of its value will not be rebuilt in the flood prone location.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.C.1.6.2, p. 4C-8.	Flood Mitigation
Calculated fire flows for system design shall be based on the Insurance Services Office Guide for Determination of Required Fire Flow, latest edition.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.D.1.2.3, p. 4D-13.	Fire Mitigation
The city will continue to investigate the feasibility of expanded reuse of treated wastewater for irrigation and landscaping in order to reduce the demand for potable water where it is economically feasible to do so.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.D.1.2.5, p. 4D-13.	Drought Mitigation

Table A.3. (Continued).

Policy/Objective/Goal	Source	Notes
The city in conjunction with PSLUSD, St. Lucie County and the South Florida Water Management District, will have established the locations and zones of groundwater influence of existing and proposed public water supply wells and/or wellfields to provide a water supply through buildout of the city, and abide by FDEP district standards.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Objective 4.D.2.1, p. 4D-14.	Wellfield Contamination Mitigation
The siting of new wells or wellfields shall consider the sanitary and water quality hazards of existing and proposed land uses. Hazards may include, but not be limited to, septic tanks, canals, surface water management systems (recharge areas), commercial properties, abandoned dumpsites and transportation systems.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.D.2.1.1, p. 4D-14.	Wellfield Contamination Mitigation
The city shall continue to prohibit by ordinance the installation of septic tanks or the application of IQ water from wastewater effluent within two hundred (200) feet of any existing or proposed public water supply well in the shallow aquifer.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.D.2.1.2, p. 4D-14.	Wellfield Contamination Mitigation
The city, through its Planning and Zoning Department, shall continue to review proposed development, for the potential for release of hazardous materials that may contaminate public drinking water supply wells, in accordance with the Interim Wellfield Protection Ordinance.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.D.2.1.3, p. 4D-14.	Wellfield Contamination Mitigation
The city will continue to enforce ordinances requiring water conserving plumbing fixtures and irrigation systems in new construction.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Objective 4.D.2.2, p. 4D-14.	Drought Mitigation

Table A.3. (Continued).

Policy/Objective/Goal	Source	Notes
The city will continue to require the use of IQ water instead of drinking water for irrigation of commercial and public properties wherever it is practicable and feasible.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Infrastructure Element, Policy 4.D.2.2.1, p. 4D-14.	Drought Mitigation
Maintain and enhance the social and economic resources of the Port St. Lucie coastal planning area through the regulation of development activities that would damage or destroy such resources, or threaten human life and cause unnecessary public expenditures in areas subject to destruction by natural disasters.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Goal 5.1, p. 5-48.	Hurricane Mitigation, Natural and Technological Disaster Mitigation
By 1999, the city will review and revise where needed land development regulations which direct population concentrations away from known or predicted coastal high hazard areas and limit public expenditures that subsidize development permitted in high-hazard areas except for restoration or enhancement of natural resources.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Objective 5.1.3, p. 5-48.	Erosion Mitigation, Flood Mitigation and Hurricane Mitigation
The Coastal High Hazard Area shall include all areas within the Category 1 evacuation zone.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.1.3.1, p. 5-48.	Erosion Mitigation, Flood Mitigation and Hurricane Mitigation

Table A.3. (Continued).

Policy/Objective/Goal	Source	Notes
Within six months of the conclusion of each annual hurricane season, the city shall review the status of lands within its corporate limits and determine whether any areas of the city meet the criteria of a coastal high hazard area as stated under Rule 9J-5.003(19). For those areas meeting the criteria for designation as a coastal high hazard area, the city shall, within one year, designate them as such; to limit development in these areas; and identify management techniques for relocating infrastructure away from such area, except for those areas determined to have vested development rights.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.1.3.2, p. 5-48.	Erosion Mitigation, Flood Mitigation and Hurricane Mitigation
Except for those areas determined to have vested development rights, the city shall limit land use densities and direct infrastructure improvements away from coastal high hazard areas through the implementation of the LDRs.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.1.3.3, p. 5-48.	Erosion Mitigation, Flood Mitigation and Hurricane Mitigation
Complete new roads or improvements in the coastal planning area to increase the number of traffic lanes for hurricane evacuation.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.1.4.2, p. 5-49.	Hurricane Mitigation
The city shall provide all hurricane evacuation studies and plans to the TCRPC, adjacent counties, and all other municipalities within St. Lucie County for consistency with regional and local plans before their adoption and implementation.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.1.4.3, p. 5-49.	Hurricane Mitigation
Prepare post-disaster redevelopment plans that will reduce or eliminate the exposure of human life, public property, and private property to natural hazards.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Objective 5.1.5, p. 5-49.	Hurricane Mitigation, Post-Disaster Redevelopment

Table A.3. (Continued).

Policy/Objective/Goal	Source	Notes
The city shall update as needed, the current Local Peacetime Emergency Plan, to contain step-by-step details for post-disaster recovery operations.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.1.5.1, p. 5-49.	Hurricane Mitigation, Post-Disaster Redevelopment
After a hurricane, but before re-entry of the population into evacuated areas, the City Council shall meet to hear preliminary damage assessments, appoint a Recovery Task Force.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.1.5.2, p. 5-49.	Hurricane Mitigation, Post-Disaster Redevelopment
The City's Emergency Management Team shall coordinate disaster preparation and recovery measures.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.1.5.3, p. 5-49.	Hurricane Mitigation, Post-Disaster Redevelopment
The City's Emergency Task Force shall: review and decide upon emergency building permits; coordinate with state and federal officials to prepare disaster assistance applications; analyze and recommend to the City Council hazard mitigation options including reconstruction or relocation of damaged public facilities; develop a redevelopment plan; and, recommend amendments to the comprehensive plan, Local Peacetime Emergency Plan, and other appropriate policies and procedures.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.1.5.4, p. 5-49.	Hurricane Mitigation, Post-Disaster Redevelopment
If rebuilt, structures that suffer damage more than fifty percent of their appraised value shall be rebuilt to meet all current requirements including those enacted since construction of the structure.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.1.5.6, p. 5-49.	Hurricane Mitigation, Post-Disaster Redevelopment

Table A.3. (Continued).

Policy/Objective/Goal	Source	Notes
The Recovery Task Force shall review all interagency hazard mitigation reports and make recommendations for amendments to the comprehensive plan accordingly.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.1.5.7, p. 5-49.	Hurricane Mitigation, Post-Disaster Redevelopment
Air quality in the City shall not violate standards set by DEP.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Objective 5.2.1, p. 5-51.	Air Pollution Mitigation
Examine measures to monitor and reduce water consumption by 10% within the 10-year planning period, and thus conserve and protect the quantity of current and projected water sources.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.2.2.1, p. 5-51.	Drought Mitigation
Work closely with the SFWMD to prepare and adopt by 1999, an emergency water management conservation plan in accordance with the plans of the District.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.2.2.2, p. 5-51.	Drought Mitigation
Work towards further education of public regarding various methods of water conservation at the household and small business level, and by 1999, either develop a water conservation brochure or use one available through the SFWMD.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.2.2.3, p. 5-51.	Drought Mitigation
Examine and revise, if needed, land development regulations that require water conserving landscape design, with minimum native vegetation requirements.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.2.2.4, p. 5-51.	Drought Mitigation

Table A.3. (Continued).

Policy/Objective/Goal	Source	Notes
The City shall continue to enforce the "St. Lucie County Public Wellfield Protection Ordinance," and restrict activities that adversely affect water quality and quantity.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.2.2.5, p. 5-51.	Wellfield Contamination Mitigation
Institute a public education program targeted at known problem areas regarding dumping of debris and maintenance of stormwater swales.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.2.3.6, p. 5-52.	Flood Mitigation
The City shall update master drainage plans and programs that examine quality and quantity of stormwater, and prioritize improvements for the Capital Improvements Plan and Capital Improvements Element.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.2.3.7, p. 5-52.	Flood Mitigation
Consider topographic, hydrologic and vegetative cover factors, and appropriate excavation and filling techniques to reduce erosion in the site plan review process of proposed developments.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Conservation and Coastal Management Element, Policy 5.2.4.1, p. 5-52.	Erosion Mitigation
Proposed plan amendments and requests for new development shall be evaluated according to the following guidelines as to whether the proposed action would: contribute to a condition of public hazard as described in the Infrastructure and Coastal Management Elements.	Port St. Lucie Comprehensive Growth Management Plan, Jan. 1998, Capital Improvements Element, Policy 9.1.3.8, p. 9-13.	Natural and Technological Disaster Mitigation

CFR = Code of Federal Regulations.
DEP = Department of Environmental Protection.
FDEP = Florida Department of Environmental Protection.
IQ = irrigation quality.
LDRs = Land Development Regulations.
NFSLR = North Fork of the St. Lucie River.
PUDs = planned unit developments.
PSLUSD = Port St. Lucie Unified School District.
SARA = Superfund Amendments and Reauthorization Act.
SFWMD = South Florida Water Management District.
SPCC = spill prevention control and countermeasures.
TCRPC = Treasure Coast Regional Planning Council.

Table A.4. Existing hazard mitigation in the St. Lucie Village Comprehensive Growth Management Plan.

Policy/Objective/Project	Source	Notes
The Village shall adopt or amend existing land development regulations to ensure that they contain specific and detailed provisions intended to implement the adopted Comprehensive Plan, and which as a minimum: Regulate areas subject to seasonal and periodic flooding and provide for drainage and stormwater management consistent with the Infrastructure Element; protect potable water wellfields.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Future Land Use Element, Policy 1.1.1.1, p. I-39.	Flood Mitigation, Wellfield Contamination Mitigation
The City shall protect potable water wellfields through participation in and implementation of the St. Lucie County Wellfield Protection Program.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Future Land Use Element, Policy 1.1.2.3, p. I-43.	Wellfield Contamination Mitigation
Proposals for development within the 100-year floodplain as identified by the Federal Emergency Management Agency (FEMA) shall conform with local regulations adopted in accordance with Federal Flood Insurance Regulations, and which are consistent with the Conservation, Coastal Management, Infrastructure elements of this Comprehensive Plan.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Future Land Use Element, Policy 1.1.2.4, p. I-43.	Flood Mitigation
The developer/owner of any site shall be responsible for the management of run-off consistent with the goals, objectives, and policies of the Infrastructure Element of this Comprehensive Plan.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Future Land Use Element, Policy 1.1.2.5, p. I-43.	Flood Mitigation
Mitigate potential impacts of future development and redevelopment activities and coordinate with regional and county hurricane evacuation plans.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Future Land Use Element, Objective 1.1.7, p. I-47.	Hurricane Mitigation

Table A.4. (Continued).

Policy/Objective/Project	Source	Notes
The Village shall locate residential areas and establish densities in coastal areas in a manner consistent with the St. Lucie County Peacetime Emergency Management Plan.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Future Land Use Element, Policy 1.1.7.1, p. I-47.	Natural and Technological Disaster Mitigation
By the year 1995, the Village shall develop, adopt, and implement drainage regulations with specific attention paid to the protection of the Village's natural drainage features.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Infrastructure Element, Objective 4.1.4, p. 4-19.	Flood Mitigation
The Village shall develop, adopt, and implement drainage system design regulations consistent with SFWMD and Department of Environmental Regulation (DER) and those being drafted by St. Lucie County.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Infrastructure Element, Policy 4.1.4.1, p. 4-19.	Flood Mitigation
Issuance of a development order or permit for new development or redevelopment shall be conditioned upon demonstration of compliance with applicable federal, state and local drainage system permit requirements.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Infrastructure Element, Policy 4.1.4.2, p. 4-19.	Flood Mitigation
The Village shall continue its membership and active participation on the drainage advisory committee to draft a county drainage ordinance. The Village shall also place a representative on the county-wide drainage authority at such time that one is created.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Infrastructure Element, Policy 4.1.4.3, p. 4-19.	Flood Mitigation
The Village shall assist the Mosquito Control District with the monitoring, maintenance and improvement of the existing drainage canals.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Infrastructure Element, Objective 4.1.5, p. 4-20.	Epidemic
By the year 1995, the Village shall develop, adopt, and implement regulations for the protection of potable water and groundwater aquifer recharge areas.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Infrastructure Element, Objective 4.1.7, p. 4-20.	Wellfield Contamination Mitigation

Table A.4. (Continued).

Policy/Objective/Project	Source	Notes
The Village, with the assistance of the SFWMD, shall install permanent groundwater quality and depth monitoring stations.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Infrastructure Element, Policy 4.1.7.3, p. 4-21.	Wellfield Contamination Mitigation
The Village shall participate in the county-wide wellfield protection program.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Infrastructure Element, Policy 4.1.7.4, p. 4-21.	Wellfield Contamination Mitigation
By 1995, the Village shall investigate and implement strategies for conserving potable water resources.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Infrastructure Element, Objective 4.1.9, p. 4-21.	Drought Mitigation
In accordance with Section 163.3202, F.S. the Village shall revise land development regulations to include requirements for the use of xeric landscaping in all new development and redevelopment.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Infrastructure Element, Policy 4.1.9.1, p. 4-22.	Drought Mitigation
In accordance with Section 163.3202, F.S., the Village shall revise land development regulations to include requirements for the use of soil water tensiometers, or other similar devices, in all irrigation systems for all new development or redevelopment.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Infrastructure Element, Policy 4.1.9.2, p. 4-22.	Drought Mitigation
By 1993, the Village shall develop an ordinance requiring the use of water-saving plumbing devices in all new development and redevelopment.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Infrastructure Element, Policy 4.1.9.3, p. 4-22.	Drought Mitigation

Table A.4. (Continued).

Policy/Objective/Project	Source	Notes
Ensure the social, economic, and environmental resources of the St. Lucie Village coastal area are maintained or enhanced through the regulation of development activities that would damage or destroy such resources, or threaten human life and cause otherwise unnecessary public expenditures in areas subject to destruction by natural disasters.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Goal 5.1, p. 5-50.	Natural and Technological Disaster Mitigation
All proposed new development and redevelopment activities shall remove nuisance and invasive exotic plant species, particularly Australian Pine, Malaleuca, and Brazilian pepper during construction and measures shall be taken to prevent soil erosion.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.1.7, p. 5-51.	Erosion Mitigation
In accordance with Section 163.3202, F.S., land development regulations shall be adopted which ensure that building and development activities are carried out in a manner which minimizes the danger to life and property from hurricanes and floods and which direct population away from coastal high hazard areas.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Objective 5.1.5, p. 5-56.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
All areas east of the Florida East Coast Railroad (FEC) shall be designated as Coastal High Hazard Areas.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.5.1, p. 5-56.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
Town-funded or supported public facilities shall not be built in the coastal high-hazard area, unless the facility is for public access, resource restoration, or required to ensure the health, safety, and welfare of its residents.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.5.2, p. 5-56.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation

Table A.4. (Continued).

Policy/Objective/Project	Source	Notes
The Village shall participate in and coordinate with surrounding local government plans to provide immediate response to post-hurricane situations.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.5.3, p. 5-57.	Hurricane Mitigation, Post-Disaster Redevelopment
Land use intensities within the coastal area shall be consistent with directing population concentrations away from CHHAs; the hazard mitigation annex of the local peacetime emergency management plan of the Treasure Coast Hurricane Evacuation Study; those which maintain an acceptable time period for emergency evacuation.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.5.4, p. 5-57.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
The Village shall implement county and regional hurricane evacuation plans as they pertain to Village residents in an attempt to maintain evacuation times established by such plans.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Objective 5.1.6, p. 5-57.	Hurricane Mitigation
The Village shall coordinate all hurricane evacuation with the county and adjacent municipalities by implementing the procedures described in county and regional evacuation plans.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.6.1, p. 5-57.	Hurricane Mitigation
The Village shall request all residents to evacuate immediately once an evacuation order is issued.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.6.2, p. 5-57.	Hurricane Mitigation
The Village shall annually notify all residents of hurricane evacuation procedures and shelters for those with special needs such as the handicapped and the infirmed.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.6.3, pp. 5-57, 5-58.	Hurricane Mitigation

Table A.4. (Continued).

Policy/Objective/Project	Source	Notes
The Village shall provide all available information regarding population and development within the town to local and state agencies for the purposes of preparing hurricane evacuation plans.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.6.4, p. 5-58.	Hurricane Mitigation
All hurricane evacuation studies and plans conducted by or for the Village shall be provided to the Treasure Coast Regional Planning Council, the county, and all other municipalities within St. Lucie County for consistency with regional and local plans prior to their adoption and implementation. The Village shall request these agencies to do likewise.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.6.5, p. 5-58.	Hurricane Mitigation
The Village shall provide immediate response to post-hurricane situations through the implementation of post-disaster response and redevelopment plans to be prepared and adopted by October 1, 1994.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Objective 5.1.7, p. 5-58.	Hurricane Mitigation, Post-Disaster Redevelopment
After a hurricane, but before re-entry of the population into evacuated areas, the Village Board of Aldermen shall convene the Recovery Task force, hear preliminary damage assessments and consider a temporary moratorium on building activities not necessary for the public health, safety and welfare.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.7.1, p. 5-58.	Hurricane Mitigation, Post-Disaster Redevelopment

Table A.4. (Continued).

Policy/Objective/Project	Source	Notes
The Recovery Task Force shall review and decide upon emergency building permits, coordinate with state, county, and federal officials to prepare disaster assistance applications, analyze and recommend to the Board of Aldermen hazard mitigation options including reconstruction or relocation of damaged public facilities, develop a redevelopment plan, and recommend amendments to the Comprehensive Plan, Local Peacetime Emergency Management Plan, and other appropriate policies and procedures.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.7.3, pp. 5-58, 5-59.	Hurricane Mitigation, Post-Disaster Redevelopment
If rebuilt, structures which suffer damage in excess of fifty percent of their appraised value shall be rebuilt to meet all current requirements, including those enacted since construction of the structure.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.7.5, p. 5-59.	Hurricane Mitigation, Post-Disaster Redevelopment
Structures which suffer repeated damage to pilings, foundations, or loadbearing walls shall be modified to delete the areas most prone to damage.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.7.6, p. 5-59.	Hurricane Mitigation, Post-Disaster Redevelopment
Repair or reconstruction of seawalls shall utilize the techniques addressed in Policy 5.1.1.7.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.7.7, p. 5-59.	Erosion Mitigation, Post-Disaster Redevelopment
The Recovery Task Force shall inventory all structures which suffer in excess of fifty percent of their assessed value, judge the utility of the land for public access, and make recommendations for acquisitions to the Board of Aldermen.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.7.8, p. 5-59.	Post-Disaster Redevelopment

Table A.4. (Continued).

Policy/Objective/Project	Source	Notes
Public funds shall not be used for infrastructure expansion or improvements in high-hazard coastal areas unless such funds are necessary to provide services to existing development (structures approved for development prior to the implementation of this policy), provide adequate evacuation in the event of an emergency, provide for recreational needs and other appropriate water dependent uses.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Coastal Management Element, Policy 5.1.9.1, p. 5-61.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
Air quality in the Village shall continue to meet or exceed the minimum air quality levels established by DER.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Conservation Element, Objective 6.1.1, p. 6-34.	Air Pollution Mitigation
In accordance with Section 163.3202, F.S., land development regulations shall be adopted which require proposed developments comply with the wellfield protection program adopted by the county.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Conservation Element, Policy 6.1.2.2, pp. 6-34, 6-35.	Wellfield Contamination Mitigation
By 1994, the Village, with the assistance of the SFWMD, shall develop, adopt, and enforce provisions for monitoring and regulating water use in order to prolong freshwater availability.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Conservation Element, Objective 6.1.3, p. 6-35.	Drought Mitigation
The Village shall request in writing a copy of the Model Water Shortage Ordinance prepared by the SFWMD for adaptation and/or adoption.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Conservation Element, Policy 6.1.3.1, p. 6-35.	Drought Mitigation
The Village shall work towards the further education of the public regarding various methods of water conservation at the household and small business level by requesting the FPUA to provide water conservation information with billings for garbage and electrical services.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Conservation Element, Policy 6.1.3.2, p. 6-35.	Drought Mitigation

Table A.4. (Continued).

Policy/Objective/Project	Source	Notes
In accordance with Section 163.3202, F.S., land development regulations shall be adopted for the control of soil erosion.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Conservation Element, Objective 6.1.4, p. 6-36.	Erosion Mitigation
The Village shall utilize the St. Lucie County Soil and Water Conservation District guidelines in the development of regulations for minimizing soil erosion.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Conservation Element, Policy 6.1.4.1, p. 6-36.	Erosion Mitigation
The Village shall continue to conserve and protect its floodplains by maintaining the policy of low density development with strict environmental controls implemented by utilization and enforcement of land development regulations.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Conservation Element, Policy 6.1.5.5, p. 6-37.	Flood Mitigation
The Village shall provide all available population, land use, and waste sanitation data to St. Lucie County or other agencies for use in developing and implementing hazardous waste identification and hazardous work disposal programs.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Conservation Element, Objective 6.1.6, p. 6-38.	Hazardous Materials Disaster Mitigation
The Village shall assist St. Lucie County as requested in implementing programs for the proper storage, collection, recycling and disposal of hazardous waste.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Conservation Element, Policy 6.1.6.2, p. 6-38.	Hazardous Materials Disaster Mitigation
The Town of St. Lucie Village will not expend public funds for infrastructure or service facilities in CHHAs, except to ensure public safety or to acquire or enhance natural resources.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Capital Improvements Element, Objective 9.1.2, p. 9-12.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
The Village shall designate the CHHA as that area east of the FEC Railroad tracks which is within the FEMA Velocity Zones.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Capital Improvements Element, Policy 9.1.2.1, p. 9-13.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation

Table A.4. (Continued).

Policy/Objective/Project	Source	Notes
Pursuant to Section 163.3202, F.S., the Village will adopt land use development regulations which require that all public facilities, except those used for recreation, shall not be located by the Village within the CHHA.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Capital Improvements Element, Policy 9.1.2.2, p. 9-13.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation
Densities within the CHHA shall not exceed 2 units per net acre with minimum lot size of one half acre.	St. Lucie Village Comprehensive Growth Management Plan, Apr. 1990, Capital Improvements Element, Policy 9.1.2.3, p. 9-13.	Erosion Mitigation, Flood Mitigation, Hurricane Mitigation

CHHA = Coastal High Hazard Area.
DER = Department of Environmental Regulation.
FEC = Florida East Coast.
FEMA = Federal Emergency Management Agency.
F.S. = Florida Statute.
SFWMD = South Florida Water Management District.

Table A.5. Existing plans, reports, or studies.

Organization	Title	Date	Hazard Addressed
St. Lucie County Health Department	Pandemic Plan	December 2001	Epidemic
St. Lucie County Health Department	All Hazards Operational Plan	October 2003	All Hazards
St. Lucie County Health Department	Point Distribution Plan	June 2002	Epidemic
St. Lucie County Health Department	Severe Acute Respiratory Syndrome (SARS) Response Plan	April 2003	Epidemic
St. Lucie County Health Department	Emergency Operations Plan	March 2003	All Hazards
St. Lucie County Health Department	Small Pox Response Plan	December 2002	Epidemic
St. Lucie County Health Department	Potassium Iodide Distribution Plan	April 2003	Radiological Accident
Sheriff's Office	Crisis Situations and Response	March 2003	Terrorism, Civil Disturbance
Sheriff's Office	Civil Disturbance/Mass Arrest	November 2001	Civil Disturbance
Sheriff's Office	Emergency Management	May 2002	All Hazards
Sheriff's Office	Response to School Shootings	May 2002	Civil Disturbance
Sheriff's Office	VIP Protection/Special Events	August 2001	Terrorism
Sheriff's Office	Headquarters Evacuation Plan	August 2001	Hurricane, Tornado, Radiological Accident, Terrorism
Sheriff's Office	Bomb Disposal Team	September 2003	Terrorism
Sheriff's Office	Crisis Negotiations Team	September 2003	Terrorism, Civil Disturbance
Sheriff's Office	Search and Rescue Plan	August 2001	All Hazards

Table A.5. (Continued).

Organization	Title	Date	Hazard Addressed
Sheriff's Office	Underwater Search and Rescue Plan	September 2001	All Hazards
Sheriff's Office	Special Operations and Tactics Team	February 2002	Terrorism, Civil Disturbance, Hazardous Materials Accident, Radiological Accident
Sheriff's Office	Emergency Access to Airport Runways and Taxi-Way	August 2001	All Hazards
Sheriff's Office	2003 Emergency Management and Mobilization Plan	May 2003	All Hazards
Sheriff's Office	Infectious Disease Preventive Measures	August 1998	Epidemic
Sheriff's Office	Blood Borne Pathogens Exposure Control Plan	August 1998	Epidemic
Sheriff's Office	Tropical Storms, Hurricanes, Civil Defense	April 2003	Hurricanes, Civil Disturbance
Fort Pierce Utility Authority (FPUA)	FPUA Storm Manual	May 2003	Hurricanes, Flood, Severe Thunderstorm
FPUA	Comprehensive Vulnerability Assessment of Water System for the FPUA		Terrorism
City of Port St. Lucie	City of Port St. Lucie Drainage Basin Studies	2001	Drainage system
City of Port St. Lucie	Utilities Vulnerability Assessments	2002-2003	All-Hazard
City of Port St. Lucie	Continuity of Operations (COOP)	2003	All-Hazard
City of Port St. Lucie	Bridge Inventory and Assessment	2002	All-Hazard
City of Port St. Lucie	Drainage and Water Control Infrastructure	2002	Flood

Table A.5. (Continued).

Organization	Title	Date	Hazard Addressed
	Maintenance Planning		
City of Fort Pierce	City of Ft. Pierce Wellfield Protection Plan	1990	Wellfield Contamination
City of Fort Pierce	Strategic Emergency Management Plan	1997	Hurricane, Flood, and Tornado
St. Lucie County	COOP Plan	2004	All-Hazard
St. Lucie County	Terrorism Annex to COOP Plan	2004	Terrorism
St. Lucie County	Comprehensive Emergency Management Plan – Update	2004	All-Hazard
St. Lucie County	Hazardous Materials Analysis Update	2004	Hazardous Materials, Radiological Accident, Power Failure
St. Lucie County	Nuclear Power Annex	2004	Radiological Accident
St. Lucie County	Emergency Shelter Deficit Report	Annually	All Hazard
St. Lucie County	Hurricane Evacuation Study	2003	Hurricane
St. Lucie County	Stormwater Master Plan	2002	Flooding
St. Lucie County	Utility Master Plan	2000	All Hazard

Table A.6. Existing programs or activities.

Organization	Title	Date	Hazard Addressed
University of Florida – Cooperative Extension	Hurricane Preparedness Handbook	Ongoing	Hurricane
University of Florida – Cooperative Extension	Hurricane Preparedness Public Presentation	Ongoing	Hurricane
University of Florida – Cooperative Extension	Building Contractor Hurricane Construction Standards Education	Ongoing	Hurricane
University of Florida – Cooperative Extension	Insurance Coverage Education	Ongoing	Hurricane
University of Florida – Cooperative Extension	TV/Radio Storm Preparation Programs	Ongoing	Hurricane
University of Florida – Cooperative Extension	Hurricane House Website	Ongoing	Hurricane
University of Florida – Cooperative Extension	Hurricane House Tours/Educational Program	Ongoing	Hurricane
University of Florida – Cooperative Extension	Clean Marina Program	Ongoing	Hurricane
University of Florida – Cooperative Extension	West Nile Virus Protection Community Education	Ongoing	Epidemic
University of Florida – Cooperative Extension	Pesticide and the Environment Courses	Ongoing	Wellfield Protection
University of Florida – Cooperative Extension	Firewise/Fire Hazard Reduction Education	Ongoing	Wildland Fire
University of Florida – Cooperative Extension	Aquatic Plant Management Training	Ongoing	Wellfield Protection
University of Florida – Cooperative Extension	Public Health Pesticide Training	Ongoing	Wellfield Protection
University of Florida – Cooperative Extension	Canker Education	Ongoing	Agricultural Pest and Disease

Table A.6. (Continued).

Organization	Title	Date	Hazard Addressed
University of Florida – Cooperative Extension	Agricultural Insect/Disease Agent Information and Identification	Ongoing	Agricultural Pest and Disease
University of Florida – Cooperative Extension	Water Quality Protection Education	Ongoing	Wellfield Protection
University of Florida – Cooperative Extension	West Nile Virus Vaccination Recommendation Update	July 2003	Epidemic
University of Florida – Cooperative Extension	Best Management Practices Cattle Notebook	January 2003	Wellfield Protection
University of Florida – Cooperative Extension	Hurricane Preparedness for Pets and Livestock	July 2003	Hurricane
St. Lucie County Health Department	Hazardous Materials Spill Drill	June 2003	Hazardous Materials Accident
St. Lucie County Health Department	St. Lucie Medical Center Small Pox Drill	October 2003	Epidemic
St. Lucie County Health Department	Nuclear Drills	Ongoing	Radiological Accident
St. Lucie County Health Department	Hurricane Drills	Ongoing	Hurricane
St. Lucie County Health Department	Operation Vaccination Florida, Phase I, II, III	October 2002 – present	Epidemic
Sheriff's Office	Jail Evacuation Plan	Ongoing	Terrorism
Sheriff's Office	Continuity of Operations Plan	Ongoing	All Hazards
Fort Pierce Utility Authority	Hurricane Awareness Bill Stuffers	Annually – May	Hurricane
City of Port St. Lucie	Hurricane Tabletop Exercise	2002	Hurricane
City of Port St. Lucie	PSLTV 20 Public Service Announcement	2002	Flood
City of Port St. Lucie	PSLTV 20 Loop Presentation	2002	Flood
City of Port St. Lucie	Hurricane Preparation Meeting	2003	Hurricane
City of Port St. Lucie	PSLTV 20 Hurricane Preparedness Public Service Announcements	2003	Hurricane
City of Fort Pierce	Virginia Avenue Outfall Project	1989	Flood

Table A.6. (Continued).

Organization	Title	Date	Hazard Addressed
City of Fort Pierce	Moore's Creek Phase I & II	2003	Flood
St. Lucie County	Hurricane Expo	Annually	Hurricane
St. Lucie County	Nuclear Power Plant Exercise	2004	Hazardous Materials Accident/Radiological Accident
St. Lucie County	Hurricane Exercise	Annually	Hurricane
St. Lucie County	Tornado Drill	Annually	Tornado
St. Lucie County	Hazardous Materials Exercise	2003	Hazardous Materials Accident
St. Lucie County	CRS/ISO Program 5-year Update	2003	Flooding
St. Lucie County	Stormwater System Updates	Annually	Flooding
St. Lucie County	Paradise Park Retrofit	2002 – 2003	Flooding
St. Lucie County	South 7th Street Retrofit	2002 – 2003	Flooding
St. Lucie County	White City Drainage – Property Acquisition	2002 – 2003	Flooding
St. Lucie County	Harmony Heights Drainage Retrofit	2002 – 2003	Flooding
St. Lucie County	Indian River Estates Drainage/Stormwater Retrofit	2002 – 2003	Flooding
St. Lucie County	Hurricane Shutter Retrofit	2003	Hurricane
St. Lucie County	Rouse Road Drainage Retrofit/Improvements	2002	Flooding

CRS = Community Rating System.
ISO = Insurance Services Office.
PSLTV20 = Port St. Lucie Television 20.

Table A.7. Damage reports and data.

Organization	Event	Date	Extent	Damages
Health Department	Hazardous materials spill	September 1999	8,500,000 gallons of sewage spilled into Indian River Lagoon	N/A
Health Department	Anthrax response	October 2001		$46,481
Health Department	Lykes fertilizer fire	July 2000	Chemical fire at manufacturing plan	N/A
Health Department	Hurricane response	Ongoing	Special medical needs shelter	N/A
Sheriff's Office	Hurricane/Tornado	June 1993	Disaster effecting courthouse	N/A
Sheriff's Office	Hostage situation	May 1999	Hostage situation at courthouse	N/A
Sheriff's Office	Bomb threat	December 2001	Bomb threat at courthouse	N/A
Sheriff's Office	Fire	December 2001	Fire effecting courthouse	N/A
Fort Pierce Utility Authority	Hurricane Irene	October 1999	Severe erosion of 12-inch water main on South AIA	$327,303
Fort Pierce Utility Authority	Hurricane Irene	October 1999	Failure of 36-inch sewer line at wastewater treatment plant	$1,005,699
St. Lucie Village	Hurricane Irene	October 1999	St. Lucie Village Riverfront Monument damaged	$1,200
City of Port St. Lucie	Wildland fire	1999	42 homes destroyed, 30 damaged	$950,000 (Federal Disaster Declaration)
City of Port St. Lucie	Hurricane Floyd	1999	Special needs shelter activated	$100,000 (Federal Disaster Declaration)
City of Port St. Lucie	Hurricane Irene	1999	City-wide flooding	$100,000 (Federal Disaster Declaration)

APPENDIX B

MITIGATION OPTIONS

Table B.1. Potential hazard mitigation measures.

Potential mitigation initiatives are presented by hazard type. Specific references are given by number for each mitigation initiative listed. **Table B.2** presents an annotated bibliography of data sources for all mitigation initiatives in the previous sections. This bibliography identifies, describes, and where possible, cross references data sources with funding sources for the proposed mitigation measures.

Natural Hazards

Hurricane.

- Encourage neighborhood preservation/revitalization for flood and wind damage retrofitting (50)
- Provide information to contractors and homeowners on the risks of building in hazard-prone areas (50)
- Develop a list of techniques for homeowner self-inspection and implementation of mitigation activities (50)
- Implement dune restoration programs (50)
- Acquire shorefront land for open space (50)
- Develop a beach management plan (30)
- Assess the need for beach nourishment projects (30)
- Develop maintenance program to clear debris from bridges (30)
- Develop a drainage system management and maintenance program (30)
- Develop a floodplain management plan (30)
- Construct shelters in mobile home parks (30)
- Require that new development be oriented to convey wind and water (30)
- Identify vulnerable properties for relocation programs (30)
- Encourage the construction of safe rooms in new construction (30)
- Require tie-downs for propane tanks and mobile homes (30)
- Install resilient street signs for navigation (30)
- Develop a comprehensive sheltering system with funding provided for the acquisition and construction of shelters (50)
- Identify “refuges of last resort” for those unable to reach shelters (50)
- Implement a Tree Hazard Management Program to encourage responsible planting practices and minimize future storm damage to buildings, utilities, and streets (2)
- Encourage building inspection by a hazard mitigation professional (2,15)
- Practice a tree trimming maintenance program (50)
- Re-landscape with native species (50)
- Distribute hurricane preparedness information including pet sheltering plans (9)
- Encourage the purchase of flood insurance (9)
- Enforce building codes (29)
- Award insurance premium credits (29)
- Retrofit:
  - Wet floodproofing (allowing water to enter uninhabited areas of the house) (35)
  - Dry floodproofing (sealing the structure to prevent floodwaters from entering) (35)
  - Install backflow valves on sewer systems (50)
  - Venting on roofs (3)
  - Garage doors with stiffer horizontal members (3, 24)
  - Glider tracks and track supports should be strengthened (3, 24)
  - In-place shutters (3, 9, 15, 24)
  - Hurricane straps and hurricane clips (15)

Table B.1. (Continued).

- Reinforcement of concrete block wall; concrete tie-columns at all corners (3)
- Bracing with struts or pilaster columns in walls perpendicular to freestanding walls (3)
- Elevation of structures by piers, posts, and columns, and pilings (3)
- Adequate connection or anchoring of each element to the adjacent element (3)
- Add shutters for glazed openings (3, 24)
- Renail sheathing (3)
- Create a secondary water barrier (35)
- Provide support for sliding glass doors and double doors opening to the outside (3, 24)
- Improve anchorage of windows to openings (3)
- Add ridge ventilators to reduce uplift of wood sheathing (3)
- Strengthen garage doors and particularly double-wide garage doors (3, 24)
- Anchor adjacent structures, including privacy fences, pool enclosures, and patio roofs (3)
- Improve connections of porch roofs and overhangs (3)
- Reinforce entry doors (3, 34)

- Modify building codes:
  - Hip roofs instead of gable (3, 24, 34)
  - Metal panels that simulate tile instead of tile roofs (3)
  - Consistent mortar pad placement (3)
  - Full 10-inch mason's trowel of mortar on tile roofs (3)
  - 4 to 6 inch nail spacing on sheathing panel (3, 34)
  - Venting on roofs (3, 34)
  - Garage doors with stiffer horizontal members (3, 34)
  - Multiple panel sliding glass doors and windows should be avoided (3)
  - Individual panel width should be no more than 3 feet (3)
  - Total window and door openings should be no more than 31% of a wall's total area (3)
  - Shatter-resistant transparent material (3, 34)
  - Improved adherence to adequate attachment procedures (3)
  - Hurricane straps and hurricane clips (3, 34)
  - Reinforcement of concrete block walls; concrete tie-columns at all corners (3)
  - Bracing with struts or pilaster columns in walls perpendicular to freestanding walls (3)
  - Walls sufficiently anchored in the foundation or story below (3)
  - Adequate connection or anchoring of each element to the adjacent element (3)
  - Require hurricane shelters on multi-unit housing (50)
  - Construction products examined by independent laboratories under the guidance of the county compliance office (34)
  - Contractors must install high-quality shutters or strong "impact" glass, like that found in car windshields in each new single family home (34)

Flood.

- Acquire floodprone homes (30)
- Maintenance program to clear debris from bridges (30)
- Develop a floodplain management plan (30)

Table B.1. (Continued).

- Encourage the use of roadside grassy swales (30)
- Limit impervious surfaces by encouraging the use of porous pavement (30)
- Require new development to be oriented to convey floodwaters (30)
- Include retention ponds in new developments (30)
- Require setback from waterways for new construction or major renovation (30)
- Require tie-downs for propane tanks and mobile homes (30)
- Encourage neighborhood preservation/revitalization for floodproofing techniques (50)
- Elevate structures above the 100-year flood level (35, 50)
- Maintenance program to clear debris from stormwater drainage areas (50)
- Provide information to contractors and homeowners on the risks of building in hazard-prone areas and mitigation (50)
- Provide the public with Federal Emergency Management Agency (FEMA) floodplain maps (50)
- Develop a list of techniques for homeowner self-inspection and implementation of mitigation activities (50)
- Install backflow valves in sewer systems (50)
- Incorporate a “hazard disclosure” requirement for deed transfers, leases, or other contracts for sale or exchange of property in flood hazard areas (50)
- Improve storm drainage areas (50)
- Develop sediment control to prevent clogged drainage systems such as street sweeping, curb and gutter cleaning, paving dirt roads, and planting vegetation on bare ground (1, 40, 45)
- Investigate the use of flood prone areas as open space (29, 40, 42, 46, 47, 50)
- Retrofit critical facilities (50)
- Purchase flood insurance (7, 15)
- Know evacuation routes (7)
- After a flood, inspect foundations of buildings for cracks and other damage (7)
- Make sure buildings are not in danger of collapsing after a flood (7)
- Encourage building inspection by a hazard mitigation professional (2, 15)
- Regulate development in the floodplain (40, 46)
- Enforce building codes (29)
- Insurance premium credits (29)
- Retrofit:
  - Elevate the lowest floor above the 100-year flood level (35)
  - Wet floodproofing (allowing water to enter uninhabited areas of the structure) (35)
  - Dry floodproofing (sealing the structure to prevent flood waters from entering) (35)
  - Levees and floodwalls (constructing a barrier around the structure to keep out flood waters) (35)
  - Demolition (tearing down the structure and rebuilding with appropriate floodproof techniques or relocating the structure) (7)
  - Elevate the main breaker or fuse box (15)

Severe Thunderstorms and Lightning.

- Clear dead or rotting trees and branches (12)
- Public information on when to turn off gas, electricity, and water; how to develop an emergency communication plan; and actions to take during a severe thunderstorm such as avoiding bathtubs, water faucets, and sinks (12)
- Develop a stormwater drainage management and maintenance plan (31)
- Construct shelters in mobile home parks (31)

Table B.1. (Continued).

- Secure outdoor objects that could become projectiles (12)
- Install lightning rods (12)
- Encourage purchase of flood insurance (12)

Wildland Fire.

- Acquire land susceptible to fire for conversion to open space (44, 48, 50)
- BEHAVE (Fire Behavior Prediction and Fuel Modeling System) (32)
- METAFIRE (National information system that transmits daily severity index values for every climate division in the country) (32)
- Create fire breaks (30)
- Conduct prescribed burns to limit fuel load (30)
- Require larger sideyards to allow access to backyards (30)
- Encourage landscaping with fire-resistant or slow burning vegetation (30)
- Move shrubs and other landscaping away from the sides of the structure (16)
- Clean brush and dead grass from the property (13, 16)
- Public information on safe fire practices (build away from nearby trees or bushes, fire extinguisher availability) (13, 30)
- Building code modification
  - Fire-resistant materials when renovating, building, and retrofitting (13, 30)
  - Create a safety zone between the structure and combustible plants and vegetation (stone walls, swimming pools) (13)
  - Install power lines underground (13)
  - Install tile, fire-retardant shingles, asphalt, fiberglass, concrete tile, or metal on the roof (4, 13, 16)
  - Plant trees in clusters so that there are gaps in the tree branch canopies overhead (4)
  - Use alternatives to wood and other combustible materials such as brick, stone, or metal when building walls (4)
  - Adequate water supply (30)
  - Access for fire trucks (a turnaround) (30)
- Prescribed burns (21, 22, 23, 43)
- Keep trees trimmed so there is no contact with power lines or other wires (16)
- Cut back tree limbs that overhang the structure (4)
- Remove combustible debris from around the structure (4)
- Adopt the wildland/urban interface building code (30)
- Development of ongoing fire safety education programs (21)
- Identification of businesses located within rural areas that contain flammable substances (21)
- Enhancement of intergovernmental relationships and coordinated action (21)
- Development of a local component of the Wildfire Response Plan (21)
- Formation of volunteer rural fire protection districts (21)
- Firesafe considerations for site improvement and building construction that may include, but may not be limited to, the following (21):
  - Assure that all water mains within the development be of proper size, looped or griddled with no dead-end, or low flow areas
  - Avoid dead-ended cul-de-sacs
  - Assure hydrants at cul-de-sacs to be on a loop or griddled to eliminate loss of water flow due to high usage of the system during wildland fires

Table B.1. (Continued).

- Design swimming pools so that fire trucks can reach them for pumping water on fires
- Develop written provisions that afford access to subdivision water systems for firefighting services
- Assure the provision of alternative access roads
- Identify and provide proper signage for access points where fire trucks can drive within 16 feet of creeks, rivers, lakes, or ponds to fill pumpers
- Provide underground wiring for electric power supply
- Assure a minimum 30-foot non-combustible areas around housing units
- Provide a firebreak around all structures and around subdivision
- Include firesafe construction performance standards such as the use of fire-resistant materials for roofs and building exteriors

Tornadoes.

- Telephone warning system (31)
- Community warning sirens (31)
- Construct shelters in mobile home parks (31)
- Require tie-downs for propane tanks and mobile homes (31)
- Install resilient street signs for navigation (31)
- National Oceanic and Atmospheric Administration (NOAA) weather radio tone alerts (31)
- Underground shelter actions to be taken during hurricanes and tornadoes need better distinction, especially among elderly residents (31)
- Retrofit structures to include reinforced “safe room” (14)
- Modify building codes:
  - Include an interior reinforced “safe room” in all new structures (14)
  - Shingles around the edges of the roof should be set into a special mastic (28)
  - Roof sheathing: the plywood or particle board should be nailed securely to the rafters; nails should be 6 inches on center at the edges, and 12 inches on center elsewhere (28)

Extreme Temperatures.

- Install window air conditioners snugly (6)
- Install temporary reflectors, such as aluminum foil covered cardboard to reflect any heat back outside (6)
- Consider keeping storm shutters up all year (6)
- Conserve electricity (6)
- Public information on heat-related disease prevention (drink plenty of water, avoid strenuous outdoor activities) (6)

Soil/Beach Erosion.

- Sand management (38)
- Relocation of threatened facilities (38)
- Threatened real estate may be set aside as open space (38)
- Vegetation replenishment program (36, 38)
- Develop a beach management plan (30)
- Require dune protection and shoreline setbacks for new construction and major renovations (30)

Table B.1. (Continued).

- Cooperative approach (vs. individual i.e., one property will have a seawall, another a groin, etc.) (37)

Agricultural Pest and Disease.
- Prompt removal of citrus trees infected by citrus canker (18)
- Prompt removal of tomato plants infected with tomato yellow leaf curl virus (19)
- Eliminate breeding spots of insects (33)
- Patch screens and other places where pests enter greenhouses (33)

Drought.
- Create cooperative Federal/non-Federal drought contingency plans for rapid implementation during water shortages (27)
- Develop an early warning system (27)
- Evaluate the current use of ground water (27, 46)
- Establish new data collection networks (27)
- Study public willingness to pay more for more reliable water supplies (27)
- Study effectiveness of conservation measures (27, 46)
- Monitor vulnerable public water supplies (27)
- Pass legislation to protect and manage ground water (27)
- Provide funds for water recycling projects (27)
- Organize drought information meetings for the public and media (27)
- Implement water conservation awareness programs (27)
- Assist water agencies in developing contingency plans (27)
- Establish stronger economic incentives for private investment in water conservation (27)
- Implement water metering and leak detection programs (27)
- Adopt an emergency water allocation strategy to be implemented during severe drought (27)
- Evaluate worst-case drought scenarios for possible further actions (27)

Seismic Hazards.
- No mitigation activities have been listed as this is not a significant hazard to Martin County

Epidemic.
- Anthrax vaccine is available (17)
- Rodent control (25)
- Mosquito control (25)
- Regular maintenance of cooling and plumbing systems (25)
- Wellfield protection and water purification maintenance (25)
- Adequate sanitation control measures (25)
- Proper food processing (25)
- Regulate widespread use of antibiotics (25)

Table B.1. (Continued).

Technological Hazards

Nuclear Disaster.
- Prepare a community accident response plan (10)
- Install community sirens (10)
- Install a telephone warning system (10)
- Distribute tone alert radios (10)
- Conduct public information meetings (10)
- Disseminate emergency information throughout the community (in-place sheltering) (10)

Power Failure.
- Voluntary conservation public information (bill inserts) (22)
- Electrical Emergency Contingency Plan (22)

Hazardous Materials Accident.
- Public information on detecting a spill/release (8)
- Public information on response/evacuation plans (8)
- Install a telephone warning system (8)
- Install community sirens (8)
- Retrofit seal gaps and air-conditioning systems (8)

Transportation System Accident.
- Develop accident contingency plans (49)
- Response training (49)

Wellfield Contamination.
- Have water tested by EPA (26)
- Maintain isolation distances from potential contamination sources (26)
- Inventory potential sources of contamination (26)
- Develop water supply contingency strategy (5)
- Reward landowners who do not conduct activities that could contaminate the water supply by easing their taxes (5)
- Investigate growth management programs to ensure that wellfield protection programs are in place before development occurs (5)

Communications Failure.
- No mitigation activities have been listed as this is not a significant hazard to Martin County

Societal Hazards

Terrorism and Sabotage.
- Encourage public education programs on terrorism including information on potential targets, visible targets, etc. (11)
- Drills for people who work in large buildings including knowing where fire exits are located, keeping fire extinguishers in working order, learning first aid (11)
- Develop a bomb threat plan (11)

Table B.1. (Continued).

- Develop an explosion plan for building (cover nose and mouth with a wet cloth, stay below smoke, exit building as quickly as possible, tap on a pipe if trapped so rescuers know where to look) (11)

Civil Disturbance.

- No mitigation activities have been listed as this is not a significant hazard to Martin County

Immigration Crisis.

- No mitigation activities have been listed as this is not a significant hazard to Martin County

All Hazards

- Map vulnerable areas and distribute information about the hazard mitigation strategy and projects (50)
- Provide information to contractors and homeowners on the risks of building in hazard-prone areas (50)
- Develop a list of techniques for homeowner self-inspection and implementation of mitigation activities (50)
- Organize and conduct professional training opportunities regarding natural hazards and hazard mitigation (50)
- Distribute NOAA weather radios (school superintendents, etc.) (50)
- Sound land use planning based on known hazards (50)
- Enforcing effective building codes and local ordinances (30, 50)
- Increasing public awareness of community hazards (50)
- Provide sites that are as free as possible from risk to natural hazards for commercial and industrial activities (30, 50)
- Consider conservation of open space by acquisition of repetitive loss structures (30, 50)
- Ensure a balance among residential growth and conservation of environmental resources through a detailed analysis of the risks and vulnerability to natural hazards (30,50)
- Joint planning and sharing of resources across regions, communities, and states (30, 50)
- Establish a hazard mitigation council (50)
- For future proposed development design guidelines, incorporate hazard mitigation provisions, including improved maps (30, 50)
- Add a “safe room” requirement for all new buildings (15, 24)
- Establish incentives to encourage business owners and homeowners to retrofit buildings with hazard-resistant features (29)
- Teach disaster and hazard awareness in schools (29)

Table B.2. Annotated bibliography for mitigation measure data sources.

#	Reference	Description	Funding Source
1	St. John's River Water Management District. "The Indian River Lagoon's problems are as common as dirt." Indian River Lagoon Update. Winter 1998.	Describes the detrimental effects that uncontrolled sediment can have on local waterways and drainage areas; also presents potential mitigation projects to control sediment.	
2	Alachua County Office of Emergency Management. "Hazard mitigation page." http://www.co.alachua.fl.us/~acem/mitigati.htm (26 Jun 1998)	Defines mitigation and provides examples of community-wide and individual mitigation practices.	Florida Department of Community Affairs, Florida Department of Environmental Protection, Florida Department of Health, Florida Department of Agriculture, Federal Emergency Management Agency (FEMA), U.S. Department of Energy, U.S. Department of Housing and Urban Development.
3	Ayscue, J. Natural Hazards Research Center. Hurricane damage to residential structures: risk and mitigation. (Nov 1996) http://www.colorado.edu/hazards/wp/wp94/wp94.html#intro	Describes potential hurricane hazards from wind and water; discusses building techniques that can mitigate hurricane damage.	
4	Boulder County. "Wildfire hazard identification and mitigation system for Boulder County, Colorado." http://www.boco.gov/gislu/whims.html (25 Jan 1999)	Contains a summary of the Wildfire Hazard Identification and Mitigation System project, detailed maps from the project, and mitigation suggestions to protect structures from wildfire.	Multiple local, State, and Federal government inter-agencies.
5	Browning, C. "Community wellhead protection programs." http://hermes.ecn.purdue.edu/water_quality/documents/oef-890.ok.ascii (13 Nov 1998)	Describes each element of a community wellfield protection program.	
6	Federal Emergency Management Agency. "Fact sheet: extreme heat." (15 Jan 1998) http://www.fema.gov/library/heatf.htm (2 Dec 1998)	Mitigation measures related to extreme heat; most are individual actions.	
7	Federal Emergency Management Agency. "Fact sheet: floods and flash floods." (13 Jan 1998) http://www.fema.gov/library/floodf.htm (2 Dec 1998)	Describes activities that may prevent a flood emergency, reduce the chance of a flood emergency happening, or lessen the effects of unavoidable emergencies. Activities are categorized as before, during, and after a flood event.	

Table B.2. (Continued).

#	Reference	Description	Funding Source
8	Federal Emergency Management Agency. "Fact sheet: hazardous materials accidents." (10 Jan 1998) http://www.fema.gov/library/hazmatf.htm (2 Dec 1998)	Contains information on preparing for and detecting a hazardous material accident.	
9	Federal Emergency Management Agency. "Fact sheet: hurricanes." (14 Jan 1998) http://www.fema.gov/library/hurricaf.htm (2 Dec 1998)	Describes measures to be taken before, during, and after a hurricane to prevent loss of life and property.	
10	Federal Emergency Management Agency. "Fact sheet: nuclear power plant emergency." (27 Feb 1997) http://www.fema.gov/library/radiolo.htm (2 Dec 1998)	Explains the nature of a nuclear disaster and describes related mitigation measures.	
11	Federal Emergency Management Agency. "Fact sheet: terrorism." (10 Jan 1998) http://www.fema.gov/library/terrorf.htm (2 Dec 1998)	Mitigation measures related to various terrorist attacks.	
12	Federal Emergency Management Agency. "Fact sheet: thunderstorms and lightning." (30 Jan 1998) http://www.fema.gov/library/thunderf.htm (2 Dec 1998)	Contains mitigation measures relating to thunderstorms and lightning.	
13	Federal Emergency Management Agency. "Fact sheet: wildland fires." (10 Jan 1998) http://www.fema.gov/library/wildlanf.htm (2 Dec 1998)	Mitigation practices for before, during, and after a wildland fire event.	
14	Federal Emergency Management Agency. "Taking shelter from the storm: building a safe room in your house." http://www.fema.gov/mit/tsfs01.htm (25 Nov 1998)	Contains two sections: one is a description of hazards that may threaten a structure, and the second is how to plan and construct a "safe room."	
15	Federal Emergency Management Agency. "What can homeowners do to reduce their risk from disasters?" (24 Aug 1996) http://www.fema.gov/mit/lowcost.htm	Low-cost mitigation measures related to floods, seismic events, wind events, and wildfire.	
16	Federal Emergency Management Agency. "Wildfire - wildland/urban interface." (17 Oct 1996) http://www.fema.gov/mit/wfmit.htm (30 Oct 1998)	Examples of how to create a "Safety Zone" around a home or business.	
17	Findlay, S. USA Today. "Clinton sees little anthrax threat to civilians." (17 Dec 1997) http://home.eznet.net/~kenberry/materials/usatodayarticle.htm (12 Aug 1998)	Article found on the internet states that an anthrax vaccine is available.	

Table B.2. (Continued).

#	Reference	Description	Funding Source
18	Florida Department of Agriculture and Consumer Services. "Citrus canker - the threat to Florida agriculture - Frequently Asked Questions." http://doacs.state.fl.us/canker/faqs.htm (4 Nov 1998)	Identifies citrus canker and the procedure to eradicate the disease.	
19	Florida Department of Agriculture and Consumer Services. "The latest on Tomato Yellow Leaf Curl Virus." (26 Aug 1997) http://www.ifas.ufl.edu/~entweb/updatetyl.htm (3 Nov 1998)	Describes symptoms of Tomato Yellow Leaf Curl Virus and methods of eradication.	
20	Florida Department of Emergency Management. "Review of efforts to optimize management and production of timber on State lands and review of the prescribed burning policy of the Division of Forestry." (Oct 1998) http://www.state.fl.us/comaff/DEM/gwfrmrc/gwrmrc.htm (21 Dec 1998)	Reviews the benefits and drawbacks of prescribed burning.	Federal Rural Community Fire Protection Program
21	Florida Department of Community Affairs, Bureau of Recovery and Mitigation. Wildfire Mitigation Suggestions. Retrieved 10 October 1998 from the World Wide Web: http://www.dca.state.fl.us/brm/	Wildfire Mitigation Suggestions (website no longer active).	
22	Florida Reliability Coordinating Council. "Generating Capacity Shortage Plan." http://www.frcc.com/capacityemergencyplan.htm.#gca	Plan for when generating capacity is tight, also suggestions for voluntary conservation.	
23	Hickenlooper, B. "Fire damaged lands begin to heal." Stream Lines. Winter 1998, p.4	Prescribed burning is used to control wildfire outbreaks on St. Johns River Water Management District land, and this article describes its many benefits.	
24	Manatee County Emergency Management. "Hazard mitigation." http://www.co.manatee.fl.us/em_html/haz_mit.htm (20 Nov 1998)	Hurricane mitigation suggestions.	
25	McNeill, W. "Emerging infectious diseases plan." (1976) http://www.cdc.gov/ncidod/publications/eid_plan/summary.htm (11 Nov 1998)	Centers for Disease Control and Prevention Strategic Plan emphasizing surveillance, applied research, and prevention activities to maintain a strong defense against infectious diseases.	

Table B.2. (Continued).

#	Reference	Description	Funding Source
26	Minnesota Dept. of Health. "Wellhead protection for Minnesota." (23 Sep 1998) http://www.health.state.mn.us/divs/eh/whp_mn2.html (13 Nov 1998)	Wellfield protection plans.	
27	National Drought Mitigation Center. "Drought mitigation tools for states." (15 Nov 1995) http://enso.unl.edu/ndmc/mitigate/policy/tools.htm	Drought mitigation tools for governments based on two surveys of states.	
28	National Science Foundation. "Tornadoes - protecting your home from the mighty twister." http://whyfiles.news.wisc.edu/013tornado/strong_house.html (4 Feb 1999)	Suggestions for protecting your home against a tornado.	
29	Nelson. L. 1997. Emergency management - a legislator's guide. National Conference of State Legislatures, Denver, CO. 47 pp.	Explains how Illinois, Missouri, and Iowa purchased lands from homeowners whose homes were repetitive damage structures; describes how building code enforcement prevented damage from wildfires, floods, and earthquakes; explains how insurance premium credits work; mentions the development of a wildland/urban interface building code, etc.	FEMA, Community Development Block Grant, State government, State government competitive grant money from the Emergency Management and Assistance Trust Fund.
30	North Carolina Division of Emergency Management. "Tools and Techniques: An Encyclopedia of Strategies to Mitigate the Impacts of Natural Hazards." (23 Dec. 2003) http://www.ncem.org/mitigation/Library/Encyclopedia2.pdf	Comprehensive source of mitigation actions for all hazards.	
31	Schmidlin, T., et al. Natural Hazards Research Center. "Risk factors for death in the 22-23 February 1998 Florida tornadoes." (1998) http://www.colorado.edu/hazards/qr/qr106/qr106.html (7 Aug 1998)	Draws conclusions toward tornado mitigation from surveys, interviews, and damage reports from the 22-23 February 1998 Florida tornadoes.	
32	Subcommittee on Natural Disaster Reduction. "Agency success stories in natural disaster reduction." (18 Oct 1995) http://www.usgs.gov/sndr/success.html (30 Dec 1998)	Briefly describes the BEHAVE and METAFIRE prediction/modeling systems.	
33	The National Food Safety Database. "Controlling insects." (June 1993) http://www.foodsafety.org/dh/dho45.htm (14 Dec 1998)	Suggestions for insect control, and insect control after a natural disaster.	

Table B.2. (Continued).

#	Reference	Description	Funding Source
34	Tibbetts, J. Sea Grant Haznet. "Racing to catch up: south Florida's hurricane threat and building codes." (6 Aug 1998) http://www.haznet.org/text/sflhurricane.html (9 Nov 1998)	Reveals the changes made in south Florida's building codes since Hurricane Andrew.	
35	United States Army Corps of Engineers. "Local floodproofing programs." June 1994, 28 pp.	Provides examples and photographs of projects financed by local governments and also identifies lessons learned that can help communities interested in financing floodproofing projects.	
36	United States Army Corps of Engineers. "New planting." http://superior.lre.usace.army.mil/shore.protection/nwplntng.html (4 Nov 1998)	Explains how vegetation can be used as an erosion control device.	
37	United States Army Corps of Engineers. "Planning considerations." http://superior.lre.usace.army.mil/shore.protection/plncns.html (4 Nov 1998)	Cooperative measures against beach erosion are detailed.	
38	United States Army Corps of Engineers. "Solutions to coastal erosion." http://www.rain.org/~pjenkin/point/growing/solution.html (4 Nov 1998)	Examples of general solutions, hard solutions, soft solutions, and retreat as coastal erosion mitigation.	
39	United States Department of Agriculture. "USDA conservation programs - conservation plant material." http://www.nrcs.usda.gov/NRCSProg.html (2 Feb 1999)	Explains the Conservation Plant Material Center Program's purpose as providing native plants that can help solve natural resource problems such as erosion.	Conservation Plant Materials Center Program
40	United States Department of Agriculture. "USDA conservation programs - resource conservation and development program (RC&D)." http://www.nrcs.usda.gov/NRCSProg.html (2 Feb 1999)	Describes the RC&D Program.	Resource Conservation and Development Program
41	United States Department of Agriculture. "USDA conservation programs - conservation reserve program." http://www.nrcs.usda.gov/NRCSProg.html (2 Feb 1999)	The Conservation Reserve Program encourages farmers to convert highly erodible land to vegetative cover.	Conservation Reserve Program
42	United States Department of Agriculture. "USDA conservation programs - flood risk reduction program." http://www.nrcs.usda.gov/NRCSProg.html (2 Feb 1999)	Describes the Flood Risk Reduction program, who is eligible, and what the requirements of the program are.	Flood Risk Reduction Program

Table B.2. (Continued).

#	Reference	Description	Funding Source
43	United States Department of Agriculture. "USDA conservation programs - forestry incentives program." http://www.nrcs.usda.gov/NRCSProg.html (2 Feb 1999)	Explains the Forestry Incentives Program. It supports good forest management practices on privately owned non-industrial forest lands nationwide.	Forestry Incentives Program
44	United States Department of Agriculture. "USDA conservation programs - stewardship incentives program." http://www.nrcs.usda.gov/NRCSProg.html (2 Feb 1999)	Qualifications to participate in the program and benefits provided.	Stewardship Incentives Program
45	United States Department of Agriculture. "USDA conservation programs - watershed and river basin planning and installation Public Law 83-566 (PL566)." (26 Oct 1998) http://www.ftw.nrcs.usda.gov/pl566/WHIP.html (2 Feb 1999)	Lists the purposes of watershed projects and describes the program.	Watershed and River Basin Planning and Installation Public Law 83-566.
46	United States Department of Agriculture. "USDA conservation programs - watershed surveys and planning." http://www.nrcs.usda.gov/NRCSProg.html (2 Feb 1999)	Overview of the Watershed Surveys and Planning Program.	Watershed Surveys and Planning Program.
47	United States Department of Agriculture. "USDA conservation programs - wetlands reserve program." http://www.nrcs.usda.gov/NRCSProg.html (2 Feb 1999)	Overview of this voluntary program to restore wetlands.	Wetlands Reserve Program
48	United States Department of Agriculture. "USDA conservation programs - wildlife habitat incentives program (WHIP)." (8 Oct 1997) http://www.ftw.nrcs.usda.gov/pl566/WHIP.html (2 Feb 1999)	Description of the WHIP program, benefits, and requirements.	Wildlife Habitat Incentives Program
49	United States Environmental Protection Agency. "Preparing for spills." (7 Oct 1998) http://www.epa.gov/oilspill/prepare.htm (3 Nov 1998)	U.S. Environmental Protection Agency oil spill preparedness program highlights.	
50	Watson, L. et al. 1998. Strategy for reducing risks from natural hazards in Pawtucket, Rhode Island: A multi-hazard mitigation strategy. Rhode Island Sea Grant. Narragansett, RI. 44 pp.	Section 1 explains why communities are writing hazard mitigation strategies and describes the hazard assessment that was completed by city officials. Section 2 uses the risk assessment from Section 1 to determine potential mitigation actions for high risk areas.	

APPENDIX C

FUNDING SOURCES

Table C.1. Description of potential funding sources.

Funding Source	Objective	Eligibility	Sponsoring Organization
Anheuser-Busch Companies, Inc.	Supports charitable organizations active in the fields of education, health care, programs for minorities and youth, cultural enrichment, and environmental protection.	Support is restricted almost entirely to cities where the company has manufacturing facilities.	Anheuser-Busch Companies, Inc. One Busch Place St. Louis, MO 63118 (314) 577-2000
Antiterrorism and Emergency Assistance Program	To provide assistance programs for victims of mass violence and terrorism occurring within and outside the United States, and a compensation program for victims of international terrorism.	Public and private nonprofit victim assistance agencies.	Department of Justice Office for Victims of Crimes www.usdoj.gov
Assistance to Firefighter Grants	To provide direct assistance, on a competitive basis, to fire departments of a State or tribal nation for the purpose of protecting the health and safety of the public and firefighting personnel against fire and fire-related hazards.	Eligible applicants for this grant program are limited to fire departments located in the fifty United States, tribal nations, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands.	Department of Homeland Security 245 Murray Drive S.W. Washington, DC 20528 (202) 282-8000 http://www.dhs.gov
Bioterrorism Training and Curriculum Development Grant	To equip a workforce of healthcare professionals to address emergency preparedness and response issues. The goals of this program are the development of a healthcare workforce that possesses the knowledge, skills, and abilities to 1) recognize indications of a terrorist event in their patients; 2) treat their patients and their communities in a safe and appropriate manner; 3) participate in a coordinated, multidisciplinary response to terrorist events; and 4) rapidly and effectively alert the public health system of such an event at the community, State, and national level. Effective responses to public health emergencies require close collaboration between all types of health professionals involved in patient care including healthcare providers, medical specialists, the public health infrastructure, and all participants in the emergency response. To achieve such a collaborative environment, it will be necessary to implement new models of undergraduate/graduate curricula and continuing education and training for health professionals that broaden public health knowledge and ensure that essential multidisciplinary and interdisciplinary collaborative responses to emergencies will occur. Bioterrorism Training	Applicant Eligibility: Continuing Education and Curriculum Development: Entities eligible to apply for this program are public or private nonprofit accredited or licensed health professions schools, multi-State or multi-institutional consortia of such schools, and other appropriate educational entities such as professional organizations and societies, and other nonprofit institutions or entities including faith-based organizations and community-based organizations. Beneficiary Eligibility: The public or private nonprofit accredited or licensed health professions schools, multi-State or multi-institutions or entities including faith-based organizations and community-based organizations.	The Bioterrorism Training and Curriculum Development Program is administered by Lynn Rothberg Wegman Division of State, Community and Public Health Bureau of Health Professions Health Resources and Services Administration (HRSA) Room 9-105 Parklawn Building, 5600 Fishers Lane Rockville, Maryland 20857 (301) 443-1648 Grants Management Contact: Director, Division of Grants Management Operations HRSA 5600 Fishers Lane, Room 11-03 Rockville, Maryland 20857

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
	and Curriculum Development Program will consist of two discrete foci of activity: 1) Provision of Continuing Education for Practicing Providers, and 2) Curricular Development in Health Professions Schools. Each of the categories above must have a distinct and separate application.		
Capitalization Grants for Drinking Water State Revolving Fund (Drinking Water State Revolving Fund)	State may use Federal funds to establish new programs that emphasize preventing contamination problems through source water protection and enhanced water systems management.	States and Puerto Rico are eligible to receive capitalization grants.	James Bounne, Implementation and Assistance Division, Office of Groundwater and Drinking Water, U.S. Environmental Protection Agency, Washington, DC 20460 (202) 260-5526
Challenge 21, Floodplain	To protect floodplains.		Department of Defense U.S. Army Corps of Engineers Attn: CECW-PM DoD Washington, DC 20314-1000 (202) 272-0169 http://www.usace.army.mil/
Citizen Corps	To support the formation of State and local Citizen Corps Councils to help drive local citizen participation by coordinating Citizen Corps programs, developing community action plans, assessing possible threats, and identifying local resources to make communities safer, stronger, and better prepared to respond to the threats,of terrorism, crime, public health issues, and disasters of all kinds.	States with a pass through to local governments.	Department of Homeland Security Emergency Preparedness and Response Directorate www.citizencorps.gov
Clean Water Act Section 319 Grants	Grants to States to implement non-point source programs, including support for non-structural watershed resource restoration activities.		Non-point Source Management Program 2600 Blair Stone Road Mail Station 3570 Tallahassee, FL 32399-2400 (850) 245-7508
Clean Water State Revolving Funds	Loans at actual or below-market interest rates to help build, repair, relocate, or replace wastewater treatment plants.		Environmental Protection Agency Office of Water State Revolving Fund Branch Branch Chief (202) 260-7359 A list of Regional Offices is available upon request

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Coastal Construction Building Zone Program	This program establishes a standard to improve the resistance to hurricane-force winds of buildings in Florida's coastal building zone. Staff trains building officials, monitors local progress in adopting ordinances, and provides technical assistance.	Compliance program only.	Rick Dixon (850) 487-1824
Coastal Partnerships Initiative Grant	To provide financial assistance for projects in specific initiative categories. The categories are: Remarkable Coastal Places, Community Stewardship, Access to Coastal Resources, and Working Waterfronts. Financial awards are limited to no more than $50,000 and no less than $15,000 and may be used for planning and coordination activities, land acquisition, small construction, or capital improvement projects.	Local governments of the 35 coastal counties and all municipalities within their boundaries designated as "coastal" by the state land planning agency or required to include a coastal element in the local comprehensive plan; national estuarine research reserves; and national estuary programs. Public and private colleges and universities, regional planning councils, and non-profit groups, as long as an eligible local government, national estuarine research reserve, or national estuary program agrees to participate as a partner. Partnerships between regional and local agencies and non-profit organizations are encouraged.	Debbie Skelton Florida Coastal Management Program 3900 Commonwealth Boulevard, MS 47 Tallahassee, FL 32399-3000 (850) 245-2161 Fax: (850) 245-2191 E-mail: debbie.skelton@dep.state.fl.us
Coastal Services Center	To support projects aimed at developing a science-based, multi-dimensional approach that will allow for the maintenance or improvement of environmental quality, while at the same time, allowing for economic growth. In Fiscal Year (FY) 96, five Fellowship Awards were made to the states of CA, CT, FL, MA, and OR. In FY 98, a cooperative agreement was awarded for an ecological and socioeconomic characterization of Kachemak Bay, AK. Uses will be in the following Center areas: Coastal Management Service: Training and Communications: training materials development and dissemination of information; and Coastal Information Services: Coastal Change Analysis Program: To develop land cover and change analysis products.	State and local governments, public nonprofit institution/organization, other public institution/organization.	Dr. Nancy Foster, Ph.D., Assistant Administrator, National Ocean Service 1305 East-West Highway Silver Spring, MD 20910 (301) 713-3074

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Coastal Wetlands Planning, Protection and Restoration Act	To grant funds to coastal states to carry out coastal wetlands conservation projects.	Available to all states bordering on the Atlantic, Gulf (except Louisiana), and Pacific coasts, and states bordering the Great Lakes.	Department of the Interior Fish and Wildlife Service 4401 N. Fairfax Dr., Rm. 140 Arlington, VA 22203 (703) 358-2156 http://www.fws.gov
Coastal Zone Management Program	Grants for planning and implementation of non-structural coastal flood and hurricane hazard mitigation projects and coastal wetlands restoration.		Department of Commerce National Oceanic and Atmospheric Administration National Ocean Service Office of Ocean and Coastal Resource Management Chief, Coastal Programs Division: (301) 713-3102
Community Development Block Grant (CDBG)	Provide for long-term needs, such as acquisition, rehabilitation, or reconstruction of damaged properties and facilities and redevelopment of disaster-affected areas. Funds also may be used for emergency response activities, such as debris clearance and demolition, and extraordinary increases in the level of necessary public services.	State governments that have elected to administer CDBG funds for non-entitlement communities. States with designated major disaster areas may receive statutory and regulatory waivers of program requirements regarding the use of regular CDBG funds, which recipients designate to address the damage.	Department of Housing and Urban Development Community Planning and Development 451 7th Street, S.W. Washington, DC 204107 (202) 708-3587 http://www.hud.gov
Community Emergency Response Teams	To train people in neighborhoods, the workplace, and schools in basic disaster response skills, such as fire suppression, urban search and rescue, and medical operations, and help them take a more active role in emergency preparedness.	States with pass through to local jurisdictions.	Department of Homeland Security Emergency Preparedness and Response Directorate www.fema.gov
The Community Foundation for Palm Beach and Martin Counties	To provide innovative responses to recognized community needs, which do not unnecessarily duplicate other efforts; strive to equip people to help themselves; significantly strengthen the capacity of existing institutions to reach a broader segment of the community; emphasize shared values and collective interests and action among divergency groups that have little or no history of working together; programs that are neighborhood driven.	Unrestricted grants are made for charitable purposes primarily to organizations serving Palm Beach and Martin counties. Applicants must be exempt from income taxes under Section 501(c)(3).	The Community Foundation for Palm Beach and Martin Counties 324 Datura St., Suite 340 West Palm Beach, FL 33401 Palm Beach: (561) 659-6800 Martin: (888) 832-6542 e-mail: cfpbmc@aol.com

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Community Rating System	Encourages State and community flood loss reduction activities beyond those required for participation in the National Flood Insurance Program. Flood insurance premiums are lower in those communities that undertake activities to reduce flood losses, facilitate accurate insurance rating, promote the awareness of flood insurance, and protect the natural and beneficial functions of flood hazard areas.		FEMA Region IV CRS Program 3003 Chamblee-Tucker Rd. Atlanta, GA 30431 (770) 220-5200
Community Services Block Grant	To provide services and activities having measurable and potential major impact on causes of poverty in the community.		Department of Health and Human Services, Administration for Children and Families Office of Community Services 370 L'Enfant Promenade, SW Washington, DC 220447 (202) 401-9340 http://www.acf.dhhs.gov/programs/ocs
Conservation Reserve Program	The Conservation Reserve Program reduces soil erosion, protects the Nation's ability to produce food and fiber, reduces sedimentation in streams and lakes, improves water quality, establishes wildlife habitat, and enhances forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter strips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost sharing is provided to establish the vegetative cover practices.		Contact U.S. Department of Agriculture (USDA), Farm Service Agency http://mimosa.itc.nrcs.usda.gov/scripts/ndisapi.dll/oip_public/USA_map for a USDA service center in your area. WPB: West Palm Beach Service Center 559 N. Military Tr. West Palm Beach, FL 33415
Conservation Plant Material Centers	The purpose of the program is to provide native plants that can help solve natural resource problems. Beneficial uses for which plant material may be developed include biomass production, carbon sequestration, erosion reduction, wetland restoration, water quality improvement, streambank and riparian area protection, coastal dune stabilization, and other special conservation treatment needs.		Contact USDA, Natural Resources Conservation Service http://mimosa.itc.nrcs.usda.gov/scripts/ndisapi.dll/oip_public/USA_map for a USDA service center in your area. WPB: West Palm Beach Service Center 559 N. Military Tr. West Palm Beach, FL 33415

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Conservation Technical Assistance	The purpose of this program is to assist land-users, communities, units of State and local government, and other Federal agencies in planning and implementing conservation systems. The purpose of the conservation systems are to reduce erosion, improve soil and water quality, improve and conserve wetlands, enhance fish and wildlife habitat, improve air quality, improve pasture and range condition, reduce upstream flooding, and improve woodlands.	Individual land users, communities, conservation districts, and other units of State and local government and Federal agencies to meet their goals for resource stewardship and help individuals to comply with State and local requirements.	Contact USDA, Natural Resources Conservation Service http://mimosa.itc.nrcs.usda.gov/scripts/ndisapi.dll/oip_public/USA_map for a USDA service center in your area. WPB: West Palm Beach Service Center 559 N. Military Tr. West Palm Beach, FL 33415
Cooperative Extension Service	To provide information and educational material to farmers, ranchers, and others on what they can do to protect themselves and their property against the hazards associated with disasters; and advice on cleanup of damaged property, sanitation precautions, insect control, food preparation in an emergency, recovery actions on damaged farms, and renovation of damaged equipment and property.	Farmers and rural residents who have suffered losses as the result of natural disasters. There is also assistance available to producers who suffer losses as a result of crop or livestock disease or pest infestation.	Contact USDA, Natural Resources Conservation Service http://mimosa.itc.nrcs.usda.gov/scripts/ndisapi.dll/oip_public/USA_map for a USDA service center in your area. WPB: West Palm Beach Service Center 559 N. Military Tr. West Palm Beach, FL 33415
Community of Oriented Police Services (COPS) Interoperable Communications Technology Program	To facilitate communications interoperability public safety responders at the State and local level.	Tribal, State, and local law enforcement agencies.	Department of Justice Office of COPS www.cops.usdoj.gov
Cora Brown Fund	To use funds made possible by a bequest of funds from the late Cora C. Brown of Kansas City, Missouri, who left a portion of her estate to the United States for the purpose of helping victims of natural disasters not caused by or attributed to war.	Individuals, families, and groups in need of 1) disaster-related home repair and rebuilding; 2) disaster-related unmet needs; and 3) other services that alleviate human suffering and promote the well being of disaster victims.	Department of Homeland Security 245 Murray Drive SW Washington, DC 20528 (202) 282-8000 http://www.dhs.gov

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Decision, Risk, and Management Science Program	Funding for research and related educational activities on risk, perception, communication, and management (primarily technological hazards).		National Science Foundation – Directorate for Social, Behavioral and Economic Science, Division of Social Behavioral and Economic Research, Decision, Risk, and Management Science Program (703) 306-1757 www.nsf.gov/sbe/drms/start.htm
Disaster Mitigation Planning and Technical Assistance	Technical and planning assistance grants for capacity building and mitigation project activities focusing on creating disaster-resistant jobs and workplaces.		Department of Commerce, Economic Development Administration (EDA): (800) 345-1222 EDA's Disaster Recovery Coordinator: (202) 482-6225 www.doc.gov/eda
Disaster Recovery Initiative (DRI) Grants	Provides flexible grants to help cities, counties, and states recover from Presidentially-declared disasters, especially in low-income areas. Grantees may use DRI funds for recovery efforts involving housing, economic development, infrastructure, and prevention of further damage. Examples include buying damaged properties in a flood plain and relocating them to safer areas; relocation payments for people and businesses displaced by the disaster; debris removal; rehabilitation of homes and buildings damaged by the disaster; buying, constructing, or rehabilitating public buildings; and code enforcement.	States and local governments in places that have been designated by the President of the United States as disaster areas.	For a guide to DRI, contact Community Connections at (800) 998-9999

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Disaster Reserve Assistance	To provide emergency assistance to eligible livestock owners, in a state, county, or area approved by the secretary or designee, where because of disease, insect infestation, flood, drought, fire, hurricane, earthquake, hail storm, hot weather, cold weather, freeze, snow, ice, and winterkill, or other natural disaster, a livestock emergency has been determined to exist.	Basic program eligibility requirements include 1) For the Disaster Reserve Assistance Program, crop losses in areas that have suffered a 40 percent or greater loss of normal grazing, and feed grain and forage production, and determined to be in a livestock feed emergency due to a natural disaster; 2) for the Emergency Feed Grain Donation Program: a) the State committee must determine and document a livestock feed emergency on a county-by-county basis, when the danger of eligible livestock perishing as a result of snow and freezing conditions exists in the county; b) the livestock owner, or other person or entities (public or private) certify that the eligible livestock were or are in danger of perishing without immediate assistance; and 3) the Foundation Livestock Relief (Cost-Share) Program: a) when foundation livestock are stranded and in imminent danger of perishing; and b) when the State committee determines and documents livestock losses due to severe weather conditions.	Department of Agriculture, Farm Service Agency, Emergency and Noninsured Assistance Program Division, STOP 0526 1400 Independence Avenue SW Washington, DC 20250-0526 (202) 720-3168 http://www.fsa.usda.gov
Domestic Anti-Terrorism Technology Development Program	To support the development of counter terrorism technologies, assist in the development of standards for those technologies, and work with State and local jurisdictions to identify particular areas vulnerable to terrorist acts and be better prepared to respond if such acts occur.	States and local governments, non-profit and for-profit organizations, and universities.	Department of Justice National Institutes of Justice www.usdoj.gov
Economic Development: Public Works Impact Program	To promote long-term economic development and assist in providing immediate useful work to unemployed and underemployed persons in highly distressed areas. Examples of funded projects: 1) renovation of buildings, including historic preservation; 2) repairing industrial streets and roads; construction of water/sewer systems.	Eligibility is based on designation of a community or neighborhood as a redevelopment area.	David L. McIlwain, Director, Public Works Division, Economic Development Administration Room H7326, Herbert C. Hoover Bldg. Washington, DC 20230 (202) 482-5265

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Economic Development - Technical Assistance	To promote economic development and alleviate underemployment and unemployment in distressed areas, Economic Development Administration operates a technical assistance program. The program provides funds to: 1) enlist the resources of designated university centers in promoting economic development; 2) support innovative economic development projects; 3) disseminate information and studies of economic development issues of national significance; and 4) finance feasibility studies and other projects leading to local economic development.	Most technical assistance recipients are private or public non-profit organizations, educational institutions, municipal, county, or State governments.	Department of Commerce Research and National Technical Assistance Division, Economic Development Administration Rm. H7315 Herbert C. Hoover Bldg. Washington, DC 20230 (202) 482-4085 http://www.doc.gov/eda
Emergency Advance Measures for Flood Prevention (Public Law 84-99 Code 500 Program)	To perform activities prior to flooding that would assist in protecting against loss of life and damages to property due to flooding. Examples of funded projects: emergency drawdown of Spirit Lake, Washington; emergency levee construction, Utah Lake, Provo, Utah; Temporary levee raising, Cowlitz River, Washington; and levee setback, Red River, Louisiana. Authorized assistance includes work such as removal of waterway obstructions, work necessary to prevent dam failure, and work necessary to prepare for abnormal snowmelt. There must be an immediate threat of unusual flooding present before advance measures can be considered. Any work performed under this program will be temporary in nature and must have a favorable benefit cost ratio.	The Governor of the affected state must request assistance. All persons living in areas subject to floods.	U.S. Army Corps of Engineers, Attn: CECW-OE, Washington, DC 20314 (202) 272-0251
Emergency Community Water Assistance Grants.	Through the Emergency Community Water Assistance Grant Program, the Rural Utilities Service is authorized to help rural residents who have experienced a significant decline in quantity or quality of water to obtain adequate quantities of water that meet the standards of the Safe Drinking Water Act.	Rural Utilities Service may make grants to public bodies, private nonprofit corporations, and political subdivisions of a state, as well as Indian tribes.	Assistant Administrator, Water and Environmental Programs, Rural Utilities Service, Department of Agriculture, Washington, DC 20250 (202) 690-2670

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Emergency Conservation Program	To enable farmers to perform emergency conservation measures to control wind erosion on farmlands, to rehabilitate farmlands damaged by wind erosion, floods, hurricanes, or other natural disasters and to carry out emergency water conservation or water enhancing measures during periods of severe drought.	Any agricultural producer who as owner, landlord, tenant, or sharecropper on a farm or ranch, including associated groups, and bears a part of the cost of an approved conservation practice in a disaster area, is eligible to apply for cost-share conservation assistance. This program is also available in Guam, Commonwealth of the Northern Mariana Islands, Puerto Rico, and the Virgin Islands.	USDA/Farm Service Agency (FSA)/Conservation Environmental Programs Division (CEPD), Stop 0513, 1400 Independence Ave. SW Washington, DC 20250-0513 (202) 720-6221 http://www.fsa.usda.gov
Emergency Loans	To assist established (owner or tenant) family farmers, ranchers, and aquaculture operators with loans to cover losses resulting from major and/or natural disasters, which can be used for annual farm operating expenses, and for other essential needs necessary to return disaster victim's farming operations to a financially sound basis in order that they will be able to return to private sources of credit as soon as possible. Loan funds may be used to repair, restore, or replace damaged or destroyed farm property and supplies that were lost or damaged as a direct result of a natural disaster.	Must meet requirements.	Department of Agriculture, Farm Service Agency, Director, Loan Making Division, Ag Box 0522 Washington, DC 20250 (202) 720-1632
Emergency Management Performance Grants	To provide basic assistance to sustain the nation's emergency management system, build State and local emergency management capability, and serve as the foundation for first responder activities.	States with pass through to local emergency management organizations.	Department of Homeland Security Emergency Preparedness and Response Directorate www.fema.gov
Emergency Management Preparedness and Assistance Trust Fund: Emergency Management Competitive Grants Municipal Competitive Grant Program	Competitive: Provides competitive grants to State or regional agencies, local governments, and private non-profit organizations to implement projects that will further State and local emergency management objectives. Municipal: Provides competitive grants to municipalities that are legally constituted, have an authorized, established, and maintained emergency management program, and have signed the current Statewide Mutual Aid Agreement (SMAA) and supplied all required information and documentation such that the SMAA is ready to be signed by the Division as of the date of the application deadline.		Department of Community Affairs 2555 Shumard Oak Blvd Tallahassee, FL 32399-2100 (850) 488-8466 Fax: (850) 921-0781 http://www.dca.state.fl.us/cps/grants.htm

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Emergency Management Institute Training Assistance	To defray travel and per diem expenses of State, local, and tribal emergency management personnel who attend training courses conducted by the Emergency Management Institute, at the Emmitsburg, Maryland facility, Bluemont, Virginia facility, and selected off-site locations. Its purpose is to improve emergency management practices among State, local, and tribal government managers, in response to emergencies and disasters. Program embodies the Comprehensive Emergency Management System by unifying the elements of management common to all emergencies: planning, preparedness, mitigation, response, and recovery.	State, local, and tribal emergency managers.	Department of Homeland Security Emergency Preparedness and Response Directorate www.fema.gov
Emergency Operations Centers	The purpose of the Emergency Operations Centers program is to supplement and assist State and local efforts to improve their capabilities to respond to emergencies or disasters including any that may be caused by terrorist attacks using conventional means or Weapons of Mass Destruction. The program provides grants to the States to encourage the development of Emergency Operations Centers that provide flexibility, sustainability, security, survivability, and interoperability. Fully capable emergency operations facilities at the State and local levels are an essential element of a comprehensive national emergency management system and are necessary to ensure continuity of operations and continuity of government in major disasters caused by any hazard.	States are eligible to apply for the assistance under this program. For purposes of this program and consistent with the Stafford Act, 42 U.S.C. 5122(4), "State" means any State of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands. Local governments may receive assistance as subgrantees to the States in which they are located. The term "local government" as used in this program has the meaning set forth in the Stafford Act, 42 U.S.C. 5122(6).	Gil Jamieson, Federal Emergency Management Agency, Office of National Preparedness 500 C Street, SW Washington, DC 20472 (202) 646-4090 e-mail: gil.jamieson@fema.gov Fax: (202) 646-4053 24-hour per day FEMA Telephone Operator Service is available at (202) 566-1600 http://www.fema.gov
Emergency Operations Flood Response and Post Flood Response (Public Law 84-99 Code 200 Program)	To provide emergency flood response and post flood response assistance as required to supplement State and local efforts and capabilities in time of flood or coastal storm. Emergency assistance is provided in all phases of flood response and post flood response to supplement State and local efforts.	State or local public agencies for flood response and the State for post flood response.	Commander, U.S. Army Corps of Engineers, Attn: CECW-OE Washington DC 20314-1000 (202) 272-0251

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Emergency Rehabilitation of Flood Control Works or Federally Authorized Coastal Protection Works (Public Law 84-99, Code 300 Program)	To assist in the repair and restoration of flood control works damaged by flood, or federally authorized hurricane flood and shore protection works damaged by extraordinary wind, wave, or water action. Authorized assistance includes emergency repair or rehabilitation of flood control works damaged by flood, and restoration of federally authorized coastal protection structures damaged by extraordinary wind, wave, or water action.	Owners of damaged flood protective works, or State and local officials of public entities responsible for their maintenance, repair, and operation must meet current guidelines to become eligible for Public Law 84-99 assistance.	Commander, U.S. Army Corps of Engineers, Attn: CECW-OE Washington DC 20314 (202) 272-0251
Emergency Relief Program	To assist State transportation agencies in the planning and development of an integrated, interconnected transportation system important to interstate commerce and travel by constructing and rehabilitating the National Highway System, including the Interstate System; and for transportation improvements to all public roads except those classified as local or rural minor collectors; to provide aid for the repair of Federal-aid roads following disasters; to foster safe highway design; to replace or rehabilitate deficient or obsolete bridges; and to provide for other special purposes.		Department of Transportation Federal Highway Administration Director, Office of Engineering Federal Highway Administration 400 7th St. SW Washington, DC 20590 (202) 366B4853 http://www.fhwa.dot.gov/
Emergency Shelter Grants (ESG) Program	The program is designed to help improve the quality of emergency shelters and transitional housing for the homeless, to make available additional shelters, to meet the costs of operating shelters, to provide essential social services to homeless individuals, and to help prevent homelessness.	States, metropolitan cities, urban counties, and territories. Local governments and non-profit organizations may apply for ESG funds directly from states. The territories receive their allocations based on their population size.	Community Planning and Development, Department of Housing and Urban Development Office of Special Needs Assistance Programs 451 7th St. SW, Rm. 7254 Washington, DC 20410 (202) 708-4300
Emergency Watershed Protection Program	Provides technical and financial assistance for relief from imminent hazards in small watersheds, and to reduce vulnerability of life and property in small watershed areas damaged by severe natural hazard events.		USDA – NRCS National Office: (202) 690-0848 Watersheds and Wetlands Division: (202) 720-3042
Emergency Medical Services for Children	To support demonstration projects for the expansion and improvement of emergency medical services for children who need treatment for trauma or critical care. It is expected that maximum distribution of projects among the States will be made and that priority will be given to projects targeted towards populations with special needs, including Native Americans, minorities, and the disabled.	State governments and schools of medicine.	Department of Health and Human Services Health Resources and Services Administration www.hrsa.gov

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Environmental Quality Incentives Program (EQIP)	Technical, educational, and limited financial assistance to encourage environmental enhancement.		USDA-Natural Resource Conservation Service (NRCS) NRCS County Offices or NRCS EQUIP Program Manager: (202) 720-1834 www.nrcs.usda.gov
Federal Land Transfer/Federal Land to Parks Program	Identifies, assesses, and transfers available Federal real property for acquisition for State and local parks and recreation, such as open space.		DOI-National Park Service (NPS) General Services Administration Offices Fort Worth, TX: (817) 334-2331 Boston, MA: (617) 835-5700 or Federal Lands to Parks Leader NPS National Office: (202) 565-1184
Financial Assistance for Ocean Resources Conservation and Assessment Program	To determine the long-term consequences of human activities that affect the coastal and marine environment; to assess the consequences of these activities in terms of ecological, economic, and social impacts upon human, physical, and biotic environments, and to define and evaluate management alternatives that minimize adverse consequences of human use of the coastal and marine environments and resources.	Universities, colleges, technical schools, institutes, laboratories, State and local government agencies, public or private or profit or non-profit entities or individuals.	Department of Commerce Office of Ocean Resources Conservation and Assessment, National Ocean Service, National Oceanic and Atmospheric Administration 1305 East-West Hwy Silver Springs, MD 20910 (301) 713-2989 http://www.noaa.gov
Fire Management Assistance Grant – FEMA Readiness, Response and Recovery (RRR)	Grants to states, tribal governments, and local governments for the mitigation, management, and control of any fire burning on publicly (non-Federal) or privately owned forest or grassland that threatens such destruction as would constitute a major disaster.	State governments and Indian tribal governments are eligible for fire management assistance grants. The State or Native American tribal government may be the Grantee. The Grantee is the government to which a grant is awarded and is accountable for the use of funds provided.	FEMA, RRR, Region IV
Flood Control Projects (Small Flood Control Projects)	To reduce flood damages through projects not specifically authorized by Congress. Corps of Engineers designs and constructs the projects. Provides a cash contribution for land enhancement benefits and for project costs assigned to project features other than flood control; prevent future encroachment, which might interfere with proper functioning of the project for flood control; and, maintain the project after completion.	States, political subdivisions of states, or other responsible local agencies established under State law with full authority and ability to undertake necessary legal and financial responsibility.	U.S. Army Corps of Engineers Attn: CECW-PM Washington, DC 20314-1000 (202) 272-1975

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Flood Insurance	To enable persons to purchase insurance against physical damage to or loss of buildings and/or contents therein caused by floods, mudslide, or flood-related erosion, thereby reducing Federal disaster assistance payments, and to promote wise floodplain management practices in the Nation's flood-prone and mudflow-prone areas.	Any state of political subdivision with authority to adopt floodplain management practices. Beneficiaries may include residents, businesses, and property owners in applicant community, in which like states can ensure municipal structures.	Federal Emergency Management Agency Federal Insurance Administration Washington, DC 20472 (202) 646-2781 http://www.fema.gov/nfip
Flood Mitigation Assistance (FMA) Program Planning Grants	To assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP). Examples of funded projects are published in a Biennial Report to Congress as required under Section 554 of the National Flood Insurance Reform Act (NFIRA). This report is available from Mr. Robert F. Shea, Jr., Program Support Division, Federal Emergency Management Agency (FEMA). Planning Grants may be used to assist states and communities in developing and updating Flood Mitigation Plans. Eligible activities under this grant are conducting local planning discussions, contracting for consulting technical services such as engineering and planning, surveying structures at risk, and assessing structures subject to repetitive flood loss. Eligible activities under this grant are the acquisition, relocation, elevation, or dry-floodproofing of insured structures, minor structural projects, and beach nourishment activities.	Eligible applicants of Technical Assistance Grants are State agencies or departments that are responsible for administering the FMA program. Eligible applicants for Planning Grants are states and communities participating in the NFIP.	Mr. Robert F. Shea, Jr. Program Support Division Federal Emergency Management Agency 500 C Street, SW Washington, DC 20472 (202) 646-3619

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Flood Plain Management Services	To promote appropriate recognition of flood hazards in land and water use planning and development through the provision of flood and flood plain related data, technical services, and guidance. Available information identifies areas subject to flooding and flood losses from streams, lakes, and oceans and describes flood hazard at proposed building sites. It can be used as a basis for planning flood plain use, for flood emergency preparedness planning, for hurricane evacuation and preparedness planning, for assistance in developing flood plain regulations, for setting elevations for flood proofing, and implementing flood proofing measures, and for indicating areas to be acquired for open space. Services are available to states and local governments without charge, but within annual funding limitations, on request.	States, political subdivisions of States, other non-Federal public organizations and the public.	U.S. Army Corps of Engineers Attn: CECW-PF Washington, DC 20314-1000 (202) 761-0169
Flood Risk Reduction Program	The Flood Risk Reduction Program was established to allow farmers who voluntarily enter into contracts to receive payments on lands with high flood potential. In return, participants agree to forego certain USDA program benefits. These contract payments provide incentives to move farming operations from frequently flooded land.		Contact USDA, Farm Service Agency http://mimosa.itc.nrcs.usda.gov/scripts/ndisapi.dll/oip_public/USA_map for a USDA service center in your area. WPB: West Palm Beach Service Center 559 N. Military Tr. West Palm Beach, FL 33415
Florida Coastal Protection Trust Fund	The purpose is to provide a mechanism to have financial resources immediately available for prevention of, and cleanup and rehabilitation after, a pollutant discharge, to prevent further damage by the pollutant, and to pay for damages.		Florida Statutes http://www.leg.state.fl.us/citizen/documents/statutes/1993/CHAPTER_376_11.html

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Florida Communities Trust	Florida Communities Trust (FCT) is a State land acquisition grant program housed at the Florida Department of Community Affairs. FCT provides funding to local governments and eligible non-profit environmental organizations for acquisition of community-based parks, open space, and greenways that further outdoor recreation and natural resource protection needs identified in local government comprehensive plans. Matching and full grants for land acquisition projects are provided to communities through an annual competitive application cycle. Approximately $66 million is available to eligible applicants each year, and applicants are eligible for up to 6.6 million or 10 percent of this amount.		2555 Shumard Oak Blvd Tallahassee, FL 32399-2100 (850) 922-2207 Fax: (850) 921-1747 E-mail: fctinfo@dca.state.fl.us http://www.dca.state.fl.us/ffct/
Florida Hurricane Catastrophe Fund (FHCF)	The purpose of the FHCF is to protect and advance the State's interest in maintaining insurance capacity in Florida by providing reimbursements to insurers for a portion of their catastrophic hurricane losses.		1801 Hermitage Blvd. Tallahassee, FL 32308 (850) 413-1349 Fax: (850) 413-1344 www.fsba.state.fl.us/fhcf/about.asp
Hazard Mitigation Grant Program	To prevent future losses of lives and property due to disasters, to implement State or local hazard mitigation plans, to enable mitigation measures to be implemented during immediate recovery from a disaster, and to provide funding for previously identified mitigation measures to benefit the disaster area.	State and local governments; certain private and nonprofit organizations or institutions; Native American tribes or authorized tribal organizations; and native villages or organizations.	Federal Emergency Management Agency Mitigation Directorate 500 AC@ St., SW Washington, DC 20472 (202) 646-4621 http://www.fema.gov/mit/
Hazard Reduction Program	Funding for research and related educational activities on hazards.		National Science Foundation, Directorate for Engineering, Division of Civil and Mechanical Systems, Hazard Reduction Program (703) 306-1360
Hazardous Materials Assistance Program (Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] Implementation)	Provide technical and financial assistance through the States to support State, local, and tribal governments in oil and hazardous materials emergency planning and exercising. To support the Comprehensive Hazardous Materials Emergency Response – Capability Assessment Program activities.	State, local, and tribal governments, State emergency response committees, local emergency planning commissions.	Department of Homeland Security Emergency Preparedness and Response Directorate

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Hazardous Materials Emergency Preparedness (HMEP) Grant	The HMEP grant program is intended to provide financial and technical assistance as well as national direction and guidance to enhance State, territorial, tribal, and local hazardous materials emergency planning and training. The HMEP Grant Program distributes fees collected from shippers and carriers of hazardous materials to emergency responders for hazmat training and to Local Emergency Planning Committees for hazmat planning.		Federal Emergency Management Agency 500 C St., SW Washington, DC 20472 http://www.fema.gov/
Hazardous Materials Emergency Preparedness Training and Planning Grants	Increase State, local, territorial, and Native American tribal effectiveness to safely and efficiently handle HazMat accidents and incidents, enhance implementation of the Emergency Planning and Community Right-to-Know Act of 1986, and encourage a comprehensive approach to emergency planning and training by incorporating response to transportation standards.	States, local, territorial, tribal governments	Department of Transportation Research and Special Programs Administration www.rspa.dot.gov
Hazardous Waste Management State Program Support	To assist State governments in the development and implementation of an authorized hazardous waste management program for the purpose of controlling the generation, transportation, treatment, storage, and disposal of hazardous wastes. State project to develop a hazardous waste program designed to meet the substantive and procedural requirements of an authorized program. (Section 3006).	State agencies responsible for hazardous waste management within the 50 states.	Grants Administration Division (3903R), Environmental Protection Agency, Washington, DC 20460
Hazardous Waste Worker Health and Safety	To assist organizations in the development of institutional competency through appropriate training and education to hazardous waste workers.		Department of Health and Human Services, Public Health Service National Institutes of Health Office of Extramural Outreach and Information National Institutes of Health 6701 Rockledge Dr., MSC 7910 Bethesda, MD 20892-7910 (301) 435-7910 http://www.nih.gov/

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Healthy Homes Demonstration Grants.	The purpose of the Healthy Homes Demonstration Program is to develop, demonstrate, and promote cost-effective, preventive measures to correct multiple safety and health hazards in the home environment that produce serious diseases and injuries in children of low-income families. The U.S. Department of Housing and Urban Development (HUD) is interested in reducing health threats to the maximum number of residents, especially children, in a cost efficient manner.	Eligible applicants include not-for-profit institutions; for-profit institutions (for-profit firms are not allowed to profit from the project) located in the U.S., State, and local governments; and Federally-recognized Native American tribes. Federal agencies and Federal employees are not eligible to apply for this program.	Ms. Ellen Taylor, Director, Healthy Homes Program. Office of Healthy Homes and Lead Hazard Control, (202) 755-1785, extension 116 E-mail: Ellen_R._Taylor@hud.gov
Historic Preservation Fund Grants-in-Aid	To provide matching grants to states for the identification, evaluation, and protection of historic properties by such means as survey, planning technical assistance, acquisition, development, and certain Federal tax incentives available for historic properties; to provide matching grants to States to expand the National Register of Historic Places; and to provide matching grants to the National Trust for Historic Preservation for its congressionally chartered responsibilities to preserve historic resources.	State and local governments and public and private nonprofit organizations and individuals.	Department of the Interior National Park Service, Preservation Heritage Services Division 1849 C Street, NW Washington, DC 20240 (202) 343-6004
Historic Preservation Grants	To assist in the identification, excavation, protection, and rehabilitation of historic and archaeological sites in Florida; to provide public information about these important resources; and to encourage historic preservation in smaller cities through the Florida Main Street program.	Departments or agencies of the State (including universities), cities, counties, and other units of local government, and not-for-profit organizations.	Division of Historical Resources 500 S. Bronough Street Tallahassee, FL 32399-0250 (850) 245-6300
Human Health Studies, Applied Research and Development	To solicit scientific proposals designed to answer public health questions arising from situations commonly encountered at hazardous waste sites. The objective of this research program is to fill gaps in knowledge regarding human health effects of hazardous substances identified during the conduct of Agency for Toxic Substances and Disease Registry's (ATSDR's) health assessments, consultations, toxicological profiles, and health studies, including but not limited to those health conditions prioritized by ATSDR.	State health departments.	Department of Health and Human Services Centers for Disease Control www.atsdr.cdc.gov

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Hurricane Loss Mitigation Program	Funds Residential Construction Mitigation Program, which was developed in coordination with an advisory council consisting of representatives designated from the Department of Insurance, Florida Home Builders Association, Florida Insurance Council, Federation of Manufactured Home Owners, Florida Association of Counties, and Florida Manufactured Housing Association.		2555 Shumard Oak Blvd Tallahassee, FL 32399-2100 (850) 410-1563 Fax: (850) 410-1555 E-mail:ted.court@dca.state.fl.us http://www.floridacommunitydevelopment.org/programs/rcmp/files/onepager.PDF
Hurricane Program	To significantly reduce the loss of life, property, economic disruption, and disaster assistance costs resulting from hurricanes.	Texas, Louisiana, Mississippi, Alabama, Florida.	Federal Emergency Management Agency Mitigation Directorate 500 AC@ St., SW Washington, DC 20472 (202) 646-4621 http://www.fema.gov/mit
Immunization Grants	To assist states and communities in establishing and maintaining preventative health service programs to immunize individuals against vaccine-preventable diseases.	States.	Department of Health and Human Services Centers for Disease Control www.cdc.gov
Immunization Research, Demonstration, Public Information and Education	To assist states, political subdivisions of states, and other public and private nonprofit entities to conduct research, demonstrations, projects, and provide public information on vaccine-preventable diseases and conditions.	States and nonprofit organizations.	Department of Health and Human Services Centers for Disease Control www.cdc.gov
Individual Assistance	To provide assistance to individuals and families who have been affected by natural or man-made Presidentially declared disasters. Funding provided from the Disaster Relief Fund.	Individuals and families.	Department of Homeland Security Emergency Preparedness and Response Directorate
Interoperable Communications Equipment Grant	To facilitate communications interoperability among public safety emergency responders at the State and local level.	State and local governments.	Department of Homeland Security Emergency Preparedness and Response Directorate
John D. and Catherine T. MacArthur Foundation	Initiates programs and supports their purposes including community development activities in Palm Beach County, Florida.	Open to non-profit, tax-exempt organizations.	John D. and Catherine T. MacArthur Foundation Program Area, Grants Management, Research and Information 140 S. Dearborn St., Suite 1100 Chicago, IL 60603-5285 (312) 726-8000 E-mail: 4answers@macfdn.com

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Land and Water Conservation Fund (LWCF)	LWCF is a competitive program that provides grants for acquisition or development of land for public outdoor recreation use.	All local governmental entities with the legal responsibility for the provision of outdoor recreational sites and facilities for the use and benefit of the public.	Department of Environmental Protection Division of Recreation & Parks Bureau of Design & Recreation Services 3900 Commonwealth Boulevard MS #585 Tallahassee, Florida 32399-3000 (850) 488-7896 (Suncom 278-7896) Fax: (850) 488-3665 (Suncom 278-3665)
Land Protection, Natural Resources Conservation Service (NRCS)	The NRCS provides technical and financial assistance for runoff retardation and soil erosion prevention as needed to reduce hazards to life and property from floods, drought, and the products of erosion on any watershed impaired by a natural disaster. NRCS provides technical assistance for rehabilitation of land conservation systems for which FSA provides cost-sharing, and emergency protection to assist in relieving imminent hazards to life and property from floods and products of erosion created by natural hazards that are causing a sudden impairment of a watershed.		Contact USDA http://mimosa.itc.nrcs.usda.gov/scripts/ndisapi.dll/oip_public/USA_map for a USDA service center in your area. WPB: West Palm Beach Service Center 559 N. Military Tr. West Palm Beach, FL 33415
Local Firefighting and Emergency Services Training	To provide specialized training and equipment to enhance the capability of metropolitan fire and emergency service departments to respond to terrorist attacks. To enhance readiness and preparedness of fire and emergency services personnel to respond to terrorist incidents of mass destruction where incendiary devices, nuclear, biological, or chemical agents are utilized.	Applicants requesting funding must have the capability to develop and provide training for fire and emergency service personnel that will prepare them to respond to a terrorist incident.	Office of State and Local Domestic Preparedness Support, Office of Justice Programs, Department of Justice 633 Indiana Ave. NE Washington, DC 20531 (202) 616-2920
Local Initiatives Support Corporation (LISC)	Helps existing community development groups revitalize urban neighborhoods throughout the country. By combining investments, technical assistance, and grants, LISC seeks to increase the ability of experienced local development groups to design projects of significant scale, raise and manage necessary capital, and work effectively with their natural allies in the private sector.	Available upon request.	John Mascotte, Chairman of the Board, or Paul S. Grogan, President Local Initiatives Support Corporation 733 3rd Ave. New York, NY 10017 (212) 455-9800
Map Modernization	This funding provides assistance to develop digital flood maps, support flood-mapping activities, and expand the Cooperating Technical Partners Program to communities and regional entities.	State, local, and tribal governments.	Department of Homeland Security Emergency Preparedness and Response Directorate

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
National Fire Academy Educational Program	To increase the professional level of the fire service and others responsible for fire prevention and control. Students are provided an opportunity to attend courses at the National Fire Academy resident facility or at a convenient off-campus location with a minimal cost to the individual or the fire department represented. The increase in the number of students attending impacts the professional level of fire service personnel. Training is provided at the resident facility in Emmitsburg, Maryland, and in the field in cooperation with State or local fire training agencies on specific subjects to specific audiences.	Any individual who is a member of a fire department or has significant responsibility for fire prevention and control.	National Emergency Training Center, Educational and Technology Services Branch 16825 S. Seton Ave. Emmitsburg, MD 21727 (301) 447-1000
National Fire Academy Training Assistance (Student Stipend Reimbursement Program)	To provide travel stipends to students attending Academy courses. Examples of funded projects: students are provided an opportunity to attend courses at the National Fire Academy resident facility with a minimal cost to the individual or the fire department represented. The increase in the number of students attending impacts the professional level of fire service personnel.	Any student who is a member of a fire department or has significant responsibility for fire prevention and control and has been accepted into an eligible course at the National Fire Academy may apply for stipend reimbursement.	National Emergency Training Center, Educational and Technology Services Branch, 16825 S. Seton Ave Emmitsburg, MD 21727 (301) 447-1035
National Flood Insurance Program	Provides federally-backed flood insurance to those who generally were not able to obtain it from the private-sector companies, and to promote sound floodplain management practices in flood prone areas.		FEMA Region IV CRS Program 3003 Chamblee-Tucker Rd. Atlanta, GA 30431 (770) 220-5200
National Flood Mitigation Fund	To fund activities designed to reduce the risk of flood damage.	States and units of local government. Local governments must be participating in the National Flood Insurance Program.	Federal Emergency Management Agency Mitigation Directorate 500 AC@ St., SW Washington, DC 20472 (202) 646-4621 http://www.fema.gov/mit

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
National Hospital Bioterrorism Preparedness Grant	HRSA is providing financial assistance to authorized jurisdictions through the National Hospital Bioterrorism Preparedness Program's Cooperative Agreements to upgrade the preparedness of the Nation's health care system to respond to bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies. Awardees are required to address the following priority areas: hospital bed capacity, isolation capacity, health care personnel, hospital-based pharmaceutical caches, mental health services, trauma and burn care capacity, communications and information technology, personal protective and decontamination equipment, emergency medical services, linkages with public health departments, education and training, and preparedness exercises.	Public Health Departments in all 50 States Territories (USVI, Guam, Puerto Rico, American Samoa, N. Marianas Islands) Freely Associated States of the Pacific (Federated States of Micronesia, Marshall Islands, Palau) New York, NY, Los Angeles County, CA, Chicago, IL, District of Columbia.	National Bioterrorism Hospital Preparedness Program Contacts Parklawn Building, Room 18A-38 5600 Fishers Lane Rockville, MD 20857 Fax: (301) 443-1296
National Weather Service	Provides weather and flood warnings, public forecasts, and advisories for all of the United States and territories. Technical assistance is provided to local, regional, and State agencies developing and operating warning programs.		National Weather Service, National Oceanic and Atmospheric Administration 1325 East-West Highway Silver Spring, MD 20910 http://www.nws.noaa.gov
National Institute of Environmental Health Services Hazardous Waste Worker Health and Safety Training (Superfund Worker Training Program)	To provide cooperative agreements and project grant support for the development and administration of model worker health and safety training programs consisting of classroom and practical health and safety training of workers and their supervisors, who are engaged in activities related to hazardous materials, hazardous waste generation, treatment, storage, disposal, removal, containment, transportation, or emergency response. Programs provide health and safety training and education for occupational population involved in waste handling and processing at active and inactive hazardous substance treatment, storage, and disposal facilities; cleanup, removal, containment, or remedial action at waste sites; hazardous substance emergency response; hazardous substance disposal site risk assessment and investigation, remedial actions, or clean-up by State and local personnel; and transportation of hazardous wastes.	A public or private nonprofit entity providing worker health and safety education and training may submit an application and receive a cooperative agreement or project grant for support of waste worker education and training by a named principal investigator. Nonprofit organizations that are incorporated under 501(c)(4) are prohibited from receiving grants.	Grants Management Contact: Dorothy G. Williams, Grants Management Officer, Grants Management Branch, Division of Extramural Research and Training, National Institute of Environmental Health Sciences, National Institutes of Health, Department of Health and Human Services P.O. Box 12233 Research Triangle Park, NC 27709 (919) 541-2749 E-mail: Williams@niehs.nih.gov

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
National Institute of Environmental Health Sciences (NIEHS) Superfund Hazardous Substances: Basic Research and Education (NIEHS Superfund Research Program)	It is intended to integrate advanced or graduate training into the multidisciplinary research program to provide for training in environmental and occupational health and safety; the engineering aspects of hazardous waste control; and graduate training in the geosciences. This interdisciplinary program supports basic research in the following: development and use of methods and technologies to detect hazardous substances in the environment; development of advanced techniques for the detection, assessment, and evaluation of the effects of human health presented by hazardous substances; and the development and use of basic biological, chemical, and physical methods and technologies to reduce the amount of toxicity of hazardous substances.	An accredited institution of higher education, as defined in the Higher Education Act, 20 U.S.C. (annotated) 3381, may submit an application and receive a grant for support of research by a named principal investigator. Nonprofit organizations that are incorporated under 501(c)(4) are prohibited from receiving grants.	Grants Management Contact: Dorothy G. Williams, Grants Management Officer, Department of Health and Human Services P.O. Box 12233 Research Triangle Park, NC 27709 (919) 541-2749 E-mail: Williams@niehs.nih.gov
Non-Structural Alternatives to Structural Rehabilitation of Damaged Flood Control Works	Direct planning and construction grants for non-structural alternatives to the structural rehabilitation of flood control works damaged in floods or coastal storms ($9 million FY 99).		Department of Defense-U.S. Army Corps of Engineers (USACE) Emergency Management contact in respective USACE field office South Atlantic (404) 331-6795
North American Wetlands Conservation Act (NAWCA) Grant Program	The North American Wetlands Conservation Act Grant Program promotes long-term conservation of North American wetland ecosystems, waterfowl and other migratory birds, fish, and wildlife that depend upon such habitat. Principal conservation actions supported by NAWCA are acquisition, enhancement, and restoration of wetlands and wetlands-associated habitat. The program encourages voluntary, pubic-private partnerships to conserve North American wetland ecosystems by creating an infrastructure and providing a source of funding.	Public or private, profit or non-profit entities or individuals establishing pubic-private sector partnerships.	Department of the Interior Fish and Wildlife Service, North American Waterfowl and Wetlands Office 4401 N. Fairfax Dr., Rm. 110 Arlington, VA 22203 (703) 358-1784 http://www.fws.gov/~r9nawwo/homepag.html
Office of Domestic Acquisition Program (ODP)	The goal of the ODP Equipment Grant Program is to provide funding to enhance the capacity of State and local jurisdictions to respond to, and mitigate the consequences of, incidents of domestic terrorism involving the use of weapons of mass destruction.	All 50 states, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, the Commonwealth of Northern Mariana Islands (CNMI), Guam, and the U.S. Virgin Islands.	ODP Help Line at (800) 368-6498

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Outdoor Recreation: Acquisition, Development and Planning (Land and Water Conservation Fund Grants)	To provide financial assistance to the states and their political subdivisions for the preparation of Statewide Comprehensive Outdoor Recreation Plans (SCORPs) and acquisition and development of outdoor recreation areas and facilities for the general public, to meet current and future needs. Examples of funded projects: acquisition and development grants may be used for a wide range of outdoor recreation projects, such as picnic areas, inner city parks, campgrounds, tennis courts, boat launching ramps, bike trails, outdoor swimming pools, and support facilities such as roads, water supply, etc.	For planning grants, only the State agency formally designated by the Governor or State law as responsible for the preparation and maintenance of the SCORP is eligible to apply. For acquisition and development grants, the above designated agency may apply for assistance for itself, or on behalf of other State agencies or political subdivisions, such as cities, counties, and park districts.	Chief, Recreation Program, National Park Service, (2225), Department of the Interior 1849 C Street, NW, Room 3624 Washington, DC 20240 (202) 565-1133
Partners for Fish and Wildlife	Financial and technical assistance to private landowners interested in pursuing restoration projects affecting wetlands and riparian habitats.		Department of Interior – Fish and Wildlife Service National Coordinator, Ecological Services: (703) 358-2201 A list of State and regional contacts is available from the National Coordinator upon request.
Physical Disaster Loans and Economic Injury Disaster Loans	Disaster loans to non-farm, private sector owners of disaster damaged property for uninsured losses. Loans can be increased by up to 20 percent for mitigation purposes.		Small Business Administration National Headquarters Associate Administrator for Disaster Assistance: (202) 205-6734
Planning Assistance to States (Section 22)	To cooperate with any state in the preparation of comprehensive plans for the development, utilization, and conservation of water and related land resources of drainage basins located within the boundaries of such state. The state must have a planning program for the development, utilization, or conservation of the water and related land resources underway or laid out in sufficient detail so that the relationship of a state's request for Corps input for some particular aspect of the program may be appraised.	The 50 states.	U.S. Army Corps of Engineers Attn: CECW-PF Washington, DC 20314-1000 (202) 272-0169
Planning Assistance to States Program	To assist the states in the preparation of comprehensive plans for the development, utilization, and conservation of water and related land resources. Floodplain management services intended to assist states in planning related to water supply, water quality, water conservation, environmental restoration and enhancement, hydropower development, flood control, or erosion and navigation.	States, District of Columbia, U.S. Territories, and federally recognized Native American tribes.	Department of Defense U.S. Army Corps of Engineers Attn: CECW-PM DoD Washington, DC 20314-1000 (202) 272-0169 http://www.usace.army.mil/

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Port Security Grants for Critical National Seaports	To support efforts of critical national seaports/terminals to enhance port security through security assessments and mitigation strategies; and enhanced facility and operational security (e.g., terminal, commuter, or ferry vessels access control, physical security, cargo security, and passenger security), including proof of concepts.	Public and private ports or terminals; State/local government entities; and consortiums composed of local stakeholder groups (i.e., river groups, ports, and terminal associations). Private entities will be considered when security interests related to location and/or operation affects the greater public interest. Consultants may prepare applications for an eligible party, but only the eligible party may submit and be considered for the grant. Prerequisites: for Enhanced Facility and Operational Security grants, applicants must have already completed a security assessment and tie the security enhancements to the assessment.	Transportation Security Administration Headquarters, Office of Maritime and Land Security, Grants/Contracts Management Branch, TSA-8 701 South 12th Street Arlington VA 22202 Tony Corio tony.corio@dhs.gov (571) 227-1233
Post-Disaster Economic Recovery Grants and Assistance	Grant funding to assist with the long-term economic recovery of communities, industries, and firms adversely impacted by disasters.		Department of Commerce – Economic Development Administration (EDA) EDA Headquarters Disaster Recovery Coordinator: (202) 482-6225
Pre-Disaster Mitigation Program	This program provides funding for mitigation activities before disasters strikes. In recent years it has provided assistance for mitigation planning. In FY 03, Congress passed a competitive pre-disaster mitigation grant program that will include project funding.	State, local, and tribal government.	Department of Homeland Security Emergency Preparedness and Response Directorate
Project Modifications for Improvement of the Environment	Provides for ecosystem restoration by modifying structures and/or operations or water resources projects constructed by the USACE, or restoring areas where a USACE project contributed to the degradation of an area.		Department of Defense (DOD)-USACE Chief of Planning @ appropriate USACE Regional Office South Atlantic: (404) 331-6270
Property Improvement Loan Insurance for Improving All Existing Structures and Building of New Nonresidential Structures (Title I)	To facilitate the financing of improvements to homes and other existing structures and the building of new nonresidential structures. Insured loans may be used to finance alterations, repairs, and improvements for existing structures and the building of new nonresidential structures that substantially protect or improve the basic livability or utility of the properties.	Eligible borrowers include the owner of the property to be improved, lessee having a lease extending at least 6 months beyond maturity of the loan, or a purchaser of the property under a land installment contract.	Persons are encouraged to contact the Homeownership Center serving their state, or nearest local HUD office.

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Protection of Essential Highways, Highway Bridge Approaches, and Public Works (Emergency Bank Protection)	To provide bank protection of highways, highway bridges, essential public works, churches, hospitals, schools, and other nonprofit public services endangered by flood-caused erosion. Reinforced barriers at either side of bridge approachments. Corps of Engineers designs and constructs the project. Nonfederal sponsor must share in projects costs, including cash and lands, easements, right-of-way and utility relocations; hold and save the United States free from damages; and maintain the project at local cost after completion.	States, political subdivisions of states or other responsible local agencies established under State law with full authority and ability to undertake necessary legal and financial responsibilities.	U.S. Army Corps of Engineers Attn: CECW-PM Washington, DC 20314-1000 (202) 272-1975
Protection of Forests and Rangelands	The Forest Service (FS) sets priorities, establishes policies, and provides financial and technical assistance to State Foresters. The FS provides technical and financial assistance to State Foresters in mitigating and improving their fire suppression capability, and serves as a technical fire advisor to FEMA in the Fire Suppression Assistance Program.	Federal and State agencies and organizations, and State and private lands.	Contact USDA http://mimosa.itc.nrcs.usda.gov/scripts/ndisapi.dll/oip_public/USA_map for a USDA service center in your area. WPB: West Palm Beach Service Center 559 N. Military Tr. West Palm Beach, FL 33415
Public Assistance	To provide supplemental assistance to states, local governments, and certain private nonprofit organizations to alleviate suffering and hardship resulting from major disasters or emergencies declared by the President.	State and local governments and any political subdivision of a state, Native American tribes, and native villages are eligible. Also eligible are private nonprofit organizations that operate educational, utility, emergency, or medical facilities and provide custodial care or other essential services of governmental nature to the general public.	Federal Emergency Management Agency Infrastructure Support Division, Response and Recovery Directorate 500 AC@ St., SW Washington, DC 20472 (202) 646-3026 http://www.fema.gov/mit/
Public Health and Social Services Emergency Fund	To continue to prepare our nation's public health system and hospitals for possible mass casualty events, and to accelerate research into new treatments and diagnostic tools to cope with possible bioterrorism incidents.	Individuals, families, Federal, State, and local government agencies and emergency health care providers.	Department of Health and Human Services ww.hhs.gov
Public Housing Modernization Reserve for Disasters and Emergencies	Funding to public housing agencies for modernization needs resulting from natural disasters (including elevation, floodproofing, and retrofit).		HUD Director, Office of Capital Improvements: (202) 708-1640

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Radiation Control: Training Assistance and Advisory Counseling	To assist states in achieving, maintaining, and improving their capabilities to conduct radiation control programs. This will assure that State programs established through agreements with NRC for transfer of certain NRC regulatory authority over atomic energy materials to the states will continue to be adequate to protect health and safety and be compatible with NRC's regulatory program. Training is made available to personnel of State and local governments in order to improve the radiological health training of staff members responsible for carrying out radiation control programs. Courses are provided in health physics and radiation protection, safety aspects of using radioactive materials, regulatory practices and procedures, and compliance inspection.	State and local government agencies that are or will be responsible for administering radiation control programs under an agreement with NRC for assumption by the State of regulatory authority initially exercised by the NRC.	Brenda Usilton, Office of State Programs, Nuclear Regulatory Commission, Washington, DC 20555 (301) 415-2348
Recreation Development Assistance Program	Florida Recreation Development Assistance Program (FRDAP) is a competitive program that provides grants for acquisition or development of land for public outdoor recreational use or to construct or renovate recreational trails.	Municipal and county governments or other legally constituted entities with the legal responsibility to provide public outdoor recreation.	Bureau of Design and Recreation Services 3900 Commonwealth Boulevard Mail Station #585 Tallahassee, Florida 32399-3000 (850) 488-7896 (Suncom 278-7896) Fax: (850) 488-3665 (Suncom Fax 278-3665)
Rehabilitation Mortgage Insurance (203[k])	To help families repair or improve, purchase and improve, or refinance and improve existing residential structures more than 1 year old. HUD insures lenders against losses on loans. These loans may be used to rehabilitate an existing one to four unit dwelling in one of four ways: purchase a structure and the land on which the structure is located and rehabilitate it; purchase a structure on another site, move it onto a new foundation on the mortgaged property, and rehabilitate it; refinance the existing indebtedness and rehabilitate such a structure; or rehabilitate such a structure.	Individual purchasers or investors are eligible to apply.	Persons are encouraged to contact the Homeownership Center serving their State, or the nearest local HUD office.

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Rural Development Assistance -- Utilities	Direct and guaranteed rural economic loans and business enterprise grants to address utility issues and development needs.		USDA-Rural Utilities Service Program Support: (202) 720-1382 Northern Regional Division: (202) 720-1402 Electric Staff Division: (202) 720-1900 Power Supply Division: (202) 720-6436
Rural Development Assistance – Housing	Grants, loans, and technical assistance in addressing rehabilitation, health and safety needs in primarily low-income rural areas. Declaration of major disaster necessary.		USDA-Rural Housing Service Community Programs: (202) 720-1502 Single Family Housing: (202) 720-3773 Multi Family Housing: (202) 720-5177
School Emergency Response and Crisis Management Plan Discretionary Grant Program	To provide school districts with funds to strengthen and improve current school crisis plans in preparation for emergencies including potential terrorist attacks.	School districts.	Department of Education www.ed.gov/emergencyplan/
Section 108 Loan Guarantee Program	Loan guarantees to public entities for community and economic development (including mitigation measures).		HUD Community Planning and Development staff at appropriate HUD field office, or the Section 108 Office at HUD Headquarters: (202) 708-1871
Small Business Administration (SBA) Pre-Disaster Mitigation Loan Program	The purpose of the Pre-Disaster Mitigation Loan Program is to make low-interest, fixed-rate loans to eligible small businesses for the purpose of implementing mitigation measures to protect business property from damage that may be caused by future disasters. The program is a pilot program, which supports FEMA's Pre-Disaster Mitigation Program. SBA's Pre-Disaster Mitigation Program is available to businesses whose proposed mitigation measure conforms to the priorities and goals of the mitigation plan for the community, as defined by FEMA, in which the business is located.		Disaster Area 2 Office One Baltimore Place, Suite 300 Atlanta, GA 30308 1-800-359-2227 http://www.sba.gov/disaster_recov/loaninfo/pre_disaster_mitigation.html
Small Cities Community Development Block Grant Program	Provides funds to rural communities to improve local housing, streets, utilities, and public facilities. The Section 108 Loan Guarantee Program offers local governments a source of financing for economic development, large-scale public facility projects, and public infrastructure.		Ian Smith (850) 922-1870 Susan Cook (850) 487-3644 Rick Stauts, Planning Manager with the Department of Community Affairs (850) 487-3644

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Snagging and Clearing for Flood Control (Section 208)	To reduce flood damages. Corps of Engineers designs and constructs the project. The nonfederal sponsor must provide all lands, easements, and rights-of-way; provide all project costs in excess of the Federal limit of $500,000; agree to maintain project after construction; hold and save the United States free from damages; provide a contribution toward construction costs for land enhancement or special benefits; agree to prevent future encroachment, which might interfere with proper functioning of the project for flood control.	States, political subdivisions of states, or other responsible local agencies established under State law with full authority and ability to undertake necessary legal and financial responsibilities.	U.S. Army Corps of Engineers Attn: CECW-PM Washington, DC 20314-1000 (202) 272-1975
South Florida Coastal Ecosystem Program	To seek the most technically sound and cost effective proposals that specifically address priority issues within South Florida's coastal ecosystem, such as restoring and enhancing degraded coastal uplands and estuarine wetlands, removing exotic vegetation from coastal areas and promoting research and public awareness of South Florida's ecological problems, to identify opportunities in which partnerships can be formed to create, restore and enhance coastal resources, and to develop partnerships among Federal, State, and local governments as well as academic, non-governmental, and business entities in South Florida.	Federal, State, and local government agencies, academic institutions, non-profit groups, and/or citizens are eligible to respond directly.	U.S. Fish & Wildlife Service South Florida Ecological Services Office 1339 20th Street Vero Beach, Florida 32960-3559
Special Economic Development and Adjustment Assistance Program - Sudden and Severe Economic Dislocation and Long Term Economic Deterioration	To help State and local areas develop and/or implement strategies designed to address structural economic adjustment problems resulting from sudden and severe economic dislocation such as plant closings, military base closures, and defense contract cutbacks, and natural disasters, or from long-term economic deterioration in the area's economy.	States, cities, counties, or other political subdivisions of a State, consortia of such political subdivisions, public or private nonprofit organizations representing redevelopment areas designated under the Public Works and Economic Redevelopment Act of 1965, Economic Development Districts established under Title IV of the Act, and Native American tribes.	Department of Commerce Economic Adjustment Division, Economic Development Administration Room H7327, Herbert C. Hoover Bldg. Washington, DC 20230 (202) 482-26659 http://www.doc.gov/eda/
State Disaster Preparedness Grants (Disaster Preparedness Improvement Grants)	To assist states in developing and improving State and local plans, programs, and capabilities for disaster preparedness and prevention. Improvement grants have produced a variety of products such as mitigation training courses, enhanced State preparedness efforts, revised assistance, and hazard mitigation plans.	All states are eligible.	C. Dwight Poe, State and Local Preparedness, Training, and Exercises Directorate, Federal Emergency Management Agency Washington, DC 20472 (202) 646-3492

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
State Domestic Preparedness Equipment Support Program	Funding will be provided to enhance first responder capabilities, and to provide for equipment purchases and exercise planning activities for response to Weapons of Mass Destruction domestic terrorist incidents.	State and local governments.	Department of Justice Office of Domestic Preparedness www.usdoj.gov
State Homeland Security Grant Program	To provide for the purchase of specialized equipment to enhance the capability of State and local agencies to prevent and respond to incidents of terrorism involving the use of chemical, biological, radiological, nuclear or explosive (CBRNE) weapons; for the protection of critical infrastructure and prevention of terrorist incidents; for costs related to the design, development, conduct, and evaluation of CBRNE exercises; for costs related to the design, development, and conduct, of a State CBRNE Training Program; and for costs associated with updating and implementing each state's Homeland Security Strategy.	State and local governments; first responders.	Department of Homeland Security Border and Transportation Security Directorate www.ojp.usdoj.gov
State and Local All Hazards Emergency Operations Planning	The purpose of the State and Local All Hazards Emergency Operation Planning Program is to supplement and assist State and local efforts to prepare themselves to respond to emergencies or disasters including any that may be caused by terrorist attacks using conventional means or Weapons of Mass Destruction. Such preparedness requires an extraordinary level of inter-service and inter-jurisdictional planning and coordination. The program provides grants to the states to encourage the development or updating of comprehensive, all-hazard emergency management plans by the states and by local governments. The requisite planning base supports and promotes efforts to establish lasting working relationships and facilitates the development of a common incident command system, general availability of interoperable communications, and effective mutual aid. In partnership with the Federal Government, strong emergency management and emergency services organizations at the State and local levels ensure the continuance of a comprehensive national emergency management system for disasters or emergencies resulting from natural disasters or accidental or man-made events.	States are eligible to apply for assistance under this program. For purposes of this program and consistent with the Stafford Act, 42 U.S.C. 5122(4), "state" means any state of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands. Local governments may receive assistance as subgrantees to the states in which they are located. The term "local government" as used in this program has the meaning set forth in the Stafford Act, 42 U.S.C. 5122(6).	Gil Jamieson, Federal Emergency Management Agency, Office of National Preparedness 500 C Street, SW Washington, DC 20472 (202) 646-4090 E-mail: gil.jamieson@fema.gov Fax: (202) 646-4053 24-hour per day FEMA Telephone Operator Service is available at (202) 566-1600 http://www.fema.gov

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
State and Local Anti-Terrorism Training	To provide delivery of specialized, multi-agency anti-terrorism preparedness training. This training, along with related research, law enforcement intelligence, operational issues development, and technical assistance support activities, is delivered to State and local law enforcement and prosecution authorities. While State and local law enforcement preparation and readiness issues addressed in this project are tailored to interventions in domestic terrorism, major portions of the program's preparedness and operational readiness outcomes are equally applicable to any terrorist threat or incident whether domestically or internationally inspired.	State and local law enforcement and prosecution authorities.	Office of Justice Programs, Bureau of Justice Assistance, Department of Justice 810 Seventh Street, NW Washington, DC 20531 Contact: Program Development Division (202) 514-5943 www.usdoj.gov/bja
State and Local Domestic Preparedness Exercise Support	To enhance the capacity of State and local first responders to respond to a weapons of mass destruction terrorism incident involving chemical, biological, nuclear, radiological, incendiary, and explosive devices.	Eligible applicants are public or private organizations with the expertise and experience to provide assistance to State and local jurisdictions; to facilitate, conduct, and evaluate exercises; and/or to develop guidance, materials, and publications related to the conduct of exercises or lessons learned.	Office for Domestic Preparedness, Office of Justice Programs U.S. Department of Justice 810 Seventh Street, NW Washington, DC 20531 (202) 305-9887 http://www.ojp.usdoj.gov
State and Local Domestic Preparedness Technical Assistance	To enhance the capacity of State and local first responders to respond to a weapons of mass destruction terrorism incident involving chemical, biological, nuclear, radiological, incendiary, and explosive devices. The program goals are to enhance the ability of State and local jurisdictions to develop, plan, and implement a program for weapons of mass destruction preparedness and to sustain and maintain specialized equipment.	Applicants may be public or private organizations with the expertise and experience to provide a specialized service or a full range of assistance to enhance the capacity of State and local emergency response agencies to respond to a weapons of mass destruction terrorism incident.	Office for Domestic Preparedness, Office of Justice Programs U.S. Department of Justice 810 Seventh Street, NW Washington, DC 20531 (202) 305-9887 http://www.ojp.usdoj.gov
State Rural Hospital Flexibility Program	To help states work with rural communities and hospitals to develop and implement a rural health plan, designate critical access hospitals, develop integrated networks of care, improve emergency medical services, and improve quality, service, and organizational performance.	States with at least one hospital in a non-metropolitan region.	Department of Health and Human Services Health Resources and Services Administration www.ruralhealth.hrsa.gov

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Stewardship Incentives Program	The Stewardship Incentives Program provides technical and financial assistance to encourage non-industrial private forest landowners to keep their lands and natural resources productive and healthy. Qualifying land includes rural lands with existing tree cover or land suitable for growing trees and which is owned by a private individual, group, association, corporation, Native American tribe, or other legal private entity. Eligible landowners must have an approved Forest Stewardship Plan and own 1,000 or fewer acres of qualifying land. Authorization may be obtained for exceptions of up to 5,000 acres.		Contact USDA, Forest Service http://mimosa.itc.nrcs.usda.gov/scripts/ndisapi.dll/oip_public/USA_map for a USDA service center in your area. WPB: West Palm Beach Service Center 559 N. Military Tr. West Palm Beach, FL 33415
Surface Transportation Program (STP)	The STP provides flexible funding that may be used by States and localities for projects on any Federal-aid highway, including the National Highway System, bridge projects on any public road, transit capital projects, and intracity and intercity bus terminals and facilities. A portion of funds reserved for rural areas may be spent on rural minor collectors. Eligible activities include environmental restoration and pollution abatement projects, including retrofit or construction of stormwater treatment facilities and natural habitat mitigation.		Florida Department of Transportation
Superfund Hazardous Substances Basic Research and Education	To establish and support an innovative program of basic research and training consisting of multi-project, interdisciplinary efforts that may include each of the following: methods and technologies to detect hazardous substances in the environment; advance techniques for the detection, assessment, and evaluation of the effects of hazardous substances on humans; methods to assess the risk to human health presented by hazardous substances; and basic biological, chemical, and physical methods to reduce the amount and toxicity of hazardous substances.	Any public or private entity involved in the detection, assessment, evaluation, and treatment of hazardous substances; and State and local governments.	Department of Health and Human Services National Institute of Health www.nih.gov

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Surveillance of Hazardous Substance Emergency Events	To assist State health departments in developing a State-based surveillance system for monitoring hazardous substance emergency events. This surveillance system will allow the State health department to better understand the public health impact of hazardous substance emergencies by developing, implementing, and evaluating a State-based surveillance system	State, local, territorial, and tribal public health departments.	Department of Health and Human Services Centers for Disease Control www.atsdr.cdc.gov
Surveys, Studies, Investigations, Training Demonstrations and Educational Outreach	Grants are awarded to support Surveys, Studies, Investigations, Training Demonstrations, Educational Outreach and Special Purpose assistance relating to the protection of public health and the environment from potential risk from toxic chemicals to come. Funding priority: annual funding priority topics for FY 2003 include, but are not limited to, promotion of pollution prevention and the public's right to know about chemical risks, evaluation of pesticides and chemicals to safeguard all Americans, including children and other vulnerable members of the population, as well as our most threatened species and ecosystems from environmental harm and emerging issues like biotechnology, endocrine disruptors, and lead poisoning prevention.	Assistance under this program is generally available to states, U S territories or possessions, federally recognized Native American tribal governments and organizations, public and private universities and colleges, hospitals, laboratories, and other public or private nonprofit institutions and individuals. Non-profit organizations described in Section 501(c)(4) of the Internal Revenue Code that engage in lobbying activities as defined in Section 3 of the Lobbying Disclosure Act of 1995 are not eligible to apply.	EPA, Office of Prevention, Pesticides, and Toxic Substances 1200 Pennsylvania Avenue, NW Washington, DC 20460
Sustainable Development Challenge Grants	To catalyze community-based and regional projects and other actions that promote sustainable development, thereby improving environmental quality and economic prosperity; leverage significant private and public investments to enhance environmental quality by enabling community sustainability efforts to continue past Environmental Protection Agency funding; build partnerships that increase a community's long-term capacity to protect the environment through sustainable development; and enhance the Environmental Protection Agency's ability to provide assistance to communities and promote sustainable development, through lessons. Examples of funded projects: from Grassroots to Tree Roots – Sustaining Forestry in New Hampshire promotes using better forest management practices to protect environmental quality and sustain the State's timber industry. Mid-City Green Project Building Materials Exchange will expand its current Paint Exchange into a	Eligible applicants include community groups and other nonprofit organizations, local governments, universities, tribes, and states.	Office of Air and Radiation Environmental Protection Agency Program Contact: Pamela Hurt (202) 260-2441

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
	full-scale building materials exchange to reduce the amount of discarded construction materials waste in the New Orleans area and encourage urban renewal. This will be accomplished through construction materials recovery, transformation, and low-cost resale; neighborhood rehabilitation promotion; creative reuse; and education.		
Transfers of Inventory Farm Properties to Federal and State Agencies for Conservation Purposes	Transfers title of certain inventory farm properties owned by Farm Service Agency to Federal and State agencies for conservation purposes (including the restoration of wetlands and floodplain areas to reduce future flood potential).		U.S. Department of Agriculture – Farm Service Agency Farm Loan Programs National Office: (202) 720-3467 extension 1632
Transportation Enhancements Program	Transportation enhancements are transportation-related activities that are designed to strengthen the cultural, aesthetic, and environmental aspects of the nation's intermodal transportation system. Eligible projects include environmental mitigation to address water pollution due to highway runoff or reduce vehicle-caused wildlife mortality while maintaining habitat connectivity.		Florida Department of Transportation
Trauma/Emergency Medical Services Grant	To improve the nation's overall emergency medical system, including the joint efforts between HRSA and National Highway Traffic Safety Administration to assess State systems and recommend improvements to the current system.		Rick Smith (301) 443-5372 rsmith@hrsa.gov
Urban Park and Recreation Recovery Program	To provide Federal grants to local governments for the rehabilitation of recreation areas and facilities, demonstration of innovative approaches to improve park system management and recreation opportunities, and development of improved recreation planning. Rehabilitation grants have been awarded to renovate a wide variety of existing community park and recreation facilities. Innovation grants have been awarded to demonstrate unique and cost-effective methods for providing better recreation services.	Eligible applicants are cities and counties meeting the eligibility requirements. Eligibility is based on need, economic and physical distress, and the relative quality and condition of urban recreation facilities and systems.	National Park Service, Recreation Programs 1849 C Street, NW, Room 3624 Washington, DC 20240 Contact: Ken Compton (202) 565-1133

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
U.S. Army Corps of Engineers	Provide planning and technical assistance to local governments to address local flood problems. The Floodplain Management Service Program and Planning Assistance to States Program can help local governments develop their own plans and initiate floodplain management actions. Under these programs, the Corps can provide flood data and carry out certain local studies.		http://www.usace.army.mil http://www.saw.usace.army.mil
U.S. Geological Survey	Assists states and local governments in maintaining stream gauge stations. In addition, the agency has prepared inundation maps in many communities. These quadrangle floodplain maps of flood prone areas are often used to delineate the approximate floodplain boundaries on the maps FEMA has provided to local governments.		Florida Geological Survey http://www.usgs.gov
Volunteer Fire Assistance (VFA) Grants	The purpose of the VFA Program, formerly known as the Rural Community Fire Protection Program, is to provide Federal financial, technical, and other assistance to State foresters to organize, train, and equip fire departments in rural areas and rural communities to prevent and suppress fires.	A single fire department serving a rural area or a rural community with a population of 10,000 or less is eligible (latest census). Area fire departments (fire districts, townships, etc.) may serve an aggregate population of greater than 10,000 as long as the service area of the fire department includes a rural area or a rural community having a population of 10,000 or less. The VFA funding must be used to benefit the rural population. A single county or town with a population over 10,000 that is served by two or more fire districts operating entirely within the bounds of the county or town may qualify as long as the service area of a given fire department includes a rural area or a rural community or the population of the fire department's jurisdiction is 10,000 or less. The VFA funding must be used for the rural area. A single community with a population greater than 10,000 and having a single fire department with one or more fire stations may qualify. The fire department must have a	Forest Protection Bureau Division of Forestry 3125 Conner Boulevard Tallahassee, FL 32399-1650 (850) 488-6111

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
		service area that includes a rural area or community that does not exceed 10,000 in population. The VFA funding must be used only for the benefit of the rural population. Similarly a single community with a population greater than 10,000, which also provide fire protection to an adjoining rural community of 10,000 or less population by contract, also may be eligible, provided the VFA funding is used entirely to support the rural community. A single community fire department serving a population greater than 10,000 and not providing protection to a rural area or to a rural community is not eligible for VFA financial assistance.	
Wallace Global Fund	The Wallace Global Fund supports initiatives that promise to advance globally sustainable development in some fundamental way. The Fund seeks to maximize its impact by investing its resources in projects that meet the following criteria: tackle root problems that impede progress toward a sustainable future; propose compelling strategies for promoting environmentally and/or socially sustainable development, such as leveraging additional financial resources, catalyzing policy change, implementing innovative programs; offer potential for significant impact at the global level; and require private money, at least initially.		http://www.wgf.org/program_criteria.html
Water Pollution Control: State and Interstate Program Support (106 Grants)	To assist states and interstate agencies in establishing and maintaining adequate measures for prevention and control of surface and ground water pollution. Grants are made to states and tribes for the administration of State and tribal programs for the prevention, reduction, and control of pollution. Activities funded include administration of State and Tribal Water Quality Standards programs; National Pollutant Discharge Elimination System permit programs; and compliance and enforcement, monitoring, and hazardous materials spills response. Broad support for the prevention and abatement of surface and ground water pollution from point and non-point sources including water	Eligible entities include State and interstate water pollution control agencies as defined in the Federal Water Pollution Control Act.	Carol Crow, State and Interstate Agencies, Section 106 Coordinator, Section 106, Office of Wastewater Management (4201), Office of Water, Environmental Protection Agency Washington, DC 20460 (202) 260-6742

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
	quality planning, monitoring, water quality standards, assessments, permitting, pollution control studies, planning, surveillance and enforcement; advice and assistance to local agencies; training; and public information.		
Water Quality Program Management	To improve water quality.		Environmental Protection Agency Office of Water Office of Wastewater Management (4201), Office of Water Washington, DC 20460
Watershed Operations -Small Watershed Program and Flood Prevention Program (WF 08 or FP 03)	The Small Watershed Program works through local government sponsors and helps participants solve natural resource and related economic problems on a watershed basis. Projects include watershed protection, flood prevention, erosion and sediment control, water supply, water quality, fish and wildlife habitat enhancement, wetlands creation and restoration, and public recreation in watersheds of 250,000 or fewer acres. Both technical and financial assistance are available.		Contact USDA, Natural Resources Conservation Service http://mimosa.itc.nrcs.usda.gov/scripts/ndisapi.dll/oip_public/USA_map for a USDA service center in your area. WPB: West Palm Beach Service Center 559 N. Military Tr. West Palm Beach, FL 33415
Watershed Protection and Flood Prevention	To provide technical and financial assistance in carrying out works of improvement to protect, develop, and utilize the land and water resources in small watersheds.	Any State agency, county or groups of counties, municipality, town or township, soil and water conservation district, flood prevention or flood control district, Indian tribe or tribal organization, or any other non-profit agency with authority under State law to carry out, maintain, and operate watershed works of improvement may apply for assistance.	U.S. Department of Agriculture Natural Resources Conservation Service P.O. Box 2890 Washington, DC 20013
Watershed Protection and Flood Prevention Loans	To provide loan assistance to sponsoring local organizations in authorized watershed areas for share of cost for works of improvement.	Be a sponsoring local organization, such as a municipal corporation, soil and water conservation district, or other organization not operated for profit in the approved watershed project; and have authority under State law to obtain, give security for, and raise revenues to repay the loan and to operate and maintain the facilities to be financed with the loan.	Department of Agriculture Water and Waste Rural Utilities Service Washington, DC 20250 (202) 690-2670

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Watershed Surveys and Planning	The purpose of the program is to help Federal, State, and local agencies and tribal governments to protect watersheds from damage caused by erosion, floodwater, and sediment and to conserve and develop water and land resources. Resource concerns addressed by the program include water quality, opportunities for water conservation, wetland and water storage capacity, agricultural drought problems, rural development, municipal and industrial water needs, upstream flood damages, and water needs for fish, wildlife, and forest-based industries. Types of surveys and plans include watershed plans, river basin surveys and studies, flood hazard analyses, and flood plain management assistance. The focus of these plans is to identify solutions that use land treatment and nonstructural measures to solve resource problems.		Contact USDA, Natural Resources Conservation Service, Watershed Surveys and Planning http://mimosa.itc.nrcs.usda.gov/scripts/ndisapi.dll/oip_public/USA_map for a USDA service center in your area. WPB: West Palm Beach Service Center 559 N. Military Tr. West Palm Beach, FL 33415
Watershed Surveys and Planning (Small Watershed Program; PL-566; Watershed Surveys and Planning)	To provide planning assistance to Federal, State, and local agencies for the development of coordinated water and related land resources programs in watersheds and river basins. Special priority is given to the objectives of setting priorities in helping to solve problems of upstream rural community flooding, water quality improvement coming from agricultural non-point sources, wetland preservation and drought management for agriculture and rural communities. Special emphasis is given to helping communities that desire to adopt floodplain management regulations to meet the requirements of the National Flood Insurance Program and State agencies in developing a strategic water resource plan. Examples of funded projects: in New Castle County, Delaware, the Central Pencader flood plain management study was initiated to guide land use, zoning, and subdivision decisions to develop sound flood plain and storm water management practices.	Any local or State water resource agency or other Federal agency concerned with water and related land resource development, counties, municipalities, town or township, soil and water conservation district, flood prevention or flood control district, Native American tribe or tribal organization or nonprofit organization.	Deputy Chief For Programs, Natural Resources Conservation Service, Department of Agriculture P.O. Box 2890 Washington, DC 20013 (202) 720-4527

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Wetlands Program	To protect natural wetlands.		Department of Defense U.S. Army Corps of Engineers Attn: CECW-PM DoD Washington, DC 20314-1000 (202) 272-0169 http://www.usace.army.mil/
Wetlands Protection Grants	To assist states and Native American tribes in developing new or enhancing existing wetlands protection programs.	States, Native American tribes, and local governments.	Environmental Protection Agency Office of Water Office of Wastewater Management (4201), Office of Water Washington, DC 20460
Wetlands Reserve Program	The Wetlands Reserve Program is a voluntary program to restore wetlands. Participating landowners can establish conservation easements of either permanent or 30-year duration, or can enter into restoration cost-share agreements where no easement is involved.		Contact USDA, Natural Resources Conservation Service http://mimosa.itc.nrcs.usda.gov/scripts/ndisapi.dll/oip_public/USA_map for a USDA service center in your area. WPB: West Palm Beach Service Center 559 N. Military Tr. West Palm Beach, FL 33415
Wetlands Protection: Development Grants	To assist states, tribes, and local governments in developing new or enhancing existing wetlands protection management and restoration programs. The projects that will be funded under this program should support the initial development of a wetlands protection restoration program or support enhancement/refinement of an existing program. Projects must clearly demonstrate a direct link to increasing a State's, tribe's, or local governments ability to protect, manage, and/or restore its wetlands resources.	State or tribal agencies, interstate/inter-tribal entities and associations, and local governmental entities are eligible to receive funding.	Peter Kalla, Wetlands Protection Section, Environmental Protection Agency Region IV, Atlanta, GA 30365 (404) 562-9414
Wetlands Reserve Program	Financial and technical assistance to protect and restore wetlands through easements and restoration agreements.		USDA-NRCS National Policy Coordinator NRCS Watersheds and Wetlands Division: (202) 720-3042

Table C.1. (Continued).

Funding Source	Objective	Eligibility	Sponsoring Organization
Wildland Urban Interface Community and Rural Fire Assistance	To implement the National Fire Plan and assist communities at risk from catastrophic wildland fires by providing assistance in the following areas: provide community programs that develop local capability including assessment and planning, mitigation activities, and community and homeowner education and action; plan and implement hazardous fuels reduction activities, including the training, monitoring, or maintenance associated with such hazardous fuels reduction activities, on Federal land, or on adjacent nonfederal land for activities that mitigate the threat of catastrophic fire to communities and natural resources in high risk areas; enhance local and small business employment opportunities for rural communities; enhance the knowledge and fire protection capability of rural fire districts by providing assistance in education and training, protective clothing, and equipment purchase, and mitigation methods on a cost share basis.	States and local governments at risk as published in the Federal Register, Native American tribes, public and private education institutions, nonprofit organizations, and rural fire departments serving a community with a population of 10,000 or less in the wildland/urban interface.	Bureau of Land Management Jackson, Mississippi Field Office 411 Briarwood Drive, Suite 404 Jackson, MS 39206 (601) 977-5400
Wildlife Habitat Incentives Program (WHIP)	The WHIP is a voluntary program for people who want to develop and improve wildlife habitat primarily on private lands. It provides both technical assistance and cost share payments to help establish and improve fish and wildlife habitat.	All lands are eligible for WHIP, except for: Federal lands; land currently enrolled in Waterbank, Conservation Reserve Program, Wetlands Reserve Program, or other similar programs; and lands where the expected impacts from on-site or off-site conditions make the success of habitat improvement unlikely.	Contact USDA http://mimosa.itc.nrcs.usda.gov/scripts/ndisapi.dll/oip_public/USA_map for a USDA service center in your area. WPB: West Palm Beach Service Center 559 N. Military Tr. West Palm Beach, FL 33415

APPENDIX D

DATA SOURCES

Table D.1. Data sources used for the St. Lucie County Hazard Vulnerability and Risk Assessment.

Source	Data Type
Natural Hazards - Hazards resulting from weather conditions, geologic conditions, or disruption of natural systems	
Hurricanes and Severe Storms (Includes Tropical Storms and Northeasters)	
Natural Hazards Research Center	Historical and current data on all types of natural hazards
Atlantic Hurricane Tracking Database	Historical data on hurricane tracks and intensities
National Oceanic and Atmospheric Administration (NOAA) Tropical Cyclone Database	Historical hurricane data
Colorado State University (Dr. Gray online site)	Hurricane probability
National Aeronautics and Space Administration (NASA) Natural Disaster Reference Database	Historical data on all types of natural hazards
National Weather Service	Weather statistics
National Climate Data Center - online database	Weather statistics
Atlantic Ocean and Meteorological Laboratory, Hurricane Research Division	Hurricane forecast models
U.S. Census	Housing data
Federal Emergency Management Agency	Emergency management procedures
Tropical Storm Watch Database	Tropical storm data worldwide
Flood Insurance Rate Maps and Community Status Book	Areas vulnerable to potential rising water
Storm Surge Atlas for St. Lucie County (Sealand Overland Surges for Hurricanes [SLOSH] model)	Areas vulnerable to storm surge flooding based on the SLOSH model
U.S. Geological Survey	Base maps and historical flood plane and elevation data
Florida State University (Meteorology Department)	Data and expertise concerning all Florida natural hazards
Florida Atlantic University	Data and expertise concerning all Florida natural hazards
National Severe Storms Laboratory	Data on storm effects
Independent Insurance Agents of America (Natural Disaster Risk Database)	Probability data and estimated exposure. Building code recommendations to reduce exposure

Table D.1. (Continued).

Source	Data Type
Florida Department of Community Affairs, Division of Emergency Management	The Arbiter of Storms (TAOS) maps and computer model projections as well as technical support and data
Florida Department of Environmental Protection	Environmental risk and exposure to hurricanes, environmental effects, and environmental hazards
Florida Game and Fresh Water Fish Commission	Hurricane effects on fish and wildlife
Florida Department of Corrections	Prison statistics and emergency management plans
Florida Department of Education	School and Board of Education emergency guidelines
South Florida Water Management District	Climatic and weather data, hydrologic data, water release schedules, and emergency management plans
Treasure Coast Regional Planning Council	Building codes and impacts of proposed State-wide unified building code
St. Lucie County Airport	Weather data and hurricane protection procedures
St. Lucie County Comprehensive Growth Management Plan	Land management, zoning, and hurricane mitigation related ordinances
St. Lucie County Administrative Services	Building codes and zoning ordinances
St. Lucie County Community Services	Building codes and zoning ordinances
St. Lucie County Property Appraiser	Tax assessor records for use in determining dollar value of exposed property
St. Lucie County Information Services	Statistical data
St. Lucie County General Services	Engineering, drainage, road elevations, and storm water data
St. Lucie County Fire Department	Critical facilities locations and emergency management plans
St. Lucie County Health Department	Critical facilities and health risk data
The School Board	Schools, shelter, and critical facilities data and emergency management plans
St. Lucie County Attorney's Office	Building codes and ordinances
St. Lucie County Parks Recreation	Environmental and recreational data and potential impacts data
St. Lucie County Emergency Services	Emergency management plans, historical data, critical facilities, special needs, and general guidance
St. Lucie County Clerk of the Court	County prison population and emergency management plans

Table D.1. (Continued).

Source	Data Type
Emergency Medical Services (E911 Coordinator)	Emergency management plans
St. Lucie Animal Control	Animal protection, regulation, and control plans following natural disasters (hurricanes)
St. Lucie County Sheriff's Department	Emergency management plans and law enforcement procedures following a natural disaster
St. Lucie County Tourist Development Council	Potential economic loss and specific areas of economic vulnerability
St. Lucie County Utilities Department	Critical facilities locations and emergency management procedures
There are four municipalities in St. Lucie County who are participating in the development of a unified LMS process with the County. Various departments corresponding to: The Property Appraiser's Office; Public Works; Public Safety; Health Department; Building, Planning, and Zoning; and Fire and Rescue. Will be contacted within each municipality.	All municipalities will be contacted to determine individual vulnerabilities, populations at risk, and dollar values of exposure. Emergency plans, building codes, storm water management engineering, and police and fire emergency management plans will be reviewed
St. Lucie County Red Cross	Historical data, shelter data, and emergency management plans
Hospitals, Clinics, and Nursing Facilities	Critical facilities locations, special equipment, special needs, and evacuation plans
Florida Power & Light and Other Municipal/Private Power Companies	Power grid vulnerabilities, structure, and emergency management plans
Home Depot/Lowe's	Emergency management supply plans for preparation and recovery
Publix/Winn Dixie	Emergency food supply plans
Southern Bell	Critical facilities locations, and emergency communication maintenance plans
AT&T Wireless Services	Critical facilities locations, and emergency communication maintenance plans
U.S. Cellular Wireless Communications	Critical facilities locations and emergency communication maintenance plans

Table D.1. (Continued).

Source	Data Type
Local Radio and Television Stations	Critical facilities locations and emergency management plans (operating plans) during natural disaster
Tornadoes and Thunderstorms	
Natural Hazards Research Center	Historical and current data on all types of natural hazards
The Tornado Project On-Line	Historical data
U.S. Census	Housing data
Optical Transient Detector Database	Lightning associated with thunderstorms (lightning statistics
NASA Natural Disaster Reference Database	Historical data on all types of natural hazards
National Weather Service	Weather statistics
National Climate Data Center - online database	Weather statistics
NOAA Wind Related Fatalities Database	Wind related fatalities
NOAA Tropical Prediction Center	Storm predictions
Florida State University	Data and expertise concerning all Florida natural hazards
Florida Atlantic University	Data and expertise concerning all Florida natural hazards
National Severe Storms Laboratory	Storm and tornado statistics and storm effects
Independent Insurance Agents of America (Natural Disaster Risk Database)	Financial data concerning losses resulting from thunderstorms and tornadoes
Florida Department of Community Affairs, Division of Emergency Management	Incident reports and historical data
South Florida Water Management District	Climatic data
Alachua County Office of Emergency Management	Thunderstorm effects
St. Lucie County Airport	Weather data and protection plans and procedures during thunderstorms and tornadoes
St. Lucie County Fire Department	Thunderstorm and tornado fire and fatality data
St. Lucie County Emergency Services	Thunderstorm and tornado historical data
St. Lucie County Emergency Medical Services	Historical data on thunderstorm and tornado related medical emergencies
Public Safety, Emergency Management, Health Department, and Fire and Rescue Departments within each municipality	Historical data on impacts of thunderstorms and tornadoes at the local level
St. Lucie County Red Cross	Historical data on impacts

Table D.1. (Continued).

Source	Data Type
Florida Power & Light and other municipal/private power companies	Historical data on impacts to the power grid
Southern Bell	Historical data on communications impacts
AT&T Wireless Services	Historical data on communications disruptions
U.S. Cellular Wireless Communications	Historical data on communications disruptions
Local radio and television stations	Historical data on losses and possible future losses
Lightning/Electromagnetic Disturbances (normally included under thunderstorms but along the Treasure Coast, we believe this hazard is significant enough to be considered alone)	
Natural Hazards Research Center	Lightning research and statistics
USA Today	Lightning impacts
NASA Natural Disaster Reference Database	Lightning statistics
National Weather Service	Lightning strike data
National Climate Data Center - online database	Lightning strike data
NOAA Lightning Related Fatalities Database	Lightning fatalities
National Lightning Safety Institute (NLSI)	Lightning research and protection measures
Western Kentucky University	Lightning impacts
Florida State University	Data and expertise concerning all natural hazards
Florida Atlantic University	Data and expertise concerning all natural hazards
University of Florida Lightning Research Laboratory	Current research on lightning causes and effects
National Severe Storms Laboratory	Lightning statistics
Independent Insurance Agents of America (Natural Disaster Risk Database)	Financial losses attributable to lightning and related electromagnetic discharges
Florida Department of Community Affairs, Division of Emergency Management	Data on major fires caused by lightning
Florida Fire Chief's Association	Data on fires caused by lightning
South Florida Water Management District	Data on lightning related losses
St. Lucie County Airport	Lightning data and protective measures
St. Lucie County Fire Department	Lightning related fires and injuries
St. Lucie County Parks & Recreation	Data on lightning related losses
St. Lucie County Emergency Services	Lightning protection procedures

Table D.1. (Continued).

Source	Data Type
Emergency Medical Services (911 Coordinator)	Lightning related injuries
St. Lucie County Sheriff's Department	Data on communication disruption
Florida Power & Light	Financial losses and power grid disruptions due to lightning
Southern Bell	Financial losses and communications disruptions due to lightning
AT&T Wireless Services	Financial losses and communications disruptions due to lightning
U.S. Cellular Wireless Communications	Financial losses and communications disruptions due to lightning
Coastal and Riverine Flooding	
Association of State Floodplain Managers	Flood plain data, flooding statistics, and mitigation approaches
Natural Hazards Research Center	Technical data on all natural hazards
NOAA Flood Related Fatalities Database	Flood related fatalities
NOAA Hydrologic Information Center	Hydrologic data
NOAA Tropical Cyclone Database	Rainfall associated with specific types of storm events
NASA Natural Disaster Reference Database	Specific flooding and mitigation data nationwide
NASA Flood Hazard Research Center	Flood research and mitigation approaches
National Weather Service	Climatic data
National Climate Data Center - online database	Weather/rainfall historical data
National Flood Proofing Committee Database	Mitigation procedures
National Association of Flood and Storm Water Management Agencies	Storm water management data and procedures
Atlantic Ocean and Meteorological Laboratory, Hurricane Research Division	Historical meteorological data
Federal Emergency Management Authority	Historical flooding data
Tropical Storm Watch Database	Rainfall events and flooding data
Flood Insurance Rate Maps and Community Status Book	Identification of properties within the flood plain
U.S. Geological Survey	Topographic maps
U.S. Army Corps of Engineers	Historical flooding data and flood prevention projects
Dartmouth Flood Observatory	Flooding research
Earth Satellite Corporation (EarthSat) Floodwatch Database	Historical flooding data

Table D.1. (Continued).

Source	Data Type
Florida State University	Data and expertise concerning all Florida natural hazards
Florida Atlantic University	Data and expertise concerning all Florida natural hazards
National Severe Storms Laboratory	Rainfall data and related flooding events
Independent Insurance Agents of America (Natural Disaster Risk Database)	Property and financial losses as a result of flooding
Florida Department of Community Affairs, Division of Emergency Management	Historical data on flooding events in St. Lucie County
Florida Association of Floodplain Managers	Flood data specific to Florida
Florida Department of Environmental Protection	Environmental parameters and risk associated with flooding
Florida Game and Fresh Water Fish Commission	Wildlife resources impacted by flooding
South Florida Water Management District	Water management, hydrology, and flood prevention procedures
St. Lucie County Growth Management	Zoning ordinances and building codes that affect flood protection
St. Lucie County Property Appraiser	Property value within flood zones
St. Lucie County Public Services	Highway and storm water management procedures
St. Lucie County Fire Department	Flooding associated fires and injuries
St. Lucie County Health Department	Disease risk and contamination potential associated with flooding
St. Lucie County Parks & Recreation	Recreational resources at risk due to flooding
St. Lucie County Emergency Services	Historical flooding data and emergency management procedures
St. Lucie County Emergency Medical Services	Flooding related injuries
St. Lucie County Animal Control	Animal control problems associated with flooding
St. Lucie County Sheriff Department	Emergency management procedures associated with flooding
St. Lucie County Emergency Services	Critical facilities at risk due to flooding and potential impacts

Table D.1. (Continued).

Source	Data Type
Municipal offices to be contacted within the participating cities: The Property Appraiser's Office; Public Works; Public Safety; Health Department; Building, Planning, and Zoning; and Fire and Rescue	All municipalities will be contacted to determine individual vulnerabilities, populations at risk, and dollar values of exposure. Emergency plans, building codes, storm water management engineering, and police and fire emergency management plans will be reviewed
Independent Drainage Districts	All independent drainage districts will be contacted for historical data and identified areas at risk
St. Lucie County Red Cross	Historical flooding data and repetitively damaged structures data
Florida Power & Light	Flooding emergency plans and critical facilities at risk
Extreme Temperatures	
National Weather Service	Historical records on extreme temperatures
National Climate Data Center - online database	Historical records on extreme temperatures
Federal Emergency Management Agency	Extreme heat impacts
U.S. Department of Agriculture - County Extension Agents	Local agricultural data on frequency, impacts, and financial losses due to extreme temperatures (heat and cold)
Florida Citrus Commission	Frequency and amount of financial losses to citrus crops due to freezing temperatures and long-term industry impacts
Florida Department of Children and Families	Homeless population data
Florida Department of Citrus	Frequency and amount of financial losses to citrus crops due to freezing temperatures and current mitigation strategies
Florida Department of Agriculture & Consumer Services	Frequency and amount of financial losses to all agricultural business as a result of extreme temperatures (heat and cold)
Florida Farm Bureau	Frequency and amount of financial losses to all agricultural business as a result of extreme temperatures and current mitigation and risk reduction strategies
Florida State University	Agricultural research and new mitigative strategies to reduce freeze impacts

Table D.1. (Continued).

Source	Data Type
Florida Atlantic University	Temperature impacts to aquaculture industry
University of Florida	Agricultural research and new mitigative strategies to reduce freeze impacts
University of Miami	Agricultural research and new mitigative strategies to reduce freeze impacts
Florida Department of Environmental Protection	Environments at risk from temperature extremes and environmental consequences of current mitigation strategies
South Florida Water Management District	Climate records and water demands associated with freeze mitigation
St. Lucie County Agriculture Extension Service	Historical impact and financial losses resulting from freezing temperatures in St. Lucie County
St. Lucie County Environmental Services	Historical impact and financial losses resulting from freezing temperatures in St. Lucie County
St. Lucie County Citrus and Farming Interest	Historical freeze/heat losses and current mitigation strategies
St. Lucie County Red Cross	Impacts to poor and homeless due to temperature extremes
Wildland Fires (Urban interface wildland fires and muck fires)	
National Weather Service	Climate data/drought predictions
National Interagency Coordination Center Reports	Wildland fire reports
National Wildland/Urban Interface Fire Protection Program	Risk assessment methodology
National Climate Data Center - online database	Climate data
U.S. Forest Service	Wildland fire reports and preventative measures
U.S. Department of Agriculture - County Extension Agents	Controlled burning/muck deposits
U.S. Geological Survey	Soil types/muck deposits
Florida Division of Forestry	Wildland fire statistics
Florida Geological Society	Soil types/muck deposits
The Wildland Fire Assessment System	Wildland fire statistics and containment procedures
Florida Forest Protection Bureau	Florida specific wildland fire statistics and current preventative practices
Florida Department of Environmental Protection	Natural resources at risk and protective measures

Table D.1. (Continued).

Source	Data Type
Florida Fire Chief's Association	Florida specific wildland fire statistics, firefighting technology, and potential mitigative measures for Florida communities
South Florida Water Management District	Water resources and right-of-way management practices
St. Lucie County Agriculture Extension Service	Land use patterns in St. Lucie County to establish areas at risk
St. Lucie County Community Development Department	Land use patterns in St. Lucie County to establish areas at risk
St. Lucie County Parks Division	Land use patterns in St. Lucie County to establish areas at risk
St. Lucie County Fire Department - Fire Prevention Plan Review and Inspection	Land use patterns in St. Lucie County to establish areas at risk and current or in-place protective measures
Wildland Fire Magazine Database	Wildland fire statistics
Drought	
National Weather Service	Climate data/drought predictions
National Climate Data Center - online database	Climate data
National Drought Mitigation Center	Drought impacts
U.S.G.S historical and real time data on water resources of south Florida	Water resources
U.S. Department of Agriculture - County Extension Agents	Historical data on droughts and the economic impacts to local agriculture
Florida Citrus Commission	Economic losses to the citrus industry from droughts
Florida Department of Citrus	Economic losses to the citrus industry from droughts and current irrigation technology
Florida Forest Protection Bureau	Drought statistics
Florida Department of Environmental Protection	Environmental impacts of droughts to natural ecosystems
Florida Department of Agriculture & Consumer Services	Agricultural losses due to droughts and current irrigation technology
South Florida Water Management District	Water allocations during drought conditions
St. Lucie County Agricultural Extension Service	County specific economic losses from drought and current economic vulnerability
St. Lucie County Parks & Recreation	Recreational resources impacted by droughts
St. Lucie County Utilities Department	Impacts from droughts of the potable water supplies and impacts in urban areas. Water rationing plans

Table D.1. (Continued).

Source	Data Type
Municipal water utilities	Impacts of, and water allotment plans during times of droughts in cities. Water rationing plans
Erosion (Beach and Waterways)	
Florida Department of Environmental Protection – Bureau of Beaches and Coastal Systems	Critical erosion areas in Florida
Union of International Associations	Soil information
Sea Grant Haznet	Erosion impacts
U.S. Army Corps of Engineers	St. Lucie County beach erosion statistics and beach restoration projects
Florida Inland Navigational District	Maintenance records for the Intracoastal Waterway and other St. Lucie County navigable waters
South Florida Water Management District	Canal maintenance and erosion
St. Lucie County Environmental Services	Environmental problems associated with erosion control and natural resources threatened by erosion
St. Lucie County General Services	Current erosion prevention measures
St. Lucie County Parks & Recreation	Current erosion prevention measures
St. Lucie County Municipalities	Current erosion problems and prevention measures
St. Lucie Inlet District	Information on beach erosion in and around St. Lucie Inlet
Agricultural Pests and Diseases	
U.S. Forest Service	Forest diseases and current problem/preventative measures
U.S. Department of Agriculture - County Extension Agents	Local agricultural pests and potential exotic threats
U.S. Customs	Current programs to prevent introduction of agricultural pests and diseases
Florida Farm Bureau	Economic losses due to agricultural pests and diseases
Florida Citrus Commission	Citrus losses due to agricultural pests and diseases
Florida Forest Protection Bureau	Forest diseases and current problem/preventative measures
Florida State University	Agricultural research and pest control
Florida Atlantic University	Agricultural research and pest control
University of Florida	Agricultural research and pest control
University of Miami	Agricultural research and pest control

Table D.1. (Continued).

Source	Data Type
Florida Department of Environmental Protection	Environmental resources at risk and environmental consequences of current or proposed control measures
Florida Department of Agriculture & Consumer Services	Economic losses from agricultural pests and diseases and current control technology
St. Lucie Agricultural Extension Service	Economic losses and current control programs
St. Lucie County Parks & Recreation	Pest control programs on public lands
Seismic Hazards (Sinkholes, Tidal Waves, and Other Geologic Hazards)	
U.S. Geological Survey	Geologic structure and seismic risk
National Earthquake Information Center	Historical events
United States Army Corps of Engineers	Dam inventory
Florida Geological Society	Geologic structure and soil characteristics
Technological/Manmade Hazards - Hazards due to accidents involving man-made facilities or functions	
Radiological Hazards	
U.S. Nuclear Regulatory Commission	Nuclear power plant regulation, accident statistics, and emergency procedures
Nuclear Energy Institute	Emergency planning information
Federal Emergency Management Agency	Nuclear power plant accident statistics and emergency procedures
National Emergency Management Agency	Nuclear power plant and radiological emergency management procedures
Florida Division of Emergency Management	Nuclear power plant and radiological emergency management procedures
Florida Emergency Preparedness Association	Radiological emergency management procedures
State and Local Emergency Data Users Group Database	Radiological accident management database
Florida Power and Light Emergency Plan	Industry emergency management plans
St. Lucie County Emergency Services - Emergency Management Comprehensive Emergency Management Plan (CEMP)	Local radiological emergency management plan
Hospital Plans - Both Radiological Materials Disposal (Hazardous Waste) and Mass Radiation casualties or Nuclear Accident Plans	Local radiological emergency plans and safeguards
Hazardous Material	
Federal Emergency Management Agency	Hazardous material emergency management guidelines

Table D.1. (Continued).

Source	Data Type
National Transportation Safety Board	Hazardous material transport regulation, spill cleanup procedures, and spill statistics
Occupational Safety and Health Agency	Hazardous material handling requirements
U.S. Environmental Protection Agency	List of hazardous materials
Hazardous Chemicals Database (online)	Hazardous materials data
Material Safety Data Sheets (online)	Specific chemical facts
State Emergency Response Commission (SERC) Emergency Plan for Hazardous Materials	Spill response procedures
Florida District and Local Emergency Planning Committee (LEPC) Emergency Plan for Hazardous Materials	Local sources and emergency management plans (vulnerabilities)
Facilities Database for Users of Extremely Hazardous Substances (EHS) and Hazardous Materials	Geo-referenced local database of users
Florida Division of Emergency Management	Methodology for handling hazardous material releases
Florida Emergency Preparedness Association	Methodology for handling hazardous material releases
Florida Department of Transportation	Highway spill data for hazardous material spill data. Methodology for handling hazardous material releases
State and Local Emergency Data Users Group Database	Spill and release of hazardous materials statistics
Florida Fire Chief's Association	Hazardous material emergency plans and containment procedures. Spill/release statistics
St. Lucie County Emergency Services	Methodology for handling hazardous material releases
St. Lucie County Fire Department	Methodology for handling hazardous material releases
Municipal Fire and Police Departments	Methodology for handling hazardous material releases
St. Lucie County Health Department	Methodology for handling hazardous material releases and emergency treatment procedures
Identified Users of EHS Emergency Plans	Industry control and emergency management plans for hazardous material
Local Gasoline and Natural Gas Companies	Location of critical facilities/infrastructure elements

Table D.1. (Continued).

Source	Data Type
Transportation System Accidents	
Federal Aeronautical Administration	Aircraft accident statistics and airport safety procedures
National Transportation Safety Board	Aircraft accident statistics
U.S. Coast Guard	Boating/shipping accidents (including oil and hazardous materials releases) and spill containment procedures
Florida Department of Transportation - Motor Carrier Compliance Division	Truck accidents (including oil and hazardous materials releases)
Florida Highway Patrol	Truck accidents (including oil and hazardous materials releases)
Florida Marine Patrol	Boating/shipping accidents (including oil and hazardous materials releases) and spill containment procedures
St. Lucie County Airport	Aircraft accident statistics and airport safety procedures
St. Lucie County Sheriff's Department - Marine Unit and Environmental Crimes Unit	Boating/shipping accidents (including oil and hazardous materials releases), spill containment procedures, and environmental crimes statistics
Florida East Coast Railway	Railway accident statistics (including oil and hazardous materials releases), and safety procedures
CSX Rail	Railway accident statistics (including oil and hazardous materials releases), and safety procedures
St. Lucie County Fire Department and Emergency Medical Services	Accident statistics involving injuries in St. Lucie County
Municipal police and fire departments	Accident statistics involving injuries in the cities
Power/Communications/Computer Grid System Failures	
Washington Post Article	2003 Northeast Power Failure
Florida Power & Light Emergency Management Plans and Historical Database	Historical data and emergency management plans
SouthernBell Emergency Management Plan and Historical Database	Historical data and emergency management plans
Cellular and Satellite Communication Companies	Historical data and emergency management plans
Florida Reliability Coordinating Council	Power shortage plan information

Table D.1. (Continued).

Source	Data Type
The Banking Industry (Large Area Networks - LANs Protection and Emergency Restoration Plans, as well as historical data on system failures)	Historical data and emergency management plans
Societal Hazards - Hazards arising from disruptions in normal government and community function	
Civil Disturbance	
Federal Bureau of Investigation Database	Historical data
National Security Council Database	Historical data and risk analysis
Drug Enforcement Agency Database	Historical data
Immigration and Naturalization Service Database	Historical data
U.S. Customs Service	Historical data
U.S. Census Database	Population demographics
Florida Department of Law Enforcement	Historical data and situation plans
Florida Department of Health Education and Welfare	Historical data
St. Lucie County Sheriff's Department	Historical data and situation plans
Municipal Police Departments	Historical data and situation plans
St. Lucie County Emergency Medical Services	Historical data and situation plans
Terrorism and Sabotage	
National Conference of State Legislators	Economic data for September 11th
Natural Hazards Research and Applications Information Center	Terrorism impacts
Federal Bureau of Investigation Database	Historical data, situation plans, and risk analysis
National Security Council Database	Historical data, situation plans, and risk analysis
Drug Enforcement Agency Database	Historical data
Immigration and Naturalization Service Database	Historical data and preventative measures
U.S. Census Database	Population demographics
American Society for Industrial Security	Risk analysis techniques and database
Florida Department of Law Enforcement	Historical data, situation plans, and risk analysis
Florida Department of Health Education and Welfare	Population demographics
St. Lucie County Sheriff's Department	Historical data, situation plans, and risk analysis
Municipal Police Departments	Historical data, situation plans, and risk analysis

Table D.1. (Continued).

Source	Data Type
St. Lucie County Public Safety Department, Emergency Medical Services Division	Historical data on injuries
Mass Immigration	
U.S. Coast Guard	Historical data, and situation plans
Immigration and Naturalization Service	Historical data situation plans, and risk analysis
Florida Marine Patrol	Situation plans and interagency coordination
Florida Department of Law Enforcement	Historical data, situation plans, risk analysis, and interagency coordination
Florida Department of Health Education and Welfare	Population demographics
St. Lucie County Sheriff's Department	Historical data, situation plans, risk analysis, and interagency coordination
Municipal Police Departments	Historical data, situation plans, risk analysis, and interagency coordination
St. Lucie County Emergency Services	Situation plans and interagency coordination
St. Lucie County Emergency Medical Services	Historical data and medical risk analysis
Other Hazards - Crime, Drug Abuse, Economic Crises, Communicable Diseases	
Federal Bureau of Investigation Database	Historical data
National Security Council Database	Historical data
Drug Enforcement Agency Database	Historical data
Immigration and Naturalization Service Database	Historical data
U.S. Census Database	Population demographics
U.S. Public Health Service - Center for Communicable Disease	Disease risk
Florida Department of Law Enforcement	Historical data
Florida Department of Health Education and Welfare	Historical data
Florida Department of Labor	Historical data
St. Lucie County Sheriff's Department	Historical data
Municipal Police Departments	Historical data
St. Lucie County Emergency Services	Historical data
St. Lucie County Emergency Medical Services	Historical data
St. Lucie County Health Department	Historical data

APPENDIX E

PARTICIPATION DOCUMENTATION

E.1 BACKGROUND

The ever-increasing time and cost associated with responding to and recovering from disasters has prompted a shift towards planning for disasters before they strike. This shift towards pre-disaster mitigation planning is evident in the Federal Emergency Management Agency's (FEMA's) development of the Disaster Mitigation Act of 2000 (DMA2K). DMA2K requires that local jurisdictions have a natural hazard mitigation plan in place in order to be eligible for hazard mitigation grant funds as well as some post-disaster assistance programs. The development of DMA2K has created a number of new natural hazard planning responsibilities for both local and State jurisdictions, including responsibilities for identifying hazards, completing risk assessments, and involving citizens. With the focus of the requirements being on the process rather than the product, citizen involvement has become a vital component of the mitigation planning process (see **Table E.1**).

Table E.1. Language of the Disaster Mitigation Act of 2000.

Citizen Involvement Requirements of the Disaster Mitigation Act of 2000
Planning Process. An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include
1. An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.
2. An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-profit interests to be involved in the planning process.

Source: National Archives and Records Administration. 2002. Federal Emergency Management Agency 44 CFR Parts 201 and 206 Hazard Mitigation Planning and Hazard Mitigation Grant Program; Interim Final Rule in Federal Register.

This appendix documents the steps taken to include various stakeholder groups and the public in general in the local mitigation strategy (LMS) planning process.

E.2 STEERING COMMITTEE MEETINGS

The main method of involving jurisdictions, community organizations, stakeholders, and the public in the LMS planning process was through the Steering Committee. Individuals and organizations with directives or programs supporting mitigation were invited to become involved in the Steering Committee. The groups listed below were invited to join the Steering Committee:

- St. Lucie County Emergency Management
- American Red Cross
- St. Lucie County School Board
- St. Lucie County Sheriff's Office
- St. Lucie County Community Development
- St. Lucie County Fire District
- St. Lucie County Human Services
- St. Lucie County Planning
- St. Lucie County Health
- St. Lucie County Public Works
- Port St. Lucie Engineering
- Port St. Lucie Police Department
- Port St. Lucie Public Works
- St. Lucie Village
- Ft. Pierce Police
- Ft. Pierce Planning
- Ft. Pierce Public Works
- Ft. Pierce Engineering
- Ft. Pierce Utility Authority
- LBFH, Inc.
- North St. Lucie River Water Control District
- Salvation Army
- David Wilbur Insurance
- Chamber of Commerce
- Treasure Coast Regional Planning Council
- St. Lucie County Tourism Committee
- St. Lucie County Historical Society
- St. Lucie County Road and Bridge Department
- Florida Atlantic University Agricultural Extension
- St. Lucie Medical Center
- St. Lucie County Council on Aging
- Treasure Coast Builders Association
- Lawnwood Medical Center
- St. Lucie County Hotel and Motel Association
- Indian River Community College
- Florida East Coast Railroad

The St. Lucie County LMS Steering Committee met a total of five times throughout the planning process. Each meeting's invitation process and outcome are described below.

Note: The Town of St. Lucie Village has a population of 604 people (U.S. Census, 2000). The Town has no full-time staff and depends upon its elected officials to represent it on committees like the St. Lucie County LMS Steering Committee. At the outset of the LMS update process, it was obvious that there might be LMS Steering Committee meetings that the Village might not be able to attend; therefore, prior to each meeting, the Town was contacted to see if their representative might be attending. In cases where the Town would have no representative, the meeting agenda packet to be considered by the Steering Committee was provided to the Mayor of the Town or his designated representative for their review and comment. If the Town representative had concerns regarding materials in the agenda packet, they would inform the planning consultant assisting the Steering Committee, and he would share the Town's concerns with other members of the Steering Committee members at their upcoming meeting. Minutes of the LMS Steering Committee would be provided to the Town.

E.2.1 Meeting #1

The first meeting of the Steering Committee was held on 13 November 2003 at the St. Lucie County Administrative Building and served as a kick-off meeting for the LMS update process. Letters of invitation were mailed to those identified as being key stakeholders in mitigation hazards in St. Lucie County. Two sets of letters were used: one for those who had already participated in LMS efforts in the past, and one for newcomers to the LMS planning process. Organizations in attendance included

- Treasure Coast Regional Planning Council
- Fort Pierce Utility Authority

- St. Lucie County Sheriff's Office
- St. Lucie County Fire District
- St. Lucie County Tourism Committee
- St. Lucie County Historical Society
- St. Lucie County Human Services
- St. Lucie County School District
- St. Lucie County Planning
- St. Lucie County Health Department
- St. Lucie County Road and Bridge Department
- St. Lucie County Cooperative Extension
- St. Lucie Village
- LBFH, Inc.
- Port St. Lucie Public Works

The focus of this meeting was to go over the new requirements of DMA2K and the tasks to be completed. The letter of invitation, agenda, sign-in sheet, and minutes from this meeting can be found attached to this appendix.

E.2.2 Meeting #2

The second meeting of the Steering Committee took place on 11 December 2003 at the St. Lucie County Administration Building. Steering Committee members were notified of the meeting through mailed communication including an invitation letter and agenda. The following organizations were in attendance:

- Treasure Coast Regional Planning Council
- City of Fort Pierce
- St. Lucie County Health Department
- Port St. Lucie Public Works
- St. Lucie County Emergency Management
- LBFH, Inc./North St. Lucie River Water Control District
- St. Lucie County Fire District
- St. Lucie Medical Center
- St. Lucie County Planning
- St. Lucie County Sheriff's Office

The focus of the meeting was to discuss the participation process, identify issues, and discuss data needs. The letter of invitation, public advertisement, agenda, sign-in sheet, and minutes from this meeting can be found attached to this appendix.

E.2.3 Meeting #3

The third meeting of the Steering Committee was held on 8 January 2004 at the St. Lucie County Administration Building. Steering Committee members were notified of the meeting through mailed communication including an invitation letter and agenda. The following organizations were in attendance:

- City of Fort Pierce
- City of Port St. Lucie
- City of Port St. Lucie Public Works Department

- St. Lucie County Community Development Department
- St. Lucie County Public Works Department
- St. Lucie County Sheriff's Office

The focus of this meeting was to identify issues, problems, and needs in the community related to disasters. The letter of invitation, agenda, and sign-in sheet from this meeting can be found attached to this appendix.

E.2.4 Meeting #4

The fourth meeting of the Steering Committee was held on 26 February 2004 at the St. Lucie County Administration Building. Steering Committee members were notified of the meeting through mailed communication including an invitation letter and agenda. This meeting was advertised to the public through the local newspaper. The following organizations were in attendance:

- City of Fort Pierce
- City of Port St. Lucie
- Fort Pierce Utility Authority
- LBFH, Inc.
- MRA Realty
- St. Lucie County Community Development Department
- St. Lucie County Fire Department
- St. Lucie County Health Department
- St. Lucie County Public Works Department
- St. Lucie Village
- Treasure Coast Regional Planning Council

The focus of this meeting was to discuss the identified issues, problems, and needs, review the County's hazard exposure based on new The Arbiter of Storms (TAOS) data, and discuss the project prioritization list and implementation strategy. The letter of invitation, agenda, and sign-in sheet from this meeting can be found attached to this appendix.

E.2.5 Meeting #5

The fifth meeting of the Steering Committee was held on 25 March 2004 at the St. Lucie County Administration Building. Steering Committee members were notified of the meeting through mailed communication including an invitation letter and agenda. The following organizations were in attendance:

- City of Port St. Lucie Public Works Department
- LBFH, Inc.
- North St. Lucie River Water Control District/Fort Pierce Farms Water Control District
- St. Lucie County Community Development Department
- St. Lucie County Public Works Department
- St. Lucie County Community Services
- St. Lucie County Sheriff's Office
- Treasure Coast Regional Planning Council

The focus of this meeting was to discuss the project prioritization methodology and the implementation strategy. The letter of invitation, agenda, and sign-in sheet from this meeting can be found attached to this appendix.

E.2.6 Meeting #6

The sixth meeting of the Steering Committee was held on 27 August 2004 at the St. Lucie County Administration Building. Steering Committee members were notified of the meeting through mailed communication including an invitation letter and agenda. The public was invited to attend the meeting to comment on the final draft plan via newspaper advertisement. The following organizations were in attendance:

- St. Lucie County Community Development Department
- City of Port St. Lucie Public Works Department
- St. Lucie County Department of Health
- City of Fort Pierce
- Small business owner

The focus of this meeting was to review and discuss the draft final plan and to collect public comment on the plan. The public advertisement, agenda, and sign-in sheet from this meeting can be found attached to this appendix.

ATTACHMENTS

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APPENDIX F

ACRONYMS

Table F.1. Acronyms used in the Local Mitigation Strategy.

Acronym	Full Name
AED	automated external defibrillator
ASFPM	Association of State Floodplain Managers
AVL	automatic vehicle locator
BFE	Base Flood Elevation
BOAF	Building Officials Association of Florida
CARL	conservation and recreational land
CBD	Central Business District
CBRA	Coastal Barrier Resources Act
CDBG	Community Development Block Grant
CDD	Community Development Department
CEMP	Comprehensive Emergency Management Plan
CERT	Community Emergency Response Team
CHHA	Coastal High Hazard Area
CIE	Capital Improvements Element
CNMI	Commonwealth of North Mariana Islands
COA	Council on Aging
COOP	Continuity of Operations Plan
CRS	Community Ratings System
CSA	Continental Shelf Associates, Inc.
DEM	Division of Emergency Management
DEP	Department of Environmental Protection
DHS	Department of Human Services
DMA2K	Disaster Mitigation Act of 2000
DOC	Department of Commerce
DPS	Department of Public Safety
DPW	Department of Public Works
DRI	Disaster Recovery Initiative
EDA	Economic Development Administration
EHS	Extremely Hazardous Substance
EMPA	Emergency Management and Preparedness Assistance
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
EPCRA	Emergency Preparedness and Community Right to Know Act
EPZ	Emergency Planning Zone
EQIP	Environmental Quality Incentives Program
ESF	Emergency Support Function
ESG	Emergency Shelter Grant
F.A.C.	Florida Administrative Code
FCMP	Florida Coastal Management Program
FCT	Florida Communities Trust
FDBPR	Florida Department of Business and Professional Regulation
FDCA	Florida Department of Community Affairs
FDEP	Florida Department of Environmental Protection

Table F.1. (Continued).

Acronym	Full Name
FDOC	Florida Department of Corrections
FDOE	Florida Department of Education
FDOF	Florida Division of Forestry
FDOI	Florida Department of Insurance
FDOMS	Florida Department of Management Services
FDOS	Florida Department of State
FDOT	Florida Department of Transportation
FEC	Florida East Coast Railroad
FEMA	Federal Emergency Management Agency
FIND	Florida Inland Navigation District
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
FPUA	Fort Pierce Utility Authority
F.S.	Florida Statutes
FSA	Farm Service Agency
HI	Heat Index
HMEP	Hazardous Materials Emergency Preparedness
HUD	United States Department of Housing and Urban Development
IBHS	Institute of Business and Home Safety
IQ	irrigation quality
LEPC	Local Emergency Planning Committee
LMS	Local Mitigation Strategy
LOD	Letter of Dispute
MEMPHIS	Mapping for Emergency Management, Parallel Hazard Information System
MOM	Maximum of Maximums
mph	miles per hour
MPO	Metropolitan Planning Organization
NASA	National Aeronautics and Space Administration
NCDC	National Climatic Data Center
NFIP	National Flood Insurance Program
NFIRA	National Flood Insurance Reform Act
NFPA	National Fire Protection Administration
NGVD	National Geodetic Vertical Datum
NHC	National Hurricane Center
NLSI	National Lightning Safety Institute
NOAA	National Oceanic and Atmospheric Administration
NRCS	National Resource Conservation Service
NRT	National Response Team
NWS	National Weather Service
PAGs	Protective Action Guidelines
PCCIP	President's Commission on Critical Infrastructure Protection
PDM	Pre-Disaster Mitigation
PDR	Purchase of Development Rights

Table F.1. (Continued).

Acronym	Full Name
PHSW	Public Health, Safety, and Welfare
PPL	Project Prioritization List
PSLTV20	Port St. Lucie Television 20
SBA	Small Business Administration
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SERC	State Emergency Response Commission
SFWMD	South Florida Water Management District
SHIP	State Housing Initiative Partnership Program
SLOSH	Sea Land Overland Surges for Hurricanes
SN	special needs
STP	Surface Transportation Program
TAOS	The Arbiter of Storms
TCRPC	Treasure Coast Regional Planning Council
TDR	Transfer of Development Rights
TIP	Transportation Improvement Plan
TYLCV	Tomato Yellow Leaf Curl Virus
USACE	United States Army Corp of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USDOI	United States Department of the Interior
USFA	United States Fire Administration
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey