

Pinellas County Local Mitigation Strategy 2015

EXECUTIVE SUMMARY



Pinellas County Local Mitigation Strategy Executive Summary

PURPOSE

Mitigation plans identify potential hazards and vulnerabilities, set goals and establish specific mitigation actions to reduce risk of natural or man-made or natural hazards to people, buildings, infrastructure and the environment. Local mitigation plans are required under Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) as enacted under the Disaster Mitigation Act of 2000 in order to be eligible for federal hazard mitigation grants.



Pinellas County including its 24 municipalities is vulnerable to hazards and has built a robust multi-jurisdictional emergency management program and comprehensive mitigation program. The Pinellas County Local Mitigation Strategy was updated in 2014-2015 and provides updated demographics and risk assessments based upon historic events and losses.

The Executive Summary is intended to give users a basic understanding of the communities' risk, what is included in the Strategy, why it is important and how they can become engaged in the planning process.

INTRODUCTION

The nation and the State of Florida can no longer afford to bear the extraordinarily high human and economic costs of disasters. All levels of government must take steps to decrease the vulnerability of their citizens, businesses, infrastructure, and institutions to the impact from these events. Every Florida community will always be vulnerable to hurricanes, other natural disasters, technological hazards, and man-made emergencies. However, the state's counties and municipalities do not have to remain unnecessarily vulnerable to the consequences of these events. The development of a community-wide local mitigation strategy is the first step in the effort to reduce or eliminate the costs of disasters and plan for an organized and timely post- disaster redevelopment.

The purpose of the Local Mitigation Strategy is to establish an ongoing process that will make hazard mitigation part of the daily functioning of the entire community, including both public and private sectors and our residents themselves. The Local Mitigation Strategy serves as a bridge between local governments' comprehensive growth management plans, the county comprehensive emergency management plan, land development regulations, and relevant ordinances and codes such as those for floodplain management. This strategy integrates mitigation initiatives established through various policies, programs, and regulations into a single stand- alone working document.

Hazard mitigation is defined as any action taken to reduce or eliminate the long term risk to human life and property from man-made or natural hazards.

THE PLANNING PROCESS

The Pinellas County Local Mitigation Strategy was originally adopted in 1998 and subsequently updated in 2004 and 2009. In 2014, Pinellas County, its municipalities and stakeholders once again embarked on a comprehensive update of the Local Mitigation Strategy. The county and its partners recognize that the planning process is as important as the plan itself. Therefore, it documents the planning process including how the plan was prepared and updated, who was involved in the process and how the public was involved. Using the 10-step planning process identified in the FEMA Floodplain Management Planning (*CRS Coordinator's Manual*, 2013), members worked together to enhance the planning process and strengthen the overall multi-jurisdictional mitigation strategy.



The local mitigation strategy planning process is critical in the creation of the LMS. The process defines not only who should be involved, but how the process is going to work, and an understanding of how the process facilitates the production of the final product.

STEP 1: THE PLANNING ORGANIZATION

The development of a mitigation strategy requires the involvement of representatives from the public, private, and governmental sectors. Therefore, every attempt has been made to include stakeholders representing the “whole community” in the LMS Workgroup. Public participation is encouraged. Meetings are noticed on County and municipal websites and online event calendars.

The LMS Workgroup elects a Chairperson and Vice-Chairperson at its regular annual meeting in January of each year. The Workgroup voted to meet at least every quarter in a central location with additional meetings to be scheduled as the workload dictates. In order to complete the 5-year update of the LMS in 2014-15, the LMS Workgroup met monthly from January 2014 to November 2014.

The Pinellas LMS website (www.pinellaslms.org) provides all meeting notices, agendas, attendees, and minutes of the meetings.

STEP 2: INVOLVING THE PUBLIC

In the initial phase of this LMS Update, several approaches were taken to solicit community involvement in the development of the strategy. The approaches included sending letters to a variety of organizations, associations, and businesses asking for their input and participation; conducting county and city meetings and workshops on the topic of the LMS and mitigation; scheduling interviews and speaking engagements; and including mitigation issues on regional and local governmental Website home pages.

There was a much greater reliance on electronic and online communications. Meeting reminders and most communications are handled via E-Mail. The meetings are announced on the County (Electronic) Calendar on the website (www.pinellas.org) and in numerous electronic newsletters to citizens via email (see Appendix 7 examples of outreach including the countywide newsletter, “Connections”). The county, as well as many of the municipalities, maintain government-access or cable television stations which also identify meetings and locations on their events

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list. The Pinellas County Communications Department held electronic Town Hall meetings, solicited input from citizen focus groups and prepared videos focusing on the county-wide Local Mitigation Strategy, flood insurance and mitigation for homeowners. The Pinellas County Economic Development agency reached out to businesses and associations with key messages regarding the update of the LMS, business preparedness (Continuity Planning) and resiliency. Other organizations including the Pinellas County Cooperative Extension Office, Regional Planning Council, Agency on Bay Management and National Estuary Program have spearheaded multi-jurisdictional collaborative efforts to address sustainability and resiliency issues complementing local efforts at the grass roots level.

Pinellas County and each municipality noticed and held public workshops to present the final plan and hear public comments prior to the adoption of the LMS. In addition the draft documents as well as the final FEMA approved document (pending adoption) were available in local public buildings, libraries and on the website, www.pinellaslms.org with an ongoing opportunity for online public comment. County and municipal websites linked to this site with a notice about the current update and pending adoption of the LMS by the local government. (See Appendix 7 for more detailed information)

STEP 3: COORDINATION

The LMS Committee representatives have responsibility to not only participate in the committee and its subcommittees, but to also reach out in their community to “spread the message”, to coordinate activities within the county and to bring back perspectives of their constituency. The intent is for the representatives to contact agencies, organizations and their residents to collect information related to hazards and mitigation activities, provide information regarding the LMS and its update as well as offer these agencies and organizations an opportunity to be involved in the planning effort. (See Appendix 7 for more detailed information)

STEP 4: ASSESSING THE HAZARD

One of the most important tasks required of the LMS Workgroup is to conduct, and maintain a hazard identification and vulnerability assessment. The information provided by the assessment is the foundation on which decisions about future mitigation initiatives are based. An analysis of both natural and technological hazards is on-going as new information and technology evolves and events occur. The hazard identification and vulnerability assessment data is gathered from FEMA, National Oceanographic and Atmospheric Administration (NOAA) and the National Weather Service, the Tampa Bay Regional Planning Council (TBRPC); the National Hurricane Center SLOSH (Sea Lake Overland Surge in Hurricanes) model; the Laser Infrared Detection and Ranging system (LIDAR); the municipalities and their departments; and Pinellas County departments of Emergency Management, Planning, Building, Information Systems, Public Works, Utilities, and Developmental Review Services. The Hazards Analysis and Vulnerability Assessment relied heavily on GIS planning tools to identify vulnerable areas, populations and recognize geographic vulnerabilities of critical facilities and key infrastructure.

It was discussed at length that the hazard analysis of the 2015 update of the Pinellas County LMS should include the potential impact of sea level rise as a result of climate change. Investigation was conducted to determine the status of the most recent research regarding the potential impacts of climate change with a specific emphasis on sea level rise. The Committee heard several presentations which provided historic information and new reports. It was decided to wait until current regional collaborative efforts and local studies currently underway released their findings and recommendations to incorporate into the hazards analysis, goals and objectives and mitigation



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initiatives. It is hoped this will be accomplished prior to the next 5-year update of the LMS.

STEP 5: ASSESSING THE PROBLEM

This previous step assessed the hazards facing the community. This step quantifies the impact of those hazards on the community. The LMS Committee collected population and demographic data from the 2010 Census and American Community Survey (ACS) data, critical infrastructure and facilities inventories, flood insurance data, building type/valuation from the property appraiser data, historical damage and an estimation of potential future events,



This section also described the areas within the floodplain that provide natural functions including wetlands, riparian areas, sensitive areas and habitat. This was tied to the community goals and policies reflected in the local government comprehensive plans which provide a description of the development, redevelopment and population trends.

STEP 6: GOALS AND OBJECTIVES

In 2009 a Goals and Objectives Subcommittee was tasked with the development of recommendations for new goals and objectives. The Subcommittee and Workgroup decided to follow the Federal Guidance and develop hazard-specific goals addressing the major hazards facing the county: coastal flooding (storm surge, coastal erosion and wave action), inland and riverine flooding, severe winds (hurricanes and tornadoes), hazardous material incidents, and security hazards (terrorism, civil disruptions, etc.). In addition, an all-hazards goal was developed for those mitigation objectives or actions which addressed a broader safety goal or more than one hazard. In 2014 the Subcommittee revisited the Goals and Objectives and made only minor adjustments to specifically address sea level rise, as appropriate.

The LMS then focused on the identification and analysis of mitigation actions and addressed existing and new buildings and infrastructure. The County followed the FEMA suggestion that the mitigation actions be sorted into the following groups:

- Prevention
- Property Protection
- Public Education and Awareness
- Natural Resource Protection
- Structural Projects

This exercise was beneficial in that the workgroup then needed to reassess its own goals/policies/LDRs, programs in light of the new LMS goals and objectives. It was then easier to notice where the gaps may be in our mitigation actions, as well as to clearly identify our priorities and challenges.

STEP 7: POSSIBLE ACTIVITIES: MITIGATION OPPORTUNITIES AND INITIATIVES

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The process of developing the local mitigation strategy culminated in the identification of potential mitigation opportunities and initiatives. Each workgroup member is required to review, evaluate, and analyze his or her current policies and ordinances regarding mitigation. The information is then shared and compared with the other members of the workgroup. This allows for the exchange of good ideas, accomplishments, and past experiences both successful and unsuccessful. The process also identifies any inconsistencies between communities. The most successful policies limit public expenditures in areas subject to repetitive damage from disasters; protect critical facilities and infrastructure; preserve, restore and enhance natural resources that can mitigate hazards; encourage economic diversification as protection from the loss of any one asset; encourage structural retrofitting, property acquisition and relocation; and identify procedures to expedite post-disaster recovery and permitting.



Because of the education gained from this process, the workgroup is better prepared to determine the future mitigation initiatives that should be or need to be pursued. Some of the needed mitigation initiatives require unified intergovernmental coordination and participation. Other initiatives can be accomplished on an individual community basis.

STEP 8: AN ACTION PLAN

Objectives were identified for each Goal to specifically identify action items and are reflected in six categories of mitigation activities:

- **Preventive** – activities which keep vulnerability from getting worse. The use and development of vulnerable areas through planning, land acquisition or regulation. This includes hazard vulnerability mapping and data; open space preservation; floodplain regulations, coastal setbacks; planning and zoning; Stormwater management; drainage system maintenance and building codes.
- **Property protection** – activities which are usually undertaken by property owners or the community on a parcel by parcel basis, including relocation, acquisition, building elevation, retrofitting, sewer backup protection and insurance.
- **Natural resource protection** – activities which preserve or restore natural areas or the natural function of the floodplain and watershed areas. These activities include wetlands protection, erosion and sediment control, natural area preservation or restoration, water quality improvement, coastal barrier protection, and environmental corridors.
- **Emergency services** - activities taken during any emergency to minimize its impact. This includes hazard threat recognition, warning, response operations, critical facilities protection, and post disaster mitigation actions.
- **Structural projects** – are those traditionally engineering/maintenance projects that protect vulnerable populations and structures including seawalls, levees, Stormwater/drainage improvements or maintenance, access restrictions, etc.
- **Public Information** – activities which advise property owners and visitors about hazards, ways to protect people and property from the hazards. These include maps, outreach projects, real estate disclosure, technical assistance and education.

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Pinellas County and each of the twenty-three (23) participating municipalities submit a list of their prioritized mitigation initiatives. The initiatives are then placed on a consolidated county-wide list, which is divided into the six categories relevant to specific goals and objectives.

These mitigation actions were then evaluated using the STAPLEE method. This technique identifies the following local conditions: Social, Technical, Administrative, Political, Legal, Economic and Environmental. Actions are also evaluated using other criteria:

- Compatibility with the State Hazard Mitigation Plan and State Comprehensive Plan
- Compatibility with the Strategic Regional Policy Plan (SRPP)
- Compatibility with Local Government Comprehensive Plans

The new process and procedure for ranking submitted projects is identified Appendix 8. The interactive form is available for LMS Workgroup participants on the website.

The philosophy of the workgroup was that each government would be encouraged to accomplish at least one of their mitigation initiatives annually. To reach the goal of a disaster-resilient community such planning and commitments will be required. Participants were encouraged to identify their accomplishments in Appendix 10 and it was rewarding for local governments to document the combined achievements of their concerted efforts.

STEP 9: ADOPTION OF THE STRATEGY

Pinellas County and each municipality notified and held a public workshop to present the final plan and hear public comments prior to the adoption of the LMS. In addition the draft documents, as well as the final FEMA approved document, will be available in public buildings including libraries and on the website, www.pinellaslms.org with an opportunity for online public comment. County and municipal websites linked to this site with a notice about the current update and pending adoption of the LMS by the local government. (See Appendix 7 for more detailed information)

STEP 10: IMPLEMENTATION, EVALUATION AND REVISION

The Pinellas County Local Mitigation Strategy serves as a guide for hazard mitigation activities on a county-wide basis. The strategy is intended to be a dynamic document that will be updated regularly.

Consistent with federal and state requirements, the LMS Workgroup will meet to update and review the effectiveness of the local mitigation strategy quarterly and will submit annual LMS updates to the Florida Division of Emergency Management no later than the last working weekday of each January. This update follows an annual review of the plan by the LMS Committee. The LMS Chair will be responsible for monitoring the plan on an ongoing basis. If by email or other communication, the LMS Chair receives information to warrant a meeting, then a special meeting will be called to discuss the changes. Any workgroup member also may request a special meeting. Pinellas County Planning Department and the LMS Chair will coordinate scheduling and notification of workgroup meetings. A minimum of thirty (30) days advance notice will be given for annual meetings. As much advance notice as possible will be given for regular and special meetings including conference calls or online webinars.

On an ongoing basis, new initiatives will be considered by the workgroup for inclusion into the strategy. Completed initiatives, termed Accomplishments, will be removed from the Initiatives List and detailed in the Accomplishments Listing. The new initiatives will be added as

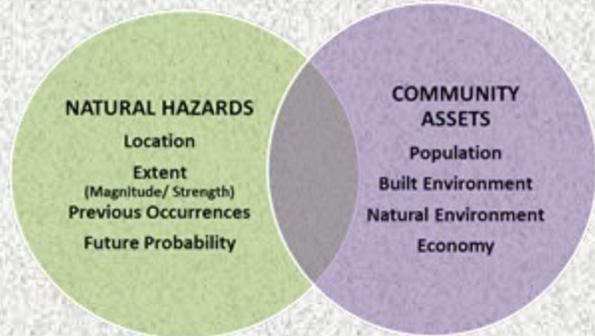
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they are identified, ranked and approved by the Workgroup. Every five years, or after any major change, the strategy will be resubmitted to municipal councils/commissions and to the Board of County Commissioners for re-adoption.

THE RISK ASSESSMENT

The Risk Assessment is the foundation of the Local Mitigation Strategy. The plan addresses all hazards that pose a threat to Pinellas County.

Risk, for the purpose of hazard mitigation planning, is the potential for damage, loss, or other impacts created by the interaction of natural hazards with community assets. Hazards are natural processes, such as tornados and hurricanes. The exposure of people, property, and other community assets to natural hazards can result in



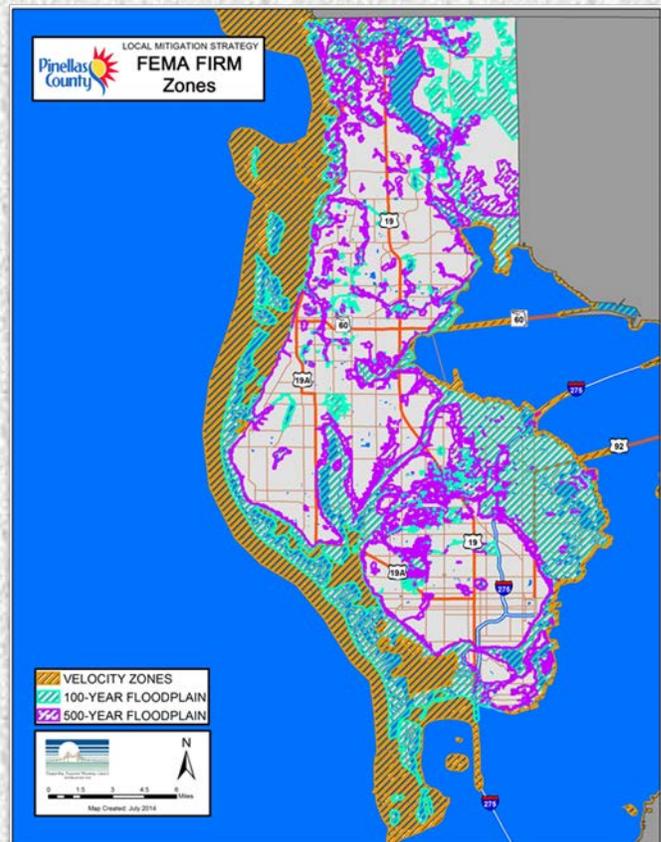
disasters depending on the impacts. Impacts are the consequences or effects of the hazard on the community and its assets. The type and severity of impacts are based on the extent of the hazard and the vulnerability of the asset, as well as the community's capabilities to mitigate, prepare for, respond to, and recover from events. (Source: FEMA, *Local Mitigation Planning Guidebook*, March 2013) The most common natural hazards in the county are floods, tropical storms (hurricanes and tropical storms), severe storms, tornadoes and, in certain areas, wildfires. In addition the LMS also addresses pandemic, technological hazards such as hazardous materials and man-made hazards including civil unrest and terrorism.

FLOODING

Flood or flooding refers to the general or temporary conditions of partial or complete inundation of normally dry land areas from the overflow of inland or tidal water and of surface water runoff from any source. Floodplains are defined as any land areas susceptible to being inundated by water from any flooding source.

In Pinellas County, several variations of flooding occur due to the effects of severe thunderstorms, hurricanes, seasonal rain, and other weather-related conditions. The loss of life, personal property, crops, business facilities, utilities, and transportation are major impacts of flooding. Floodwaters present an additional hazard as a public health problem when they inundate drinking water facilities, chemical and waste storage facilities, wastewater treatment facilities, and solid waste disposal sites.

Serious flooding has occurred 51 times in the past 30 years, with two



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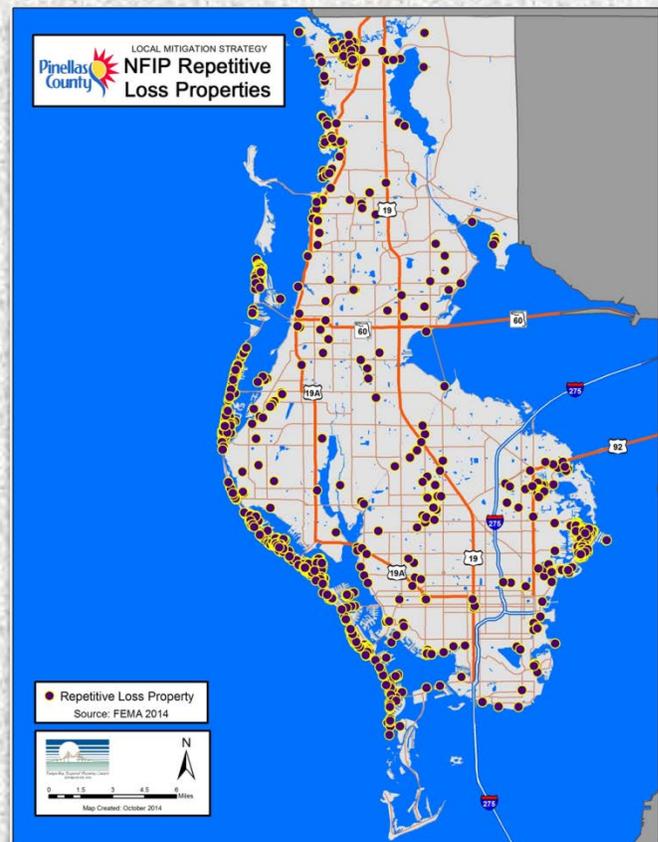
incidents, May 8, 1979, and Tropical Storm Debby (2012) resulting in Presidential Disaster Declarations. Although the drainage system has been improved in response to the past flooding, there is potential for the situation to occur again during periods of higher than normal rainfall. Based on past history, Pinellas County can expect heavy rainfall to cause flooding 1.7 times a year. Therefore, the probability for major flooding is considered to be high during any given year.

One of the key elements in a floodplain management plan is the mitigation of repetitive loss properties. A repetitive loss property is defined as property for which two or more losses of at least \$1,000 each have been paid by the National Flood Insurance Program (NFIP) over a rolling 10-year period.

Pinellas County has 7% of all the NFIP policies in the state (138,072) with 15% of the total number of repetitive loss structures in the state. This illustrates that Pinellas County is very vulnerable to coastal and inland flooding and that most residents and businesses in the floodplain purchase flood insurance.

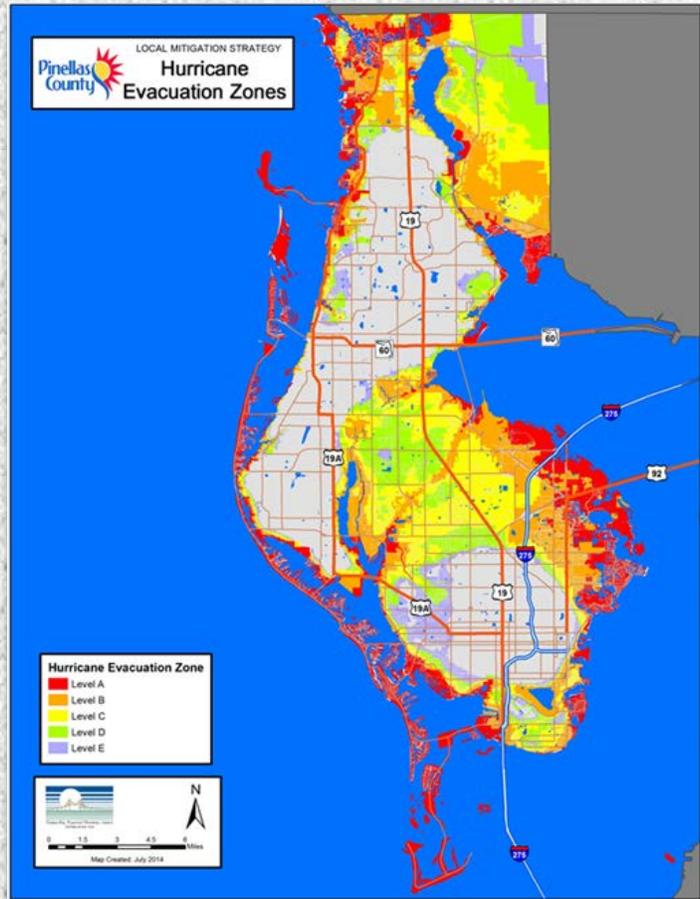
The areas with the highest number of repetitive loss locations are the geographic areas with the highest historic flooding. These include the barrier island communities and along the Intra Coastal Waterway, the historic area in Tarpon Springs, the Gandy and Shore Acres communities in the City of St. Petersburg.

The location of specific areas in the community where flooding continues to be a problem allow planners to identify where mitigation efforts should be concentrated. For many of these areas, mitigation will involve significant property owner investment and will probably be delayed until redevelopment/ reconstruction occurs. New construction or significant remodeling will require adherence to current floodplain management regulations will be enforced.



HURRICANES AND COASTAL STORMS

In general terms, a hurricane is a cyclone. A cyclone is any closed circulation developing around a low-pressure center in which the wind rotates counterclockwise in the Northern Hemisphere. As a developing center moves over warm water, pressure drops (measured in millibars or inches of Mercury) in the center of the storm. As the pressure drops, the system becomes better organized and the winds begin to rotate around the low pressure, pulling the warm and moist ocean air. It is this cycle that causes the wind (and rain) associated with a tropical cyclone. If all of the conditions are right (warm ocean water and favorable high altitude winds), the system could build to a point where it has winds in excess of 155 miles per hour and could become catastrophic if it makes landfall in populated areas. The following are descriptions of the three general levels of development for tropical cyclones:



- **Tropical depression:** The formative stages of a tropical cyclone in which the maximum sustained (1-min mean) surface wind is < 38 mph.
- **Tropical storm:** A warm core tropical cyclone in which the maximum sustained surface wind (1-min mean) ranges from 39–73 mph.
- **Hurricane:** A warm core tropical cyclone in which the maximum sustained surface wind (1-min mean) is at least 74 mph.

Saffir-Simpson Hurricane Wind Scale

<u>Category</u>	<u>Millibars</u>	<u>Winds (MPH)</u>
1	> 980	74–95
2	965–979	96–110
3	945–964	111–129
4	920–944	130–156
5	< 920	> 157

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Although Pinellas County has not experienced a direct hit of a major (category 3 or greater) hurricane since 1921, based on the history of hurricanes affecting the Tampa Bay area, Pinellas County can expect a hurricane to affect us at least once every 4.5 years. The vulnerability of Pinellas County to potential hazards from hurricanes (storm surge, high winds, tornadoes and flooding) is analyzed prior to each storm. The population at risk and potential for property/economic damages is based on the specific characteristics of the threatening hurricane.



The potential impacts of a major storm to Pinellas County would include:

- Severe coastal flooding and erosion;
- Significant structural damage including critical facilities from storm surge, freshwater flooding and high winds;
- Deaths and injuries from flooding and collapsed buildings and windborne debris;
- Extreme disruption to the transportation networks, communications and power;
- Disruption of utility, sanitation and drinking water;
- Requirements for sheltering, temporary housing and disaster supplies;

Evacuation zones are defined by 5 levels: A, B, C, D and E. Based on anticipated impacts from the approaching tropical storm or hurricane, these areas are evacuated due to potential storm surge flooding, the most deadly hurricane hazard. In addition all mobile homes are evacuated due to increase vulnerability to high winds.

The population-at-risk by Evacuation level is presented in the table below.

Pinellas County Evacuation Population by Evacuation Level

<i>Hurricane evacuation Levels</i>	A	B	C	D	E
Site-built Homes	158,203	292,366	421,279	519,624	572,995
Mobile/Manufactured homes	2,789	9,196	17,531	26,345	27,906
Total Population	160,992	301,562	438,810	545,969	600,901

Source: 2010 Statewide Regional Evacuation Study; Pinellas DOR, 2014

According to HAZUS, a model used to determine potential impacts from flooding and winds, a catastrophic category 4 or 5 hurricane striking the Pinellas coastline could result in more than \$57 billion in structural loss in Pinellas County alone.

SEVERE STORMS AND LIGHTNING

A thunderstorm forms when moist, unstable air is lifted vertically into the atmosphere. The lifting of this air results in condensation and the release of latent heat. Pinellas County has an unusually high incidence of lightning strikes and thunderstorms causing death and injury. Between 1950 and 2014 there were 172 severe thunderstorms reported in Pinellas County with 51 storm days resulting in \$187 million in property damage and 5 events with (1) death or (6) injuries. Lightning occurs mostly in the months of May through October. Between 1959 and 2008, lightning caused \$3,431,000 in damage with 23 injuries and 1 death in Pinellas County. Thirty (30) lightning events were reported between 06/01/2009 and 06/30/2014 resulting in 2 deaths and \$947,000 in property damage.



There is a relatively high probability that lightning strikes and thunderstorms will continue to occur in Pinellas County (countywide). However, the risk to the population is relatively low concerning injury and death. With 172 thunderstorm events reported between 6/01/50 and 6/30/2014, the probability of occurrence is approximately 64%. The chance of minor property damage within the thunderstorm is 36%. The probability of death or injury is 3.5%. The entire County is equally at risk to severe storms and lightning. Because of the very frequent occurrences, Pinellas County has a high vulnerability to these incidents. Additionally, with the waters of Tampa Bay and the Gulf of Mexico surrounding Pinellas County, there is an added vulnerability to fisherman, swimmers, and boaters.

TORNADOES

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. A tornado's wind speed normally ranges from 40 to more than 300 mph. Waterspouts are weak tornadoes that form over warm water and are most common along the Gulf Coast and the southeastern states. Waterspouts occasionally move inland, becoming tornadoes and causing damage and injuries.



The tornado, potentially the most violent storm produced in nature, is a common occurrence in Florida and Pinellas County. From 1959 to 2014, Pinellas County recorded 108 tornado incidents, some minor, but all causing varying degrees of property loss. In the past 30 years only two outbreaks of strong tornadoes have occurred in Pinellas County, one in May of 1979 and the other in October of 1992. One of the most severe incidents occurred on May 4, 1979, when a tornado struck Highpoint Elementary School during a school day. Three children were killed, 15 hospitalized and another 84 injured, with property damages totaling \$4 million. The last major event occurred October 3, 1992, when tornadoes damaged and destroyed a subdivision of homes and a mobile home park in the City of Pinellas Park. Four were killed, 130 were injured; the property damages totaled \$37 million.

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WILDFIRE

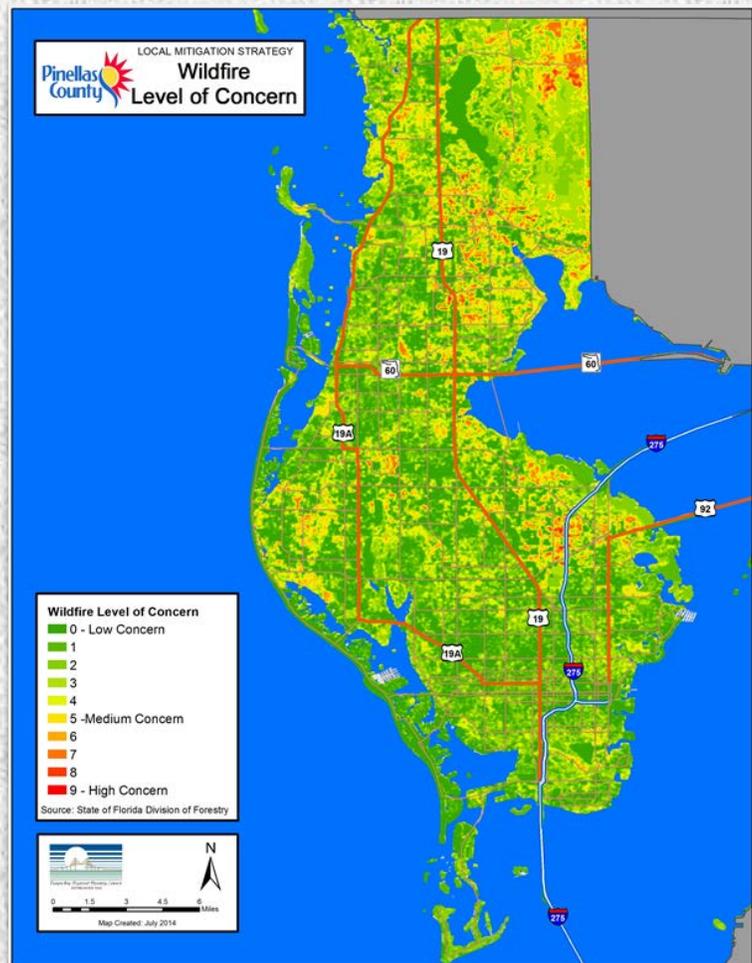
A wildfire is any fire occurring in wildlands (i.e., grasslands, forest, brush land, etc.) Wildfires have burned across the woodlands of Florida for centuries and are part of the natural management of much of Florida's ecosystems. Forest fires from natural causes such as lightning account for only a very small percentage of Florida's wildfires, whereas, man is by far the leading cause of wildfires. Forest land is continuously susceptible to destruction by wildfires.

The Urban/Wildland interface situation is largely the result of development in areas once considered wildlands and the desire of people to live in a more natural woodland setting. Wildfires near developed areas can threaten human life, structures and wildland resource values.



Pinellas County is nearly "built out," meaning there are few large contiguous areas with vegetated land cover. However, sporadic wildfires do occur, mainly in the northeast part of the county. The East Lake area near the power line corridor is the most likely location for wildfires to occur. The State and County conduct controlled burning in the entire northeast corner of the County and small burns at parks and other properties throughout the year.

In March of 2000, the City of Clearwater experienced minor property damage (\$5000) from a small wildfire. In May, 2001, the County did experience smoke from fires in adjacent counties. In 2006 there were 16 reported wildfires affecting 306.4 acres. Again, in the spring/summer of 2007, Pinellas County residents experienced smoke from fires across the state and in Georgia. Luckily there were no damages and no injuries. Between 2006 and 2012, there were a total 33 wildfires affecting almost 540 acres. Based on an analysis of recent fire histories, Pinellas County can expect about 5.5 wildfires burning approximately 16.35 acres annually. This number will probably decrease as the remaining brush areas are developed.



OTHER NATURAL HAZARDS

A number of other natural hazards affect Pinellas County and are addressed in the Local Mitigation Strategy; although their effects are typically less common and not as severe or widespread as floods, tropical cyclones, severe storms, tornadoes or wildfire. These hazards include:

- Drought and Extreme Heat,
- Winter Storms and Freezes,
- Coastal Erosion, and
- Sinkholes

More detailed information is located in Appendix 1 of the Pinellas County LMS.

EMERGING HAZARDS WITH CLIMATE CHANGE

Climate change affects our environment and natural resources, and may impact our way of life. For example:

- Warmer temperatures increase the frequency, intensity, and duration of heat waves, which can pose [health risks](#), particularly for young children and the elderly.
- Rising sea levels threaten coastal economies and ecosystems.
- Increased stormwater flooding of low lying areas resulting from sea level rise.
- Changes in the patterns and amount of rainfall, as well as changes in the timing and amount of stream flow, can increase the risk of wildfires, affect water quality and drinking water availability.
- Changing [ecosystems](#) influence geographic ranges of many plant and animal species and the timing of their lifecycle events, such as migration and reproduction.
- Increases in the frequency and intensity of extreme weather events, such as heat waves, droughts, and floods, can increase losses to property, cause costly disruptions to society, and reduce the availability and affordability of insurance.

SEA LEVEL RISE AND COASTAL HAZARDS

Climate change could affect coastal areas in a variety of ways. Coasts are sensitive to sea level rise, changes in the frequency and intensity of storms, increases in precipitation, and warmer ocean temperatures.

In the Southeast, sea level has risen steadily over the last 100 years at a rate of 8.5 inches per century. As average global ocean temperatures increase, ocean water expands and sea levels rise. The Intergovernmental Panel on Climate Change (AR5, 2013) estimates that sea level will rise from 10-39 inches by 2100. For comparison, the latest (2014) National Climate Assessment states that the sea level rise of 1 to 4 feet is projected by 2100. Pinellas County is working with the technical experts to determine the best way to demonstrate their recommended scenarios, which have a range of increases in sea level rise based on the different scenarios. Adaptation to sea level rise is the steps a community takes to become more resilient to the impacts of rising seas over a period of time. The three main strategies a community may use to adapt to sea level rise are:

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1. **Protection** - Protection strategies involve "hard" and "soft" structurally defensive measures to mitigate the impacts of rising seas, such as shoreline armoring or beach renourishment, in order to decrease vulnerability yet allow structures and infrastructure in the area to remain unaltered. Protection strategies may be targeted for areas of a community that are location-dependent cannot be significantly changed structurally (i.e., downtown centers, areas of historical significance, water-dependent uses, etc.).
2. **Accommodation** - Accommodation strategies do not act as a barrier, but rather alter the design through measures such as elevation or stormwater improvements, to allow the structure or infrastructure system to stay in place. Adaptation measures do not prevent flooding or inundation of the property but do protect the structure. Accommodation strategies may be suitable for location-dependent structure that could be changed to accommodate water, without compromising the use (i.e., bridge elevation, residential home elevation, downtown stormwater improvements, etc.).
3. **Retreat/Relocate** - Retreat strategies involve the actual removal of existing development and possible relocation to other areas and the prevention of future development in these high risk areas. Retreat options usually involve the acquisition of vulnerable land for public ownership, but may also include other strategies such as transfer of development rights, purchase of development rights, rolling easements, conservation easements, etc.

The climate of the Southeast United States and Pinellas County is likely to change in the next decades. While the extent of these changes is subject of intense debate, it is important to prepare for the range of potential challenges posed by climate change by becoming a more efficient society, reducing greenhouse gas emissions, identifying vulnerable sectors of society, and developing adaptation strategies. (<http://climatecenter.fsu.edu/>)

Along these lines, the Local Mitigation Strategy will be updated over the next 5 years with, at a minimum, consideration given to how best:

- To analyze and determine the vulnerability of our communities to a changing climate;
- To include climate change into areas of risk, where applicable;
- To include products from work with the MPO regarding transportation infrastructure resiliency;
- To include any regional sea-level increase data that may also be recommended by the Regional Climate Adaptation Working Group (facilitated by Pinellas County UF/IFAS Extension), One Bay Disaster Resiliency Group and consideration of the inclusion of sea level risk impacts in local Floodplain Management Plans;
- To include modifications to ensure recognition and the implementation of CRS programs within the county;
- To include recognition to consequence management and other emergency management programs and certifications, as appropriate; and
- To include updates to vulnerable populations and county areas.

TECHNOLOGICAL AND HUMAN-CAUSED HAZARDS

The Pinellas LMS also addresses technological and human-caused hazards in addition to natural hazards. Technological hazards are those that are caused by tools, machines, and substances that are used every day. The major technological hazards that will be discussed in this section are hazardous materials, as well as aircraft, water and rail accidents, power failures, and coastal oil spills. Human-caused events include civil unrest and terrorism. Other vulnerabilities are briefly addressed including threats to the region's water supply and epidemic/disease outbreak.

More detailed information is located in Appendix 1 of the Pinellas County LMS.



CONTENTS OF THE PLAN

APPENDIX ONE: MULTI-HAZARD IDENTIFICATION & RISK ASSESSMENT

The Local Mitigation Strategy Workgroup conducts and maintains an analysis of Pinellas County's hazard vulnerabilities. The analysis includes a general geographic description, population and housing estimates, economic indicators, transportation routes and methods, and threats from natural and technological hazards. Captured in the documentation of each hazard analysis is a brief history that includes information about any significant related events, the probability of the specific hazard occurring in Pinellas County, the impact it would have, and an example to illustrate the maximum threat. This Appendix was updated and significantly revised.

APPENDIX TWO: WORKGROUP MEMBERS

The local mitigation strategy workgroup is comprised of representatives from the public, private and governmental sectors, in accordance with Administrative Rule 9G-22. Documentation that such invitation has occurred will be included in each annual update of the plan and detailed in Appendix Two. All members are encouraged to consistently attend the workgroup meetings and there is an ongoing effort to solicit participation from both governmental and non-governmental organizations.

APPENDIX THREE: MITIGATION STRATEGY CONFLICT RESOLUTION

Conflict resolution within the workgroup will focus on issues which are opposed by 50% or more of the voting workgroup. Some items can be deferred for future evaluation. However, for items that need immediate resolution, a majority vote will be required.

APPENDIX FOUR: GOALS & OBJECTIVES

The goals and objectives of the workgroup are to serve as guidance in the planning of future hazard mitigation initiatives and are applicable to both pre-disaster and post-disaster efforts. The Goals and Objectives were revised in the 2009 Update to include six (6) hazard-specific goals and one (1) over-arching all-hazards goal. These include:

- Become a more Disaster Resilient Community.
- Minimize Coastal Flooding Losses in the Coastal High Hazard Area (CHHA) Coastal Storm Area and Hurricane Vulnerability Zone.

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- Minimize Riverine or Inland Flooding Losses in multiple flood zones.
- Minimize Severe Wind Losses in the County.
- Minimize Losses from Hazardous Material Incidents.
- Minimize Wildfire Losses in the Wildland Urban Interface areas.
- Minimize Losses from Security Attacks.

Each goal identified objectives which fell into six (6) measures (Preventive, Property Protection, Public Education and Awareness, Natural Resource Protection, Emergency Services, and Structural Projects.). Goal 1 was revised to include an objective to research and collaborate to identify adaptive strategies to address climate change in the next LMS Update, as appropriate.

APPENDIX FIVE: LOCAL PROGRAMS, POLICIES AND CAPABILITIES

Pinellas County and each municipality evaluated and compared existing local policies and ordinances regarding mitigation. Commonalities among jurisdictions were evident in floodplain management, restrictions on expansion of infrastructure and building densities in the CHHA, and compliance with or exceeding requirements established by the Federal Emergency Management Agency (FEMA). This section required considerable input from the Workgroup members as a new format (Excel Spreadsheet) was developed and recent legislation relating to public safety and mitigation had required changes to the Coastal and Conservation and Future Land Use Elements of the Local Government Comprehensive Plans (LGCPs).

APPENDIX SIX: LOCAL DEPARTMENTAL RESPONSIBILITIES IN MITIGATION IMPLEMENTATION

Pinellas County and each of the municipalities identifies the local hazard mitigation functions that are being practiced on a daily basis. The identification of these functions serves to complement the evaluation of the policies and procedures that have been conducted. The performance of these functions indicates that mitigation is a part of our daily operations. A new format for this section was developed to facilitate multi-jurisdictional input.

APPENDIX SEVEN: COMMUNITY PARTICIPATION AND OUTREACH

To develop an effective mitigation strategy, partnerships between the private and public sectors must be formed and maintained. Businesses and citizens need to understand the importance of building disaster resilient communities BEFORE a disaster strikes. Stakeholders from a wide variety of businesses and public and private non-organizations are always invited to participate, as directed in Administrative Rule 9G-22.

In order to facilitate increase public and private participation in the crafting and maintenance of the LMS as well as to increase public awareness of the importance of preparedness and mitigation, an ongoing public outreach initiative, a strategy was developed and approved by the LMS Workgroup. For this particular update to the plan, we set up a series of public focus groups where input was solicited concerning mitigation goals, objectives and actions. This process will be maintained and repeated for the next update to the plan.

APPENDIX EIGHT: PRIORITIZATION METHODOLOGY

Pinellas County and each municipality are responsible for submitting all of their mitigation initiatives to the Workgroup annually. The Workgroup uses a prioritizing procedure that involves the local representatives assigning points to 16 parameters describing their initiatives. These scores are reviewed by the LMS Vice Chair and are used to rank the projects objectively.



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APPENDIX NINE: MITIGATION INITIATIVES

The list of mitigation initiatives reflects all of the initiatives submitted by all participants including the County, each municipality, regional entities and private non-profit organizations. These mitigation initiatives are evaluated using the STAPLEE method. This technique identifies the following local conditions: Social, Technical, Administrative, Political, Legal, Economic and Environmental.

If mitigation funds are made available to the Pinellas County area, the Workgroup would refer to the Initiatives List and identify those that could be accomplished with the given funds. Next, the governments of those identified initiatives would be asked if they were interested and prepared to apply. Each entity must consider that it is likely that the applicant may need to provide some matching funds.

The Initiative List will be updated each year as part of the annual review process. Initiatives that have been completed are moved to the Accomplishments List. The Initiative List and any prioritization procedures may also be updated following a major disaster event, a change in funding sources, or as determined appropriate by the workgroup.

APPENDIX TEN: MITIGATION ACCOMPLISHMENTS AND SUCCESS STORIES

An accounting of completed projects detailed by jurisdiction and showing cost data, an estimate of the total benefit and source of funding. The list of Mitigation Accomplishments does not include ALL of the projects completed over the last 10. However, it does represent an impressive group of success stories.

APPENDIX ELEVEN: POTENTIAL FUNDING SOURCES

Many potential funding sources exist for hazard mitigation projects. The workgroup conducted research of the various state and federal grant programs, to become better educated about all potential options. The findings of the research indicate that a variety of programs is only available prior to a disaster, and others are only available following a disaster. Therefore, the workgroup's list of potential funding sources is divided into pre-disaster and post-disaster sections. If and/or when a funding source is identified, the Workgroup will meet and decide, by majority vote, which projects will be submitted. It is the goal of the Workgroup to continually survey programs for potential sources of mitigation funding and alert participants.

APPENDIX TWELVE: CRITICAL FACILITIES

The Critical Facilities Inventory (CFI) Database for the county was updated and a vulnerability matrix was developed which identifies the facilities most vulnerable to flood, surge, wildfire and other hazards.

APPENDIX THIRTEEN: REPETITIVE LOSS PROPERTY INVENTORY

A county-wide record of all of the Repetitive Loss Properties in Pinellas County was updated as of January 2014. These parcels were geo-coded and mapped to illustrate repetitive loss area within the county and its jurisdictions. The database itself is protected under privacy laws and not distributed as part of the LMS to the general public.

APPENDIX FOURTEEN: RESOLUTIONS ADOPTING THE LOCAL MITIGATION STRATEGIES

Federal law 44 CFR 201.6(c)(5) requires all participating jurisdictions to adopt the Local Mitigation Strategy (LMS). A copy of the municipalities' resolutions supporting mitigation programs and



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initiatives in the county and adopting the *Pinellas County Local Mitigation Strategy*, as revised, are filed here.

APPENDIX FIFTEEN: LOCAL FLOODPLAIN MANAGEMENT PLAN AND ANNUAL REPORT

Local jurisdictions who have a floodplain management action plan to accompany the LMS plan can file it in this appendix.

CONCLUSION

The benefits of developing and maintaining the Local Mitigation Strategy are apparent. The LMS identifies the plans and policies, goals and objectives, the existing actions and proposed future projects which will, hopefully, make our community safer.

The Workgroup has sought to expand its membership to include a broader scope of stakeholders. There is an ongoing concerted effort to reach out to the public as well as to non-traditional players in this effort. It is recognized that it will take a team effort to accomplish this task and that a key component is the private sector, including businesses, retailers, the health care industry, the private non-profits service providers, our colleges and universities, etc. A coordinated multi-jurisdictional approach, the LMS also recognizes the need to reach out beyond the county limits to adjacent counties and the existing regional partnerships, such as the regional planning council, Regional Disaster Security Task Force (RDSTF) and Local Emergency Planning Committee (LEPC).

The Workgroup members committed significant time to update the sections relating to its comprehensive plans, programs and local activities/departmental responsibilities. We felt it was important to demonstrate each jurisdiction's commitment to building a more disaster-resilient community "everyday" and readiness to push forward with mitigation initiatives if federal funding becomes available.

It is this commitment which has allowed for the Workgroup to work together to continue to enhance this LMS Strategy and to provide the County and its jurisdictions with a clear blueprint for mitigation efforts and guide for making our community a safer place to live and work.