Local Mitigation Strategy 2015




Palm Beach County
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SECTION 1: PLANNING PROCESS

1.0 Introduction

The Palm Beach County Local Mitigation Strategy (LMS) was formally adopted by the County, municipalities, and the LMS Steering Committee in 1999. Initial development of the LMS was funded, in part, by the Florida Department of Community Affairs/Florida Division of Emergency Management (FDCA/FDEM) with Federal Emergency Management Agency (FEMA) funds earmarked for the development of comprehensive hazard mitigation planning.

The LMS was established and continues to operate in accordance with prevailing federal, state and local guidelines and requirements. In 2004 the plan and program were substantially modified to enhance operational effectiveness and to comply with new federal guidelines established in response to the Disaster Mitigation Act of 2000.

1.2 Purpose

The purpose of the LMS is to develop and execute an ongoing strategy for reducing the community's vulnerability to identified natural, technological and human caused hazards. The strategy provides a rational, managed basis for considering and prioritizing hazard-specific mitigation options and for developing and executing sound, cost-effective mitigation projects. The LMS also provides a basis for justifying the solicitation and use of local, state, federal, and other funding to support hazard mitigation projects and initiatives.

1.3 Program Organization

1.3.1 LMS Structure

The current structure meets federal guidelines and criteria established in response to the Disaster Mitigation Act of 2000 and Title 44 Code of Federal Regulations (See figure 1).

Local Mitigation Strategy Coordinator

The LMS Coordinator is a staff member within the County's Division of Emergency Management and serves as the coordinator for all mitigation projects, committees, and mitigation funding designated for the County. The LMS Coordinator facilitates committee and sub-committee meetings and represents the County on these committees. Specifically, the LMS Coordinator supervises revision and updates to the Local Mitigation Strategy a minimum of every five (5) years. The Coordinator monitors changes in federal, state, and local laws in the area of mitigation that may affect the County. The LMS Coordinator readies the LMS for approval to the Florida Division of Emergency Management, the LMS Steering Committee, the Board of County Commissioners, and local municipalities. The LMS Coordinator is responsible for the continued maintenance of the LMS as well as the storing and filling of all documents pertaining to mitigation issues. In addition, the LMS Coordinator is responsible for the coordination of the Project Prioritization List that scores and ranks projects in the County that are eligible for Federal monies. This process is conducted through the Evaluation Panel. Panelists are solicited by the LMS Coordinator on behalf of the Steering Committee based on LMS member recommendations and are subject to approval by the Steering Committee. The LMS Coordinator interfaces with appropriate governmental and non- governmental agencies and offices to ensure LMS goals, objectives, and priorities are consistent with and cross-referenced with those articulated in other existing plans, namely the County's CEMP. In addition the LMS Coordinator seeks opportunities at the regional, county and municipal levels to:

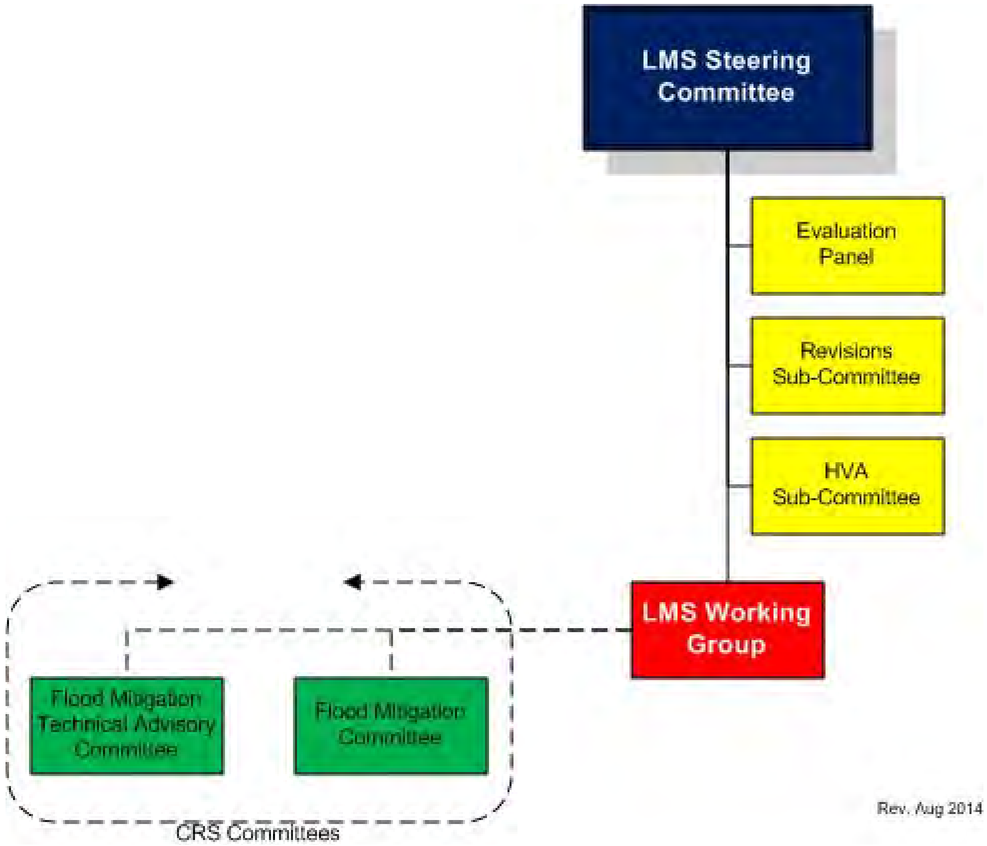
- Update plans, policies, regulations and other directives to include hazard mitigation priorities
- Encourage the adoption of mitigation priorities within capital and operational budgets and grant applications
- Share information on grant funding opportunities
- Offer guidance for carrying out mitigation actions
- Explore opportunities for collaborative mitigation projects and initiatives
- facilitate and coordinate the application process and serve as a primary communication link with funding agencies

LMS Working Group

The LMS Working Group represents a broad cross-section of public sector and private sector organizations and individuals, including the general public, regional universities, neighboring emergency management departments, and state coordinators. The Working Group serves as an umbrella organization for coordinating all mitigation programs and activities, supplies the staffing for all committees of the LMS, and is the primary mechanism and forum for exchanging information and mobilizing the vast expertise and resources of the community.

LMS Steering Committee

The LMS Steering Committee consists of 15 members composed of seven municipal representatives, two county/local government representatives, one state/federal government representative, one university/college representative, one healthcare industry representative, one non-profit representative, and two representatives from the private sector. The Steering Committee serves as the LMS program board of directors. As such, it is the primary decision and policy body for LMS sponsored mitigation activity. Members of the committee are replaced as needed with coordination of the committee and the committee chairperson. Each January an updated list is sent to FDEM. The LMS Steering Committee provides the needed attention to ensure mitigation projects are more cost-effective and focused on threat-specific mitigation priorities and strategies.



1.3.2 Standing Committees

- Evaluation Panel - Designated to review, evaluate, score and rank mitigation projects applying established local, state and federal prioritization processes and criteria.

- Revisions Sub-Committee - Designated to review, update, and verify that subsequent LMS plans meet all federal guidelines and criteria. In addition, the revisions committee meets as needed to evaluate the effectiveness of the plan as well as to monitor and update the plan during the five (5) year cycle. The revisions committee has a standing meeting once a quarter. If no issues or concerns with the plan are proposed or presented, the committee does not meet. Eighteen months before the plan is up for revisions, the standing meeting is held regardless of whether changes need to be made. Monthly meetings of the committee are held 12 months before the plan expires to ensure all address with the revision are being met.

- Hazard and Vulnerability Analysis Sub-Committee - Provides a detail assessment of hazards that may affect Palm Beach County (PBC) and provides mitigation recommendations.

1.3.3 Community Rating System (CRS) Cooperating Committees

- Flood Mitigation Technical Advisory Committee - Comprised of flood mitigation engineers and experts from public and private sector organizations, is charged with assessing County-wide flood risks and vulnerabilities without regard to jurisdictional boundaries and recommending flood mitigation priorities, strategies, plans and projects for LMS consideration and action that optimally benefit to the greater community.

- Flood Mitigation Committee - Comprised of representatives from the county's active CRS communities, who collaborate on a full range of Outreach Projects Strategy (OPS) initiatives and promote CRS participation. (This committee is being transitioned to the Program for Public Information (PPI)).

  While there is no regulation that requires the CRS committee to meet or coordinate, Palm Beach County has a very involved CRS user group that passes information and best practices and meets on a scheduled basis. Out of the 38 municipalities in Palm Beach County, 28 are in the CRS user group. A chart in appendix J shows that list as well the number of insured homes each have in that municipality as well as their CRS rating.

1.4 Participation Requirements

Since the LMS is written directly from input from all stakeholders, it is important to make sure that the entire PBC community is represented. Each group has different participation requirements; however, all groups are strongly encouraged to participate in the process.

Jurisdictions

Municipal and County participation is critical to the success of the LMS. In order to retain LMS voting rights, qualify for federal mitigation assistance consideration, and otherwise remain a member in good standing, the County and all municipal jurisdictions are expected to conform to the following standards:

- Participation of the representative or alternate in the four (4) annual Working Group meetings; or

- Participation of the representative or officially designated alternate(s) in a majority of the Steering Committee meetings, and

- Participation in a majority of subcommittee meetings; or

- Participation in special conference call meetings of the Steering Committee or subcommittees; and

- Have an officially executed resolution adopting the revised LMS plan on file with the County. In order for a jurisdiction to be eligible for Hazard Mitigation Grant Program

(HMGP), Flood Mitigation Assistance Program (FMAP) and Pre-Disaster Mitigation (PDM) funding programs, they must have an officially adopted resolution and a fully executed interlocal agreement.

More than two (2) absences of the Working Group meeting will be cause for disqualification from the LMS, subject to appeal and review by the LMS Chair. All rights and privileges will be terminated during a period of disqualification and formal reapplication. All jurisdictions will be notified of meetings via email one week in advance, and will be updated with meeting summaries thereafter.

Non-Governmental Organizations (NGO) and other Governmental Entities

In order to qualify for LMS grant sponsorship, NGOs and other governmental entities must:

- Have a duly executed letter of commitment to the LMS on file with the County; and
- In the judgment of the LMS Steering Committee, actively participate in, and otherwise support LMS activities.

The Public and Private Sector

The LMS membership believes broad community support, including ongoing public and private sector involvement, is very important to the success of the program. While participation by private organizations and the general public is strictly voluntary, their attendance, comments, contributions, and support are actively invited, sought, monitored and fully documented.

In order to promote the opportunity for broad participation, at a minimum, notices and agendas for all general meetings of the LMS are posted through some combination of newspaper ads or public service announcements; social media, postings on county and municipal websites, announcements in the county and municipal newsletters and calendars, and blast faxes and e-mailings to all previous participants.

1.5 Jurisdictional Adoption

All jurisdictions wishing to participate in and share in the benefits deriving from the LMS program must complete and file a fully executed resolution which conforms to the adoption standards jointly established and amended by the PBC Board of County Commissioners (BCC) and the LMS Steering Committee.

1.6 New Jurisdictions/Entities

In the event municipal jurisdictions are added, deleted, or merged within the County, the LMS will appropriately adjust its membership rolls as necessary and require any newly defined jurisdictions to provide documentation necessary for participation in the program.

1.7 Jurisdictional Participation

Palm Beach County has 38 municipalities. In addition to jurisdictions being encouraged to participate, each member is provided minutes from the previous working group or steering committee meeting within once week following the meeting. Participation is also monitored with sign-in sheets. This information along with a roster of the primary LMS representative from each municipality can be found in appendix G. You will also find summaries of both working group and steering committee meetings.

1.8 Guiding Principles

The LMS guiding principles are an expression of the community's vision of hazard mitigation and the mechanisms through which it is striving to achieve that vision. The principles address concerns of the community relative to natural, technological, and human caused hazards.

1.9 Process

As part of the process, a survey was distributed to each jurisdiction to understand their local issues. The LMS Steering Committee, along with the LMS Working Group, assessed existing plans, studies, and strategies. Using state and federal guidance on how an LMS update should be constructed, the LMS Steering Committee and LMS Working group developed a comprehensive list of hazards of concern. From these defined hazards, the Working Group identified areas of concern from existing plans and future considerations.

These areas of concern include:

- Loss of life
- Loss of property
- Community sustainability
- Health/medical needs
- Sheltering
- Adverse impacts to natural resources (e.g., beaches, water quality)
- Damage to public infrastructure (e.g., roads, water systems, sewer systems, stormwater systems)
- Economic disruption
- Fiscal impact
- Recurring damage
- Redevelopment/reconstruction
- Development practices/land use
- Intergovernmental coordination
- Public participation
- Repetitive flood loss properties
- Historical structures

1.10 Strategy

The strategy used for the development and revision process of the LMS, consisted of the following tasks:

1) Public involvement to ensure a representative plan
2) Coordination with other agencies or organizations
3) Hazard area inventory
4) Risk and Vulnerability Assessment
5) Incorporating existing plans, reports, best practices, and technical information into the LMS
6) Review and analysis of possible mitigation activities
7) Local adoption following a public hearing
8) Periodic review and update

1.11 Benefits

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 (FAC), 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 programs

- Universal points from the National Flood Insurance Program's (NFIP) CRS Program for developing a Floodplain Management Program, which may help further reduce flood insurance premium rates for property owners

- Access to FEMA's Federal grant programs

- Compliance with the Disaster Mitigation Act of 2000

- Set forth the guiding principles with which both the County and municipal governmental entities of PBC will address the issue of all hazard mitigation

- Identify the known hazards to which the County is exposed, discuss their range of impacts, and delineate the individual vulnerabilities of the various jurisdictions and population centers within the County (**Section 2, Hazard Identification and Vulnerability Analysis**)

- Develop a detailed method by which PBC (municipalities and County government) can evaluate and prioritize proposed mitigation projects along with new federal requirements

- Develop the process and schedule by which this entire LMS will be reviewed and updated to include public participation

1.12 Criteria and Procedures for Revision

This document will be updated a minimum of every five (5) years by the LMS Coordinator with the assistance of the Revision Subcommittee and approval by the Steering Committee with input from the LMS Working Group.

The public is given an opportunity to review this document and provide comments through the County website, as well as committee meetings. Revisions may also be made based upon experience from any significant events such as a hurricane, tornado, sea level rise, hazardous materials spill or any other occurrence where mitigation could benefit the community. Changes in federal, state, and local laws will also be reflected in the updated version of this document. The revisions will then be distributed to all affected parties by the LMS Coordinator.

- The evaluation criteria which are used include:

    - New mandates from federal, state or local agencies that require changes to the Local Mitigation Strategy New or changing laws, policies or regulations.

    - Societal developments or significant changes in the community that must be added to the current LMS.

    - Changes in the Comprehensive Plan or any other form of standard operating procedure.

    - The mitigation opportunities implemented. The priorities for implementation the same.

    - Recommendations or lessons learned from any major incidents that have occurred since last adoption.

During the revision process, each criterion is addressed to determine if they are still valid and adjustments are made as necessary. All existing mitigation opportunities that are determined to still be viable projects will be left standing. All those that are determined to be no longer workable will be set aside for further review and revision or, dropped as no longer feasible.

Once revisions are approved by the Steering Committee, the LMS Coordinator provides the copy to all members, on the website, and to the State for approval. Once approved by the State, the LMS Coordinator distributes to members for final adoption by governing body.

1.13 Goals

- Reduce the loss of life, property, and repetitive damage from the effects of natural, societal and technological hazards from all sources but especially hurricanes, tornadoes, major rainfall and other severe weather events
- Achieve safe and fiscally sound, sustainable communities through thoughtful long-range planning of the natural and man-made environment
- Take preventative actions to reduce the number of repetitive loss properties published annually by FEMA on the list of "Repetitive Loss Properties"
- Qualify the county and jurisdictions for incremental improvements on the Community Rating System classification in relation to flood insurance under the National Flood Insurance Program (NFIP) and to reduce flood hazards
- Optimize the effective use of all available resources by establishing public/private partnerships, and encouraging intergovernmental coordination and cooperation
- Promote awareness and preparedness through the distribution of information on hazards and measures to mitigate them
- Increase the level of coordination of mitigation management concerns, plans and activities at the municipal, county, state and federal levels of government in relation to all hazards
- Establish a program that facilitates orderly recovery and redevelopment, and minimizes economic disruption following a disaster
- Ensure an enforceable commitment for the implementation of the local hazard mitigation strategy

1.14 Objectives

The ultimate objectives of the LMS are to:

- Improve the community's resistance to damage from known natural, man-made, and environmental hazards

- Place Palm Beach County in a position to compete effectively and productively for pre and post-disaster mitigation funding assistance

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- Encourage strong jurisdictional, nongovernmental and public participation and support of LMS activities
- Reduce the cost of disasters at all levels
- Facilitate community recovery when disasters occur
- Minimize recurrence of damage by incorporating mitigation into post disaster rebuilding
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SECTION 2: HAZARD IDENTIFICATION AND VULNERABILITY ANALYSIS

This section represents an update of the 2004 and 2009 hazard and vulnerability analysis. It addresses, in part, the following FEMA requirements:

Requirement: §201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

Requirement §201.6(c)(2)(i): The risk assessment shall include a description of the type of all natural hazards that can affect the jurisdiction.

Requirement §201.6(c)(2)(i): The risk assessment shall include a description of the location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Requirement §201.6(c)(2)(ii): The risk assessment must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.

Requirement §201.6(c)(2)(ii): The risk assessment shall include a description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

2.1 Hazard Identification

Section 2.1 and Table 2.1 list the general hazards to which PBC is vulnerable and indicates their projected impact potential across the entire spectrum of community exposure and services. **Section 2.1, Hazard Identification**, describes these hazards in detail and discusses County-wide exposures; **Section 2.2, Vulnerability Assessment**, discusses specific vulnerabilities faced by the individual governmental entities, County and municipal, forming the PBC community. Vulnerability, probability, and risk assessments for the County and municipal jurisdictions, and a County-wide impact analysis are contained in **Appendix A**. **Section 2.3, Risk Assessment**, describes the elements considered in the risk assessment process. Hazard & Risk Assessment Maps and potential loss values for PBC and each jurisdiction are located in **Appendix C**. Most hazards in Palm Beach County affect the entire county equally. However, there are a view that maybe more concentrated in one area of the county. For example, a Herbert Hoover Dike Breach would cause more severe damage to the western communities. For the purpose of this document, The County has been devidided down into four geographical areas: Northern Palm Beach, Southern Palm Beach, Western Palm Beach, and Coastal Palm Beach County.

In each of the hazards identified and defined, the latest occurrence of that event hazard is listed. For example the last major hurricane to hit Palm beach County was 2007. Therefore, there would be no examples beyond that point.

In addition, the charts with show probability of occurance and impact. These will be rated as low = under 5% chance of occurring, medium, 5% - 15% chances of occurring, or High, greater than 15%. These rating responds with the information of the charts presented.

Each disaster affects Palm Beach County differently based the severity and scope of the disaster and where it occurred in the County. While impacts to structures, infrastructure, people, and the environment will be addressed in each individual hazard, in most cases unless the disaster is significant, (major or catastrophic), in duration and destruction, impact will be minimum and can be handled with resources within the county. If not specifically discussed in the hazard, it is assumed that there would be none or minimum impact to the to the County.

The presented charts will provide additional information on impacts.

Disasters are classified by the magnitude of their effect. The recognized classification system is as follows:

- 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. The damage level to life and property is minimal and can be controlled and contained with resources within the municipality, or county in which they occurred.
- Major Disaster - As defined under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C 5122) a major disaster is any natural catastrophe (earthquakes, explosion, fire, flood, high water. Hostile actions, hurricanes, landslide, mudslide, storms, tidal wave, tornado, wind-driven water, snowstorms, or drought), or, regardless of cause, any fire, flood, or explosion, in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant disaster assistance under this Act to supplement the effort and available resources of States, tribes, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby.

- Catastrophic Disaster – A disaster event that results in large numbers of deaths and injuries; causes extreme damage or destruction of facilities that provide and sustain human needs; produces an overwhelming demand on the state and local response resources and mechanisms: causes a severe long-term effect on general economic activity; and severely affects state; local, and private sector capabilities to begin and sustain response activities.

The hazards identified in **Table 2.1** and discussed in **Section 2.1** are organized based on their maximum projected impact potential. This means that 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, it simply means that their potential to affect the total community is lower.

Table 2.1 Identification and projected impact potential for hazards

Hazard Category	Projected Impact Potential																			
	Excessive Wind	Excessive Water	Damaging hail	Soil/beach erosion	Electric power outage	Surface and air transportation	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																				
Flood		√		√	√	√	√	√	√		√	√	√	√	√	√	√	√	√	√
Hurricane/Tropical storm	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Tornado	√				√	√				√	√	√	√							
Severe thunderstorm	√	√	√		√	√				√	√	√	√					√		√
Drought													√		√	√		√		
Temperature extremes					√						√	√	√		√	√				
Agricultural pest/disease											√	√	√		√	√				
Wildfire					√	√				√	√	√	√	√	√	√		√	√	
Muck Fire						√					√		√		√	√		√	√	
Soil/beach erosion				√			√						√			√				√
Seismic hazards						√													√	
Sea Level Rise		√		√		√	√	√					√	√	√	√	√			√

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TECHNOLOGICAL																				
Herbert Hoover Dike Breach		√					√		√		√	√	√	√	√	√				√
Hazardous material accident						√					√	√	√					√	√	
Radiological accidents (nuclear power plant)					√	√				√	√	√	√	√		√			√	
Communications failure										√			√	√						
Hazardous material release						√					√	√	√	√				√	√	
Transportation accident						√	√				√		√	√				√		
Wellfield contamination								√	√		√	√	√	√						
Power failure (outage)					√	√		√	√	√	√	√	√	√						
HUMAN CAUSED																				
Civil disturbance						√					√	√	√	√			√			
Terrorism and sabotage					√	√		√		√	√	√	√			√	√	√	√	
Mass migration crisis											√	√	√	√						

2.1.1 Natural Hazards

2.1.1.1 Flooding

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 2.5 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 6.0 to 8.5 inches. Heaviest rainfall usually occurs in June and September. In PBC, 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 PBC particularly vulnerable to flooding associated with late season tropical storms and hurricanes because they typically occur when the water table is high and the ground is saturated. More information is available through the PBC Flood Awareness website accessible at:http://pbcgov.com/dem/floodawareness/.

Historical Flooding Events

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 five months. Many parts of PBC 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.

Flood of October 1952. As occurred in 1947, this flood was preceded by five 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.

Rains of January 1957. On 21 January 1957, PBC received 9 to 21 inches of rainfall within a 24-hour period. There was severe flooding in the vegetable garden areas of the County and much crop damage. Some fields had to be pumped out. Local crop damage was estimated at $1,000,000.

Flood of June 1959. Heavy rains fell across most of central Florida from 17 to 21 June. These rains were associated with and followed a tropical depression, and caused extensive flooding in poorly drained, low-lying agricultural areas and some residential sections. Considerable pasture land and some citrus land in PBC were inundated. Some highways also sustained damage from these flood waters.

Rains of October 1966. On 22 October 1966, heavy rains ranging from eight to ten inches over a 24-hour period destroyed approximately 4,200 acres of vegetable crops.

Rains of March 1982. On 28 and 29 March 1982, PBC was subjected to a severe coastal storm with heavy rains and high winds. Lantana measured 16 inches of rain over a 24-hour period. High seas sunk a Haitian freighter and a total of 11 people were drowned.

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 produce 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 PBC.

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

The Unnamed Storm of October 1995. Almost exactly one year after the Hurricane Gordon flooding incident in 1994, a stalled frontal system dropped over 15 inches of rain on PBC over a period of 29 hours. In the intervening year between these two events, some communities in PBC had conducted a number of mitigation projects and initiatives designed to improve drainage and prevent flooding in known flood prone areas. These mitigation projects and initiatives undoubtedly reduced the extent of flooding and flood related damages during the 1995 flooding event, nevertheless, the County did experience significant flooding again in 1995.

Unnamed Storm of January 1999. On Saturday 2 January of 1999, a cold front stalled over the northern part of PBC. Warm, moist air from the Bahamas became entrained in this frontal system and produced a fairly localized, intense rain event in northern PBC. Initial reports indicated 21 inches of rain in a 12-hour period. This later turned out to be an erroneous reading from the recording instrument involved; however, it is generally recognized that between 18 and 22 inches of rain fell in the northern third of the County over a 12 to 18 hour period. Flooding was even more extensive than in the 1995 event, but it is interesting to note that many areas where flooding mitigation projects had been implemented remained dry, or showed a minimum of damage compared to areas where planned mitigation had not yet been implemented. Hardest hit were the Riviera Beach and Lake Park jurisdictions with a total of over $6,000,000 damage between them. Flooding was extensive along Northlake Boulevard. Erosion caused the collapse of a portion of I-95 that was under construction. **Table 2.2** shows the final damage assessment in PBC from this storm.

Record Rainfall June - July 2002. On July 14, 2002 a record 27 consecutive days of rain came to a conclusion. The combined June - July rainfall total was six inches below the all time record. June rainfall was 20.16" (12.5% above normal). The County experienced five days of one inch or more rain. The water level in Lake Okeechobee rose to 12.57 feet. Because this rainy period was preceded by an extended dry period and rains were spread over several days, flooding was limited to street flooding.

Hurricane Frances September 4, 2004. A maximum storm-total rainfall amount of 12.56 inches was measured at West Palm Beach International Airport with 10.26 inches occurring in a 24-hour period. Unofficial storm-total rainfalls included 9.56 inches at Boynton Beach, 8 inches at Deerfield Beach and 7.18 inches at the Hillsboro Canal. Widespread storm-total amounts of three to five inches occurred in southeast and interior south Florida with southwest Florida averaging one to three inches. Rainfall flooding was mostly minor except for a few locations in PBC, which had up to three feet of standing water. A section of I-95 in PBC was closed due to a large sinkhole. Within the confines of the Herbert Hoover Dike, water levels on Lake Okeechobee fluctuated up to five feet above and below normal.

Hurricane Jeanne September 25, 2004. A South Florida Water Management District (SFWMD) gauge measured a maximum storm-total rainfall amount of 10.22 inches over the eastern portion of Lake Okeechobee. A SFWMD gauge about four miles west of West Palm Beach International Airport measured 9.10 inches with 8.79 inches of that occurring in a 24-hour period. At Moore Haven, 5.99 inches of rain was measured. Widespread storm-total amounts of one to four inches occurred in most of southeast and interior south Florida with Miami-Dade County and Collier

County averaging one half to one inch. Mostly minor rainfall flooding was observed except locally in Palm Beach Gardens, Jupiter and in the farmlands of western PBC where it was more severe. Within the confines of the Herbert Hoover Dike, water levels on Lake Okeechobee fluctuated up to seven feet above and below normal causing severe flooding of some marinas.

Flood of June 5, 2005. Eight inches of rain in three hours caused flooding in streets and businesses in Boca Raton and in Highland Beach. Cars were stalled and Federal Highway was closed for a nine-block section from NE 20 to NE 29 Street.

Hurricane Wilma October 24, 2005. Rainfall amounts across South Florida generally ranged from two to four inches across southern sections of the peninsula to four to six inches across western Collier County and around Lake Okeechobee, with a maximum amount of 7.21 inches in Clewiston. There was scattered street flooding.

Flood of December 14, 2006. A slow-moving low pressure trough caused very heavy rains and significant flooding over parts of PBC. West Palm Beach International Airport received a total of 8.21 inches of rain ending at 7 PM on the 15th. Other locations in Central and Southern PBC received between six and eight inches of rain. Northern Broward County received lesser amounts in the two to three inch range. Several streets and roads were closed in the city of West Palm Beach, with water reaching up to three feet deep in some areas. Hardest hit was the neighborhood of Pineapple Park. Many vehicles were stranded in the deep water, with local police receiving about 120 calls for assistance. No significant damage was reported to property despite water entering homes and businesses. Florida Power and Light reported 20,000 customers without power during the afternoon and early evening hours. Shelters were opened for people left homeless by the floods, but only five people arrived as of 8:20 PM.

Flood of January 22, 2008. Intense rains affected Boynton Beach and the northwest section of Delray Beach during the late afternoon and evening hours of 22 January. Maximum observed rainfall amounts were between four and six inches in Boynton Beach, although Doppler radar estimated as much as ten inches of rain fell in just over three hours. Numerous reports of flooding were reported. A trained spotter reported water getting into houses in the corridor west of Federal Highway and east of Congress Avenue between Boynton Beach Boulevard and Woolbright Road. Water rose to as high as two feet along sections of Congress Avenue. Significant flooding was reported at the parking lot of Boynton Beach mall. The I-95 on-ramp at Gateway Boulevard was closed due to the water depth, as were sections of Boynton Beach Boulevard. Dozens of vehicles stalled and 40 traffic accidents were reported due to the rain and standing water. The combination of a mid and upper level trough moving east across South Florida and a developing warm frontal boundary provided the necessary atmospheric conditions for intense rains and flooding in the Boynton Beach area on 22 January.

March 22, 2008. Heavy rain across the Wellington area produced multiple reports of knee deep water in yards and across roadways. Heavy rain across central portions of PBC including the Wellington area produced flooded roads and water approaching a structure.

May 24, 2008. Flooding reported at the intersection of Linton Boulevard and Congress Avenue making the intersection impassable. Flooding also reported along Nassau Street with water intruding into some homes. Flood waters were near two feet deep at some locations. A shortwave moved across South Florida during the afternoon hours allowing multiple severe thunderstorms to develop across southeast Florida. A total of 8,200 customers lost power due to the severe thunderstorms in the three-county area of Palm Beach, Broward and Miami-Dade counties.

March 21, 2009. A warm front lifted north through South Florida during the day of March 21. Unstable air south of the front combined with warm temperatures to produce strong and severe thunderstorms over PBC. A total of about 5,000 customers lost power. Significant flooding was reported in the Palm Beach Gardens and North Palm Beach areas. Flooding was most severe in the area of Pearl Street and Riverside Drive, and along US 1 near PGA Boulevard. Water reached the windows of cars in some cases. The flooding along US 1 was exacerbated by construction on the highway.

August 14, 2010. Strong and slow-moving thunderstorms produced flooding in the Jupiter area due to light atmospheric flow and copious moisture. A spotter reported severe street flooding in Jupiter and the closing of Central Boulevard and Indian Creek Parkway. Rainfall of 2.75 inches reported within 45 minutes.

October 28, 2011. A weak frontal boundary across South Florida, in combination with a flow of deep tropical moisture from the western Caribbean Sea associated with the remnant of Hurricane Rina, led to periods of very heavy rain and significant flooding lasting the better part of 4 days. An estimated 2,000 customers lost power across South Florida due to the rain. Rainfall amounts of 6 to 9 inches fell over southeastern PBC in less than 6 hours, leading to numerous reports of flooded streets and some road closures. No reports were received of water entering structures.

August 26, 2012. Tropical Storm Isaac moved west-northwest across the Florida Straits south of the Florida Keys on 26 August. The northern edge of the wind and rain area associated with Isaac affected the South Florida peninsula throughout the day on the 26th. Isaac continued on a west-northwest track into the Gulf of Mexico on the 27th with winds, rain and flooding continuing over parts of South Florida. Moderate to severe flooding affected a large portion of metro PBC west of the Florida Turnpike. Hardest hit communities include The Acreage, Royal Palm Beach, Loxahatchee and Wellington. Canals were overtopped and communities were stranded by high water for several days after the rains stopped. Few homes suffered water damage, but major damage was sustained to infrastructure, including roads and water management structures. Rainfall amounts as high as 16 inches were measured in Royal Palm Beach and Loxahatchee, with estimates in excess of 18 inches in a two-day period.

August 27, 2012. Flooding persisted over the western communities of PBC through the end of August as a result of torrential rains from Tropical Storm Isaac which fell on 26 and 27 August.

It is important to note that many of the areas that experienced heavy flooding in both the 1994, 1995, and 2012 rainfall events were not in designated flood zones. For those areas where the

Flood Insurance Rate Maps (FIRM) did indicate a flooding hazard, these two events both exceeded the 100-year storm levels and occurred back-to-back. The 1999 event was extremely localized, but rainfall exceeded all previous records in specific areas, and was beyond the design capacity of virtually all drainage systems in the County.

Often when these types of 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 Intracoastal Waterway are particularly susceptible to flooding under these conditions. The most flood prone areas in the eastern portion of PBC poorly drained soils, a high water table, and relatively flat terrain; all of which contribute to their flooding problems. Flat terrain and heavily wooded areas aggravate flood problems by preventing rapid drainage in some areas.

January 9, 2014. During the night of Thursday, January 9, 2014, several mesoscale meteorological factors combined to produce torrential rainfall across portions of coastal PBC over a rather short period of time. From roughly 8pm until midnight, several locations received over 12 inches of rain in just those few hours, with one mesonet site just west-southwest of Hypoluxo receiving an astonishing 22.21 inches during the same time frame according to National Oceanic and Atmospheric Administration (NOAA).

In addition, heavy rains continue for 12 hours causing major flooding in the Kings Point area, at Atlantic Avenue and Jog Road in suburban Delray Beach.

Estimated rainfall totals in that area were almost 12 inches, according to the South Florida Water Management District. A number of home say minor damage and a presidential declaration were sought but not granted due to the damage not meeting federal threshold guidelines.

Flood Water Sources and Frequency of Occurrence

Sources of flood waters in PBC include:

- The Atlantic Ocean
- The Intracoastal Waterway
- Lake Okeechobee
- The West Palm Beach Canal
- The Hillsboro Canal
- The North New River Canal
- The Miami Canal

Major water retention areas include:

- Corbett Wildlife Management Area
- Loxahatchee Wildlife Refuge and WCA No. 2
- The Rotenberger/Holey Land Area

Floodplains designated on the FIRM 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. Additional flood information is addressed in **Section 2.2.1.2 The PBC Flood Insurance Rate Maps are currently being updated but were not available for this update.**

Table 2.2 Final damage assessment from the January 1999 storm.*

Jurisdiction or Geographic Area	Number of Structures Damaged	Residential and Business Loss	Public Infrastructure Loss	Total Jurisdiction Loss
Unincorporated Palm Beach County	94	$884,000	$119,655	$1,002,655
Lake Park	2	$2,008,200	$67,000	$2,075, 200
Riviera Beach	201	$2,927,075	$28,000	$2,965,075
Palm Beach Gardens	126	$675,400	$12,000	$688,400
North Palm Beach	25	$40,000	B	$40,000
North Jupiter	1	B	B	--
Northern Palm Beach Improvement District	B	B	$51,000	$51,000
Total County Losses	460	$7,524,675	$288,655	$7,822,220

* Data from PBCDEM.

As a relatively flat, low lying, heavily developed coastal county that experiences frequent intense rain events and periodic tropical storms, Palm Beach County is especially susceptible to flooding. Palm Beach County flooding has historically taken one of the following forms:

1. Flash flooding resulting in the rapid buildup of flood waters from intense localized precipitation that exceeds drainage capacities
2. General flooding resulting from a buildup of water levels over time
3. Water body overflows resulting from excessive rainfall or water management actions
4. Coastal surge flooding driven by storm-force winds
5. Dike breaches or overtopping related to major rain and tropical storm events

Causes of Local Flooding

Significant factors contributing to inland flooding include rainfall intensity, rainfall frequency, rainfall duration, surface conditions, topography, and inadequate natural drainage.

Palm Beach County's torrential rains, low and flat terrain, and large number of inland water bodies, conspire to create a significant probability for inland flooding. An additional, increasingly significant, contributing factor is rapid water runoff associated with the vast areas of impervious surfaces created by new development, creating flood prone areas where they did not previously exist.

In urban areas, grates and drains can become overtaxed or blocked with debris, leaving no space for excess water to enter drainage and sewer systems. According to the South Florida Water Management District, "Many new residents to Palm Beach County are alarmed when they see standing water in streets or driveway swales. In other places, that could be a cause for concern, but in our region, it's something you can expect to see after a soaking summer shower."

Palm Beach County averages over 60 inches of rain a year and more than 130 rain days, with most of it coming between the months of June and November. Most developed areas are clustered along the coasts or near large waterways. Virtually flat, with most areas at or only slightly above sea level, even moderate rains can accumulate quickly.

The Water Management Challenge

Rainfall has been critical to South Florida's history, feeding its natural wetlands and refreshing surface-water and groundwater reservoirs. Its water management issues differ from those of most other areas in the country. Where most areas are concerned with protecting "scarce" water resources, South Florida's challenge is managing an overabundance of surface water. In order to drain and manage the excess water, hundreds of miles of canals, dikes, and levees have been built. Water management policies have created agricultural, tourism, and real estate industries whose success has fueled the state's population growth and taxed the seemingly abundant water supply. Now choices must be made between further population growth, environmental protection, and an adequate, safe water supply.

The area's high hydrologic variation, low physical relief, and limited storage and conveyance capacities, make water management challenging. A delicate balance must be struck, dealing with extremes: flooding versus drought and open land versus crowded urban areas. Actions range from enforcing water restrictions during dry periods to precautionary or emergency flood management during wet periods and storm events. With annual rainfall averaging over 60 inches (but varying widely), and more than 50 percent occurring in 4 months (June to September)… with the rainy season necessitating the movement of water away from populated areas for flood control and the storage of excess water necessary to meet population needs and demands during dry periods… water management is a complex challenge.

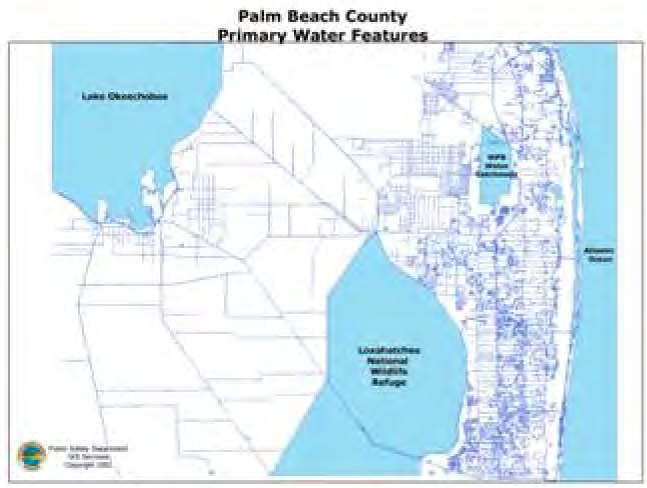
County Elevations

Terrain throughout the Palm Beach County is relatively level. The mean elevation is 15 feet above sea level. Ocean coastal beachfront gradually slopes up to a dune line with top elevations of 12 to 23 feet. From the dune line there is a gradual downward slope to lake and inland waterway frontage with a width of from a few hundred feet to a half mile. From there, land slopes upward to a coastal ridge then downward to elevations of 5 to 12 feet in a drainage valley. Further inland, elevations remain relatively stable.

Primary Surface Water Areas

Lake Okeechobee, the largest fresh water lake after the great lakes, is South Florida's primary water reservoir. Approximately 250 square miles of the lake are within the geographical boundaries of Palm Beach County. Other sizeable bodies of water include Lake Mangonia (540 acres) and Clear Lake (401 acres) in West Palm Beach and Lake Osborne (356 acres) in southern Lake Worth and northern Lantana. The West Palm Beach Canal connects Lake Okeechobee and Lake Worth. A vast network of canals is interconnected with the West Palm Beach Canal. A system of lakes runs north and south within 8 miles of the east coast. The Loxahatchee River system is located in the northern section of the county and is interconnected with the Loxahatchee Slough.

The map below shows the relative distribution of primary surface water areas within Palm Beach County



Natural & Beneficial Flood Water Storage Areas

The following areas, designated as "Environmentally Sensitive lands" are undisturbed natural areas of Palm Beach County that act as natural storage areas for flood waters, reduce the possibility of flooding nearby residences, and help to recharge the groundwater aquifer.

- Bee Line Corridor (1399 acres)
- Delray Oaks (25 acres)
- Frenchman's Forest (150 acres)
- High Ridge Scrub (40 acres)
- Juno Hills (560 acres)
- Jupiter Ridge (269 acres)
- Loxahatchee River (368 acres)
- Loxahatchee Slew (10389 acres)
- Fox Property (1538 acres)
- Pal-Mar (6944 acres)
- Rosemary Scrub (14 acres)
- Royal Palm Beach Pines (748 acres)
- Sea crest Scrub (54 acres)
- Yamato Scrub (217 acres)
- Leon M. Weekes Area (12 acres)

The map below shows these natural and beneficial flood water storage areas:

Flood Prone Areas

Flood prone areas are widely scattered throughout the county. Areas close to inland bodies of water and lower elevation areas in the northern and southern sections of the county are particularly susceptible to inland flooding.

The map below depicts Special Flood Hazard Areas areas within the county designated by FEMA as having a one percent chance of inundation in any given year. While some areas of_the county might believe they are immune from flooding based on recent history, published elevations, and/or designations on Flood Insurance Rate Maps (FIRMS), virtually the whole county has proven to be susceptible to short term localized flooding when extraordinary rain events have exceeded the capacity of natural runoff and absorption.

A review of recent flood events suggests that Palm Beach County significantly surpasses the national average of 25% of flooding occurring outside of Special Flood Hazard Areas. Even a significant number of county properties designated as "repetitive flood loss list" by the National Flood Insurance Program (NFIP) lie outside Special

Flood Hazard Areas.

Historically, the Palm Beach County rainfall area has the highest annual rainfall in South Florida, followed by Broward County and Miami-Dade rainfall areas. The county's east coast communities receive higher rainfall levels than the inland and western areas. Even during drought years, there have been instances where the coastal rainfall in eastern areas of the county were close to the average. Because there are no large impoundments in the eastern coastal rainfall areas, runoff has to be discharged into the Atlantic Ocean.

Flood Control

Flood control in Palm Beach County is dependent on a complex, integrated system of canals, waterways and flood control devices operated by the South Florida Water Management District, 20 drainage districts, and thousands of privately owned canals, retention/detention lakes and ponds.

The county's drainage system is designed to handle excess surface water in three stages. The "neighborhood or tertiary drainage systems" (made up of community lakes, ponds, street and yard drainage grates or culverts, ditches and canals) flow into the "local or secondary drainage system"(made up canals, structures, pumping stations and storage areas) and then into the "primary flood control system" (consisting of South Florida Water Management District canals and natural waterways and rivers), ultimately reaching the Atlantic Ocean.

The Water Control Districts serving Palm Beach County include the following:

South Florida Water Management District	
Acme Improvement District	Pahokee Drainage District
East Beach Water Control District	Pelican Lake WCD
East Shore Water Control District	Pine Tree WCD
Gladeview Drainage District	Ritta WCD
Highland Glades Drainage District	Seminole WCD
Indian Trail Improvement District	Shawano Drainage District
Lake Worth Drainage District	South Florida Conservancy District
Loxahatchee Groves WCD	South Indian River WCD
North Palm Beach Heights WCD	South Shore Drainage District
Northern PBC Improvement District	WPB Water Catchment Area

Drainage System Maintenance

Palm Beach County's drainage systems consist of a combination of natural drainageways and channels, engineered channels, storm sewers and ditches, and detention/retention basins contiguous to drainage systems. These systems can easily lose their carrying capacity with debris accumulation, sedimentation buildup and/or vegetation growth, becoming ineffective for flood prevention. Extensive maintenance is necessary to ensure flood preparedness.

Responsibility for inspection and maintenance of drainage systems falls to a variety of organizations depending on the type of system involved:

- South Florida Management District and the various water control districts provide oversight for the routine inspection of the drainage systems under their purview and for debris clearance and other maintenance activities.
- Storm drain maintenance falls within the purview of the County's Road & Bridge Division, municipal public works departments, and the State Department of Transportation.
- Inspection, clearance, and maintenance of privately owned systems are the responsibilities of property owners and associations.

In rare instances, environmental regulations may prohibit removing natural debris and new growth from some drainageways.

Maintenance activities, most commonly, include ongoing monitoring, debris and sediment removal, and the correction of problem sites and damaged systems by field crews. Quite often, maintenance actions are prompted by citizen complaints and reports. Given the shear size of the County, the vigilance of citizens is a critical element in identifying potential drainage problems. The County has ongoing programs for structural and permanent changes to channels or basins (e.g. enlargement of openings, installation of grates to catch debris, installation of hard bank protection, construction of new retention basins, etc.) to reduce flooding and maintenance problems. Coastal communities commonly undertake a variety of maintenance measures including dune and mangrove preservation, bluff stabilization, and beach nourishment to protect coastal buildings, property, and coastal water bodies from flooding and erosion.

The county and municipalities work continuously to improve and maintain their stormwater management systems. Some of these projects are self funded and others depend on grant support. Drainage improvement projects are among the most prevalent flood mitigation strategies reflected on the County's Local Mitigation Strategy prioritized project list.

Vulnerability

While damages caused by storm surge and dike failure can be extensive and costly, historically physical damages from inland structural flooding have been relatively minor and isolated. As a predominantly localized event, inland flooding does not pose a significant threat to the ability of the county, municipalities and businesses to carry on normal operations.

People, structures, and infrastructure located within floodplains and areas with poor drainage are most susceptible to inland flooding, particularly to flash flooding. However, flash flooding can and does affect all areas of the county. Continued development will certainly contribute to an increased frequency of runoff flooding.

For the most part, flooding depths are not sufficient to inundate large residential and commercial areas. Developed parcels tend to be elevated to a level that limits significant water intrusion from water build-up. Where water does intrude structures, damage can be costly for individual property owners. Beyond physical water damage, perhaps the greater issue is the potential for mold infestation, which can create health problems for occupants and lead to costly cleanup and repairs.

Flooding can cause damage to cars and outdoor equipment, contaminate water systems, and interrupt water treatment. Sewage overflow raises health concerns.

Significant expanses of street flooding are common, can be costly in terms of loss of function for extended periods of time, and can create dangerous, even potentially deadly, driving conditions.

Post storm accidents, especially electrocutions, are not uncommon, when people wander into flood waters where live wires or generators are present.

2.1.1.2 Hurricane/Tropical Storm

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 constructed during the 1970s and 1980s, 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 1970s and 80s were infrequent and of relatively low intensity. Homeowners, business interests, 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 reevaluation of this risk assessment. While experts sometimes disagree on the annual cost of hurricane damage, all sources agree that hurricane Andrew was one of 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 PBC has been increased by the rapid growth over the last few decades, particularly along the coastline. Population risk has also been exacerbated by some complacency due to the recent period of reduced hurricane frequency.

Hurricanes are tropical cyclones with winds that exceed 74 mph and blow counter-clockwise around 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. 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.

Since 1886, 55 storms of hurricane intensity have passed within 125 miles of PBC. This represents an average of one hurricane every two years. The number of direct hits on the southeastern Florida coastline between 1899 and 2013 has been as follows:

- Category 1 Storms: (winds 74 to 95 mph) = 9 storms
- Category 2 Storms: (winds 96 to 110 mph) = 3 storms
- Category 3 Storms: (winds 111 to 120 mph) = 17 storms
- Category 4 Storms: (winds 121 to 155 mph) = 16 storms
- Category 5 Storms: (> 155 mph) = 9 storms

A storm surge is a large dome of water often 50 to 100 miles wide and rising anywhere from four to five 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 tornadoes and inland flooding and heavy rainfall that usually accompany these storms. Hurricane Andrew, a relatively "dry" hurricane, dumped ten inches of rain on south Florida and left many buildings extensively water damaged. Rain water may seep into gaps in roof sheathing and saturate insulation and ceiling drywall, in some cases causing ceilings to collapse.

Aside from direct property damage, the potential for crop damage and economic disruption from hurricanes and tropical storms is significant. Tropical Storm Mitch dropped as much as 10 inches of rain in some south Florida areas, which resulted in approximately $20 million in direct crop damage in PBC. The largest monetary loss, however, was sustained by the sugar cane mills in the western part of the County, where contracted part-time help and union workers must be paid whether or not the mills run. The six mills in PBC and the one in Hendry combined lost about $500,000 a day in wages. The mills remained down until the fields dried out.

Palm Beach County has 671 listed farm proprietors with approximately 8,000 employees and a total annual payroll of $12,894,000. PBC has approximately 627,924 acres of farmland currently valued at $2,417,525.

Historical Hurricane/Tropical Storm Events

Hurricane of September 1902. This hurricane made landfall near West Palm Beach on 11 September 1902 and exited the state near Tampa Bay on the 12th. Maximum-recorded winds were only 78 mph, however 14 deaths were attributed to this storm and one ship was wrecked near Jupiter. Damages specific to PBC are not recorded.

Hurricane of July 1926. A Category 1 hurricane with winds of 90 mph made landfall near Jupiter 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. Palm Beach County experienced high winds and flooding.

Hurricane of September 1928. This hurricane made Florida landfall near the Town of Palm Beach as a strong Category 4 hurricane with one of the lowest barometric pressures ever recorded in this area (928.9 millibars/27.42 in). This was the 5th most intense hurricane ever to make landfall in U.S. territory. It reached Lake Okeechobee with very little diminished intensity and moved across the northern shoreline. This sent a massive storm surge southward flooding lower areas on the southern and western edge of the lake. In excess of, 2,500 people were killed 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 of central Florida was affected by this killer storm, PBC mainly experienced wind damage and flooding from the associated rains.

Hurricane of September 1922. This major, Category 2 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. Minimal damage was reported from PBC, although there was some flooding in the lower areas of the County.

Hurricane of August 1929. A 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 the 12^{th}. Minimal damage and flooding was experienced in PBC.

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. Palm Beach County received heavy rains and high winds from this storm.

Hurricane of August 1949. This Category 2/Category 4 hurricane made landfall in Florida between Delray Beach and Palm Beach with winds of 120 mph and a barometric pressure of 954.0 millibars (28.17 in). As it moved inland, its center passed over the northern part of Lake Okeechobee, but the levees in that area held and no major flooding occurred. Damages were estimated at $45 million. Tides of 11.2 ft. at Fort Pierce, 8.5 ft. at Stuart, and 6.9 ft. at Lake Worth were reported. Stuart sustained severe damages from this storm. Statewide, over 500 people lost their homes as a result of this storm.

Hurricane Donna of September 1960. Hurricane Donna was the 6th most intense U.S. Hurricane at landfall. This storm crossed the Florida Keys into the Gulf of Mexico then turned back toward the northeast and struck the Florida mainland just south of Naples. It then turned north moved across Ft. Myers, where it turned again to the northeast, moved across the state, and exited Florida at just north of Daytona Beach. Rainfall ranged from five to ten 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 and inundated considerable agricultural land. At least 12 people were killed statewide and more than 1,794 were injured.

Hurricane Cleo of August 1964. This small but destructive storm moved northward into Biscayne Bay on 27 August 1964. Palm Beach County received three to five inches of rain associated with this storm, mostly in the eastern portion of the County. Most sustained damage was associated with wind rather than flooding.

Hurricane Agnes of June 1972. Hurricane Agnes moved through the Gulf of Mexico off Florida's west coast. While it never struck central Florida mainland, it spawned the worst severe weather outbreak in Florida history. The outer rain bands covered virtually the entire peninsula and spawned numerous tornadoes. There were six people killed and 40 injured in Okeechobee, one killed and seven injured in La Belle, 40 injured at Big Coppit Key, two injured at Bassinger, three injured in Haines City, four at Crystal Springs, 11 in Malabar, and 12 in Cape Canaveral. Most of those injured lived in manufactured housing. Damage estimates totaled $5 million to public property and $26 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 coastline of Florida from PBC northward. Officially classed as a minimal hurricane, its strongest winds were offshore when it officially made landfall approximately 20 miles south of Melbourne. Tides were three to five feet above normal along the eye track and one to two feet above normal elsewhere along the Florida's east coast. Light to moderate erosion was reported along the PBC coastline. Storm rainfall was quite variable from location to location. Totals generally ranged from six to nine inches, but some stations reported as much as 11 inches during the storm's passage.

Tropical Storm Isidore of September 1984. Tropical Storm Isidore made landfall near West Palm Beach on 27 September 1984 and moved inland toward Orlando. Highest winds were 72 mph and rainfall was reported to be five to seven inches over a 24-hour period. There was some flooding, but this occurred mostly in northern Florida.

Tropical Storm Bob of June 1985. On 22 June 1985, Tropical Storm Bob moved across south Florida in a northeasterly direction from Fort Myers to just north of Palm Beach. Rainfall from this event did minor damage, mostly along Florida's west coast. Palm Beach County suffered moderate agricultural losses.

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 then turned back to the northeast and struck the mainland Florida Peninsula near Fort Myers on 12 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 52 mph, the storm caused eight deaths and 42 injuries.

Palm Beach County had experienced a period of extensive growth during the 1970s and 1980s. Most of this growth took place in the form of residential and commercial land development in the eastern portion PBC close to the Intracoastal Waterway and the beaches. The rain event associated with Tropical Storm Gordon in October of 1994 was the most significant rain event to occur after this period of development. Essentially, the County received 17+ inches of rain over a 2-day period. Rainfall was not evenly disbursed over the whole County.
Statewide damages associated with Gordon totaled over $400 million. Agricultural interests sustained $275 million in damages primarily from the widespread flooding. Vegetable and citrus crops were hit particularly hard. Exacerbating the flooding associated with Tropical Storm Gordon was the fact that prior to October 1994 had been a very wet year for PBC. Rainfall recorded through September of that year had reached 74 inches before the Gordon event occurred. Altogether PBC received approximately 100 inches of rain in 1994, making that year the wettest year since 1912.

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

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. Palm Beach County received minimal rains from this storm, which passed to the north of the County. Extensive agricultural damage was reported throughout South Florida.

Hurricane Irene of October 1999. Hurricane Irene weakened to Tropical Storm force winds by the time it tracked north through the Everglades, but it menaced South Florida and PBC with incessant rains and its sluggish pace. In the end, it dropped 10-20 inches of rain throughout the County, causing extensive flooding in some areas. By Friday evening (October 15) 125,000 homes in PBC were without power.

Hurricane Frances of September 4, 2004. Hurricane Frances formed from a tropical depression in the deep tropical Atlantic on 25 August about 1400 miles east of the Lesser Antilles and reached hurricane strength on 26 August. Frances became a Category 4 Hurricane on 28 August while about 700 miles east of the Lesser Antilles. Frances then moved generally west-northwest and weakened to a Category 2 hurricane while crossing the northwest Bahamas. After stalling for about 12 hours on 4 September in the Florida Straits between Grand Bahama Island and the southeast Florida coast, the center of the nearly 70-mile diameter eye crossed the Florida coast near Sewalls Point, at 1 A.M. EDT, 5 September with the southern eyewall affecting the extreme northeast portion of PBC. Frances moved farther inland just north of Lake Okeechobee and weakened to a tropical storm before crossing the entire Florida Peninsula and exiting into the Gulf of Mexico just north of Tampa. It made a second landfall as a tropical storm in the eastern Florida Panhandle.

Sustained tropical storm-force winds likely occurred in all six south Florida counties. Although no sustained hurricane-force winds were officially observed in any of the six south Florida counties, a National Weather Service (NWS) instrument on the eastern shore of Lake Okeechobee at Port Mayaca, just across the PBC border, measured a sustained wind of 85 mph. At West Palm Beach International Airport, the highest sustained wind was 64 mph with a peak gust of 82 mph and the lowest observed barometric pressure was 972 millibars. A SFWMD instrument measured a peak wind gust of 92 mph over the eastern portion of Lake Okeechobee. The estimated peak wind gust in the Palm Beach metro area was 91 mph at Jupiter Inlet with a peak wind gust of 87 mph measured by a Coastal-Marine Automated Network (C-MAN) station at Lake Worth Pier. In Glades County near the western shore of Lake Okeechobee, the highest measured sustained wind was 60 mph with a peak gust of 90 mph. In Clewiston, a sustained wind of 60 mph with a gust of 80 mph was estimated.

A maximum storm-total rainfall amount of 12.56 inches was measured at Palm Beach International Airport with 10.26 inches of that occurring in a 24-hour period. Unofficial storm-total rainfalls included 9.56 inches at Boynton Beach, eight inches at Deerfield Beach and 7.18 inches at Hillsboro Canal. Widespread storm-total amounts of three to five inches occurred in southeast and interior south Florida with southwest Florida averaging one to three inches. Rainfall flooding was mostly minor except for a few locations in PBC, which had up to three feet of standing water. A section of I-95 in PBC was closed due to a large sinkhole. The maximum storm surge was estimated to have ranged from two to four feet along the northeast Palm Beach Coast to one to two feet along the northeast Broward Coast.

Within the confines of the Herbert Hoover Dike, water levels on Lake Okeechobee fluctuated up to five feet above and below normal. Coastal beach erosion was moderate in Palm Beach and portions of Broward counties.

There were no confirmed tornadoes. There were no known direct deaths, but at least nine people died in the aftermath. Six of these deaths occurred in PBC, mainly as the result of vehicle-related accidents or from drowning. An unknown number of injuries occurred. Property damage at the coast occurred mainly to marinas, piers, seawalls, bridges and docks, as well as to boats. Inland structure damage included 15,000 houses and 2,400 businesses in PBC. Wind damage to house roofs, mobile homes, trees, power lines, signs, screened enclosures and outbuildings occurred over much of southeast Florida including areas near Lake Okeechobee, but was greatest in PBC. A preliminary damage estimate for Frances in south Florida was $620 million, including $500 million in Palm Beach, $80 million in Broward, and $24 million in Miami-Dade. Crop damage in PBC was estimated at an additional $70 million to sugar cane and vegetables and additional heavy losses occurred to nurseries. Florida Power and Light reported power outages for 659,000 customers in Palm Beach, 590,000 in Broward, 422,000 in Miami-Dade, 29,200 in Collier, 2,500 in Hendry and 1,700 in Collier. An estimated 17,000 persons sought refuge in public shelters in PBC and nearly 7,000 in Broward County.

Hurricane Jeanne of September 25, 2004. Just three weeks after Hurricane Frances, Hurricane Jeanne struck the same area of southeast Florida. Hurricane Jeanne formed from a tropical depression just east of the Leeward Islands on 12 September. She moved across Puerto Rico and Hispaniola then turned north into the Atlantic and became a hurricane on 20 September. Jeanne made a clockwise loop for three days in the Atlantic north of Hispaniola before moving west-northwest. It strengthened to a Category 2 Hurricane while over the northwest Bahamas and then made landfall around 11 P.M., 25 September near the south end of Hutchinson Island, nearly coincident with the landfall point of Hurricane Frances just three weeks before. The 40-mile diameter eye was not quite as large as Frances, but the southern eyewall again affected northeast PBC. After landfall, Jeanne initially moved along a track similar to Frances, just north of Lake Okeechobee as it weakened to a tropical storm then turned to the northwest and moved over the northwest Florida Peninsula.

Although slightly smaller and stronger then Hurricane Frances, winds and pressures over southeast Florida were remarkably similar to Frances. Unfortunately, the Automated Surface Observing System (ASOS) at Palm Beach International Airport stopped sending data during the height of the hurricane. Sustained tropical storm-force winds likely occurred over most of Palm Beach and northeast Glades counties and portions of Broward, Hendry, and Collier counties. Although no sustained hurricane-force winds were officially observed in any of the six south Florida counties, portions of northern PBC mostly likely experienced them. A SFWMD instrument in the Martin County portion of Lake Okeechobee measured a 15-minute sustained wind of 79 mph with a peak gust of 105 mph. In metropolitan Palm Beach, the highest official sustained wind speed was 60 mph with a peak gust of 94 mph from the C-MAN station at Lake Worth Pier. An unofficial peak wind gust of 125 mph was measured in West Palm Beach at the Solid Waste Treatment Plant. Near Clewiston, the highest measured sustained wind was 21 mph with a peak wind gust of 72 mph from a SFWMD instrument. The lowest barometric pressure of 960.4 millibars was measured at a SFWMD site in the Martin County portion of Lake Okeechobee.

A SFWMD gauge measured a maximum storm-total rainfall amount of 10.22 inches over the eastern portion of Lake Okeechobee. A SFWMD gauge about four miles west of West Palm Beach International Airport measured 9.10 inches with 8.79 inches of that occurring in a 24-hour period. At Moore Haven, 5.99 inches of rain was measured. Mostly minor rainfall flooding was observed except in Palm Beach Gardens, Jupiter and in the farmlands of western PBC where it was more severe.

The estimated maximum storm surge ranged from two to four feet along the northeast Palm Beach Coast to one to two feet along the northeast Broward Coast. Within the confines of the Herbert Hoover Dike, water levels on Lake Okeechobee fluctuated up to seven feet above and below normal causing severe flooding of some marinas. Beach erosion was moderate in Palm Beach.

There were no confirmed tornadoes. There were no known direct deaths but four persons died in the aftermath. An unknown number of injuries occurred. Storm surge and winds at the coast caused damage to condos, marinas, piers, seawalls, bridges and docks, as well as to boats and a few coastal roadways. Inland wind damage to building roofs, mobile homes, trees, power lines, signs, and outbuildings occurred mainly over PBC and portions of eastern Glades and Hendry counties. Preliminary damage estimates for Jeanne in southeast Florida were $220 million, including $260 million in PBC, $50 million in Broward and $10 million in Miami-Dade. Agricultural Damage in PBC was estimated at $20 million. Florida Power and Light reported outages occurred to 591,200 customers in PBC, 165,900 in Broward, 25,100 in Miami-Dade, 5,200 in Collier, 2,000 in Hendry and 1,500 in Glades. An estimated 12,524 persons sought refuge in public shelters in PBC.

Hurricane Wilma October 24, 2005. Wilma was a classic October hurricane, which struck South Florida as a Category 2 hurricane on October 24th, 2005. Wilma developed from a tropical depression near Jamaica, a typical source region for October tropical cyclones, on the afternoon of 15 October. It became the 21st named storm of the season during the morning hours of 17 October which tied the record for the most named storms in one season originally set back in 1922. Wilma underwent a rapid intensification cycle, which began on 18 October and ended in the early morning hours of 19 October, with a central pressure decrease of 88 millibars in only 12 hours. The central pressure reached 882 millibars, making Wilma the most intense hurricane ever in the Atlantic Basin, lower than Hurricane Gilbert in September 1988. Wilma went on to make landfall on Cozumel Island just off the Yucatan Peninsula as a strong category 4 hurricane on 21 October, then drifted erratically over the Yucatan Peninsula through the evening 22 October. Wilma began to move off the northeast coast of the Yucatan Peninsula on the night of the 22nd, then gradually accelerated northeast over the southern Gulf of Mexico toward South Florida as a strong mid and upper-level trough over the central United States moved south and forced a southwesterly steering flow.

The hurricane made landfall as a Category 2 storm shortly before 7 AM Monday October 24th on the southwest Florida coast between Everglades City and Cape Romano with maximum sustained winds of 125 mph and an estimated minimum central pressure of 950 millibars. Wilma exhibited a very large 55 to 65 mile-wide eye while crossing the state, and the eye covered large portions of South Florida, including the eastern two-thirds of Collier County, extreme northwestern Miami-Dade County, the southern and eastern third of Hendry County, most of Broward County, and all of PBC. The eye also clipped the southeastern shore of Lake Okeechobee. The eye wall affected virtually all of South Florida. Around 10:20 AM, a SFWMD meteorological station located at the south end of Lake Okeechobee reported sustained winds of 102 mph. The highest recorded gusts were in the 100-120 mph range. The winds on the back (south/west) side of the eye wall were as strong, if not stronger, than those on the front (north/east) side. This goes against the common, but sometimes erroneous, belief that the strongest winds in a hurricane are always in the right-front quadrant of the storm. This occurred over much of South Florida, except for central and southern Miami-Dade County, which barely missed the southwestern portion of the eye wall and likely contributed to the heavier damage across Broward and Palm Beach counties compared to slightly lesser damage across much of Miami-Dade and Collier counties.

Wilma moved rapidly northeast across the state, with an average forward speed of 25 mph. Wilma exited the east coast over northeastern PBC near Palm Beach Gardens around 11 AM Monday October 24th as a Category 2 hurricane with maximum sustained winds of around 105 mph. It traversed the southern peninsula in about four hours. Rainfall amounts across South

Florida generally ranged from two to four inches across southern sections of the peninsula to four to six inches across western Collier County and around Lake Okeechobee, with a maximum amount of 7.21 inches in Clewiston, Downtown Miami and Northeast Miami.

In Collier, Miami-Dade, Broward, and Palm Beach Counties, the winds killed a total of five people. Total damage estimates from all the effects ranged from $9 to $12 billion. Extensive damage to crops was reported, with an estimated $222 million in crop damage for Miami-Dade County alone. Damage was widespread, with large trees and power lines down virtually everywhere, causing over 2 million customers to lose power. Structural damage was heaviest in Broward and Palm Beach counties where roof damage and downed or split power poles were noted in some areas. High-rise buildings suffered considerable damage, mainly in the form of broken windows. This was observed mainly along the southeast metro areas. An F1 tornado caused snapped power poles, uprooted large trees, and significant damage to mobile homes. Small swaths of greater damage elsewhere in South Florida have not been attributed to tornadoes, but were instead likely caused by "mini-swirls", small vortices within the eye wall.

Tropical Storm Noel of October 20-21, 2007. Tropical Storm Noel moved north from eastern Cuba across the western Bahamas Islands from 20 to 21 October. The interaction of Noel with a strong high-pressure area located over the Mid-Atlantic States produced strong winds over southeast Florida and the adjacent waters well before Noel made its closest passage to the area early on 1 November. Damage was minor and mainly confined to a few downed power lines. Around 5,000 customers lost power in the three-county area of Palm Beach, Broward, and Miami-Dade. Rainfall amounts were light, ranging from a half-inch (0.5) to nearly two inches. A strong pressure gradient between high pressure over the Mid-Atlantic States and Tropical Storm Noel over Hispaniola and eastern Cuba caused a prolonged period of strong east winds over Southeast Florida and the adjacent waters. As Noel moved north across the western Bahamas, the strong winds continued across southeast Florida. The event caused severe beach erosion, coastal flooding, and minor wind damage. The event lasted into the first few days of November.

Tropical Storm Fay of August 15-22, 2008. The center of Tropical Storm Fay moved across Key West early in the evening of August 18^{th} and into the mainland of South Florida at Cape Romano shortly before 5 AM on the 19th. Minimum central pressure was 989 millibars at landfall, but continued to decrease after landfall to 986 millibars at Moore Haven on the southwest shore of Lake Okeechobee.

Maximum sustained winds were estimated to be around 60 mph at landfall, however as the storm tracked across the western Everglades and Southwest Florida the radar presentation continued to organize and winds increased to around 65 mph around Moore Haven. A maximum wind gust of 79 mph was recorded on a South Florida Water Management gauge on Lake Okeechobee as the storm passed. Wind gusts of tropical storm force were felt area-wide, with sustained tropical storm force winds experienced over portions of mainland Monroe, Collier, Hendry and Glades counties as well as the immediate coastal sections of Miami-Dade, Broward, and Palm Beach Counties. Wind damage was most significant in the areas affected by tropical storm force sustained winds, primarily around Lake Okeechobee and interior sections of southwest Florida, with only minor wind damage elsewhere.

The storm caused over $10 million in beach erosion along PBC's coastline. A maximum rainfall total of 16.17 inches was reported with this event at Moore Haven in Glades County. Flooding from these rains produced total damage estimates of $280,000, primarily in Glades and Hendry counties. Rainfall elsewhere ranged from three to six inches in southeast Florida, and six to eight inches in southwest Florida, with isolated amounts up to ten inches in coastal PBC. All the associated effects of Tropical Storm Fay in South Florida resulted in one fatality, four injured, and $2.949 million in property damage. Two tornadoes produced $1.25 million in damage, but caused no injuries or fatalities. The one fatality and three of the injuries were indirectly caused by Fay with a traffic accident in PBC. The direct injury occurred when a kite surfer on Fort Lauderdale Beach lost control during a squall and was slammed into a building along A1A. Fay caused tropical storm force winds, significant rainfall flooding in some areas and two confirmed tornadoes.

Hurricane Irene of August 25–26, 2011. Hurricane Irene passed over the western Bahamas about 170 miles east of the Florida coast. The western fringes of Irene impacted southeast Florida with high surf and winds bordering on tropical storm force. Winds to marginal tropical storm force and high surf impacted the PBC coast as the outer fringes of Hurricane Irene passed over the area. Sustained winds to 26 knots with gusts to 46 knots were measured near the coast from Jupiter through Boynton Beach associated with intermittent squalls. Wind damage was limited to a few uprooted trees and knocked down tree branches, causing minor power outages. High surf pounded the coast during the day, causing damage to Lake Worth Pier totaling $2,000 and injuring 8 people at Boynton Inlet when a large wave crashed onto the jetty while onlookers were present. Maximum storm surge at Lake Worth Pier was 1.28 feet with a maximum tide of 1.55 feet.

Tropical Storm Debby of June 22-27, 2012. The outer bands from Tropical Storm Debby located in the Northeast Gulf of Mexico continued to move over South Florida. Severe thunderstorms developed during the late morning into the afternoon with severe wind gusts and eight tornadoes occurring over a span of four hours in Lake Worth, Okeechobee Boulevard and east of I-95, a warehouse district just south of Okeechobee Boulevard, Tamarind Avenue, and Banyan Boulevard. Additional detail related to the tornadoes is discussed below.

Hurricane Isaac of August 26, 2012. The center of Tropical Storm Isaac moved over the Florida Straits south of the Florida Keys on Sunday, August 26th, passing just south of Key West. Rain bands and winds on the north side of the circulation of Isaac affected Southeast Florida throughout the day of the 26th and part of the 27th. Highest winds over land were recorded along and near the southeast Florida coast where the highest sustained winds ranged from 40-45 mph, with 25-30 mph sustained winds over most inland areas as well as over southwest Florida. Highest wind gusts ranged from 50-60 mph over most land areas to as high as 65 mph along the Atlantic coast and just offshore. Three-day rainfall totals ending at 8 AM August 28th ranged from 5-7 inches across southeast Florida to 2-5 inches over interior and southwest Florida. The primary exception was over northern metro Broward County and much of PBC where 8 to 12 inches fell, with maximum amounts up to 15-18 inches from west of Boynton Beach to Wellington, The Acreage, Royal Palm Beach, and Loxahatchee. These areas of highest rainfall amounts experienced severe flooding with communities cut off for several days after the storm. Maximum storm tide values were observed at 4.9 feet at Naples, with estimates of 5 to 7 feet along the southern Collier County coast from Goodland to Everglades City. Highest estimated inundation values of up to 2 feet above ground level were noted in Goodland and Everglades City. Major beach erosion was also observed along the Collier County beaches, with moderate beach erosion along the Atlantic beaches. All of the associated effects of Isaac in south Florida resulted in about $17.2 million in property damage. Specifically, Isaac's inland floodwaters resulted in about $10 million in damages, mostly in Palm Beach and Broward counties. Flooding caused by storm tides along the coast in Collier County resulted in about $400 thousand in damage. Damage from beach erosion in Collier and Broward counties was estimated at $6 million. Wind damage was estimated at $750,000. Approximately 112,000 customers lost power during the storm in South Florida.

Hurricane Sandy of October 25-26 2012. Hurricane Sandy began to affect the PBC coast and its adjacent Atlantic waters with tropical storm force winds during the evening of 25 October as it moved slowly north across the northwest Bahamas. Tropical storm force wind gusts were first observed along the coastal PBC region by early in the evening of 25 October. Several Weather Flow sensors along and near the PBC coast recorded Tropical Storm Force wind gusts during the evening of October 25th with a peak wind gust of 67 mph observed at Jupiter. However, as Hurricane Sandy continued to move slowly north and then northeast over the Atlantic waters north of the Bahamas through the 28th the main impact along the PBC coast were large northeast swells generated by the storm, which pummeled the Southeast Florida coast with significant beach erosion and coastal flooding. Large breaking waves of possibly over 20 feet were estimated along the coast. As a result, major coastal flooding occurred with the most significant impacts experienced from central Palm Beach north, including the Manalapan area where beachfront structures were threatened by water intrusion. In all, there was an estimated $14 million in damage sustained in PBC. A total of 44,270 customers lost power. A maximum storm tide of 5.2 feet above mean lower low water (MLLW) was observed at Lake Worth Pier on October 28th at 7:12 AM along with a maximum storm surge of 2.28 feet on 28 October at 2:26 AM. Similar tide and surge levels were measured at the highest daily high tide during this period, generally between 7:00 and 9:00 AM.

2.1.1.3 Tornado

Florida ranks third in the United States 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 0.004, or once per 250 years.

Tornadoes are classified using the Enhanced Fujita (EF) Scale as follows:

Scale	Wind speed		Relative frequency	Potential damage	
	mph	km/h			
EF0	65–85	105–137	53.5%	Minor damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0.	
EF1	86–110	138–178	31.6%	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.	
EF2	111–135	179–218	10.7%	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.	
EF3	136–165	219–266	3.4%	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.	
EF4	166–200	267–322	0.7%	Extreme damage to near-total destruction. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.	
EF5	>200	>322	<0.1%	Massive Damage. Strong frame houses leveled off foundations and swept away; steel-reinforced concrete structures critically damaged; high-rise buildings have severe structural deformation. Incredible phenomena will occur.	

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is generated by a thunderstorm (or sometimes as a result of a hurricane) and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado is a result of the high wind velocity and wind-blown debris. 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. Occasional wind-storms accompanied by tornadoes such as the winter storm of 1992 are also widespread and destructive. Of the 124 tornadoes seen in PBC between 1950 and 2002, 87 were classified as F0 tornadoes (59%), 28 (21%) were classified F1, eight (9%) were classified as F2, and one (1%) was classified as an F2 tornado. Between 1950 and 2008 there have been 277 reported tornadoes, 102 people injured and one death in PBC as a result of a tornado. The damage is estimated at over $150 million dollars since 1950. Since 2008 there have been six (6) reported tornadoes.
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 means that conditions are favorable for tornadoes to develop
- A Tornado Warning means that a tornado has actually been sighted

August 7, 2002. On August 7, 2002, there was a Tornado Watch issued by the NWS. Two tornadoes touched down later that evening in the northern part of PBC. Jupiter suffered damage to a shopping plaza. No injuries were reported. A second tornado touched down in unincorporated PBC in a mobile home park causing major damage in some areas. The tornado moved in the direction of east southeast toward Interstate 95. The tornado caused considerable damage to an industrial park located in unincorporated PBC/Riviera Beach. The tornado continued in the same direction damaging several neighborhoods in Riviera Beach. It continued through additional neighborhoods in Riviera Beach just north of Blue Heron Boulevard. The damage path was narrower until it lifted or dissipated near the intersection of Blue Heron Boulevard and Old Dixie Highway.

From all of the evidence considered, including some damage that was very close to F2 damage, National Weather Service Forecast Office (WFO) Miami classified the unincorporated PBC-Riviera Beach tornado as F1 on the Fujita scale, meaning that winds were approximately 72 to 112 mph. The worst damage was apparently caused by winds near the upper end of that range. Miami (WFO) meteorologists determined that the main path of the tornado was approximately 1/6 mile (200 yards) wide at its widest point and about four miles long. There were no deaths, but 28 individuals suffered minor injuries. There were 22 dwellings destroyed and a total of 226 suffered damage. The damage has been estimated to be $70 to $80 million dollars.

June 12, 2008. A small waterspout briefly moved onshore at Delray Beach just north of Atlantic Avenue. The waterspout stirred up some beach umbrellas and blankets, and dissipated shortly after touching land.

August 19, 2008 Wellington Tornado. At about 1:20 AM on August 19, 2008 a tornado associated with a spiral band of strong thunderstorms rotating around the circulation of Tropical Storm Fay moved through the Village of Wellington. The tornado began near Polo Mark Middle School near the intersection of Lake Worth Road and Isles View Drive and ended just southwest of Wellington High School. The tornado had an approximate damage path of 2.75 miles from the southeast to the northwest and was around 100 yards wide at its widest point, but averaged 70 to 80 yards in width.

The tornado moved through a number of equine farms and polo grounds as well as two subdivisions in Wellington. The most significant damage was to Palm Beach Equine Clinic, where stables were de-roofed, power poles snapped, and many trees fell in crisscrossing patterns. The Equine Veterinary lost more than 95 percent of its roof tiles; a heavy trailer was tossed about 40 yards from its previous location northwest of the International Polo Club; and an apartment home near Folkstone Circle lost about 70 percent of its roof tiles. There were no deaths or injuries to people or animals.

March 21, 2009 Palm Beach Gardens Tornado. A warm front lifted north through South Florida during the day of March 21. Unstable air south of the front combined with warm temperatures produced strong and severe thunderstorms over PBC. A total of about 5,000 customers lost power. A tornado touched down in Palm Beach Gardens in the Ballenisles Golf Country Club near Holly and Seagrape Drives. The tornado moved southeast, across Military Trail and Lilac

Street, and lifted near Palm Beach Gardens High School. Minor roof damage was noted to a few residential buildings, as well as, uprooted trees and a damaged fence near Palm Beach Gardens High School. Final tornado rating was EF0 based on an Emergency Management survey and analysis of damage photos.

March 21, 2009 Glen Ridge Tornado. A second tornado touchdown occurred in West Palm Beach near Palm Beach Lakes Boulevard and Australian Avenue. This is the same storm that produced the tornado in Palm Beach Gardens, but eyewitness reports and photographs indicate a likely second tornado touchdown in the West Palm Beach area. Damage was minor (EF0) consisting of downed traffic signals, broken tree branches, and a flipped bus bench.

April 12, 2010. A brief tornado occurred 2 miles northeast of Belle Glade. The PBC Sherriff's office reported a tornado 2 miles northeast of the PBC Sherriff's office substation along state road 80; however, no damages or injuries occurred.

August 7, 2010. A small and short-lived tornado moved through the West Boca area, with numerous reports received of trees down, overturned patio furniture, street lights knocked down, some roofing shingles blown off houses, and downed power lines from around the intersection of Powerline Road and SW 18th Street to the Boca Point Golf Course. No major structural damage was reported. No damage assessment was performed by PBC officials due to the minor nature of the damage.

January 25, 2011. A small and brief tornado touched down in the Cameo Woods development of Boca Raton near the intersection of Camino Real and Military Trail. Damage was exclusively to vegetation, including an uprooted large avocado tree and several large branches snapped off or broken. About 20 trees in total were damaged by the tornado. Estimated wind speeds were in the 70-75 mph range, indicative of an EF0 tornado.

June 24, 2012. The outer bands from Tropical Storm Debby located in the Northeast Gulf of Mexico continued to move over South Florida. Severe thunderstorms developed during the late morning into the afternoon with severe wind gusts and eight tornadoes occurring over a span of four hours. This event spawned the most number of tornadoes in one day over the southern Florida peninsula since October 14, 1964 when Hurricane Isbell also spawned eight tornadoes. All of the tornadoes were of EF0 intensity.

A brief tornado in Lake Worth touchdown occurred and damage was confined to a few homes on North A Street and 15th Avenue, between US 1 and I-95. Damage was minor and consisted primarily of vegetation and debris from a nearby park.

First report of damage was to a carport south of Okeechobee Boulevard and east of I-95. The tornado traveled through a warehouse district just south of Okeechobee Boulevard and east of Australian Avenue, damaging roofs and doors to a warehouse building. The tornado then crossed Okeechobee Boulevard and traveled between Australian and Tamarind Avenues, damaging trees and knocking down a large metal gate at the West Palm Beach train station. A railroad-crossing arm was broken at Tamarind Avenue and Banyan Boulevard; Discontinuous path of 1.2 miles and tornado width of probably no more than 20 yards. Maximum winds were likely in the upper end of EF0 scale (75-85 mph), with most areas along the path probably experiencing low end EF0 winds (65-75 mph).

2.1.1.4 Severe Thunderstorm/Lightning

A severe thunderstorm is defined as a thunderstorm containing one or more of the following phenomena: hail 2/4" or greater, winds gusting in excess of 57.5 mph, and/or a tornado. 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 supercell thunderstorms. A supercell 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. Supercell thunderstorms are responsible for producing the majority of severe weather, such as large hail and tornadoes (NOAA). Downbursts are also 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 even occur with showers too weak to produce thunder (NOAA). Strong squall lines can also produce widespread severe weather, primarily very strong winds and/or microbursts.

When a severe thunderstorm approaches, the NWS will issue alerts. Two possible alerts are:

- Severe Thunderstorm Watch - Conditions are favorable for the development of severe thunderstorms
- Severe Thunderstorm Warning - Severe weather is imminent or occurring in the area

Thunderstorms are common in PBC, and area residents are quite familiar with them and the severe weather they can bring. In 1997, thunderstorms produced 102 tornadoes and other damaging winds and hail. These winds injured 121 people and caused over $28 million in damage throughout the state.

Perhaps the most dangerous and costly effect of thunderstorms is lightning. As a thunderstorm grows, electrical charges build up within the 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, they connect and complete the electrical circuit. Charges from the ground then surge upward at nearly one-third the speed of light and produce a bright flash of lightning (Cappella, 1997).

On average, more people are killed by lightning than any other weather event. Florida leads in the nation in lightning related deaths and injuries (National Lightning Safety Institute). Florida also has the most strikes, about 12 strikes per square kilometer per year in some places (National Lightning Safety Institute). Nationwide, lightning related economic losses to over $5 billion dollars per year, and the airline industry alone loses approximately $2 billion a year in operating costs and passenger delays from lightning. From July of 1959 to August of 2002 there have been 25 deaths and 92 injuries as a result from lightning strikes. The peak months for lightning strikes are June, July, and August, but no month is safe from lightning danger.

In Palm Beach County, from January 2004 – July 2014, experienced 90 thunderstorm events with winds gust over 50 miles per hours between January 2004 and July 2014 with the highest wind gust occurring in the city of Riviera Beach with wind gust reaching 80 miles per hour on August 2, 2004. This event caused $5000 in damage when wind gust blew shingles off a duplex home and blew down power lines. There was only one recorded injury that occurred on February 26, 2008 when thunderstorm winds produced damage at the Moroso Motor Sports Park on BeeLine Highway in North Central Palm Beach County. An awning was blown off a trailer, and a man was injured when a 400-500 pound water barrel struck him. Damage was also done to a truck on site. The total amount of damage for that event was also $5000. Total property damage for all combined 90 events was estimated at $106,000. There was no recorded crop damage or no other recorded injuries.

2.1.1.5 Drought

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, 1998) or a lack of water levels on the ground. 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, 1998).

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 habitats. Social impacts include public safety; health issues; 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, 1998).

The impact is so diffuse that it is difficult to come up with financial estimates of damages. However, FEMA estimates $6-8 billion in losses as the annual average. The worst drought in recent history occurred in 1987-1989, and the National Climatic Data Center (NCDC) reports the estimated cost as $40 billion (National Drought Mitigation Center, 1998).

In PBC, the primary sources of water are Lake Okeechobee, watershed areas, and the County’s wellfields. Normally, excess water from an interconnected series of lakes, rivers, canals, and marshes flows into Lake Okeechobee via the Kissimmee River. When this cycle is disrupted by periods of drought, one of the potentially most damaging effects is substantial crop loss in the western agriculture areas of the County. In addition to obvious losses in yields in both crop and livestock production, drought in PBC is associated with increases in insect infestations, plant disease, and wind erosion. The incidence of wild fires increases substantially during extended droughts, which in turn places both human and wildlife populations at higher levels of risk.

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

The driest year on record for Florida was 2000. The worst drought on record for PBC was from 2000 to 2001. From November 2000 until February 2001, PBC recorded its four driest months on record. An illustration of this dry period occurred after Irene in 1999, when Lake Okeechobee was recorded to be at 18 feet. By May of 2001, it had dropped to nine feet. Lake Okeechobee's average is about 12 feet.

Palm Beach County averages between 50-60 inches of rain a year. In the year 2000, there was less than 40 inches of rain. However, records illustrate rainfall often varies 20 inches above or below the annual average. This leads to the potential drought conditions.

Significant droughts since 1970 to impact PBC include:

1970 - 1971 Drought. Lake Okeechobee reached a minimum stage of 10.29 feet National Geodetic Vertical Datum (NGVD) on June 7, 1971. A rainfall deficit of 42 percent was reported as average for Lake Okeechobee and the Northern, Central, and Southern Everglades for the eight-month period from October 1970 to May 1971.

1972 – 1974 Drought. The 1972–1974 Drought was comparable to the 1971–1972 drought. The rainfall deficit during this period was 47 percent. The minimum lake stage of 10.98 feet NGVD was reached on May 21, 1974.

1980 – 1982 Drought. The 1980–1982 Drought was one of the most severe droughts ever in South Florida. A more than 20-inch rainfall deficit over two years resulted in the decline of the Lake Okeechobee stage from 17.46 feet NGVD on January 1, 1980 to 9.79 feet NGVD on July 21, 1981. The 7.7-foot drop in water level was attributed to a decrease in rainfall and increases in evaporation and water use. The drought for the Lower East Coast and Water Conservation Areas was relieved in 1981 by Tropical Storm Dennis.

1985 Drought. The 1984 wet season and the 1984–1985 dry season had rainfall deficiencies that resulted in the 1985 drought. The upper Kissimmee, lower Kissimmee, and Lake Okeechobee rain areas had an average deficit of 14 inches. The Lake Okeechobee water level declined from 15.14 feet NGVD to 11.82 feet NGVD between January 1, 1985 and June 12, 1985. The South Florida Water Management District had to initiate back pumping to increase water supply. A water shortage plan was also implemented.

1988 – 1989 Drought. South Florida experienced a severe drought from September 1988 to August 1989, during which there was a 21-inch rainfall deficit in the Everglades Agricultural Area and the Lower East Coast. The Lake Okeechobee water level declined from 15.95 feet NGVD on September 1, 1988 to 11.06 feet NGVD on August 8, 1989. During the same period, record storage depletion was reported for Lake Okeechobee and the Water Conservation Area.

1990 Drought. The 1990 drought was a continuation of the 1988–1989 drought. From June 1989 through May 1990, a nine inch rainfall deficit occurred District-wide and was most severe in Everglades National Park. Lake Okeechobee supply-side management and water restrictions were implemented to conserve lake water. The Lake Okeechobee water level declined from 12.25 feet NGVD on January 1, 1990 to 10.47 feet NGVD on June 21, 1990.

2000 - 2001 Drought. A new low water level record of 8.97 feet NGVD was set for Lake Okeechobee on May 24, 2001 during the 2000–2001 drought in South Florida.

2007 Drought. A severe drought affected the region from late 2006 through 2007. This drought followed back-to-back years of unprecedented hurricane activity and higher-than-normal rainfall. On July 2, 2007, water levels in Lake Okeechobee reached an all-time record low of 8.82 feet, eclipsing the mark of 8.97 feet set during the 2001 drought. Rainfall directly over the lake was low enough to qualify the 2007 drought as a 1-in-100-year event. Just north of the lake, along the tributary Kissimmee River and Upper Chain of Lakes, low rainfall produced a 1-in-50-year drought. Only 40 inches of rain fell on the region in an 18 month period, about one-half the average. More than 200 days passed without water flowing from the Kissimmee River into Lake Okeechobee.

A combination of voluntary and mandatory water use restrictions were enacted by the SFWMD in early 2007. Drought conditions diminished somewhat on the coasts during the wet season, however, water supplies in the center of the region (Kissimmee Valley and Lake Okeechobee) continued to decline. Widespread drought conditions continued into late 2007, particularly in the Lake Okeechobee watershed, evidenced by record-low water levels and dry water control structures in the vicinity of the lake.

A wetter than normal February, March, early April and, summer 2008 finally interrupted the extended drought. Punctuating this increased rainfall was the passage of Tropical Storm Fay on August 18 and 19. Fay was a very wet tropical storm, which brought a general average of 7 to 10 inches of rain into southern PBC, including Lake Okeechobee and surrounding areas. Isolated amounts near the southwest shore of Lake Okeechobee were in the 12 to 15 inch range, with Moore Haven recording a two-day total of 16.17 inches. Despite this relief, water use restrictions continued into 2009 and beyond in order to balance longer-term regional water availability and supply needs.

The 2007 Drought was abnormal. Typically, when one part of the regional system is experiencing drought conditions, backup water supplies are available through operation of the Central and Southern Florida Flood Control Project. Previous to the 2007 drought, the SFWMD had never experienced a situation where all three major water storage areas of the system – the Upper Kissimmee Chain of Lakes, Lake Okeechobee, and the Water Conservation Areas – simultaneously had substantially below normal water levels approaching record lows. Lakes in the Upper Kissimmee area were below their regulation schedule and not available as a source of water to Lake Okeechobee. Lake Okeechobee was anticipated to reach a new record and not be available to send backup water supplies to the Lower East Coast. At the same time, the Water Conservation Areas were nearing their minimum regulation schedule, below which no water could be withdrawn. Without a schedule deviation authorized by the U.S. Army Corps of Engineers, the District is not able to withdraw water from these areas to recharge the coastal canals.

The period from November 2005 to March 2007 ranked as the third driest period in recorded history. The Governing Board of the District imposed mandatory water shortage restrictions in areas around Lake Okeechobee in November 2006 and in Southeast Florida in March 2007. Nevertheless, drought conditions intensified substantially. Compounding the lack of rainfall there were consistently windy conditions, low humidity, and lack of cloud cover contributing to above average evapotranspiration rates.

August 2011 Drought. Rainfall amounts in August ranged from 4 to 6 inches over parts of interior southwest Florida to over 10 inches over parts of southeast Florida. Overall, rainfall averaged near to above average over most areas, leading to gradually improving drought conditions. Lake Okeechobee remained over 2 feet below the normal level for this time of year. Underground water levels remained below normal over much of south Florida, especially over the metro east coast sections.

There has been no significant effect to the County as a result of past droughts.

2.1.1.6 Extreme Temperatures

Freezing Temperatures

According to the Department of Agriculture and Consumer Services, a moderate freeze may be expected every one to two 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 PBC on a recurring basis, and are a significant threat to the economic vitality of the Florida's vital agriculture industry. Palm Beach County has experienced seven significant freezes between 1970 and the present.

Florida has experienced a number of severe or disastrous freezes, when the majority of the winter crops are lost. The lowest temperature ever recorded in the state is 12°F (NCDC). 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 an extensive loss of citrus trees and the majority was not replanted.

On rare occasions, the winter of 2000-2001 for example, there were over 20 nights between November and March where temperatures or wind chill readings fell below 40°F.

Freezing conditions primarily affect agriculture and homeless indigents in PBC. While PBC enjoys warm weather through-out the years, freezing does occur, primarily in the months late December and January. During the night temperatures can dip to as low as 35 degrees but normally is not sustained for more than three hours before the temperatures rises above 40 degrees. Palm Beach County's Cold weather shelter plan calls for shelters to be open if there is a sustained temperature of 40 degrees or below or wind-chill factor of 35 degrees or below for four consecutive hours. In the past 5 years the shelters have only been activated three times for one day each. When conditions are predicted to fall below thrushlods, the shelter plan manager and the County Warning point is alerted. During 2013, the shelters were opened once and closed the next morning with less than 10 people in the entire Palm Beach County using the shelter.

Recent significant freezes include:
The 1977 Freeze. Climaxing one of the coldest winters ever recorded in the eastern United States, a severe cold outbreak of arctic air swept into Florida January 18 through 21, 1977. Snow was reported as far south as Homestead and a severe freeze affected all of the State's citrus and vegetable crops.

In South Florida agricultural areas, the freeze was one of the most severe of this century. Temperatures were below freezing for l0 to l4 hours, and 28°F or colder for four to eight hours. An unusually heavy frost accompanied these freezing temperatures and extended to the coast. West Palm Beach recorded an all-time low of 27°F. Some farmers in the area reported temperatures near 20°F.

A U. S. Department of Agriculture report indicated the following crop loss statewide: Citrus 25%, vegetables 95-l00%, commercial flowers 50-75%, permanent pastureland 50%, sugar cane 40%. It is estimated the 1977 freeze cost the Florida economy $2 billion (1977 dollars).

The 2009 Freeze. Agricultural damages from a January 2009 freeze were assessed. Seventy million citrus trees and tens of thousands of acres of fresh fruits and vegetables were in regions where temperatures remained below 20°F for several hours for two consecutive days. In the Glades area, freezing temperatures lasted as long as 12 hours. Early estimates indicated that the bean crop was destroyed and as much as 85% of the corn crop was lost. Sugar cane also took a hit, but damage was not known until harvest time. This event was the most destructive since the 1989 freeze. Tens of millions of dollars, if not hundreds of millions of dollars, in losses are possible. A second freeze occurred two weeks later causing some additional crop damage, but was not as severe.

Extreme Heat

Temperatures that remain 10°F or more above the average high temperature for a region and last for several weeks are defined as extreme heat (FEMA, 1996). 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. The highest temperature ever recorded in PBC was on July 21, 1942 at 101°F at Palm Beach International Airport. In a normal year, approximately 175 Americans die from extreme heat. However, in 1995 the national death toll was 1,021 (NWS, 1997).

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 98.6°F, the heart begins to pump more blood, blood vessels dilate to accommodate the increased flow, and the 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. 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 factors being equal, the severity of heat disorders tend to increase with age. Heat cramps in a 17-year-old may be heat exhaustion in someone 40 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 feels when relative humidity is added to the actual air temperature. The NWS will initiate alert procedures when the HI is expected to exceed 105°F for at least two consecutive days. Possible heat disorders related to the corresponding HI are listed below.

In most cases, extreme heat affects those who do not have the ability to stay inside during extreme heat. Palm Beach County does not have a significant population of people that experience heat related injuries. Although the County does have a sheltering program, shelters have never activated shelters due to heat.

Heat Index	Effects of Exposure
80°F -90°F	Fatigue possible with prolonged exposure and physical activity
90°F -105°F	Sunstroke, heat cramps with prolonged exposure
105°F -120°F	Sunstroke, heat cramps, and heat exhaustion likely and heatstroke possible with prolonged physical activity
120°F or Higher	Heatstroke/Sunstroke; exposure for people in higher risk groups

This chart represents the averages and potential extreme temperatures of south Florida.

South FL Monthly Averages (Degrees Fahrenheit)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg Temp	66°	68°	71°	74°	79°	82°	82°	82°	82°	79°	74°	69°
Record High	88° '79	94° '64	92° '77	99° '71	98° '02	98° '09	99° '82	98° '64	98° '77	98° '00	91° '02	89° '09
Record Low	28° '77	22° '89	20° '80	40° '50	51° '92	60° '66	64° '75	66° '81	61° '65	47° '76	25° '50	20° '89
Avg Rain	2.6"	2.2"	2.5"	2.5"	6.2"	9.8"	7.4"	8.0"	9.4"	6.4"	2.9"	2.2"

2.1.1.7 Agricultural Pest and Disease

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 percent. 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 PBC economy; 54% of the County is farmland. The main threats to the PBC agriculture industry are Citrus Canker, Tomato Yellow Leaf Curl Virus (TYLCV), and the Mediterranean Fruit Fly (Medfly), and sugarcane pests.

However, as it relates to PBC, we have not experienced or had any issues as it relates to Agricultural Pest and Disease over the past 10 years.

Citrus Canker

Citrus Canker was found in PBC in numerous locations in 2002. The Florida Department of Agriculture (FDACS) reported cases of orange and grapefruit trees infected in the southern and northern parts of the County. Citrus Canker is a bacterial disease 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.

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. In 2002, legal cases over the cutting down of infected and exposed trees began when citrus canker was discovered in PBC. The FDACS wanted to search a 70-square-mile area of PBC for diseased trees. 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. There is great potential to impact Florida's $9.1 billion citrus industry.

Tomato Yellow Leaf Curl Virus (TYLCV)

This virus is believed to have entered the state in Dade County sometime in early 1997. 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. Less than one in ten 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 (Polston & Brown, 1997).

Mediterranean Fruit Fly (Medfly)

Another threat to PBC'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. For example, a Medfly outbreak in 1997 cost an estimated $26 million to eradicate. 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. If the Medfly is not eradicated in Florida, on-going pesticide treatments by homeowners and commercial growers will be necessary. Costly post-harvest treatment of fruits and vegetables to meet quarantine restrictions of domestic and foreign markets would also be required.

Adult Medflies are up to 1/4 inch long, black with yellow abdomens, and have yellow marks on their thoraxes. Their wings are banded with yellow. The female Medfly 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, Medflies will feed on hundreds of other commercial, backyard fruit, and vegetable crops.

Because Medflies 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.

Sugarcane Pests

Changes in sugarcane agriculture, including new disease 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 (United States Department of Agriculture, 1998).

2.1.1.8 Wildfire/Urban Interface Zone

The recent wildfires that burned throughout Florida, specifically central Florida, are examples of the increasing wildfire 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 wildlands, people living in these communities are increasingly threatened by wild fires.

There are three different classes of wildland fires. 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 loss in adjacent developed areas if not effectively controlled. Wildfires are caused by numerous sources including arson, carelessness by smokers, individuals burning debris, operating equipment that throws sparks, and children playing with matches. However, the largest number of fires is caused by lightning strikes, which coincides 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, such as erosion, may develop (FEMA, 1998).

Structures in the wildland/urban interface zone are vulnerable to ignition in three different ways: radiation, convection, and firebrands (National Wildland/Urban Interface Fire Protection Program). Radiating heat from a wildfire 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. Another source of ignition by wildfire is convection. 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 and steep slopes will tilt the flame and the convection column uphill increasing the chance of igniting a structure. Structures extending out over a slope have the greatest likelihood of ignition from convection.

Firebrands also pose a threat to structures in the wildland/urban interface. A firebrand is a piece of burning material that detaches from a fire due to strong convection drafts in the burning zone. They can be carried a long distance (approximately 1 mile) by fire drafts and winds. The chance of these firebrands 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.

On April 15, 1999, just north of PBC in Port St. Lucie, a wildfire consumed 42 homes in 24 hours. Every fire unit in St. Lucie County and assistance from Indian River, Martin, Palm Beach, Broward, and Okeechobee Counties and units from two Division of Forestry Districts, two helicopters, and a Type 1 Air Tanker contained the fire after 26 hours. Due to the near perfect wildfire conditions, the fire suppression units were unable to keep up with these rapidly moving fires. The estimated damage was $4.2 million. Over 5,000 people were evacuated, most self-evacuated from the area.
On Thursday, April 10, 2002, a brush fire occurred in a heavily wooded area just east of the Acreage on the north side of Northlake Boulevard. Fueled by high winds, and low humidity, the fire eventually burned approximately 450 acres, destroyed a number of vehicles and trailers stored on the property, and required several days to fully extinguish. A helicopter was called in to aid in extinguishing the wildfire. The helicopter made a total of 58 water drops. A loss of $250,000 of timber was lost in relation to the wildfire.

Palm Beach County has over 587,649 acres of vegetation and trees that could be potentially destroyed or damaged in an uncontrolled muck or wildfire. The majority of these areas are in the western and south western part portion of county. These acres are under contract with the Florida Departmet of agriculture to be protected in case of fire with coordination with Palm Beach Country Fire Rescue.

2.1.1.9 Muck Fire

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 (New Scientist, 1997). This type of fire could have a significant impact on global warming.

Muck fires are not a frequent threat to Florida. However, during a drought in the 1980s, 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 specialized, non-traditional firefighting techniques.

A muck fire occurred in June of 1999. There were about 20,000 acres of muck, brush, and sawgrass on fire in the Rotenberger Wildlife Management Area located in Southwestern PBC.

In May 2008, a muck fire, spawned by an extended drought, scorched the dried up edges of Lake Okeechobee between Moore Haven and Clewiston covering an area of over 5,800 acres.

In Palm Beach County, most of the muck area is owned by the sugar cane industry and not owned by the county. The corporation conducts controlled burns each year to over 300,000 acres of muck area to prepare the land for seasonal growth. These areas are monitored very closely. If a muck fired occurred, that required Country resources, they would be provided with coordination.

2.1.1.10 Soil/Beach Erosion

Soil Erosion

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 humans 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 humans, 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 because the rate is so rapid that surface soil may sometimes be blown or washed away right down to the bedrock.

Undisturbed by humans, soil is usually covered by shrubs and trees, by dead and decaying leaves or by a thick mat of grass. Whatever the vegetation, it protects the soil when the rain falls or the wind blows. Root systems of plants hold the 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 the plant cover is disturbed by 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, and a kind of deficit spending of topsoil begins. With the destruction of soil structure, eroded land is even more susceptible to erosion.

The occurrence of erosion has greatly increased, usually 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 is also in the field of agriculture that most efforts have been made to conserve soils, with mixed success (Union of International Associations).

Beach Erosion

Wind, waves, and longshore currents are the driving forces behind coastal erosion. This removal and deposition of sand permanently changes beach shape and structure. Most beaches, if left alone to natural processes, experience natural shoreline retreat. As houses, highways, seawalls, and other structures are constructed upon 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 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 longshore 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).

Palm Beach County under the department of environmental resources has a shoreline enhancement and restorarion program that anticipates erosion of beach and shoreline areas and takes pro-active measures to protect the costal areas. The plan is also adaptable to respond to disasters that may cause an effect to the shoreline.

Palm Beach County’s forty-six (46) miles of ocean shoreline has been subjected to coastal erosion for many years due to the stabilization of inlets, residential and commercial development, and natural forces. The coastal strand ecosystem is one of the most threatened natural systems in Florida due to over-development.

Presently, thirty one (31) of the County’s 46 miles are listed as critically eroded by Florida’s Department of Environmental Protection (FDEP). While there is no one solution to beach erosion, several methods are utilized by Palm Beach County - each with its own merits and drawbacks. The first approach is to facilitate sand transfer at the inlets in order to restore the natural flow of sand. The second approach includes protecting the existing dunes and beaches and restoring the portions of shoreline that are already degraded. The last approach includes evaluating erosion control structures for use along beaches that may not qualify for a traditional beach fill project or may experience an erosional hot spot.

All approaches include environmental monitoring of the resources to ensure that our effort to restore sand is accomplished in a manner that protects the natural environment to the greatest extent possible. Through the Shoreline Enhancement & Restoration Program, the County is able to provide publicly accessible beaches, support the tourist-based economy, restore beach habitat and protect upland property. Funding for this capital improvement program is derived from a portion of “bed tax” fees administered through the Tourist Development Council, as well as funds from the state, the federal government and municipal partners Modifications to natural tidal inlets and the creation and stabilization of artificial inlets affect the natural littoral transport of sediments. Therefore, efforts to maintain the natural sediment movement in and around all four inlets in Palm Beach County are encouraged. Transfer of material from the north side of an inlet to the south prevents beach quality sand from being lost to the interior of an inlet or from becoming impounded within near shore shoals. Since the dissolution of the South Lake Worth Inlet District in 1996, the County has been responsible for the management of the South Lake Worth Inlet (Boynton Inlet) and the development of the Inlet’s Management Plan.

In 2011, the County constructed a new sand transfer plant (STP) and rehabilitated the north and south jetties. The STP is operated by the County and transfers approximately 70,000 cubic yards of material per year to the beaches south of the Inlet. The County also dredges the Inlet’s interior sand trap approximately every six years. Sand from the trap is pumped into the nearshore along the beach south of the Inlet.

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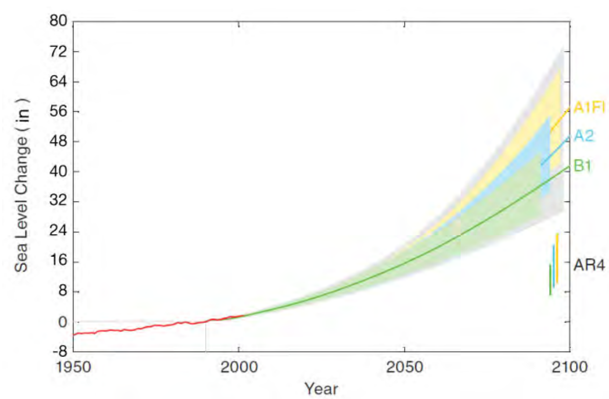
Since the dissolution of the South Lake Worth Inlet District in 1996, the County has been responsible for the management of the South Lake Worth Inlet (Boynton Inlet) and the development of the Inlet’s Management Plan. In 2011, the County constructed a new sand transfer plant (STP) and rehabilitated the north and south jetties. The STP is operated by the County and transfers approximately 70,000 cubic yards of material per year to the beaches south of the Inlet. The County also dredges the Inlet’s interior sand trap approximately every six years. Sand from the trap is pumped into the near shore along the beach south of the Inlet.

Recent erosion events include:

Hurricanes Frances & Jeanne (September 2004). Both Hurricanes Frances and Jeanne in 2004 equaled or exceeded the 100 year return period for storm surge in St Lucie, Indian River and southern Brevard Counties when they made landfall on the Martin County shoreline. The highest measured surge level for Category 2 Hurricane Frances was 11.8’ (NGVD). The highest surge level for Category 2 Hurricane Jeanne was 10.8' (NGVD). Surge levels in PBC were significantly lower. Both storms caused significant beach erosion along the coastline of PBC.

Tropical Storm Noel November 2007. Between November 1 and November 4, 2007, high surf associated with Tropical Storm Noel battered the PBC coast. Hardest hit spots were beaches in Jupiter, Singer Island, and South Palm Beach/Lantana, where severe to locally extreme beach erosion occurred. A steel sea wall protecting the Condado condominium complex in Singer Island collapsed, causing cracks to form in the outer walls of the building. In some areas, the dune line was completely eroded, leaving oceanfront buildings sitting precariously on top of 15-foot cliffs looking straight down to the water. A sea wall at the Imperial House condominiums in South Palm Beach collapsed from the pounding surf, and the east portion of the building was evacuated. South of Lantana to Boca Raton, erosion was reported as moderate to severe. Total damage for the County (minus beach restoration costs) was estimated at $4 million. No tide measurements were available from PBC, but storm tide was estimated to have been as high as two to three feet over northern PBC. A strong pressure gradient between high pressure over the Mid-Atlantic States and Tropical Storm Noel over Hispaniola and eastern Cuba caused a prolonged period of strong easterly winds over Southeast Florida and the adjacent waters. As Noel moved north across the western Bahamas, the strong winds continued across southeast Florida. The event caused severe beach erosion, coastal flooding, and minor wind damage. The event began in the last week of October.

Hurricane Sandy of October 25, 2012. The main impact of Hurricane Sandy to the Palm Beach coast was large northeast swells generated by the storm, which pummeled the Southeast Florida coast with significant beach erosion and coastal flooding. Large breaking waves of possibly over 20 feet were estimated along the coast. As a result, major coastal flooding occurred with the most significant impacts experienced from central Palm Beach north, including the Manalapan area where beachfront structures were threatened by water intrusion. In all, there was an estimated $14 million in damage sustained in PBC. A maximum storm tide of 5.2 feet above mean lower low water (MLLW) was observed at Lake Worth Pier on October 28th at 712 AM EDT along with a maximum storm surge of 2.28 feet on October 28th at 226 AM EDT. Similar tide and surge levels were measured at the highest daily high tide during this period, generally between 7 and 9 AM.



Projection of sea level rise from 1990 to 2010, based on three different emissions scenarios. Also shown: observations of annual global sea level rise over the past half century (red line), relative to 1990.
Source: NRC 2010

2.1.1.11 Sea Level Rise

Sea level rise is defined as a mean rise in sea level. Since 1870, global sea level has risen by about 8 inches. Due to numerous factors such as greenhouse gas warming, estimates of future sea level rise vary for different regions, but global sea level for the next century is expected to rise at a greater rate than during the past 50 years. Sea level rise predictions are complex and are based on multiple scenarios of global temperature change and greenhouse gas emission. As coastal populations increase, vulnerability of those populations to sea level rise increases as well.

Sea Level Rise is a new hazard for the County. Palm Beach County did not monitor or record any incidents of Sea level Rise before 2013. All future occurrences will be tracked and recorded and included in current and future updates."

2.1.1.12 Seismic Hazards

Tsunamis

Recent, widely published, research by British and American scientists warned of potential catastrophic destruction of coastal areas of the Atlantic, including the Florida east coast, by mega tsunami waves generated by a future volcanic collapse in the Canary Islands. The research predicted a gigantic wave would traverse the Atlantic at jet aircraft speeds and devastate the Florida coast as far as ten miles inland. Such an event would present a tremendous warning challenge and a virtually impossible evacuation response. Subsequent research by the Tsunami Society, a body of scientists solely dedicated to the study of tsunamis, has concluded the threat has been grossly overstated. The society challenged many of the assumptions made relative to the probability and magnitude of a collapse on La Palma and the characteristics of waves should such a collapse occur. The Society notes that there have been no such mega-tsunami events in the Atlantic or Pacific oceans in recorded history. However, the deadly Asian tsunami in December of 2004 has rekindled interest in revisiting the research.

The threat of a tsunamis impacting PBC is considered to be extremely low (approximately 5% or less per century). Tsunamis are most often generated by earthquake-induced movement of the ocean floor. Landslides, volcanic eruptions, and even meteorites can also generate a tsunami. They are often incorrectly referred to as tidal waves, but a tsunami is actually a series of waves that can travel at speeds averaging 450 (and up to 600) miles per hour in the open ocean. In the open ocean, tsunamis are not felt by ships because the wavelength is hundreds of miles long, while the amplitude is only a few feet. This would also make them unnoticeable from the air. As tsunami waves approach a coast, their speed decreases, and their amplitude increases. Unusual wave heights have been known to be over 100 feet high. However, waves that are 10 to 20 feet high can be very destructive and cause many deaths or injuries.

There has been no reported or recorded Tsunamis in Palm Beach County History.

Earthquakes

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 (Zirbes, 1971). Earthquakes will not be discussed further in this plan as they pose no risk to the county.

- In January 1879, a shock 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 shock was felt in Tampa, throughout central Florida, and in Savannah, Georgia as well (Zirbes, 1971).
- 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 (Zirbes, 1971).
- 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 (Zirbes, 1971).
- In June 1892, Jacksonville experienced a minor shock that lasted about 10 seconds. Another earthquake occurred in October 1892, and did not cause any damage either (Zirbes, 1971).
- In November 1948, doors and windows rattled in Captiva Island, west of Ft. Myers. It was reportedly accompanied by sounds like distant heavy explosions (Zirbes, 1971).
- 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 (Zirbes, 1971).
- There have been no recorded earthquakes in Palm Beach County.

2.1.1.13 Geologic Hazards

Sinkholes and Subsidence

Sinkholes are a common feature of Florida's landscape. They are only one of many kinds of karst land forms, which include caves, disappearing streams, springs, and underground drainage systems, all of which occur in Florida. Karst is a generic term, which refers to the characteristic terrain produced by erosion 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. Limestone in Florida is porous, allowing the acidic water to percolate through it, dissolving some 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). However, PBC have not had any reported sinkholes as they are defined in this paragraph in the past 20 years. This is due to our location and the lack of limestone deposits in the County which does not provide an opportunity for acidic decay to occur.

At this time, Palm Beach County has not experienced any Sinkholes or Subsidence. They are not common to the PBC area. But due to the frequency of this hazard in other locations throughout the State, these hazards are included in the LMS.

2.1.1.14 Pandemic

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 pandemics, under suitable circumstances, a new infection first appearing anywhere in the world could travel across entire continents within days or weeks (Morse, 1996). Due to the potential of complex health and medical conditions that can threaten the general population, Florida’s vulnerability to a pandemic is continually monitored. With millions of tourists arriving and departing the state annually, disease and 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 mitigate 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. Most recently, millions of pounds of possibly contaminated beef from the Hudson packing plant were seized by the Department of Agriculture and destroyed.

While this plan addresses all potential pandemic diseases, those that have actually affected PBC will be addressed in that disease discussion.

Avian (Bird Flu) H5N1

Although there are many forms of bird flu, the form that has most recently concerned health officials is the H5N1 flu virus carried by wild birds (many migratory). While wild birds seldom get sick from the virus, they can easily pass the virus to farm birds such as chickens, ducks, and turkeys being raised for food. These farm birds get sick, which poses a serious health risk.

It is thought that both the 1957 Asian Flu and the 1968 Hong Kong Flu pandemics had avian origins. Quarantine and depopulation (culling) and surveillance of affected flocks have helped contain outbreaks. The current bird flu virus originated in Hong Kong in 1997 and disappeared after that. It reemerged in 2002 and has since caused havoc worldwide.

Historically, bird flu viruses had not been passed from birds to humans. However, that changed in 1997, when people became infected by a serious, deadly form of bird flu. Most of these infections occurred in Asian countries among people who had had close contact with farm-raised birds. Sick birds had to be killed in great numbers in hopes of stopping the spread of the virus. It was suspected that the bird flu virus was passed to humans through bird droppings, saliva or contaminated surfaces on cages, tractors, and other farm equipment.

Because viruses can change (mutate) quickly, experts worry that bird flu will one day be passed easily from person to person. The H5N1 bird flu virus has proven to be extremely lethal. Even though only a few hundred people thus far have been stricken by the H5N1 virus, more than half of those have died.

The first case of H5N1 was traced to a farmed goose in China in 1996. Human infections were first reported in Hong Kong in 1997 (18 cases, 6 fatal). According to the World Health Organization, who monitors global disease outbreaks, as of April 2009, there have been approximately 417 human cases and 257 deaths in 15 countries from H5N1 influenza, none in the United States. The highest number of cases and deaths occurred in Indonesia (141 cases, 115 deaths) and in Vietnam (110 cases, 55 deaths). Other countries with cases and deaths have included Egypt, China, and Thailand.

In June 2006, the World Health Organization confirmed a human-to-human transmission of the bird flu in Indonesia. Although the H5N1 virus had mutated, the mutation apparently was not severe enough to trigger an avian influenza pandemic. Experts believe, however, that the virus may eventually spread to all parts of the world.

Swine Flu A (H1N1)

One way an antigenic shift can occur is through pigs. Pigs can be infected with both avian and human influenza viruses. If pigs become infected with viruses from different species at the same time, it is possible for genes of the viruses to mix and create a new virus for which humans have no natural immunity.

According to the CDC, estimating the number of individual flu cases in the United States is very challenging because many people with flu don't seek medical care and only a small number of those that do seek care are tested. More people who are hospitalized or die of flu-related causes are tested and reported, but under-reporting of hospitalizations and deaths occurs as well. For this reason CDC monitors influenza activity levels and trends and virus characteristics through a nationwide surveillance system and uses statistical modeling to estimate the burden of flu illness (including hospitalizations and deaths) in the United
When the 2009 H1N1 flu outbreak began in April 2009, CDC began reporting the number of laboratory-confirmed cases, hospitalizations and deaths associated with 2009 H1N1 flu in the United States that were reported by states to CDC. These initial case counts, and subsequent ongoing laboratory-confirmed reports of hospitalizations and deaths, are thought to represent a significant undercount of the actual number of 2009 H1N1 flu cases in the United States

A paper in *Emerging Infectious Diseases* authored by CDC staff entitled "Estimates of the Prevalence of Pandemic (H1N1) 2009, United States, April–July 2009" reported on a study to estimate the prevalence of 2009 H1N1 based on the number of laboratory-confirmed cases reported to CDC. Correcting for under-ascertainment, the study found that every case of 2009 H1N1 reported from April – July represented an estimated 79 total cases, and every hospitalized case reported may have represented an average of 2.7 total hospitalized people. Since that time, CDC has been working to develop a way to estimate, in an ongoing way, the impact of the 2009 H1N1 pandemic on the U.S. in terms of 2009 H1N1 cases, hospitalizations and deaths.

The CDC reports that in 2013 the H1N1 virus, although not elimated, had been contained and a vaccine is now available that was not available during the height of the 2009 outbreak. Although deaths are still being reported in the United States, they are becoming more rare.

The origins of the new virus are not known. One theory is that Asian and European strains traveled to Mexico via migratory birds or human travelers, then combined with North American strains in Mexican pig factory farms before jumping over to farm workers. The Mexican health agency believes the original disease vector may have been flies multiplying in manure lagoons of pig farms.

The American cases were found to be made up of genetic elements from four different flu viruses, the North American swine influenza, the North American avian influenza, human influenza, and swine influenza typically found in Asia and Europe.

Within one month of detection, officials in the United States had confirmed that seven people in California, two students from a high school in Texas, and a married couple in Kansas were infected with A/09(H1N1) swine flu; all recovered. New York State had confirmed cases as well. The cases in Kansas and New York were linked to travel to Mexico; most of the cases in California and Texas were not linked to travel, suggesting localized outbreaks of the virus. At this writing, isolated cases of suspected swine flu were surfacing across the U.S. and abroad daily. Deaths will certainly result. Government health agencies continue to closely monitor developments.

West Nile Virus

The PBC Health Department reported cases of the West Nile Virus in 2002, 2002, 2010, and 2011. This disease is transmitted by mosquitoes. Health notifications were given throughout the County both years to alert and caution the public. Individuals were advised to take precautions when outdoors and to try to avoid being outside after dusk.

Mosquitoes become infected when they feed on infected birds, which may circulate the virus in their blood for a few days. Infected mosquitoes can then transmit West Nile virus to humans and animals while biting. The virus is located in the mosquito's salivary glands. During feeding, the virus may be injected into the animal or human, where it may multiply, possibly causing illness. The more DEET a repellent contains the longer time it can protect you from mosquito bites.

Most people who are infected with the West Nile virus will not have any type of illness. It is estimated that 20% of the people who become infected will develop West Nile fever: mild symptoms, including fever, headache, and body aches, occasionally with a skin rash on the trunk of the body and swollen lymph glands.

The symptoms of severe infection (West Nile encephalitis or meningitis) include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis. It is estimated that 1 in 150 persons infected with the West Nile virus will develop a more severe form of disease.

SARS

Severe Acute Respiratory Syndrome (SARS) is a viral respiratory illness caused by a corona virus, called SARS-associated corona virus (SARS-CoV). SARS was first reported in Asia in February 2002. Over the next few months, the illness spread to more than two dozen countries in North America, South America, Europe, and Asia. According to the WHO, during the SARS outbreak of February – July 2002, a total of 8,427 people worldwide became sick with SARS; of these, 812 died. In the United States, there were 192 cases of SARS among people, all of whom got better. There were eight cases reported in Florida. However, PBC had no reported cases of SARS.

The main way that SARS seems to spread is by close person-to-person contact. The virus that causes SARS is thought to be transmitted most readily by respiratory droplets (droplet spread) produced when an infected person coughs or sneezes. Droplet spread can happen when droplets from the cough or sneeze of an infected person are propelled a short distance (generally up to 2 feet) through the air and deposited on the mucous membranes of the mouth, nose, or eyes of persons who are nearby. The virus also can spread when a person touches a surface or object contaminated with infectious droplets and then touches his or her mouth, nose, or eye(s). In addition, it is possible that the SARS virus might spread more broadly through the air (airborne spread) or by other ways that are not now known.

Malaria

About 1,200 cases of malaria are diagnosed in the United States each year. Most cases in the United States are in immigrants and travelers returning from malaria-risk areas, mostly from sub-Saharan Africa and the Indian subcontinent. Each year in the United States a few cases of malaria result from blood transfusions, passing from mother to fetus during pregnancy, or transmission by locally infected mosquitoes. For the year 2002, as of September 14, eight cases of malaria were reported in PBC. In 2008, there were four reported cases, eleven in 2011, sixteen in 2010, and seven in 2011.

Humans get malaria from the bite of a malaria-infected mosquito. When a mosquito bites an infected person, it ingests microscopic malaria parasites found in the person's blood. The malaria parasite must grow in the mosquito for a week or more before infection can be passed to another person. If, after a week, the mosquito then bites another person, the parasites go from the mosquito's mouth into the person's blood. The parasites then travel to the person's liver, enter the liver's cells, grow, and multiply. During this time when the parasites are in the liver, the person has not yet felt sick. The parasites leave the liver and enter red blood cells; this may take as little as 8 days or as many as several months. Once inside the red blood cells, the parasites grow and multiply. The red blood cells burst, freeing the parasites to attack other red blood cells. Toxins from the parasite are also released into the blood, making the person feel sick.

Symptoms of malaria include fever and flu-like illness, including chills, headache, muscle aches, and tiredness. Nausea, vomiting, and diarrhea may also occur. For most people, symptoms begin ten days to four weeks after infection, although a person may feel ill as early as 8 days or as late as one year later.

Any traveler who becomes ill with a fever or flu-like illness while traveling to Malaria risk areas and up to one year after returning home should immediately seek professional medical care. A person should tell his/her health care provider that they have been traveling in a malaria-risk area.

Persons living in and travelers to, any area of the world where malaria is transmitted may become infected. Malaria can be cured with prescription drugs.

2.1.2 Technological Hazards

2.1.2.1 Dike Failure

Dam/levee failure poses a threat to population and property in several areas of PBC. All are earthen structures and are state, regionally, locally, 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, some dating back to 1919. Rainfall in excess of designed capacities could cause erosion of constructed drainage facilities and flooding of many areas including primary roadway evacuation routes (PBC CEMP, 2011).

The Herbert Hoover Dike (HHD) was completed in 1927 to protect PBC citizens from experiencing another flooding event similar to the occurrence in 1928. The flooding derived from the 1928 hurricane, which resulted in over 2,500 deaths and thousands more injured in the western portion of PBC. The dike protects from major flooding events occurring in Belle Glade, Pahokee, and South Bay municipalities. Also, there is a potential for flooding in The Village of Wellington, Royal Palm Beach, West Palm Beach, Palm Beach Gardens, and unincorporated PBC. The Herbert Hoover Dike is continuously monitored by the Army Corp of Engineers in partnership with the SFWMD.

The Corps is currently implementing a dam safety process to lower the risk across the entire HHD system. The Corps is constructing enhanced cutoff walls along the most vulnerable areas. Construction of the cutoff wall helps reduce the risk by eliminating existing piping and preventing additional internal erosion through the dike and foundation. Construction between Port Mayaca and Belle Glade was completed in 2012. The Corps will also replace or remove 22 culverts within the HHD system. Replacement work began in 2012 to Culverts 2 and 4A near South Bay among others. The Corps anticipates removing or replacing all the culverts with construction continuing through 2018. Until work to stabilize the dike is completed by the Army

Corp of Engineers, there is the potential for stability problems and/or seepage to occur from heavy rainfall raising the level of the lake above 18 feet. Policy changes within the SFWMD maintain the water levels of Lake Okeechobee at low levels, thereby, reducing potential risk. A catastrophic failure of the Herbert Hoover Dike could pose a significant danger to the residents, local economies, and environment of PBC and South Florida. This threat is greater and has a more severe impact in the three western PBC Cities of South Bay, Belle Glade, and Pahokee.

2.1.2.2 Hazardous Materials Accident

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. Out of approximately 1,662 hazardous materials incidents reported statewide in 1997, no known fatalities were reported, less than four percent resulted in injuries, and less than six percent 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 (LOC) established by the U.S. Environmental Protection Agency. Minimizing this exposure will reduce the consequences of an emergency to people in the area near to facilities, which manufacture, store, or process hazardous materials (TCRPC).

Large volumes of hazardous materials are transported to and through the county by railroad, highway, air, water, and pipeline daily. Within PBC, there are a number of both public and private fixed facilities, which produce or use hazardous materials. Coordinating procedures for hazardous material response are found within the County's *Hazardous Materials Hazard Specific Plan*.

In addition to the County's *Hazardous Materials Hazard Specific Plan*, as well as other hazardous materials plans, Local Emergency Planning Committee (LEPC) 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.

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

Palm Beach County has not experienced any significant hazardous material accidents in the past ten (10) years.

2.1.2.3 Radiological Accidents (Nuclear Power Plant Accident)

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 populations 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 (cloud-like) formation. The area the radioactive release might affect is determined by the amount released from the plant, wind direction, and speed and weather conditions (e.g., rain, snow, etc.) which would quickly drive the radioactive material into the ground, causing increased deposition of radio nuclides.

The levels of response to the release of radioactive materials are as follows:

- 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 Environmental Protection Agency 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 alert will have site-specific information and instructions.

Thirty of the 67 counties in the State of Florida are involved in preparedness planning for a commercial nuclear power plant emergency.

The St. Lucie nuclear power plant is located on Hutchinson Island approximately four miles east-northeast of the City of Port St. Lucie, approximately 5.5 miles north of Martin County/St. Lucie County boundary line. This facility is owned and operated by the Florida Power & Light Company. Palm Beach County is located more than 20 miles from the plant and is well outside the 10 mile Emergency Planning Zone/potential plume area, so there is not a risk to direct radiation exposure. Therefore, PBC would provide assistance to St. Lucie and Martin Counties in the unlikely chance of an accident at the plant. Palm Beach County municipalities located in part or whole within 50 miles of the power plant (Tequesta, Jupiter Inlet Colony, Jupiter, Juno Beach, Palm Beach Gardens, North Palm Beach, Lake Park, Riviera Beach, Mangonia Park, West Palm Beach, Palm Beach, Pahokee, Royal Palm Beach, Haverhill, Glen Ridge, Wellington, Palm Springs, Greenacres and Lake Clarke Shores) fall within the 'Ingestion Pathway Zone' meaning if there is a major release at the power plant, radioactive contamination could be deposited as far as 50 miles affecting food and water supplies.

The purpose of the County radiological preparedness program is to prepare to receive, shelter and decontaminate (if necessary) potentially contaminated evacuees from an accident at the St. Lucie nuclear power plant. A radiological emergency response plan is developed and exercised in order to have reasonable assurance that adequate protective measures can be taken in the event of a radiological emergency.

2.1.2.4 Communications Failure

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 27 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 were also affected. The pager failure not only affected personal and business communications, but emergency managers and medical personnel as well. More commonly, communication failures occur due to power outages.

2.1.2.5 Hazardous Materials Release

A large volume of hazardous materials are transported to and through the County by railroad, highway, air, water, and pipeline daily, on a routine basis. Within PBC, there are a number of both public and private fixed facilities, which produce or use hazardous materials. Coordinating procedures for hazardous material response are found within the County's *Hazardous Materials Hazard Specific Plan*.

Mishandling and improper disposal or storage of medical wastes and low-level radioactive products from medical use are also a hazard to PBC. In 1988, an incident occurred in New Jersey when improper disposal of medical wastes resulted in used products ending up on Atlantic Ocean beaches.

Palm Beach County has not experienced any significant hazardous material releases in the past ten (10) years.

2.1.2.6 Transportation System Accidents

Florida has a large transportation network consisting of major highways, airports, marine ports, and passenger railroads. The heavily populated areas of PBC are particularly vulnerable to serious accidents, which are capable of producing mass casualties. With the linear configuration of several major highways in PBC, 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 the Value Jet Flight 592 on May 11, 1996, which resulted in 110 fatalities and cost millions of dollars to respond, 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.

Palm Beach County has not experience any significant Transportation System Accidents in the past ten (10) years.

2.1.2.7 Coastal Oil Spill

As a major industrial nation, the United States 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. At every point in the production, distribution, and consumption process, oil is invariably 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 U.S. Environmental Protection Agency has established a program designed to prevent oil spills. The program has reduced the number of spills to less than 1 percent of the total volume handled each year (Environmental Protection Agency, 1998).

Spilled oil poses serious threats to fresh water and marine environments, affecting surface resources and a wide range of subsurface organisms. Most oils tend to spread horizontally into a smooth and slippery surface, called a slick, on top of the water. However, once the oil reaches the shoreline it can escape downward into sand, making it difficult to clean up and reducing its ability to degrade. Spilled oil can harm the environment in several ways, including the physical damages that directly impact wildlife and their habitats (such as coating birds or mammals with a layer of oil), and the toxicity of the oil itself, which can poison exposed organisms.

Not only would an oil spill adversely affect the environment, but also the economy would suffer due to a decrease in tourism. Depending on the severity of the spill, the economy could suffer mild, short-term effects to devastating, long-term effects.

Many advanced response mechanisms are available for controlling oil spills and minimizing their impacts on human health and the environment. Mechanical containment or recovery is the primary line of defense against oil spills. This type of equipment includes a variety of booms, barriers, and skimmers. Natural and synthetic sorbent materials are used as well to capture and store the spilled oil until it can be disposed of properly. Chemical and biological methods can be combined with mechanical means for containing and cleaning up oil spills. Dispersants and gelling agents are most useful in helping to keep oil from reaching shorelines and other sensitive habitats. Physical methods are used to clean up shorelines as well. Wiping with sorbent materials, pressure washing, raking, and bulldozing can be used to assist natural environmental recovery processes. Scare tactics are used to protect birds and animals by keeping them away from oil spill areas.

Palm Beach County has 45 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 Department of Environmental Protection, Division of Florida Marine Patrol. There are two active oil field regions in Florida: in Escambia and Santa Rosa counties in the Panhandle, and Collier, Hendry, and Lee counties in southwest Florida.

On April 20, 2010, an explosion on the Deepwater Horizon/BP MC252 drilling platform in the Gulf of Mexico killed 11 workers and caused the rig to sink. As a result, oil began leaking into the Gulf creating one of the largest spills in American history. During the next 87 days an estimated 4.9 million barrels (210 million gallons) of oil were released. In 2010. While the spill did not affect the water ways or coastal communities of Palm Beach County, it did put PBCDEM and other supporting agencies throughout the County on alert. Extensive plans were coordinated to prepare for a potential containment and oil clean up response.

2.1.2.8 Wellfield Contamination

As communities become more aware of both the potential health risks and the economic effects of ground water contamination, they are beginning to look increasingly toward preventative efforts. Even when no immediate hazard appears to exist, a community should be concerned about protecting its drinking water supply for three reasons: to reduce potential risks to the health of the community; to avoid the costs of cleaning up contamination and providing alternative water supplies; and to prevent the negative economic impacts on community development that ground water contamination can cause.

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 groundwater contamination, monitoring for the presence of specific contaminants, and managing existing and proposed land and water uses that pose a threat to groundwater quality.

Ground water is a vitally important natural resource. It is a source of drinking water for more than half of the U.S. population and more than 95 percent of the rural population. 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 nationwide, resulting in more than 52,000 individuals being affected by associated illnesses (Browning).

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 the isolation distances from potential contamination sources, reporting to the state violations of the isolation distance to the state, and asking a local governmental unit to regulate these sources.

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

2.1.2.9 Power Failure (Outages)

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. These problems resulted 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.

On August 14, 2002, the largest power outage occurred in the northeast and Midwest states. The power outage started around 2 o'clock in the afternoon and was out in some places until Monday the 18th. There were major cities without power for an extended period of time. Some of the cities included: New York, Cleveland, Detroit, Buffalo, and Toronto. The power outage affected millions of people across states and Canada. The source of the outage is unclear at this time. The entire northeast power grid was affected.

In PBC, the major causes of a power failure are lightning and trees. Lightning strikes and trees falling onto power lines can shut down power for hundreds of people. Other factors that can cause a power failure are:

- Age of facility (transmission and distribution);
- Community growth; and
- High winds.

The location of power lines underground or above ground also has significance. Lines underground have the advantage of being less vulnerable to tree foliage; however, they are still at risk from other underground hazards such as tree roots.

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):

- 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 warranted. 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.

2.1.3 Human-Caused Hazards

2.1.3.1 Civil Disturbance

As in any other area, PBC is subject to civil disturbances in the form of riots, mob violence, and a breakdown of law and order in a localized area. 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 specific area of the County.

2.1.3.2 Terrorism and Sabotage

Terrorism

The FBI defines terrorism as, "the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof in furtherance of political or societal objectives." A terrorist incident could involve the use of a Weapon of Mass Destruction (WMD) that would threaten lives, property and environmental resources by using explosives or incendiary devices and/or by contamination with chemical, biological, and/or radiological materials.

It is recognized that the state has many critical and high-profile facilities, high concentrations 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, some extremist groups are known to be present within Florida. Terrorist attacks may take the form of the hazards described in this section when incidents of these types are executed for criminal purposes, such as induced dam or levee failures, the use of hazardous materials to injure or kill, or the use of biological weapons to create a pandemic. Terrorists have the potential to create disasters, which threaten the safety of a large number of citizens.

In the recent years, terrorist acts have become a reality for the nation. Palm Beach County is not immune from acts of terrorism. The 2001 World Trade Center bombing was the largest terrorist attack the United States has ever experienced. After the World Trade Center attack, it was learned that many of the perpetrators resided in and the (terrorists) pilots took flight lessons in PBC. In addition, Anthrax, which was dispersed via the postal system in late 2001, claimed the lives of five US citizens including one person from PBC. It was determined that he became infected with the disease at American Media Incorporated (AMI), in Boca Raton, his place of employment. A second employee became infected and survived.

The federal government has recognized that the United States 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. The influx of undocumented aliens into South Florida from areas unfriendly to the interest of the United States is monitored by those involved with the emergency management of government.

Computer Accidents and Sabotage

The President's Commission on Critical Infrastructure Protection (PCCIP) recently reported that there is an increasing threat that the U.S. could suffer something similar to an "Electronic Pearl Harbor". 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 the 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 (Rubin, 1998).

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:

- 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, organized crime
- Industrial espionage
- Terrorism – including various disruptive operations
- National Intelligence – information warfare, intended disruption of military operations

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 form of communication. The outcomes 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. Computer failures could affect emergency communications as well as routing civilian applications, such as telephone service, brokerage transactions, credit card payments, Social Security payments, pharmacy transactions, airline schedules, etc.

2.1.3.3 Mass Migration Crisis

Florida's location as the nearest United States land mass bordering the Caribbean basin makes it a chosen point of entry for many migrants attempting to enter the country illegally. A major consequence of a mass arrival of illegal aliens could be disruptive to the routine functioning of the impacted community, resulting in significant expenditures that are 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; 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 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 PBC is the frequent scene of arrival of undocumented aliens, usually Haitian or Cuban. The County has both the history and potential for the unannounced arrival of a large number of aliens. Until relieved of the responsibility by the state and federal governments, PBC must be capable of providing mass refugee care to include shelter, food, water, transportation, medical, police protection, and other social services.

2.2 Vulnerability Assessment

Palm Beach County is a diversified county. While all PBC residents are exposed to the hazards identified in **Table 2.1** to some degree, geographic location and other factors greatly affect individual vulnerabilities and probabilities relating to specific hazards illustrated in **Appendix A** for the County and each jurisdiction. Factors influencing vulnerability include community location, type of construction, demographics, and cultural characteristics. **Table A-1** summarizes individual community vulnerability within PBC. **Table A-2** relates the probability of future hazard events for each identified hazard within PBC. **Appendix B** includes mitigation initiatives to reduce the impacts of each jurisdiction risks for PBC in reference to the individual hazards identified in **Section 2.1** Additional maps will be located in **Appendix C**. These maps will be illustrated by hazard addressing critical facilities having the potential to be effected by hazard. The critical facilities will have a potential dollar loss figure tied to it.

With the assistance of the DEM, the LMS conducted impact analyses to assess the potential for detrimental impacts from all identified natural, technological, and human caused hazards. Results of these analyses are summarized below. Impacts were categorized into the following groupings: health and safety of the resident population in the affected area; health and safety of incident responders; impacts on the continuity of government and non-government operations; impacts to property, facilities and infrastructure; impacts to the critical community services; impacts to the environment; economic and financial impacts; impacts on regulatory and contractual obligations; and impacts negatively affecting the PBC's reputation, image, and/or ability to attract public and commercial interests.

Most hazards in Palm Beach County affect the entire county equally. However, there are some that may be more likely in one area of the County. For example, a Herbert Hoover Dike breach would cause more damage to the western communities. For the purpose of this document, the County has been divided into four geographical areas: Northern Palm Beach County, Southern Palm Beach County, Western Palm Beach County, and Coastal Palm Beach County.

In each of the hazards identified and defined, the latest occurrence of that event hazard is listed. For example the last major hurricane to hit Palm beach County was 2007. Therefore, there would be no examples beyond that point.

In addition, the charts show probability of occurrence and impact. These will be rated as low = under 5% chance of occurring, medium, 5% - 15% chances of occurring, or High, greater than 15%. These rating responds with the information of the charts presented.

- An impact rating of "Low" for any hazard type means the hazard is not likely to have any measurable or lasting detrimental impact of a particular type and consequences will likely be rectified promptly with locally available resources. The chances here are less than 5%.

- An impact rating of "Medium" means there will likely be a measurable detrimental impact which may require some time to rectify and may require outside resources and/or assistance. The chances here are between 5% - 15%.

- An impact rating of "High" means the impact will likely be severe and of longer duration, and require substantial time, resources, and/or outside assistance to rectify. The chances are greater than 15%.

- Multiple ratings indicate detrimental impacts might easily vary within the range indicated.

2.2.1 Natural Hazards

2.2.1.1 Hurricanes and Tropical Storms

From 1920 through 1959, a total of 58 hurricanes struck the U.S. mainland, 25 of which were category 2 or higher (major storms). Between 1960 and 1989, 42 hurricanes struck the U.S. of which only 16 were Category 2 or stronger. Most hurricane experts feel we are entering a period of increased hurricane formation similar to the levels seen in the 1920s and 1940s. Current hurricane risk calculations are complicated by climatic factors suggesting the potential for even greater hurricane frequency and severity in the world's entire hurricane spawning grounds. Since 1995, there have been 62 Atlantic hurricanes, 12 of which occurred in 2010 alone. Global warming may cause changes in storm frequency and the precipitation rates associated with storms. A modest 0.9 degree Fahrenheit (0.5 degree centigrade) 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 22%. The warmer ocean surface will also 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 strikes 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 increases the County's vulnerability. The potential for property damage and human casualties in PBC 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.

Hurricane damage is caused by two factors:
- High winds
- Storm surge (discussed under "Flooding")

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 by wind, but from flying debris. Tree limbs, signs and sign posts, roof tiles, metal siding, and other lose objects can become airborne missiles that penetrate the outer shells of buildings, destroying their structural integrity and allowing the 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:

- They are more turbulent than winds in most other type storms

- They are sustained for a longer period of time (several hours) than any other type of atmospheric disturbance

- They change slowly in direction, thus they are able to seek out the most critical angle of attack on a given structure.

- 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 percent. 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 lbs per square foot on a flat surface, while a 190 mph wind will exert a force of 122 lbs per square foot on that same structure. In terms of a four by eight foot sheet of plywood nailed over a window, there would be 1,280 lbs of pressure against this sheet in a 100 mph wind, and 2,904 lbs 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 wind on their upper stories. Recent studies estimate that wind speed increases by approximately 27 percent 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 phenomena that generate uplift on an 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, door, or roof damage, wind pressure on internal surfaces becomes a critical 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 Andrew, catastrophic failure of one and two-story wood-frame buildings in residential areas was observed more than catastrophic failures in any other type of building. 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.

Hurricane winds generate massive quantities of debris, which 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. The Arbiter of Storms (TAOS) model predicts the following quantities of debris for PBC given the following hurricane strengths:

Storm Strength	Debris Generated
Tropical Storm	156,142 cubic yards/acre
Category 1 Hurricane	1,049,571 cubic yards/acre
Category 2 Hurricane	2,182,522 cubic yards/acre
Category 3 Hurricane	7,421,401 cubic yards/acre
Category 4 Hurricane	16,289,149 cubic yards/acre
Category 5 Hurricane	44,874,888 cubic yards/acre

Both the Town of Palm Beach and City of West Palm Beach are old, historical communities on PBC'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 West Palm Beach and to a lesser extent in many of the other coastal communities, suggests these communities would be hit very hard by a major storm.

2.2.1.2 Flooding

Flooding in PBC results from one or a combination of both of the following meteorological events:

- Tidal surge associated with northeasters, hurricanes, and tropical storms
- Overflow from streams and swamps associated with rain runoff

Major rainfall events occur in association with hurricanes, tropical storms, and thunderstorms associated with frontal systems.

When these types of 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 PBC coast 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 their flooding problems. Flat, swampy terrain and heavily wooded areas in the western part of PBC aggravate flood problems by preventing rapid drainage in some areas.

In response to mounting losses from flooding nationwide, the United States Congress initiated the National Flood Insurance Program (NFIP) in 1968. The program is administered through FEMA. Under this program, FEMA produces Flood Insurance Rate Maps (FIRM) which show areas subject to various levels of flooding under different conditions. This flood risk information is based on historic, meteorological, hydrologic, and hydraulic data, as well as open-space conditions, flood control works, and development.

Appendix C, Flood Section, presents a generalized picture of the flood prone areas in PBC based on the 1992 version of the FIRM maps. Note that NFIP flood zones B and C do not appear in the legend, as they are not on the PBC FIRM map.

In addition to the FIRM maps there are two numerical models, which predict the effects of storm surge in PBC. The older model, developed by the National Oceanic and Atmospheric Administration, is called the Sea, Lake and Overland Surges from Hurricanes (SLOSH) model. **Appendix C**, Flood Section illustrates the areas of PBC vulnerable to this type of flooding.

The State of Florida acquired another model for predicting hurricane storm surge as well as wind and property damage. This model, known as The Arbiter of Storms (TAOS) model, predicts storm surge height and wind field intensity for Category 1 through Category 5 hurricanes. **Appendix C**, Flood Section illustrates the areas of PBC subject to flooding during a Category 5 Hurricane. It is important to remember that the TAOS model projections are based on a Maximum of Maximums (MOM) or absolute worst-case scenario. For this analysis, we have considered the TAOS model projections as reflecting total, worst-case exposure for PBC.

2.2.1.3 Severe Thunderstorm/Lightning

Risk of severe thunderstorms and lightning is high (**Appendix A Table A-3**) in PBC, but many of the jurisdictions shown in **Appendix A Table A-1** 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 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.

2.2.1.4 Wildfire/Urban Interface Zone

Less urbanized communities and areas within the County are more vulnerable to wildfires than the more developed communities. Large areas in the western part PBC and many isolated unincorporated pockets of residential development are quite vulnerable to wildfire. The southern and western portion of the Village of Wellington, the unincorporated areas west of Boca Raton, South Bay, Pahokee, and Belle Glade, and virtually all of PBC's unincorporated areas have a high vulnerability to wildfire during the dry season each year. The problems in the Village of Wellington, west Boca Raton area, and in the various unincorporated pockets of development such as Jupiter Farms, Loxahatchee, and the Lion Country Safari area arise from the fact that these areas have an extensive canopy of slash pine (*Pinus elliotii*) and 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 they 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 firebreaks, and controlled burns in the undeveloped or rangeland areas of PBC, are the best mitigation measures that can be applied for this hazard.

2.2.1.5 Muck Fire

Muck fires have never occurred in PBC. The only areas where this hazard might produce impacts are the western portions of the County. At the present time, muck fires are not considered a significant hazard anywhere other than the Pahokee, Belle Glade, and South Bay areas in the western County.

2.2.1.6 Tornado

Historical data indicates the frequency of tornadoes in PBC is relatively low. However, the vulnerability does exist as proven in June of 2012 when PBC was affected by a tornado. Some individual communities have a higher vulnerability to this hazard due to the type of construction or numbers of mobile homes (manufactured housing units) within their boundaries.

2.2.1.7 Extreme Temperatures

Temperature extremes, both freezes and periods of excessive heat, impact communities with a larger senior population to a greater extent than those with younger populations. 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.

The increase in temperature across the U.S. in this century is slightly smaller, but of comparable magnitude to the increase of temperature that has characterized the world as a whole. The increase in minimum temperature and the related increase in area affected by much above normal minimum temperatures are also found in many other countries of the northern hemisphere. Worldwide precipitation over land has changed little through the twentieth century; increases noted in high latitudes have been balanced by low-latitude decreases. By comparison, the change in precipitation in the U.S. is still relatively moderate compared to some of the increases and decreases at other latitudes. Decreases in the day-to-day differences of temperature observed in the U.S. are also apparent in China and Russia, the only other large countries analyzed as of this date. The persistent increase in the proportion of precipitation derived from extremely heavy precipitation has not been detected in these other countries.

A Climate Extremes Index (CEI), defined by an aggregate set of conventional climate extremes indicators, supports the notion that the climate of the U.S. has become more extreme in recent decades, yet the magnitude and persistence of the changes are not now large enough to conclude that the climate has systematically changed to a more extreme state. Similarly, a U.S. Greenhouse Climate Response Index (GCRI), composed of indicators that measure the changes that are expected to follow increased emissions of greenhouse gases, reflects in recent years the very changes that are predicted. Still, the rate of change of the GCRI, as with the CEI, is not large enough to unequivocally reject the possibility that the increase in the GCRI may have resulted from other factors, including natural climate variability, although statistically this is but a 5 to 10% chance. Both indices increased rather abruptly during the 1970s, at a time of major circulation changes over the Pacific Ocean and North America. There is little doubt that the increase in the indices is at least partially related to these circulation variations, although the role of increased anthropogenic greenhouse gas concentrations in such circulation variations is poorly known.

Since the indices are influenced by natural changes and variations that can either add to or subtract from any underlying long-term anthropogenic-induced change it will be important to carefully follow their behavior over the next decade to see if they sustain their incipient trends or return to previous levels. Such an effort is critical for a better understanding of climate itself, how it changes, and how these changes can affect our own lives and well-being.

2.2.1.8 Coastal & Beach Erosion / Sea Level Rise

Palm Beach County's vulnerability to coastal and beach erosion is moderate along its entire coastline. The most significant areas of beach erosion are the areas south of the stabilized inlets where the natural flow of laterally transported sand has been artificially interrupted. Many areas in PBC have been the subject of major beach re-nourishment projects sponsored jointly by the County and Army Corps of Engineers. Inland communities report some erosion problems along major canals and around water control structures.

The 2014 update of the Vulnerability Assessment Section of the LMS integrates sea level rise as a potential hazard. The Southeast Florida Regional Climate Change Compact estimates that a 2-foot sea level rise is the most probable planning scenario for the immediate future. PBC completed an assessment of vulnerability due to sea level rise in a report entitled "Overview Analysis of the Vulnerability of Southeast Florida to Sea Level Rise, South Florida Regional Climate Change Compact Inundation, Mapping and Vulnerability Assessment Work Group, April 2011." In this report, the County conducted an inundation analysis, identifying land at elevations below sea level, highlight areas located near PBC's coastline and tidal waterways. The report concluded that limited physical infrastructure in PBC is at risk at the one, two and three foot sea level rise scenario. Initially low volume roads and parking areas may be impacted at one foot and increase to up to forty-one (41) miles of roadways as the sea level continues to rise to three feet. Property with a current taxable value of $296-557 Million may become vulnerable as sea level rises. Facilities such as wastewater treatment, emergency evacuation shelters, landfills, airports, ports, and power plants will likely not be affected by sea level rise.

An initiative conducted by Florida Department of Economic Opportunity in 2011 to analyze sea level rise integration utilized PBC as a pilot study (Statewide Post-Disaster Redevelopment

Planning Initiative: Phase V). It concluded that while sea level rise was not addressed as an independent hazard category, other identified hazards may anticipate heightened impacts as the condition of sea level rise impacts over. Floods (Section 2.1.1.1), hurricanes (Section 2.1.1.2), and soil and beach erosion (Section 2.1.1.10) may be intensified due to the condition of sea level rise altering the traditional elements of the natural and man building environment. Section 2.1.1.1 details the conditions under which flooding occurs within the County and provides an overview of historical flooding events sea level rise will likely exacerbate flooding in flood prone areas, because flow rates in low lying areas may be further inhibited. The traditional flood conditions due to severe rain events will be impacted by sea level rise. Section 2.1.1.2 addresses these vulnerabilities associated with hurricanes. It details the overall vulnerability of the state and region due to its topography. Due to dense population along the coast, the potential for property damage and human casualties continues to increase. Florida not only has the most people at risk from hurricanes, but it also has the most coastal property exposed to these storms. While there continues to be debate among the experts, global climate change is likely to impact the development, intensity, and frequency of hurricanes in the world. Similarly, the condition of a higher sea level will increase the total inundation resulting from the storm surge. Section 2.1.1.10 address the vulnerability associated with beach and soil erosion stating that the natural forces of wind, waves, and long shore currents move the natural sand placement and change the beach shape and structure. However, this retreat is altered by man-made structures, and creates a perceived need to protect the existing shoreline conditions. This condition will be vastly augmented by the increase of the sea level. Existing homes, businesses, roads, bridges, and other man-made structures will suffer more rapid beach erosion and eventual water intrusion.

Access to and from the barrier islands could be vulnerable due to bridges being inaccessible from local roadway inundation, and coastal marinas could experience impacts. Natural habitats may also become increasingly vulnerable as water salinity levels and areas of inundation alter. Palm Beach County Assessment prioritizes salt water ponds, salt water marshes, and mangrove swamp as potential sensitive impacted habitats. In Appendix C, the sea level rise map illustrates PBC's vulnerability to 2 feet sea level rise.

Generally, the areas in the northern parts of the jurisdiction do not appear they will suffer as much inundation in comparison with the southern parts of the County, particularly along the Intracoastal Waterway. Most of the areas in PBC that are impacted by sea level rise are already fully developed or consist of natural lands. The rise in sea level will result in losses of land and structures, impact on utilities and infrastructure, and cause a reduction in value of real estate.

The map illustrates isolated area below sea level and areas inundated with 2 feet sea level rise. Areas within PBC that may be most problematic consist of those already below sea level. Cities in the northern portions of the County that are most inundated include Juno Beach, and the coastal areas of North Palm Beach and Palm Beach. The areas most inundated in Juno Beach and North Palm Beach includes the designated natural areas. The land uses most impacted are the residential, commercial, and recreation designations. Further analysis of this area may be necessary to determine if future land uses may be changed over time in order to decrease vulnerability to hurricane storm surge augmented by sea level rise. Land uses in the southern portions of the County include residential and commercial designations.

2.2.1.9 Agricultural Pest and Disease

Agricultural pests and disease are a more significant hazard in those areas of PBC where agriculture is a more significant element in the economic base. The western portion of PBC is a major ranching and farming area and there are numerous nurseries and smaller agriculture related businesses located throughout the County.

2.2.1.10 Drought

Palm Beach County overall has a moderate vulnerability to the impacts from drought due to the County's large agricultural land use in the west and extensive urbanization in the east. Overall, PBC has a narrow reserve of potable water and this could become a significant problem during a long-term drought. 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 PBC's coast are less vulnerable economically due to their location and non-agricultural economic base. Potential impacts to PBC's potable water supply by saltwater intrusion during drought conditions are generally low, with the exception of the City of West Palm Beach, which draws its water from surface supplies.

2.2.1.11 Pandemic

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. In addition, vulnerability to disease hazards has increased by the number of illegal immigrants reaching U.S. shores. Palm Beach County's vulnerability to pandemic 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.

2.2.1.12 Seismic Hazards

Sink Holes and Dam/Levee Failures

There are areas in PBC 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 PBC. While these hazards may exist, County vulnerability to them at this time must be considered very low as referenced in an earlier section. As such, PBC does not have a Hazard Specific Plan to address sinkholes.

Palm Beach County does have a major vulnerability to levee failure around the eastern boundary of Lake Okeechobee. Extensive dyking of Lake Okeechobee has taken place since the hurricane of 1928 when about 2,500 people were killed from surge in western PBC. Palm Beach County has the dubious distinction of having had the second highest number of fatalities (following Galveston, Texas) of any county in the United States. The U.S. Army Corps of Engineers maintains the levees around Lake Okeechobee and they are considered to be sound. A levee failure with today's population would be a catastrophic disaster for PBC.

Tsunamis

There have been no recorded tsunamis to have ever affected PBC. However, scientists have been studying La Palma Island in the Canaries as a possible site where a tsunami could originate if a massive landslide were to occur. Research published in 2001 by two prominent geologists (Ward & Day) created a major debate and concern over whether a predicted volcanic collapse in the Canary Islands could generate a mega tsunami, which could traverse the Atlantic Ocean at jet aircraft speeds (8 to 9 hours) and devastate the eastern coast of the U.S., including Florida. It was postulated that the wave, at impact on the Florida coast, could be approximately 50 meters high and cause damage inland as far as 20 km. This mega tsunami would cause unprecedented destruction and loss of life.

Subsequently, more comprehensive and rigorous research published by several scientists of the Tsunami Society has taken exception with the original research. The original research, they argue, was based on several erroneous assumptions regarding a structural weakness observed in the western flank of the Cumbre Vieja volcano on island of La Palma in the Canary Islands, the probability of a gravitation collapse of a massive land mass of the ocean bottom, and the magnitude and traveling distance of a wave (s) that might be generated should such a collapse occur.

The mega tsunami was postulated to occur sometime in the next 1500 years. The weight of scientific evidence suggests there is no discernible tsunami threat to the coast of Florida as a result of geological activity in the Canary Islands. The probability of a tsunami is low.

2.2.2 Technological Hazards

2.2.2.1 Hazardous Materials Accident

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

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

Overall, unincorporated PBC 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. All the jurisdictions along the eastern sand ridge (Boca Raton, Delray Beach, Boynton Beach, Hypoluxo, Lantana, Lake Worth, West Palm Beach, Riviera Beach, Lake Park, Palm Beach Gardens, Jupiter, and Tequesta) are extremely vulnerable to toxic material spills and releases from transportation system accidents, primarily rail accidents. The Florida East Coast Railroad runs through all these areas and toxic material spills have occurred along the rail line. Given the right set of circumstances, such releases could produce significant detrimental effects on life and property in these communities.

2.2.2.2 Radiological Accidents (Nuclear Power Plant Accidents)

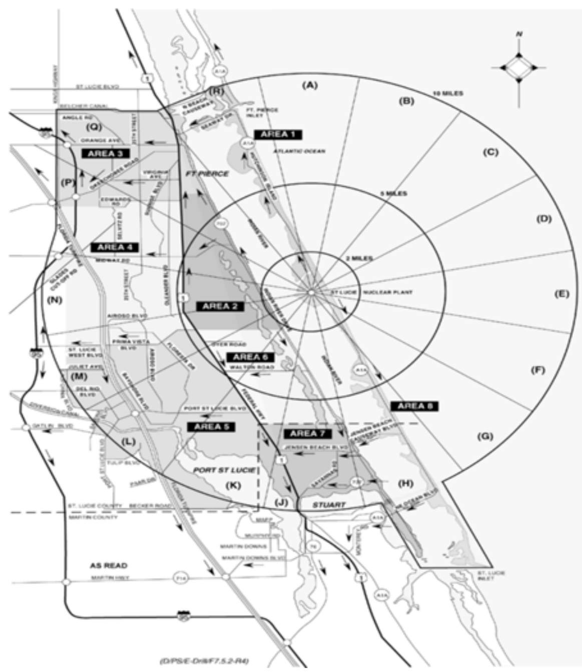


Figure 2.2: St. Lucie Nuclear Power Plant 10 Mile EPZ

The Florida Power and Light St. Lucie Nuclear Power plant is located on south Hutchinson Island in St. Lucie County. In the US, federal regulations define two distinct planning zones with regard to commercial nuclear power plant emergency planning. The Plume Exposure Pathway Emergency Planning Zone, commonly known as the EPZ, has a radius of 10 miles (16 km). The focus of the EPZ defines the geographic area for the management of protective actions related to the direct exposure to, and inhalation of, airborne radioactive contamination in citizens. The Ingestion Planning Zone, commonly known as the IPZ, has a radius of about 50 miles (80 km). The focus of the IPZ is to define the geographic area for the management of protective actions related to the ingestion of food and liquid contaminated by radioactivity that may reach the food supply. Approximately 45% of PBC falls within the 50-mile radius Ingestion Pathway Zone (IPZ) for the St. Lucie Nuclear Power plant. This means that a significant portion of PBC is 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 PBC is therefore considered low.

Nuclear emergency is perhaps the single hazard facing PBC, 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 the federal, state, local, and corporate levels. Drills are held routinely and extensive documentation is required by the Nuclear Regulatory Commission as well as several other federal agencies. Contingency planning for nuclear accidents at the plant itself appears to be well in hand. Of greater risk to the citizens of PBC is the transport of fissionable material to and from the plant. Such materials transfers are handled with a great deal of care and there has never been a significant accident during any such transfer. Again, while PBC's vulnerability to such accidents is high, the risk that this hazard will produce an impact within the community appears to be low. Some risks to PBC include:

Figure 2.3 50 Mile Ingestion Pathway Map for St. Lucie Nuclear Power Plant (Copyright © 2010 GIS Dolph Map LLC – Used with permission)

- Loss of life or potential physical injury (including long-term effects such as cancer)
- Loss of property (displacement from homes)
- Palm Beach County is within the 50 mile IPZ making contamination of food supplies and drinking water a possibility
- Exaggerated media reporting could lead to heightened public alarm. Impacts to tourism industry are possible

In the event of an accidental release of radioactive materials from the St. Lucie Nuclear Plant, evacuation areas would depend on several metrological factors such as wind direction and wind speed. According to the 2010 Census data, there are approximately 268,000 people living within ten miles of the power plant. If an accident at the plant took place during tourist season, PBC could expect half this population to evacuate into PBC (approximately 110,000 evacuees). Palm Beach County must be prepared to shelter 10 percent (11,000 people) of the evacuating population. All evacuees will be sheltered in Palm Beach, Indian River, and/or Brevard Counties. Currently, there are 19 shelters of which 18 are schools.

There are several safety design measures at the plant and stringent federal safety standards govern plant operations (e.g. plants have protective barriers and are designed to withstand aircraft attack, tornados, severe accidents and earthquakes). It is most likely that an accident would slowly progress from one stage of emergency classification to the next. A “fast breaker” accident is very unlikely, but the plant can shut down operations within 2 seconds if needed. Most likely, an accident would slowly progress providing time to warn the public and implement protective measures. In the case of a radioactive release, Florida Power and Light and the American Nuclear Insurers organization would reimburse evacuees for damage or re-location

2.2.2.3 Communications System Failure

Communication failures have a greater potential to produce adverse economic impacts in business-based rather than retirement or residential communities. On the other hand, communication system failures in residential and retirement communities may put more human lives at risk. Palm Beach County’s vulnerability to communication system failures is generally considered moderate. Basically, PBC’s vulnerability to this hazard is no greater or less than most other Florida coastal counties.

2.2.2.4 Transportation System Accidents

Palm Beach International Airport is a major commercial air transportation hub, with extensive commercial passenger and freight business as well as a significant amount of private or general aviation activity as well. The airport is located directly to the south and west of the City of West Palm Beach and the runway approaches pass directly over both the Town of Palm Beach and the City of West Palm Beach. Aviation is an important element of the economy in PBC, 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 PBC. Individual community and population center vulnerabilities to this hazard are entirely dependent upon location. Again, the communities built on the eastern sand ridge of the County are most vulnerable. Major transportation hubs, rail yards, trucking centers, and the Port of Palm Beach all raise these communities’ vulnerabilities to transportation system accidents and breakdowns. Transportation accidents have occasioned blockages on the major highways throughout PBC. Due to their locations along the rail line, the eastern cities have higher vulnerabilities to rail system accidents. The Town of Palm Beach and the City of West Palm Beach are also more vulnerable to plane crashes due to their location relative to the Palm Beach International Airport. The central, unincorporated portion of the County has a higher vulnerability to major highway accidents due to the presence of Interstate 95 and the Florida Turnpike.

2.2.2.5 Wellfield Contamination

Wellfield contamination has not been a major problem for most of PBC. There is some potential exposure to this hazard in the eastern portion of the County, but overall the vulnerability to this hazard is considered low at this time.

2.2.2.6 Power Failure

Power failures have the same potential impacts in all PBC communities. The vulnerabilities of all communities to power failures are considered moderate. The power grid throughout PBC is diversified and there is no single choke point or distribution node whose failure would disrupt power distribution to the entire community.

2.2.3 Human Caused Hazards

2.2.3.1 Civil Disturbance

The overall potential for civil disturbance in PBC is considered moderate. The Cities of West Palm Beach, Delray Beach, Boynton Beach, and Rivera Beach are considered to have relatively high vulnerability to this hazard. There has been significant civil unrest in certain areas of these cities in the past and a significant potential for such unrest remains. Recently (within the last 2 years), the potential for civil disturbance appears to have been reduced as a result of community based police activities and the generally overall strong national economy.

2.2.3.2 Terrorism and Sabotage

The possibility for terrorism and sabotage in PBC does exist, but the County's vulnerability to this hazard is low. The City of West Palm Beach has a slightly higher vulnerability to terrorism since it is the center of government and also by the role played by aviation in the local economy, but this vulnerability is still considered only moderate. The Town of Palm Beach, as well as many other wealthy enclaves within PBC has a slightly higher vulnerability to celebrity terrorism since so many well-known and wealthy personalities make their residence there. While this vulnerability exists, it is considered to be no greater than that faced by many other communities around the country where the rich and famous live.

The warm temperatures, onshore winds, high rate of sunshine (UV exposure), and rainfall in PBC make this area a less favorable target for biological or chemical terrorism than many other areas of the United States. The population here is dispersed when compared to major cities in the northeastern U.S., and the transportation system infrastructure is highly dependent upon individual vehicles. Both of these features make PBC a less desirable target for transportation system or conventional type (bomb related) terrorist acts.

2.2.3.2 Mass Migration Crisis

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 PBC. Palm Beach County's vulnerability to this hazard is moderate, however, due to demographic features. The cities of West Palm Beach, Delray Beach, Boynton Beach, Rivera Beach, South Bay, Pahokee, and Belle Glade all have a slightly higher vulnerability to illegal immigration impacts due their larger populations of Latin American and Caribbean immigrants.

2.2.4 Vulnerability of Critical Facilities

In **Appendix C**, maps demonstrate the vulnerability of each hazard in relation to the County and each jurisdiction's location and critical facilities and/or infrastructure. Structures have been identified for each hazard with jurisdictional boundaries. An estimated dollar figure in relation to potential dollar losses has been identified and summarized in a narrative for each identified hazard by jurisdiction.

Palm Beach County determined a criticality based on the relative importance of its various assets for the delivery of vital services, the protection of special populations, and other important functions. The types of critical facilities and infrastructure identified within these risk assessment maps are: schools, police stations, fire stations, specific government buildings, nursing homes, assisted living facilities, hospitals, shelters, Herbert Hoover Dike, Turnpike, I-95, water treatment facilities, utility stations, draw bridges, seaports, and airports. These facilities can be located on the risk assessment maps and a potential dollar loss will be correlated in the charts broken down by municipality and unincorporated PBC. The estimated costs are based upon information from the County Auditor's Office. The dollar figures specific to each hazard by municipality or unincorporated area express the potential human and economic impacts within PBC.

2.3 Risk Assessment

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?

- 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).

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 2.3a**). The larger the triangle's area, the higher the community's risk with respect to a given hazard. If a community wishes to reduce its potential for loss or risk of impacts from any given hazard, it can attack the problem by reducing any one of the three elements forming the sides of this triangle; the frequency of a hazard's occurrence, the vulnerability of the community, or the exposure of the community.

For example, if a community wishes to reduce its exposure to hurricanes, it could move off of the barrier islands. This actually happened in the 1870s when an entire community on the North Carolina barrier islands moved to the mainland after suffering two devastating hurricanes in three years. By moving out of harm's way, a community drastically reduces its exposure and therefore its potential for loss from a given natural hazard (**Figure 2.3b**).

In today's world, the potential to relocate an entire community off the barrier islands is, to say the least, remote. A community may, however, reduce its vulnerability to hurricanes by strengthening its buildings. If buildings are hardened, vulnerability is reduced and there is a corresponding reduction in a community's probability of loss (**Figure 2.3c**).

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 those hazards must therefore focus on reducing the community's vulnerability or exposure. In terms of technological and human caused hazards, the most cost-effective type of mitigation is to limit or reduce the frequency with which such hazards actually occur. **Table A-4** summarizes Palm Beach County's potential for loss relative to each of the hazards identified. In addition, **Appendix A** will include a risk assessment by jurisdiction. The risk assessments will be illustrated by means of maps located in **Appendix C** by hazard. This is to give a clear image of potential risk throughout PBC hazard specific with potential dollar losses estimated tied to assessed property values. This assessment will be linked to **Appendix B** and **Appendix D** illustrating mitigation actions being addressed in the PBC comprehensive plans. The overall strategy is to mitigate to reduce damage of a potential hazard.

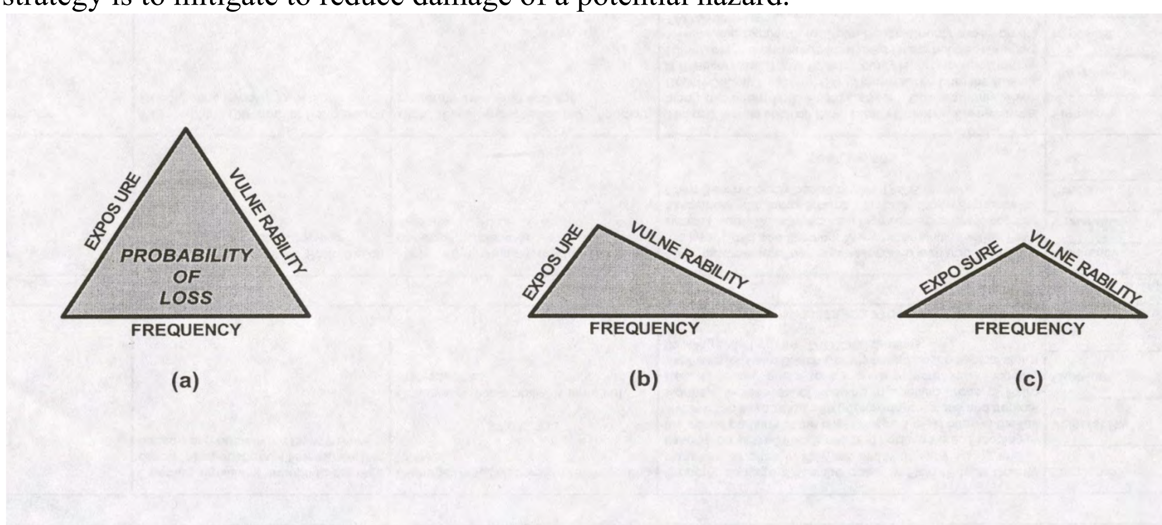


Figure 2.3 a, b, c Risk Triangle

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SECTION 2A: VULNERABILITY OF CRITICAL FACILITIES

This subsection assesses the vulnerability of critical facilities by jurisdiction in terms of the dollar values of property at risk from key hazards. It addresses, in part, the following FEMA requirement:

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area.

Numbers and types of existing residential, commercial and critical service facilities and infrastructure are referenced in **Appendix C**:

With regard to future facilities, the following should be considered:

- Developable coastal areas of the County in are substantially built out. Future development is likely to be replacement and upgrading of existing facilities.
- Development in the Coastal High Area is strictly limited and managed by local ordinances and codes which tend to meet or exceed those recommended of the State.
- Future growth throughout the County is guided by the managed growth tiers which consider hazard vulnerability.
- Virtually the whole County is potentially vulnerable to isolated flooding during excessive rain events, even areas lying outside Special Flood Hazard Areas. Repetitive flood loss properties are widely scattered - not clustered - because PBC has no riverines or significant elevation variations to speak of.
- All new residential, commercial and critical service facilities will be built to meet or exceed South Florida Building hurricane standards. Several local developers are now building Category 5 type structures.
- Wildfire mitigation practices are being promoted for development in the wildland-urban interface areas.

Quantitative and evaluative analyses of the vulnerability of future residential, commercial and critical services structures remains highly uncertain in today's economically unstable climate. As the State of Florida and the US as a whole show signs of gradual economic recovery, it may be premature to predict long-term trends. Economic and scientific sources to illustrate definitive trends for analysis are not currently available. The PBC Property Appraiser's 2012 Annual Report, continued to indicate a decline. Palm Beach County property values decreased 1.6% in 2011 over 2010. However, the Property Appraiser has provided preliminary reports that this past year may be the first indication of property value stabilization and perhaps recovery. There was a .2% increase from 2011 to 2012 (Palm Beach Post). This one year trend may be indicative of longer term stabilization and possible economic recovery throughout the Florida real estate markets. The Table below details the 2011 – 2012 property value trends by city.

Palm Beach County property values, 2012

The tax base for Palm Beach County and 15 of its 38 cities increased in 2012 over 2011, according to property values released Thursday by Palm Beach County Property Appraiser Gary Nikolits.

Taxing authority	2011 taxable value	2012 taxable value*	Change
Jupiter Inlet Colony	$219,723,894	$225,671,708	2.7%
Palm Beach	$11,623,306,786	$11,886,934,990	2.3%
Ocean Ridge	$679,547,225	$691,696,740	1.8%
Highland Beach	$1,732,047,474	$1,757,376,550	1.5%
Atlantis	$388,429,635	$393,534,454	1.3%
Boca Raton	$16,363,274,000	$16,560,029,766	1.2%
Tequesta	$765,017,585	$774,190,994	1.2%
Palm Beach Gardens	$7,764,780,280	$7,857,161,573	1.2%
Gulf Stream	$655,987,005	$663,376,897	1.1%
Manalapan	$827,434,621	$835,128,355	0.9%
Wellington	$5,321,076,907	$5,363,252,199	0.8%
Juno Beach	$923,299,324	$930,175,700	0.7%
Haverhill	$61,889,841	$62,152,684	0.4%
Delray Beach	$6,149,055,201	$6,165,908,059	0.3%
Jupiter	$7,135,152,279	$7,141,702,641	0.1%
North Palm Beach	$1,488,137,908	$1,482,462,167	-0.4%
Village of Golf	$119,930,349	$119,387,173	-0.5%
Lake Clark Shores	$183,471,629	$182,061,305	-0.8%
Riviera Beach	$3,015,088,751	$2,984,416,026	-1.0%
South Bay	$47,767,240	$47,143,078	-1.3%
Loxahatchee Groves	$182,211,218	$179,669,330	-1.4%
South Palm Beach	$262,590,986	$258,096,679	-1.7%
Boynton Beach	$3,752,272,309	$3,679,832,193	-1.9%
Lantana	$693,539,420	$679,420,341	-2.0%
Royal Palm Beach	$1,839,840,870	$1,796,690,341	-2.3%
Hypoluxo	$252,780,829	$246,832,783	-2.4%
West Palm Beach	$8,373,665,157	$8,107,372,057	-3.2%
Mangonia Park	$134,517,228	$129,982,169	-3.4%
Lake Park	$446,581,002	$431,077,363	-3.5%
Palm Beach Shores	$507,453,154	$489,799,594	-3.5%
Briny Breezes	$37,552,579	$36,006,571	-4.1%
Greenacres	$1,192,441,995	$1,135,022,141	-4.8%
Lake Worth	$1,106,255,651	$1,044,793,780	-5.6%
Palm Springs	$592,925,084	$550,032,594	-7.2%
Belle Glade	$279,225,613	$255,490,876	-8.5%
Cloud Lake	$4,596,019	$4,198,557	-8.6%
Glen Ridge	$14,944,150	$13,231,343	-11.5%
Pahokee	$78,899,300	$67,128,976	-14.9%
Unincorporated	**$39,052,983,536**	**$39,363,723,234**	**0.8%**
All Cities	**$85,216,710,498**	**$85,228,440,747**	**0.0%**
Palm Beach County	**$124,269,694,034**	**$124,592,163,981**	**0.3%**
School Board	**$132,048,705,669**	**$132,205,503,114**	**0.1%**

* Without new construction

Source: Property Appraiser's Office

CHRISTOPHER SMITH / The Palm Beach Post

SECTION 2B: VULNERABILITY OF RESIDENTIAL & COMMERCIAL PROPERTIES

This subsection assesses the structural vulnerability of residential and commercial properties by jurisdiction in terms of the dollar values of property at risk from key hazards, in partial fulfillment of the following FEMA requirement:

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area.

Numbers, types and characteristics of existing residential, commercial and critical service facilities and infrastructure are referenced in **Appendix C**.

Since the last update of the LMS in 2009, there has been moderate growth in residential and commercial properties throughout the State of Florida (Bergstrom Center for Real Estate Studies, 2012). However, there is still a cloud of uncertainty in the market place. Higher demand for housing, more occupancy in apartments and retail are providing lifts to the industry. According to the Property Appraiser's 2012 Annual Report, PBC property values have decreased 1.6% in 2011 over 2010. However, there was a .3% increase in 2012. Assuming we can get past the uncertainty of the current environment and avoid another recession, it is expected that the Florida real estate markets will continue to improve at a slow but positive pace over the next year.

The following observations are offered with regard to future facilities:

- Developable coastal areas of the County are substantially built out. Future development in these areas will likely be replacement and upgrading of existing facilities.

- Development in the Coastal High Area is strictly limited by local ordinances and codes which tend to meet or exceed those recommended by the State of Florida.

- Future growth throughout the County is guided by the managed growth tiers which consider hazard vulnerability.

- Virtually the whole County is potentially vulnerable to isolated flooding during excessive rain events, even areas lying outside Special Flood Hazard Areas. Repetitive flood loss properties are widely scattered - not clustered - as the County has only one river and no significant elevation variations to speak of.

- All new residential, commercial and critical service facilities will be built to meet or exceed South Florida Building hurricane standards. Several local developers are now building Category 5 type structures.

- Wildfire mitigation practices are being promoted for development in the wildland-urban interface areas.

The following pages provide assessments of the dollar values of existing properties at risk at this writing, by hazard, by jurisdiction.

Methodology for Assessing Vulnerability of Existing Structures

After considering the advantages and limitations of the Hazards U.S. Multi-Hazard (HAZUS-MH) modeling software, it was decided instead to use local property appraisal databases, Geographic Information System (GIS) mapping capabilities and hazard environment profiles as the basis for identifying and quantifying property and dollars at risk from key hazards.

Analyses of the types and numbers of existing buildings in PBC are complicated by the County's size and diversity, and by highly variable and incompatible databases and record keeping practices. The primary data source is the Property Appraiser Database (PAPA). The PAPA database is not well suited for purposes of vulnerability assessments but it is the best data available.

A comprehensive profile of PBC's built environment is contained in the Special Appendix. It describes the residential, commercial, industrial, government, education, healthcare, religious, and other building stocks.

The paragraphs below provide a brief summary of existing residential and commercial properties.

Residential Units

According to Property Appraiser data, there are an estimated 373,495residential structures in PBC. Nearly 53 percent of the County's single family residential units are single story structures, 45 percent are multi-story, and 1.2 percent are manufactured homes. The residential housing stock is well distributed throughout the eastern portion of the County. Forty three (43) percent of residential units reside in the unincorporated areas of the county. The seven municipalities of West Palm Beach, Boca Raton, Boynton Beach, Palm Beach Gardens, Jupiter, Wellington and Delray Beach collectively have about 37% of PBC's residential units. The southern municipalities of Boca Raton, Delray Beach and Boynton Beach collectively have an estimated 56,979 residential units; the northern municipalities of Palm Beach Gardens and Jupiter have 37,791units; West Palm Beach has 25,130 units; and the communities of Wellington and Royal Palm Beach have 48,477 units. The western communities of Belle Glade, Pahokee and South Bay have approximately 4,920 total residential units.

The overwhelming majority of residential structures (81%) are of CB Stucco construction. Thirteen and a half percent have exterior wall of wood in the form of wood siding, wood frame stucco or board batten. The balance is constructed of a variety of other materials. The County's database consists of approximately 25 categories, many of which have a multiplicity of variations.

Commercial Properties

Commercial properties were even more challenging to estimate. Property Appraiser data indicates that there are approximately 11,277 commercial and 7,401 industrial structures countywide. In addition other non-residential structures include 1,600 government structures, 750 healthcare facilities, and another 7,778 registered facilities of other types.

Number & Assessed Values of Residential & Commercial Property at Risk

Deriving an accurate estimate of residential property values at risk from hazards is complicated by a number of factors. Property Appraiser data is maintained on a parcel by parcel basis, not by structures. Certain gaps in values occur because of the diversity of property types. Land values had to be backed out of assessed property values. Assessments represent market values, not replacement costs. Homestead exemptions were also backed out of analyses. Multi-family residential structures (like high rise condominiums, co-ops, townhouses, zero lot line units) are considered to be understated in the results.

The methodology used to estimate the value of residential property at risk involved a number of compromises using best available data. Parcel data was extracted from the Property Appraiser database. It was sorted by jurisdiction and hazard boundaries. A derived factor for land values was backed out of loss estimates to concentrate only on improved parcels.

Estimating the Value of Property Contents

Based on analyses of property records, values for residential contents at risk are assumed to be approximately 80% of the appraised value of the structure. Values for commercial contents and inventory at risk are assumed to be 175% of the appraised value of the structure. A countywide summary of property values at risk, including contents, is presented at the end of this Section.

Critical Facilities

For the purpose of the LMS, Critical facilities are defined as any facility that would have a major negative effect on a large percentage of the population of a community. Based on the nature of the service (s) it provides to the community or the negative impact that would occur to that same community if the facility became damaged, destroyed or non functional. These facilities include but are not limited to law enforcement and fire rescue facilities, schools, government facilities, utility facilities, sea ports and airports, hospitals and other critical medical facilities, shelters, adult living facilities, etc. For security reasons and their sensitive nature, critical facility listings are excluded from publicly distributed copies of the LMS plan. A list is maintained by DEM and made available to authorized personnel.

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SECTION 3: MITIGATION STRATEGY

3.1 Governmental

3.1.1 Federal

The National Mitigation Strategy has been developed to provide a framework for reducing the exposure of all Americans to the catastrophic losses caused by natural disasters. Federal mitigation action planning is directed toward protecting U.S. citizens by:

- Utilizing the scientific and technical knowledge resulting from the research efforts of the National Institute of Standards and Technology (NIST), and integrating it into local fire and building codes in order to reduce major urban fires and building failures;

- Establishing under the NFIP a national program for floodplain management with strong mitigation provisions to significantly reduce flood losses;

- Developing a national system of emergency management with a coordinated Federal Response Plan to replace the piecemeal approach to recovery only after disaster strikes;

- Establishing a National Earthquake Hazards Reduction Program to increase the availability of applied seismic research, develop state seismic hazard reduction programs, and improve training and education on methods to the risk of loss of life and property to earthquakes;

- Establishing a National Hurricane Program to minimize loss of life and property from hurricanes through better property protection, warning and evacuation procedures, and training and education;

- Developing a National Inventory of Dams identifying high-hazard dams and encouraging the development of warning systems and emergency plans for many of these facilities;

- Establishing an effective program of assistance to state and local governments for post-disaster mitigation actions through the Stafford Act's Section 404, HMGP, and under Section 406 in terms of the mitigation of damage to public facilities; and

- Establishing a nationwide program of federal, state, and local preparedness consisting of trained personnel, facilities, equipment, training, and exercises to save lives and protect property through warning, evacuation, shelter, and other post-disaster actions.

In 1986, the United States Congress enacted the Emergency Planning and Community Right-to-Know Act. It imposed upon state and local governments planning and preparedness requirements for emergencies involving the release of hazardous materials. The role of the federal government in response to an emergency involving the release of hazardous materials is to support local and state emergency operations. Activation of the Federal Regional Response

Team provides access to federal resources not available at the state and local levels. An on-scene coordinator is designated to manage federal resources and support.

- The national warning and communications center for emergencies involving the release of hazardous materials. It is manned 24 hours a day, and is located at the U.S. Coast Guard headquarters in Washington, D.C.

3.1.2 State

The Florida Division of Emergency Management (FDEM), under the Executive Office of the Governor, has primary responsibility in disaster response and mitigation. The FDEM developed the Florida Hazard Mitigation Strategy (FHMS) to establish a comprehensive program to effectively and efficiently mobilize and coordinate the state's services and resources to make Florida's communities more resistant to the human and economic impacts of disasters. The Strategy achieves this purpose by the following actions:

- Improving the understanding and awareness of the natural, technological, and human caused hazards faced by the people, property, businesses, and institutions within the State of Florida;

- Defining the goals, objectives and priorities of the FDEM for hazard mitigation and post-disaster redevelopment in Florida;

- Developing and implementing programs to promote hazard mitigation throughout the state;

- Enhancing programs among state agencies and local governments to more effectively guide post-disaster redevelopment to minimize community vulnerability to future disasters;

- Increasing the identification of mitigation opportunities and maximizing the utilization of available funding;

- Improving coordination of programs within the FDEM related to hazard mitigation and post-disaster redevelopment;

- Facilitating coordination between the FDEM and other federal, state, regional, local and private sector programs related to hazard mitigation and post-disaster redevelopment;

- Describing clearly the State of Florida's hazards mitigation program-implementation tasks and establishing schedules for their completion;

- Designating who is responsible for the development and implementation of hazard mitigation and post-disaster redevelopment programs;

- Encouraging public participation and involvement in the development and implementation of the strategy; and

- Identifying and prioritizing hazard mitigation and redevelopment initiatives, programs, and projects prior to a disaster.

The FHMS provides the FDEM with operational and programmatic guidance to promote the goals and objectives of the nationally based National Mitigation Strategy as coordinated by FEMA.

The FDEM 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 FDEM is the designated State Watch Office (SWO) as the notification point in the event of a hazardous materials incident. As such, the FDEM is responsible for receiving notification of an emergency from the County Communications Coordinator (i.e., County Warning Point), and coordinating the request(s) for County support, if requested. The DEM is responsible for assisting Local Emergency Planning Committee (LEPC)'s in providing warnings and instructions to the general public.

The Florida Division of Forestry (DOF) has major responsibility for protecting forest lands and the public from the effects of wildfire. 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 wildfire event is beyond its capacity to fight, the local fire-rescue department can request assistance from the DOF. When that occurs, an incident command control is established with state and local fire-rescue departments working together to extinguish the wildfire.

3.1.3 Regional

3.1.3.1 Treasure Coast Regional Planning Council (TCRPC)

The TCRPC was created under Section 186.501, F.S. The TCRPC is 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 for 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". (**Appendix B**).

- **Strategy 5.1.1** Direct development away from areas most vulnerable to the effects of natural and man-made 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 in-put 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 manor making future disasters less destructive to life and property.

3.1.3.2 South Florida Water Management District

The creation of the South Florida Water Management District (SFWMD) along with the four other water management districts were enabled under Section 373.069, F.S. 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
- Water quality protection

One of the purposes of the plan is to provide a framework to address issues of water conservation, extreme drought and flooding. The SFWMD administers several programs that achieve hazard mitigation relative to flooding, hurricanes, and drought. 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 SFWMD's responsibilities for flood protection relate primarily to serving as the regional water conveyance and storage entity. To meet this responsibility 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 five year period
- To establish standard canal survey criteria
- 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 SFWMD for a surface water management permit approval.

Besides flood control, the SFWMD is responsible for 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 CHHAs is reduced.

3.1.4 Local

3.1.4.1 Palm Beach County

Palm Beach County occupies approximately 1,993 square miles on Florida's southeastern Atlantic coast. It is the second largest county in the state in terms of land area. It has approximately 44 miles of coastal shoreline that fronts the Atlantic Ocean.

Palm Beach County is the third most populated county in the state. In 2010 the countywide population was listed as 1,320,134 (US Census). That is an increase of nearly 200,000 people from the 2000 census. It is projected that by the year 2020, the population will increase by over another 200,000 to about to 1,597,535. The majority of the growth is expected between the coastal ridge and Water Conservation Areas.

Thirty-eight (38) municipalities exist in the County. In terms of population, they vary significantly. The City of West Palm Beach is the largest (99,919) while the Town of Cloud Lake (133) is the smallest (see **Table 3.1**). There are three urban centers of population along the coast: in south PBC, the Boca Raton/Delray Beach/Boynton Beach area (combined population – 213,131); the West Palm Beach/Lake Worth/Riviera Beach area (combined population – 167,317) in central PBC; and in north PBC, the Palm Beach Gardens/Jupiter area (combined population – 103,608). Two other centers of population exist in the County. One is the Glades agricultural communities of Belle Glade, Pahokee, and South Bay that border on Lake Okeechobee, (combined population – 27,992). This area has unique needs because of its relative physical isolation from the highly urban area along the Atlantic coast. The other area, rapidly urbanizing, is the Royal Palm Beach/Wellington/Greenacres (combined population – 128,221) area. Based on projected population, the City of Palm Beach Gardens is expected to experience the largest population increase among the municipalities in PBC by the year 2020.

As growth has occurred, and PBC has become more and more urbanized, large portions of the County have experienced shifting land use patterns, moving from rural, agricultural areas to emerging residential communities, industrial and business employment centers. Land in PBC is used for three major purposes: urban uses, agriculture, and protecting environmentally sensitive resource areas (e.g., water conservation areas, Corbett Wildlife Refuge, beach areas). **Table 3.2** provides a synopsis of each municipality.

From a hazards perspective, transportation is an important component shaping the overall development pattern. Being a major urban county, the residents and businesses are serviced by many suppliers that depend upon the air, rail, and trucking industries that distribute goods throughout the region. Key major modes of transportation traverse throughout PBC. The area is served by major transportation corridors (e.g., Interstate 95, Florida Turnpike), three rail lines (Florida East Coast Railroad, CSX Railroad and Tri-Rail), the Port of Palm Beach, and Palm Beach International Airport. As the area becomes more urban and more congested, the potential for transportation accidents will increase.

Within PBC, the SFWMD operates six major drainage canals: C-18, C-17 (Earman River), C-51 (West Palm Beach Canal), C-16 (Boynton Canal), C-15 (drains 75 square miles in southeastern PBC), and the Hillsboro Canal. Secondary stormwater drainage canals drain into these regional conveyance system drains. Prior to the construction of the extensive SFWMD canal system, flooding was a common occurrence, and served as a limiting factor to growth. In addition to providing drainage relief, the regional drainage facilities also benefit the area's water resources. Eastern PBC generally relies upon local rainfall and water stored in the Water Conservation Areas for its water. The regional SFWMD system can move water from Lake Okeechobee, through the Water Conservation Areas, and then to eastern PBC where the water helps supplement local recharge of urban wellfields. Palm Beach County's connection to the SFWMD regional system makes it less vulnerable to drought conditions than if it depended solely on local supplies. The south County wellfields would be seriously impacted by the loss of recharge from surface water systems.

It is the goal of PBC to protect human life and property by limiting public expenditures in areas subject to destruction by natural disasters (especially within the coastal high hazard area), maintaining and implementing an effective emergency management program, and providing for orderly recovery and redevelopment in a post-disaster period. Toward this end, PBC and its 38 municipalities maintain a series of coordinated, interlinked preparedness and recovery plans including, but not limited to:

Comprehensive Plans at County and municipal levels which focus on environmental resources management, managed avoidance of development in high hazard areas, and responsible post disaster redevelopment;

Comprehensive Emergency Management Plan and Local Emergency Plans, which establishes the framework to ensure that PBC and the municipalities will be adequately prepared to deal with the hazards threatening the lives and property of citizens and details pre and post-disaster hazard mitigation strategies, policies and activities;

Local Mitigation Strategy, which describes county-wide strategies and projects for mitigating the effects of identified vulnerabilities to natural, technological and human caused hazards;

Continuity of Operations Plan, which ensures the continuance of essential governmental functions during any emergency or situation that, might otherwise disrupt normal operations.

Through subcommittees of the Local Mitigation Strategy, these and other plans relevant to the protection of life and property are closely monitored in an effort to ensure their language, policies, procedures and practices are compatible, consistent, coordinated, and mutually beneficial.

Palm Beach County and its 38 municipalities participate in a full complement of federal, state, and local mitigation programs and initiatives. Representative of these programs and initiatives are the LMS, CRS, NFIP, FMAP, Citizens Emergency Response Team (CERT), Continuity of Operations, counter-terrorism, radiological emergency preparedness initiatives, and hazardous materials. The collective purpose of these activities is the elimination or mitigation of hazards presenting significant risk to PBC and its residents.

Palm Beach County's population by city

Eleven of Palm Beach County's 38 cities saw population declines from 2000 to 2010, with the town of Palm Beach seeing the largest actual number drop: 2,120 people or 20.3 percent of its 2000 population.

City/town	2000 population	2010 population	2000-2010 increase	Percentage of 2010 population WHITE	BLACK	HISPANIC
Atlantis	2,005	2,005	0.0%	88.3%	1.2%	7.4%
Belle Glade	14,906	17,467	17.2%	8.8%	55.6%	34.2%
Boca Raton	74,764	84,392	12.9%	79.1%	5.0%	11.9%
Boynton Beach	60,389	68,217	13.0%	53.6%	29.6%	12.8%
Briny Breezes	411	601	46.2%	98.8%	0.3%	0.8%
Cloud Lake	167	135	-19.2%	71.1%	5.9%	23.0%
Delray Beach	60,020	60,522	0.8%	59.2%	27.7%	9.5%
Glen Ridge	276	219	-20.7%	69.4%	1.4%	28.3%
Golf	230	252	9.6%	98.8%	0.4%	0.8%
Greenacres	27,569	37,573	36.3%	40.8%	16.0%	38.3%
Gulf Stream	716	786	9.8%	94.1%	0.3%	4.3%
Haverhill	1,454	1,873	28.8%	45.4%	22.1%	29.2%
Highland Beach	3,775	3,539	-6.3%	94.6%	0.3%	3.6%
Hypoluxo	2,015	2,588	28.4%	83.1%	6.7%	6.8%
Juno Beach	3,262	3,176	-2.6%	93.1%	0.7%	3.8%
Jupiter	39,328	55,156	40.2%	82.6%	1.4%	12.7%
Jupiter Inlet Colony	368	400	8.7%	94.5%	0.0%	1.3%
Lake Clarke Shores	3,451	3,376	-2.2%	70.8%	2.1%	24.7%
Lake Park	8,721	8,155	-6.5%	33.2%	53.7%	8.0%
Lake Worth	35,133	34,910	-0.6%	38.1%	18.9%	39.6%
Lantana	9,437	10,423	10.4%	56.3%	21.4%	18.6%
Loxahatchee Groves*	–	3,180	–	74.2%	3.1%	18.7%
Manalapan	321	406	26.5%	89.9%	3.9%	4.7%
Mangonia Park	1,283	1,888	47.2%	6.7%	81.3%	9.2%
North Palm Beach	12,064	12,015	-0.4%	87.8%	2.5%	6.9%
Ocean Ridge	1,636	1,786	9.2%	93.6%	0.2%	4.3%
Pahokee	5,985	5,649	-5.6%	9.7%	55.4%	33.8%
Palm Beach	10,468	8,348	-20.3%	94.1%	0.5%	3.9%
Palm Beach Gardens	35,058	48,452	38.2%	82.3%	4.2%	8.9%
Palm Beach Shores	1,269	1,142	-10.0%	95.9%	1.1%	2.4%
Palm Springs	11,699	18,928	61.8%	35.4%	10.5%	50.6%
Riviera Beach	29,884	32,488	8.7%	22.9%	65.0%	7.4%
Royal Palm Beach	21,523	34,140	58.6%	51.1%	21.8%	20.4%
South Bay	3,859	4,876	26.4%	11.4%	64.0%	23.2%
South Palm Beach	699	1,171	67.5%	93.9%	0.4%	4.6%
Tequesta	5,273	5,629	6.8%	91.1%	0.5%	6.1%
Wellington	38,216	56,508	47.9%	64.8%	10.0%	19.4%
West Palm Beach	82,103	99,919	21.7%	41.6%	31.5%	22.6%
Unincorporated	521,447	587,844	12.7%	63.5%	12.2%	20.1%
County total	**1,131,184**	**1,320,134**	**16.7%**	**60.1%**	**16.8%**	**19.0%**

*Incorporated in 2006

Source: U.S. Census Bureau

CHRISTOPHER SMITH/Staff Artist

Table 3.1: Total Population- 1.3million

Table 3.2 Characterization of Municipalities (2010 US CENSUS) Palm Beach County

Municipality	***Location***	***Urban/Rural***	***Community Character (Residential/Working/Retirement)***	***Percent Built Out***	***Source Year***	***Economic Base (Agricultural/Business/Industrial/Residential/Retirement)***
Atlantis	Inland	Urban	Residential	NI		Residential/Retirement
Belle Glade	Lakefront	Rural	Working	75	89	Agricultural
Boca Raton	Coastal	Urban	Working	97	2014	Business/Residential
Boynton Beach	Coastal	Urban	Residential	NI		Business/Residential
Briny Breezes	Coastal	Urban	Retirement	100	89	Retirement
Cloud Lake	Inland	Urban	Residential	94	89	Retirement/Residential
Delray Beach	Coastal	Urban	Residential/Working	98.9	08	Business
Glen Ridge	Inland	Urban	Residential	86.3	89	Residential/Commercial
Golf	Inland	Urban	Residential	NI		Residential
Greenacres	Inland	Urban	Residential	97	06	Residential/Commercial
Gulfstream	Coastal	Urban	Residential	NI		Residential
Haverhill	Inland	Rural/Urban	Residential	96	89	Residential/Commercial
Highland Beach	Coastal	Urban	Residential/ Retirement	98	08	Residential/Retirement
Hypoluxo	Coastal	Urban	Residential	NI		Retirement
Juno Beach	Coastal	Urban	Residential	90	2014	Residential/Commercial
Jupiter	Coastal	Urban	Residential/Working	90	2014	Business/Residential
Jupiter Inlet Colony	Coastal	Urban	Residential	99	08	Residential/Retirement
Lake Clark Shores	Inland	Urban	Residential	96	2014	Residential/Commercial
Lake Park	Coastal	Urban	Working	95	08	Business
Lake Worth	Coastal	Urban	Residential	NI		Commercial

Lantana	Coastal	Urban	Residential	NI		Residential/Commercial
Loxahatchee Groves	Inland	Rural	Residential	NI	09	Residential
Manalapan	Coastal	Urban	Residential	NI		Residential
Mangonia Park	Inland	Urban	Working	85	2014	Working/Residential
North Palm Beach	Coastal	Urban	Residential	98	89	Residential/Commercial
Ocean Ridge	Coastal	Urban	Residential	NI		Residential/Retirement
Pahokee	Lakefront	Rural	Working	NI		Agricultural
Palm Beach	Coastal	Urban	Residential	97	2014	Residential/Commercial
Palm Beach Gardens	Inland	Urban/Rural	Residential/Working	95%	2014	Agricultural/Business
Palm Beach Shores	Coastal	Urban	Residential	NI		Residential/Retirement
Palm Springs	Inland	Urban	Residential	96	2014	Residential/Commercial
Riviera Beach	Coastal	Urban	Working	94		Industrial
Royal Palm Beach	Inland	Urban	Residential	90		Business/Industrial/Residential
South Bay	Inland	Rural	Residential/Working	91	89	Agricultural/Industrial
South Palm Beach	Coastal	Urban	Residential	100	89	Residential/Retirement
Tequesta	Coastal	Urban	Residential	95	89	Residential/Retirement
Wellington	Inland	Urban	Residential	NI		Residential
West Palm Beach	Coastal	Urban	Residential	NI		Business

County Agencies with Key Roles in Mitigation
Within the existing county organizational structure, there are a number of departments that play key roles in hazard mitigation. They are as follows:

Public Safety Department (PSD). The PSD is composed of five divisions: Division of Emergency Management (DEM), Animal Care & Control Division, Consumer Affairs Division, Medical Examiner's Office, and Victim & Justice Services Division. During emergency events (e.g., hurricanes), the DEM has the lead role in coordinating the resources and key agencies, non-profits, and private sector entities involved in the emergency situation.

Department of Planning, Zoning & Building (PZ&B). The PZ&B is comprised of three divisions: Planning, Zoning and Building. The PZ&B has primary responsibility for administering the PBC Comprehensive Plan, and appraising and updating it from time to time. In addition to its long-range planning role, PZ&B is responsible for processing development petitions (i.e., rezoning petitions, site plans). The Building Division issues and oversees compliance with all building permits. The Zoning Division administers the Zoning Ordinance and Lot Clearing Ordinance. The County also issues building permits for one municipality Gulf Stream.

Department of Environmental Resource Management (ERM). The ERM is involved in the evaluation and assessment of environmental projects (e.g., shoreline stabilization projects, beach erosion initiatives), and administering various environmental ordinances (i.e., Irrigation & Water Conservation, Sea Turtle Protection/Sand Preservation Ordinance, Stormwater Pollution Prevention, Vegetation Protection and Preservation, Turnpike Wellfield Protection). To mitigate erosion and enhance and restore the beaches and dunes along its coastal shorelines, the County has developed a Shoreline Protection Plan. The County avoids the use of shoreline armoring (except as a measure of last resort). Preferred alternatives include beach nourishment, dune restoration, and inlet sand transfer.

Facilities Development and Operation (FD&O). This department is responsible for the development of County buildings including sitting, real estate, design and construction, and operations of the facilities. The department is responsible for overseeing the construction of capital projects as well as the long-term maintenance of County facilities (e.g., emergency management operations center).

Engineering and Public Works Department (EPWD). The EPWD is responsible for project design and construction of roads and bridges and street improvements (includes stormwater drainage facilities), and vehicular and pedestrian traffic control, as well as the maintenance of the facilities.

PBC Fire Rescue (PBCFR). Palm Beach County Fire Rescue provides fire suppression, emergency medical services, fire prevention and community education programs throughout PBC. The department not only serves the unincorporated County, but many municipalities. They include: Belle Glade, Canal Point, Cloud Lake, Glen Ridge, Haverhill, Juno Beach, Jupiter, Lake Clarke Shores, Lake Park, Lake Worth, Lantana, Manalapan, Pahokee, Royal Palm Beach, South Bay, South Palm Beach and Wellington. The County also provides fire-rescue dispatch service to other municipalities. Besides emergency services, the Department provides other types of services. The Bureau of Safety Services is responsible for ensuring that buildings comply with appropriate fire codes. The department also offers public education programs which 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.

Palm Beach County Sheriff's Office (PBSO). Besides their responsibilities for crowd and traffic control during emergency events such as hazardous waste truck spills, the Sheriff's Department is responsible for enforcing PBC's dumping ordinance.

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.

- County Comprehensive Plan

  Palm Beach County's Comprehensive Plan provides the framework for future development within the unincorporated area, and provides mechanisms and standards through which changes could occur. The directives include implementing County-wide growth management strategies while providing the opportunities for flexibility that recognize and maintain the diversity of lifestyles. The Comprehensive Plan contains the nine required plan elements, as set out in Section 163.3177, F.S. They include: Conservation, Coastal Management, Utilities (i.e., potable water, sanitary sewer, stormwater management, solid waste, and natural aquifer recharge), Future Land Use, Housing, Recreation and Open Space, Transportation, Intergovernmental Coordination, and Capital Improvement. In addition, the County has added several optional elements to the Comprehensive Plan. This plan addresses: Library Services, Public School Facilities, Historic Preservation, Fire-Rescue Services, Health and Human Services. Hazard Mitigation is addressed in the Conservation and Coastal Management Elements. A listing of relevant hazard mitigation objectives and policies for PBC is located in Appendix B.

  Mitigation of natural hazards such as flooding, hurricanes, drought, and beach erosion is a focus of the Coastal Management Element in the Comprehensive Plan. Technological and societal hazards are also addressed in the plan Coastal Management Element.

  Effective October 25, 2002 by Ordinance 2002-51, PBC's Comprehensive Plan contains specific language which recognizes, concurs with, and links the County's LMS objectives, processes and project prioritization criteria with capital improvement and coastal management policies and priorities. Key references can be found in Policy 1.4 of the Capital Improvement Element; and Section 2, Objective 2.4 and

Policies 2.4-e and 3.1-c of the Coastal Management Element. By virtue of their intended purpose to mitigate public hazards, projects carried on the LMS Prioritized Project List are considered to meet the County's standards for categorization as "Essential." The Comprehensive Plan also recognizes that the governing body of the LMS program shall comprise representatives assigned by each of the 38 municipalities and PBC and be governed by appropriate policies, procedures and/or either interlocal agreements or resolutions.

Appendix B
Conservation Element: Policy 1.3-e: The County shall pursue opportunities, such as State Hazard Mitigation Grant Funding, to preserve lands for natural resources (i.e. beaches and dunes, native vegetation, wetlands and barrier islands). A benefit of preserving lands for natural resources is hazard mitigation aimed at protecting development from natural disasters.

Coastal Management Element: Policy 2.5-d: The County shall continue to enforce regulations and codes, which provide for hazard mitigation. These include land use, building construction, flood elevation, septic and sanitary sewer, coastal construction setback, and stormwater facility regulations. These regulations shall also be applied to eliminate unsafe conditions and inappropriate uses.

Coastal Management Element: Policy 2.5-e: The County shall, pursuant to the Comprehensive Emergency Management Plan, continue recommended hazard mitigation activities, including land development regulations and construction law administration. Post-disaster recommendations contained in Hazard Mitigation Plans shall be incorporated to avoid future destruction and loss of life.

- Palm Beach County Comprehensive Emergency Management Plan (CEMP)

The BCC has adopted the CEMP. It is an operations-oriented document that establishes the framework for effective management of emergencies and disasters for PBC. The CEMP addresses a broad range of hazards. They include:

- Severe Weather
- Flooding
- Fire
- Agricultural Pests and Diseases
- Hazardous Materials
- Nuclear Power Plant
- Dike Failure
- Domestic Security
- Mass Migration
- Communicable Diseases
- Transportation
- Workplace/School Violence

The CEMP addresses evacuation in terms of local and regional evacuation, public shelter, disaster response and recovery, rapid deployment of resources, communications and warning systems, training exercises, and agency responsibilities. These responsibilities constitute Emergency Support Functions (ESF). 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 serves as the primary mechanism through which outside assistance to PBC is coordinated.

In the Mitigation section of the CEMP, there is extensive language stating the objectives and details of the Local Mitigation Strategy. The mitigation techniques within the two plans include projects, policies, or programs which will reduce, eliminate, or alleviate damage caused by disasters. Moreover, the CEMP and the LMS work collectively to improve the community's resistance to damage from known natural, technological, and human caused hazards.

Ordinances. Hazard-related ordinances are administered primarily by the PZ&B, ERM or Fire-Rescue departments. The list of relevant ordinances includes:

- Irrigation & Water Conservation
- Sea Turtle Protection/Sand Preservation
- Stormwater Pollution Prevention
- Countywide Wellfield Protection
- Turnpike Wellfield Protection
- Lot Clearing
- Zoning
- Building Code
- Fire Prevention Code
- Vegetation Protection and Preservation

County Mitigation Plans, Programs Projects/Initiatives

There are a number of projects and initiatives PBC has implemented to mitigate potential damage resulting from various hazards.

Palm Beach County has also made a statement of the importance of hazard mitigation, by incorporating within its Comprehensive Growth Management Plan policy statements regarding the development of a county-wide Local Mitigation Strategy. 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 each year, Fire-Rescue actively participates on the County development review committee. 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 Department has a significant role relative to hazardous materials. Fire-Rescue 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, PBC has upgraded its building code. It requires that all structures be able to withstand 110 mph wind load. The code now requires a finished floor elevation at 6 inches above minimum 100-year flood level. The County's building code also requires corrosion resistant hurricane clips, water resistant adhesives for shingles, and trusses manufactured in accordance with local wind models. Unlike many counties in Florida, PBC also requires shutters for all new single family homes, and glazing of exterior windows to achieve impact resistance from windborne debris.

Another mitigation activity of Fire-Rescue involves pre-planning for hurricanes. This involves identifying "target hazards." These are buildings/developments that are highly vulnerable to damage during a hurricane. In pre-storm stage, Fire-Rescue personnel identify residents that did NOT evacuate, and where they live in the event Fire-Rescue staff has to search for individuals following the storm event.

All fire stations have been fitted with shutters and have emergency generator and LP gas power sources. Also, all new facilities are being built to updated standards and have fire sprinkler/alarms.

National Flood Insurance Programs (NFIP)

The function of NFIP is to provide flood insurance to homes and businesses located in floodplains at a reasonable cost, and to encourage the location of new development away from the floodplain. The program is based upon mapping areas of flood risk, and requiring local implementation to reduce that risk, primarily through guidance of new development in floodplains.

Congress created the NFIP in 1968 to minimize response and recovery costs and to reduce the loss of life and damage to property caused by flooding. FEMA administers the NFIP. The two fundamental objectives of NFIP are to:

1. Ensure that new buildings will be free from flood damage; and
2. Prevent new developments from increasing flood damage to existing properties.

The primary benefits of the NFIP are to:

1. Provide flood insurance coverage not generally available in the private market;
2. Stimulate local floodplain management to guide future development;
3. Emphasize less costly nonstructural flood control regulatory measures over structural measures;

4. Reduce costs to the federal and state governments by shifting the burden from the general taxpayer to floodplain occupants.

Palm Beach County and its 38 municipalities participate in the NFIP (**Appendix J**). In return for NFIP making flood insurance available to property owners, the County and municipalities are required to adopt ordinances to manage development within 100-year floodplains to prevent increased flooding and minimize future flood damage. Palm Beach County Flood Insurance Rate Maps published by the FEMA date as far back as 1978 are used as the basis for delineating the 100-year floodplain and identifying regulated land.

Flood Damage Prevention Ordinances

Palm Beach County's Flood Damage Prevention Ordinance, covering the unincorporated areas of the County, can be accessed through the PBC Planning, Zoning and Building Division's website. Municipal residents should contact their respective building department officials to determine what requirements are in effect for their jurisdictions.

Floodplain Permitting

The NFIP requires participating counties and municipalities to issue permits for all development in the 100-year floodplain. Development is broadly defined by NFIP to include any man-made change to land, including grading, filling, dredging, extraction, storage, subdivision of land, as well as the construction or improvement of structures. Proposed development must not increase flooding or create a dangerous situation during flooding, especially on neighboring properties. If a structure is involved, it must be constructed to minimize damage during flooding. Permitting officials work with applicants to discourage development in the floodplain wherever possible, but when unavoidable, the effects of development must be minimized.

The permitting review process is a requirement for continued community participation in the NFIP. Violations can not only jeopardize a community's standing in the NFIP; moreover, they can impact the ability of residents to obtain flood insurance. Residents witnessing development occurring without permits are asked to protect their rights by reporting violators to the local permit office.

Map Modernization Program

Palm Beach County is an active participant in the Map Modernization Program. Since September 2000, PBC and its 38 municipalities have been working with FEMA, their contract consultants, local engineering agencies, the SFWMD and the County's contract consultant in the development of a complete new set of Flood Insurance Rate Maps (FIRMs). The data being provided to FEMA's contractor includes new accurate Light Detection and Ranging (LIDAR) developed elevation data obtained from the U.S. Army Corps of Engineers and from a PBC contract with Florida International University.

We anticipate the availability of a complete set of new FIRMs for all of PBC prior to December 2014. In addition, the coordination process established between all of the agencies listed above will provide for faster coordination of future changes with FEMA, to ensure continued improvement in the currency and accuracy of the FIRMs.

Community Rating System (CRS)

In 1991, the NFIP implemented the Community Rating System (CRS) for encouraging and recognizing community flood plain management activities that "exceed" these minimum NFIP standards. Today more than 900 communities across the nation participate in CRS, including Palm Beach County and most of its municipalities. Palm Beach County joined the CRS program in October of 1991.

As an incentive and reward for participation, the flood insurance rates of residents in CRS communities may be reduced by up to 45% to reflect the reduced flood risk resulting from activities that meet CRS's three goals: reducing flood losses, facilitating accurate insurance ratings, and promoting the awareness of flood insurance.

Communities can earn points in creditable activity areas grouped into four areas of emphasis: promoting public awareness, reduction of flood damage, improved mapping and regulations; and enhanced flood preparedness. Based on the number of points earned, each CRS community is ranked in one of ten classes (with Class 1 requiring the most points). In turn, a community's class rating determines the amount of flood premium reduction its residents are eligible to receive. Communities are encouraged to improve their class ratings. Property owners residing within a Special Flood Hazard Area, an area subject to the one percent chance a year, may qualify for anywhere between 5% and 45% discount. Property owners outside the Special Flood Hazard Area qualify for a standard discount of 5%. The County strongly encourages all of its communities to take part in the CRS program.

The County and its CRS participating municipalities track repetitive loss properties county-wide on an ongoing basis using information gathered annually from FEMA and state Focus reports. For analysis, LMS GIS maps and databases are updated using these inputs to reflect repetitive loss property locations relative to historical flood areas and designated Special Flood Hazard Areas.

In accordance with CRS guidelines, letters are mailed annually to repetitive loss property owners by the County and municipalities explaining NFIP program benefits, the availability of mitigation assistance funding through the FMAP and other mitigation assistance programs. Repetitive loss properties are an ongoing discussion and planning priority for the LMS. These Committees, comprised of public and private sector representatives, are encouraged to develop and promote mitigation project ideas and strategies.

Table 3.4 outlines the communities involved in the CRS program. All the communities involved in the CRS program have program activities that follow the same strategies. Palm Beach County's CRS program activities overlap and are inextricably interlinked with the activities of the LMS program. While the objectives of the CRS program are many, its key strategic objectives include:

1. Heightening public awareness of flood threats in PBC
2. Discouraging/managing development in flood plains
3. Minimizing flood losses in the community
4. Mitigating to eliminate repetitive loss properties
5. Ensuring residents have access to the most cost affordable flood insurance possible

Some of these goals were met through the Education and Outreach Subcommittee formed during the development of the PBC Local Mitigation Strategy. Today, a countywide CRS committee's purpose is to provide information to the community and involve the community in mitigation efforts. One major effort of this committee has been to encourage countywide participation in the CRS program by providing technical assistance to communities wishing to enter the CRS program, and assisting those communities already participating in the CRS program to improve their CRS ratings. Most communities in PBC are already participants in the program.

These objectives are met by encompassing County and municipal plans and programs including FMA, CRS, CEMP, Comprehensive Plan, Capital Improvement Plan and the LMS. All have the objective to ensure the successful mitigation activities to reduce repetitive loss properties throughout the County and its municipalities.

Outreach & Education

The LMS administers and otherwise supports a range of community Outreach and Education initiatives. Detailed descriptions of these activities and initiatives are contained in the County's Multi Year Community Outreach Plan, Comprehensive Emergency Management Plan, the Five Year Strategic Plan, documentation associated with Community Rating System recertification, DEM website, etc. Outreach activities take many forms, including (but not limited to): presentations, workshops, courses, multilingual brochures, flyers, websites, media releases, plans, telephone directory postings, mailings and inserts, expos, on-site briefings, special websites and website postings, and library holdings. Many of these activities are done in cooperation with private-public partners and sponsors.

Another significant part of mitigation outreach education are the community outreach presentations that are conducted throughout the Palm Beach Community. These presentations provide municipalities, schools, neighborhood associations, non for profit organizations, and residents, information on mitigation, mitigation projects, disaster preparedness, and hazards that may affect the County. More than 100 presentations are conducted each year.

As part of its participation in the Community Rating System program, the County maintains a collaborative Outreach Project Strategy Program under a PPI, which encompasses a number of major outreach activities which are updated and reported to the Insurance Services Office as part of the annual recertification process.

A representative listing of some of the more significant outreach and education activities includes:

- Annual publication of a Hurricane & Flood Survival Guide (3 languages)

- Annual Hurricane & Flood Awareness Expo(s)
- AT&T Directory Emergency Information Pages (4 Directories)
- Preparation/distribution of hazard and audience-specific brochures
- Business preparedness and post-disaster needs posting websites
- Business disaster planning guide - CD
- Flood Information website
- Emergency Information website
- Social Media (Twitter/FaceBook)
- LMS meetings open to the public
- Library holdings through the County Library System
- Special programs for association represented communities
- On-site presentations, structural evaluations, and planning assistance for special-interest groups such as home owner associations, property management firms, businesses, churches & synagogues, public gathering facilities, etc.
- Speakers bureau of County (paid and volunteer staff), municipal, not-for-profit, and private business volunteers
- Participation in numerous fairs and expos hosted by public and private sector groups
- Annual hurricane call-in event sponsored by a local TV affiliate
- Course offerings (certified and not) on safety and preparedness topics
- Participation as presenters/instructors at the National and Governor's hurricane conferences
- Published articles, papers

Most of the activities above are provided on an ongoing or seasonal basis. Details of most activities are documented in one or more of the following forms: in program specific reports, recertification packages, post-activity reports, monthly status reports, and in plan updates. The County and municipal jurisdictions maintain and distribute government and not-for-profit publications as appropriate. Lists of most distributed and held government and not-for-profit publications are contained in PBC's Comprehensive Emergency Management Plan and relevant Community Rating System documentation.

Flood Mitigation Assistance Program (FMAP)

The Flood Mitigation Assistance Program (FMAP) is a NFIP initiative administered by the FDEM to help communities identify and implement measures to reduce or eliminate the long-term risk of flood damage to homes and other structures insurable under the NFIP.

Presently PBC offers the program on a limited basis to owners of "repetitive flood loss" properties based on the availability of federal and state funds and the availability of local resources to administer the program. The program provides homeowners with reasonable, cost-effective hazard mitigation options and potential public and private financing alternatives.

The FEMA contributes 75% of eligible mitigation costs. The remaining 25% must come from non-federal sources. The homeowner must contribute at least 12.5%. However at the present time, PBC requires the homeowner to contribute the full non-federal share.

Examples of flood mitigation projects that might qualify for FMA funding assistance include:

- Elevation of flood prone structures
- Relocation of flood prone structures
- Demolition (with or without rebuilding at higher elevation)
- Acquisition
- Various flood proofing measures.

Information and support is provided in a variety of forms to potential FMA applicants to assist them in developing projects and preparing application packages. Through the County's LMS committee structure, the Hazard Vulnerability Analysis Subcommittee, as well as FDEM, is available to offer technical and administrative guidance and assistance to applicants, including assistance with benefit-cost computations.

Table 3.4. Summary of repetitive loss properties by local government and Community Rating System (CRS)

Community Number	Community Name	Number of Repetitive Loss Properties	Number of Claimed Repetitive Losses	CRS Rating	% Reduction in NFIP Rates
120192	PBC - Unincorporated	41	96	7	15%
120193	City of Atlantis	0	0	8	10%
000000	City of Belle Glade	0	0	NP	0%
120195	City of Boca Raton	3	7	8	10%
120196	City of Boynton Beach	5	30	8	10%
000000	Town of Briny Breezes	0	0	NP	0%
120198	Town of Cloud Lake	1	2	8	10%
125102	City of Delray Beach	1	2	9	5%
120200	Town of Glen Ridge	0	0	NP	0%
000000	City of Greenacres	0	0	NP	0%
125109	Town of Gulf Stream	2	5	8	10%
120205	Town of Haverhill	1	UK	NP	0%
125111	Town of Highland Beach	0	0	9	5%

Community Number	Community Name	Number of Repetitive Loss Properties	Number of Claimed Repetitive Losses	CRS Rating	% Reduction in NFIP Rates
120207	Town of Hypoluxo	0	0	8	10%
120208	Town of Juno Beach	2	6	5	25%
125119	Town of Jupiter	7	24	7	15%
120162	Town of Jupiter Inlet Colony	0	0	NP	0%
120211	Town of Lake Clark Shores	0	0	9	5%
120212	Town of Lake Park	2	4	9	5%
120213	City of Lake Worth	8	19	9	5%
120214	City of Lantana	6	7	9	5%
	Loxahatchee Groves				
120215	Town of Manalapan	2	7	9	5%
120216	Town of Mangonia Park	1	0	8	10%
120217	Village of North Palm Beach	1	2	8	10%
125134	Town of Ocean Ridge	13	29	8	10%

Community Number	Community Name	Number of Repetitive Loss Properties	Number of Claimed Repetitive Losses	CRS Rating	% Reduction in NFIP Rates
120219	City of Pahokee	1	UK	NP	0%
120220	Town of Palm Beach	43	114	7	15%
120221	City of Palm Beach Gardens	2	4	7	15%
125137	Town of Palm Beach Shores	0	0	9	5%
120223	Village of Palm Springs	1	2	8	10%
125142	City of Riviera Beach	6	UK	NP	0%
000000	Village of Royal Palm Beach	0	0	NP	0%
000000	City of South Bay	0	0	NP	0%
120227	City of South Palm Beach	3	10	8	10%
120228	Village of Tequesta	1	3	8	10%
125157	Village of Wellington	0	0	9	5%
120229	City of West Palm Beach	18	40	7	15%

• Based on the FEMA Florida Repetitive Loss List • NP Non-Participant in the CRS Program • UK Unknown

Elevation of New and Substantially Improved Structures

Damage to "new" and "substantially improved" floodplain structures is minimized by elevating the lowest floor of occupied areas a specified amount above the 100-year flood elevation. Substantially improved structures are those where the cost of reconstruction, rehabilitation, additions or other improvements equals or exceeds 50% of the building's market value. Substantially improved structures are subject to the same elevation standards as new structures. Check with your local permit office for specific requirements in your jurisdiction.

Elevation Certificates

To verify that a building has been properly elevated, building officials require the completion of an Elevation Certificate by a professional engineer or surveyor. After the lowest floor is in place, its elevation above sea level is determined by a survey. The Elevation Certificate is part of the permit record and must be submitted before the building may be occupied.

Further information on the requirements for floodplain development, the permitting process and Elevation Certificates can be obtained from your local permit office.

Documented Repetitive Losses

Palm Beach County adheres to FEMA's definition of repetitive loss properties, that is, properties whose owners have received payment for more than one claim within a 10-year period of their flood insurance policies as recorded by the NFIP. **Table 3.4** summarizes the repetitive losses from PBC and the incorporated areas. Also, present data on each community's CRS score indicates the percent reduction in National Flood Insurance rates each community's residents receive if they participate actively in the CRS program. **Appendix H** identifies and locates each repetitive loss property and evaluates its continued vulnerability to flooding damage.

At this writing, FEMA records accounted for 183 registered repetitive loss properties within PBC unincorporated and its jurisdictions. The number has grown steadily with the increased tropical activity and extraordinary rain events the County has experienced. A significant percentage of these repetitive loss properties lie outside PBC's recognized special flood hazard areas.

The PBC LMS's goal is to reduce the number of repetitive loss properties throughout the County and prevent new properties from being added to the list. The County takes great strides in trying to reduce and prevent repetitive loss properties. Palm Beach County takes part in various programs to reduce and prevent repetitive losses such as FMA and CRS as demonstrated above. The LMS also has various plans incorporated into it to ensure it correlates with the other objectives throughout the County and its jurisdictions. The LMS is referenced throughout the Mitigation section of the Comprehensive Emergency Management Plan as the guiding source for mitigation activities pre and post disasters. Also, the Capital Improvement Plans reflect mitigation objectives to prevent repetitive loss properties.

Since its inception, PBC's LMS has placed a major emphasis on drainage improvement projects as a major flood mitigation strategy. Indeed, drainage improvement projects have had a predominant representation on the LMS prioritized project list. Some large-scale drainage improvement projects, perceived to be beyond the threshold for funding assistance applications, have historically been handled locally by Capital Improvement Plans rather than through the LMS. The LMS drainage projects are often coordinated with larger self-funded community drainage improvement projects.

Drainage improvement projects; however, are often not the answer for isolated repetitive flood loss properties. Increasingly, the LMS has been moving toward a more comprehensive program of mitigation directed at repetitive loss problems.

The County's network of CRS communities provides an excellent mechanism for identifying repetitive flood loss properties and coordinating comprehensive activities to launch mitigation initiatives. The LMS program not only provides the strategic guidance necessary to coordinating flood mitigation initiatives, it also helps in translating those strategies into viable flood mitigation projects. The final component in PBC's multi-program strategy is participation in the FMAP.

Mitigation Projects to Repetitive Loss Properties

Palm Beach County first submitted project applications for FMAP assistance in 1999. It was not until 2002 that the initial two projects were approved for FMAP funding. The projects were completed in 2003. These projects provided all jurisdictions an opportunity to learn about the program and information that would be useful in planning their own programs. These two completed projects have been successful since two properties have been taken off the repetitive loss properties list.

Project #1 - Elevation Project
The first project involved a home in the unincorporated area of PBC referred to as "The Acreage." The property has amassed four insurance losses since 1988 despite, the fact that the property does not reside in Special Flood Hazard Area.

The elevation involved raising a slab on grade structure with the slab intact and placing it on extended foundation walls. A series of coordinated hydraulic jacks were used to achieve the target elevation above the base flood elevation. Openings for equalization of flood forces were included per FEMA specifications.

Project #2 – Flood Wall Project
The second FMAP project involved a multiple flood loss property located in a residential community in the Lake Park area. The property did not suffer from flood water build up. Instead, flood water runoff from neighboring properties tended to enter the slab at grade level structure, flowing through the house before exiting to lower elevations on the opposite side of the home. The project involved a combination of mitigation measures, including construction of a

deflection wall, creation of swales, and the installation of improved drainage systems. These measures permit flood water runoff to be redirected around the structure rather than through it. These projects served two important purposes. They gave the county's CRS participating communities opportunity to observe and learn about the requirements and procedures of the FMAP and what will be required to organize and manage their local initiatives. They also provided lessons learned that will be valuable in developing a model for County jurisdictions and residents seeking FMA assistance.

3.1.4.2 Municipalities

Within PBC, there are 38 municipalities (see **Table 3.1**). There is wide variation among the jurisdictions in terms of community character. Community character is shaped by factors such as land use mix, density, size of population, and location (e.g., on the Atlantic Ocean, adjacent to Lake Okeechobee, inland). Due to the differences, it is not unusual for local governments to have different perspectives relative to the significance various hazards have on their community. Certainly there are hazards that all jurisdictions, regardless of the community character, have concern over such as flooding, hurricanes, tornadoes. In agricultural communities like Pahokee, South Bay and/or Belle Glade, agricultural pests, freezes, and drought are more likely to be of greater concern, while in communities bordering the Atlantic Ocean (e.g., Ocean Ridge, Palm Beach, and Jupiter), hazards such as beach erosion and shoreline stabilization generate considerable concern among the residents.

Table 3.2 delineates the location, type, community character, economic base, and degree to which each of the participating municipalities within PBC is "built-out" at the present time. The following defines the headings displayed in the table:

- Location
  - Coastal - Municipality borders on the Atlantic Ocean
  - Inland - Municipality does not border on the Atlantic Ocean or Lake Okeechobee
  - Lakefront - Municipality borders on Lake Okeechobee
- Urban/Rural
  - Urban - Area characterized by activities predominantly based on the manufacture, production, distribution, or provision of goods and services in a setting which typically includes residential and nonresidential development uses other than those which are characteristic of rural areas
  - Rural - Areas characterized by activities which are largely based on agricultural uses or the extraction of natural resources, or areas containing large proportions of undeveloped, unimproved, or low density property
- Community Character
  - Residential - Land use is primarily for housing
  - Retirement - Land use is primarily for adult housing communities
  - Working - Land use is primarily connected with the sale, rental, and distribution of products or performance of services

- Percent Built Out
- Economic Base

  Agricultural - Main source of income is activities within land areas which are predominantly used for the cultivation of crops and livestock
  Business - Main source of income is primarily connected with the sale, rental, and distribution of products or performance of services
  Industrial - Main source of income is activities predominantly connected with manufacturing, assembly, processing, or storage of products
  Residential/Retirement - Main source of income is primarily connected with real estate.

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 West Palm Beach (population – 99,919) has an organizational structure that is considerably more complex than some of the smaller communities like Atlantis, Cloud Lake or Jupiter Inlet Colony.

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

Emergency Management. Emergency management responsibilities generally fall within the purview of public safety, fire, and/or police departments. West Palm Beach is one of the few municipalities that have a staff person whose sole responsibility is emergency management. It is not unusual in many cities that emergency management is an individual's secondary responsibility. During emergency events, such as hurricanes, each local government has an "executive group" (e.g., Mayor, city manager, police chief, fire chief) which coordinates the city's efforts with the County Division of Emergency Management.

Planning. The larger jurisdictions such as West Palm Beach, Boca Raton, Jupiter, Boynton Beach, Delray Beach and Palm Beach Gardens operate planning departments with professional staffs. Some of the smaller jurisdictions have single-person staffs, while the smallest assign those duties to a lay planning and zoning board and provide staff support by a building official or comparable staff person. The community development departments review zoning petitions, site plans, and other development orders (e.g., variances and special exceptions), as well as administer their local comprehensive plan.

Building. Most municipalities issue their own building permits. However, for one municipal government, the County Building Division reviews and issues their permits. The-community is the Town of Loxahatchee Groves. All communities in the state operate under the *Florida Building Code*. Modifications can be made to the administrative / enforcement provisions (e.g., what requires a permit, what inspections are required, etc...) of the Code, as long as the administrative provisions are equal or more stringent than the "base" version of the Code; however, municipalities may not amend their local building code to be less stringent, or make changes to the technical provisions of the Florida Building Code without going through a formal technical amendment process which requires demonstration of unique local geographical need for the amendment and an analysis of the cost impact of the proposed technical amendment. If local technical amendments are enacted and adopted by a community, then the amendments automatically sunset during the next statewide code adoption (unless the local technical amendment is adopted statewide by the Florida Building Commission).

Public Works and Engineering. While not all municipalities have a public works and engineering department, all generally perform this function in some manner. If it is under a contractual arrangement, there is someone in the jurisdiction responsible for overseeing the consultant. The group having responsibility for public works and engineering has the responsibility for implementing structural improvements (e.g., stormwater facility retrofit, shuttering buildings, constructing new EOCs).

Fire Departments. While many cities contract with the PBC Fire Rescue Department, there are others that operate their own fire-rescue departments. In some instances, smaller jurisdictions contract with a larger municipal neighbor

Municipal Mitigation Policies, Ordinances, and Plans
Policy Plans.

- Municipal Comprehensive Plans

  Like the County, each city has an adopted Comprehensive Plan. It serves as a policy instrument for each city and defines that particular city's development and redevelopment policies. All comprehensive plans are required by Section 163.3161, F.S. to contain 8 plan elements: Conservation, Infrastructure (i.e., potable water, sanitary sewer, stormwater management, solid waste, and natural aquifer recharge), Future Land Use, Housing, Recreation and Open Space, Transportation, Intergovernmental Coordination, and Capital Improvement. For units of local government abutting the Atlantic Ocean, they must also prepare a Coastal Management Element. In PBC, 19 municipalities border the Atlantic Ocean coastline.

  There is considerable variation among local governments in the depth to which hazards are addressed in their comprehensive plans. Certainly the population size, geographic spatial limits, diversity in mix of land uses, and depth of understanding of hazard mitigation affects the level of detail local governments apply to the issue of hazards. Any extended discussion of hazards occurs, for the most part, in the Conservation, Coastal Management, and Infrastructure elements (**Appendix D**).

- Local Emergency Management Plans

  A number of municipalities have adopted emergency management plans. Most follow the content of the PBC CEMP. Their focus is on emergency response versus long-term hazard mitigation.

Ordinances and Other Plans. Other types of ordinances and plans municipalities that have adopted that are relevant to hazard mitigation include:

- Incorporating the 2010 edition of Florida Building Code complete with Appendices A,B,C,D,E,F,G,H,I,J and K

- Adding window glazing and/or shuttering requirements to their building codes

- Becoming affiliated with the Community Rating System (CRS) program (*currently 29 out of 38 local governments are CRS qualified)*

- Emergency Water Restriction ordinances

- Stormwater Master Plan

- Flood Damage Prevention and Protection Ordinance

Mitigation Projects/Initiatives/Outreach

A LMS Survey was 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 was implementing. Projects are defined as capital facilities. Initiatives can be anything from purchase of property and relocation of homes or businesses, to upgraded building codes, to incentives, to public information campaigns, to preparedness training and drills, to professional development seminars. *Thirty-six municipalities responded*. There is wide variation; while a number of municipalities have not undertaken any mitigation projects, others have been highly proactive, completing multiple projects/initiatives. The following provides a general discussion of what is being accomplished by municipal governments in PBC. Also, there are a few communities that already have well-developed hazard mitigation programs in place. A brief discussion of each is included.

Projects. Shuttering public facilities and upgrading or correcting drainage facility deficiencies are the two most common types of hazard mitigation projects undertaken by PBC municipalities. Other types of projects reported in the local government LMS Survey are:

- Glazing exterior windows on public facilities to achieve impact resistance from windborne debris

- Replacing and/or upgrading drainage pumps

- Installing emergency power generators

- Installing a radio telemetry monitoring system for public utilities

- Sirens/loudspeaker warning system used for severe storms/lightning

Codes/Ordinance Amendments. Many municipalities incorporated the Florida Building Code 2010 Edition. Some of the more important features include:

- Modifying building codes to require floor slab or wood joists be above the 100-year floodplain and a minimum of 18 inches above the crown of the road

- Requiring the elevation of structures

- Trusses manufactured in accordance with local wind models

Other actions municipalities have taken include:

- Modifying existing Local Development Regulation (LDR) to incorporate windborne debris impact standards

- Amending LDR to include section titled, "Building and Property Maintenance: Hurricane Precautions

- Professional Development Training. *Twenty-three* municipalities reported that their staff received professional development training over the course of a year. The amount of training staffs received differed by jurisdiction.

- Computer-Aided Management of Emergency Operations (CAMEO) is a system of software applications used to plan for and respond to chemical emergencies. Developed by EPA and the National Oceanic and Atmospheric Administration to assist front-line chemical emergency planners and responders, CAMEO can access, store, and evaluate information critical for developing emergency plans.

- Amending LDR to include section titled, “Building and Property Maintenance: Hurricane Precautions”

- Orientation to disaster assistance programs

- Radiological emergency management

- Annual state hurricane conference training sessions

- Natural hazards mitigation and recovery

- Yearly conference of National Fire Protection Association

- Yearly conference of Building Officials Association of Florida

- Training sessions with Federal Emergency Management Agency

- Building Inspector courses on topics like hurricane resistant structural design, roofing updates, wood construction, and fire resistance and egress

Preparedness Training. Fourteen (14) local governments reported that they conduct preparedness training and drills for emergency situations. They carry out hurricane exercises and other types of preparedness training based on their Municipal CEMP or EAP as reported to the LMS Coordinator:

- Structural fire drills

- Tornado drill

- Chemical spills

- Terrorist response

- Chlorine leak drills

- Communication tests

- Generator tests

Education/Public Awareness. It is common practice among local governments to distribute informational materials to its citizens, especially as it relates to hurricanes. Among the 18 local governments reporting, the scope of their programs varied. The following are methods municipalities in PBC use to disseminate information about hazards or an impending emergency event:

- Annual correspondence mailed to the residents reminding them of the need to be prepared for a hurricane

- Hurricane Survival Guide

- A Homeowner's Guide to Hurricane Retrofit

- Classes on Emergency Response Training

- Discussions with residents about hurricane preparedness

- Hurricane preparation video shown on city cable station

- Brochures on variety of disaster/emergency topics, including insurance, pet care, business interests, children and disasters, lightning and tornado safety

- FAX-back system with a menu of public safety information

- Emails to residents

- Communicator NXT or a similar system which automatically dials and plays recorded information regarding imminent emergencies

- City newsletter

3.1.5 Intergovernmental Coordination

An essential element of the hazard mitigation process is intergovernmental coordination. Disasters know no boundaries; governments and service providers increasingly must work together to strengthen communities against the loss of life and property. 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.

Metropolitan Planning Organization

The Metropolitan Planning Organization of PBC, commonly known as the MPO, coordinates local, state, and federal funding for thoroughfare improvements. The policy board is comprised of 18 voting members (i.e., 5 representatives of the BCC, 13 representatives from the municipalities), and one non-voting member (i.e., Secretary of the Florida Department of Transportation, District IV). Two key policy documents of the MPO are the long-range transportation plan, and the five-year transportation improvement plan (TIP). The TIP identifies and schedules all future roadway improvements in the near-term.

Local Government Comprehensive Plans

One mechanism to achieve intergovernmental coordination is the local comprehensive plan. Each comprehensive plan contains an intergovernmental coordination plan element.

Palm Beach County Comprehensive Emergency Plan

Palm Beach County's CEMP as described in the section titled, **Mitigation Policies and Ordinances**, is very important in terms of coordination. It identifies coordination of the responsibilities and functions of agencies and organizations during disaster situations.

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 full-time staff to administer the activities of the Committee.

State Emergency Management Plan

The State of Florida CEMP establishes the framework of a coordination system to ensure that the State of Florida is prepared to respond to the occurrence of emergencies and disasters. The plan describes roles and responsibilities of state agencies, special districts, local governments, and voluntary organizations, 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:	Actions that are unique to a specific hazard, and are described in the Basic Plan and Response Functions sections.
Response Functional Annexes:	Present the State's strategies for disaster response by outlining Emergency Support Functions (ESF). ESF's are structured from the Federal Response Plan.

Comprehensive Plan Amendment Coordinated Review Committee

The Comprehensive Plan Amendment Coordinated Review Interlocal Agreement establishes a countywide Comprehensive Plan Coordinated Review Process. It is designed to provide coordination of proposed plan amendments, cooperation between affected local governments and service providers, and opportunities to resolve conflicts only within the Plan Amendment Process. This process includes the following actions:

- Proposed plan amendments must have sufficient distribution and dissemination to insure that initial transmittal and final approval do not occur without adequate notice to local governments and service providers who may be adversely affected by the action.

- An avenue for discussion and evaluation of the proposed plan amendments is created so that the governing body is aware of objections, the basis for them, and the reasonableness of the objection.
- An opportunity is created for conflict resolution of an item which, if approved, may result in a potential problem for another local government or service provider.

- The Comprehensive Plan Amendment Coordinated Review Process does not diminish or transfer existing authority with respect to planning and implementation decision of the participants.

The Multi-Jurisdictional Issues Coordination Forum

The forum has been established through a resolution/interlocal agreement. The primary goal of this entity is to establish a mechanism that will provide a means of communication and education between the various local governments and service providers. This is accomplished through the receipt and review of reports; through presentations of items of multi-jurisdictional impact; and through the review of actions taken by the Executive Committee. All members of this forum must be participants in the Comprehensive Plan Amendment Coordinated Review Interlocal Agreement.

EM Team

Emergency Management Team is an organization of professionals from agencies and municipalities throughout PBC who share a mutual interest in emergency management issues. The EM Team meets once a month. Meeting notices of related interest and other information are distributed in advance of the scheduled meeting date. Members of EM Team benefit by:

- Receiving the latest information from federal, state and local levels of government concerning all issues relating to comprehensive emergency management;

- Strengthening ties and sharing information with the County, neighboring municipalities and other agencies in the area;

- Exchanging ideas and receiving information regarding training opportunities in emergency management (many of which are free or involve minimal costs);

- Meeting the managers and officials they may need to call on in times of emergency or disaster.

3.2 Private Sector

3.2.1 Background

Major disasters have repeatedly demonstrated that all components of the community can be significantly impacted, either directly or indirectly by the event. It is therefore important that mitigation and redevelopment planning efforts also involve the entire community. Involvement of the private sector in the LMS process was given high priority from the outset of the program by the DEM. Besides receiving funding from the FDEM to prepare the LMS, FDEM also awarded PBC a grant pursuant to Chapter 9G-19, Florida Administrative Code, to develop a

Business Community Recovery and Redevelopment Strategy program. Since private sector involvement was important in both efforts, the DEM a committee for education and outreach was created. In addition, staff from the DEM and the PBC Office of Economic Development coordinated with each other on all relevant issues of mutual interest to both programs.
The following groups have participated actively in the program:

- Business Alliance
- Business Loan Funds of the Palm Beaches
- Florida Light & Power Company
- Palm Beach State College
- Florida Insurance Council
- Black Business Investment, Inc.
- Brown Distributing
- Home Depot
- Tourist Development Board
- Motorola
- Farm Bureau West
- Port of Palm Beach
- Palm Beach County Purchasing Department
- Delray Beach Chamber of Commerce
- Delray Beach Community Development Agency
- WPBF Channel 25
- PBC Information System Services Department
- The Boynton Beach Mall
- Palm Beach County Economic Office
- Fidelity Federal of the Palm Beaches
- Poe & Brown, Inc
- The Northern Palm Beach Chamber of Commerce
- Small Business Bank
- Suntrust Bank
- Marine Industries Association of Palm Beach County, Inc
- Pratt & Whitney
- Bank Atlantic

Perhaps the greatest accomplishment, beyond the specific accomplishments outlined in this section, has been special collaborative relationships now established between the private sector and public sector entities. Cornerstone partnerships in this endeavor now exist between the DEM and Economic Development Divisions, and participating municipalities on the public side and a network of participating Chambers of Commerce.

The initiatives outlined in this section are an integral part of the ongoing local disaster mitigation strategy. In the private sector, efforts are directed at minimizing private sector losses, improving business survival rates, protecting and preserving the economic base provided by businesses, and speeding the overall community recovery process.

Four key objectives were addressed:

Objective 1	*Establish improve intergovernmental and private sector coordination.*
Objective 2	*Refine the hazard and vulnerability analysis for the economic sector.*
Objective 3	*Evaluate local available resources, identify gaps, and develop appropriate funding mechanisms and strategies to fill any gaps.*

<u>*Objective 4*</u> *Create a public education program focusing on educating the business community to be prepared for disasters and able to recover quickly.*

3.2.2 Accomplishments

The following summarizes the improved accomplishments of the private sector work effort of the Outreach and Education Committee by objective:

3.2.2.1 Objective 1: Establish improved intergovernmental and private sector coordination.

Three tasks related to this objective represent the beginning points for an ongoing, long-range program to improve intergovernmental and private sector collaboration, coordination and relations.

Task 1

Prepare a comprehensive vendor list and inventories of equipment and supplies. The primary thrust of this task was to create a system whereby businesses victimized by disasters could access vendors and suppliers to procure goods and services necessary to rebuild and resume normal business operations.

Early in the project, the Economic Development Specialist met with the purchasing staff of several County and municipal agencies relative to the characteristics of their databases and their potential suitability for business disaster applications. With the assistance of representatives from the PBC Information Systems Services Department (ISS), the idea was conceived of housing the vendor database in the business section of the PBC Emergency Management web site.

Upon further discussion, the idea eventually evolved to the creation of a reverse vendor database, an emergency need posting system for disaster-impacted businesses. This approach avoids most of the maintenance costs and burdens that are associated with traditional vendor databases.
ISS was subsequently commissioned to develop this system, eventually dubbed the "Emergency Business Buyers' Database." Development and testing were successfully accomplished in early July; the system awaits activation if and when a local disaster occurs.

Task 2

Develop a comprehensive list of needs for emergency contracts and agreements, and secure sources for items needed by the response community which are usually not needed in day to day operations. Research determined that the PBC Purchasing Department has in place item lists, source lists, and systems and procedures necessary for fully meeting the needs of the County's response community and to satisfy the assistance requirements spelled out by the mutual aid agreement with Orange County. Efforts to publicize the existence of this list to the local community are being made through the Chambers of Commerce to facilitate local involvement, when possible.

Task 3

Establish Business Hotlines, Business Aid and Redevelopment Assistance Centers. An important element in the support of private sector preparedness and timely recovery is the ability of businesses to stay abreast of critical information. An objective in this project was to provide the business community with a single-point contact for accessing important business-related information to assist pre-disaster preparations and post-disaster recovery activities. As part of its partnership agreements with various Chambers of Commerce throughout the County, PBC Emergency Management is encouraging chambers to dedicate one or more telephone lines to serve as an emergency "hot line" service for community businesses.

3.2.2.2 Objective 2: Refine hazard and vulnerability analysis for the economic sector.

The LMS definition (as described earlier) of critical facilities includes several economic sector facilities, notably nursing and convalescent centers, and public communication facilities in what are designated as primary critical facilities, and financial institutions, pharmacies, reconstruction material suppliers, medical clinics, and food distribution centers in what are designated as secondary critical facilities. Private sector primary critical facilities are included in the ArcView database, and, when the Property Appraiser's office completes the automated inventory conversion of commercial and industrial properties into an ArcView database, secondary critical facility information will be merged with the database file.

The vulnerability of the business community to potential disasters was analyzed. Mapping and tabular products were developed that may be used by commercial/industrial property owners for performing self-analysis of hazard vulnerabilities. These products also provide a better understanding of the various hazards that could potentially impact segments of business community.

An Economic Disaster Management Information System (EDMIS) was developed and designed. Unfortunately, this product cannot be used until database conversion is completed by the Property Appraiser's Office. Once on-line, however, EDMIS will be used to more fully explore mitigation opportunities in the private sector.

3.2.2.3 Objective 3: Evaluate local available resources, identify gaps, and develop appropriate funding mechanisms and strategies to fill the gaps.

Exploratory initiatives were explored relating to ensuring post-disaster cash flow, creating emergency loan programs and community credit programs, expediting the processing of post-disaster loans, and establishing a "bridge loan" capability. The policies and programs of area banks were reviewed, various loan funds examined, and state and federal agency programs, including "Operation Open for Business," were reviewed. Among the most glaring "gaps" uncovered that could impact PBC businesses were the following:

- Meeting the managers and officials they may need to call on in times of emergency or disaster.

- Insurance typically does not cover all business losses.

- Banks will not necessarily loan money to victimized businesses and may not relax their requirements for financial documentation and credit status in emergency periods.

- Business interruption insurance is seldom purchased by businesses because it is so costly.

- Low interest loans for mitigation projects are not yet available in PBC.

The challenge of dealing with these issues, however, is indeed complex. The decision authority for creating policies and programs dealing with these issues invariably resides at levels outside PBC. Creation of emergency business assistance programs will likely require legislative initiatives and corporate lobbying beyond the influence of even regional interests. Even so, the need for creative funding mechanisms and strategies was a consistent theme throughout the project and was a common speaking point at private sector and public sector forums.

The project team of a year 1999-2000 grant funded to PBC, entitled Businesses Addressing Readiness & Recovery (BARR), will continue efforts to mobilize sufficient support to positively influence private sector and public sector decision makers to institute meaningful emergency assistance programs for businesses. It will support other related initiatives underway at the state level. The BARR program will also pattern many of programs and initiatives after those of *Project Impact* and the City of Deerfield Beach's *Operation Open for Business*.

3.2.2.4 Objective 4: Create a public education program focusing on educating the business community to be prepared for a disaster and able to recover quickly.

Two tasks of this objective address a program to enable the business community to educate and prepare itself, reaching the greatest number of businesses in the shortest time possible.

Task 1

Train Chamber of Commerce staff and the business community. During the course of the project, staff members attended, participated in, and led a variety of business-related forums on disaster issues, including disaster conferences, workshops, professional association meetings, expos and trade shows, and community planning sessions. They also worked closely with private and public sector experts on a number of significant community initiatives and reviewed extensive literature from FEMA, state, federal and non-government organization sources. Among the many methods employed to reach and educate the business community throughout PBC were:

- Insurance typically does not cover all business losses
- Distribution of specially designed BARR pamphlets and business cards

- "Business" location on the County's Emergency Management web site

- Booths in expos, fairs, trade shows
- Presentations to business, professional and public sector groups
- Media interviews and articles
- Presentations at the National and Florida Governor's Hurricane Conference
- Participation in other initiatives

One-on-one contingency planning assistance for larger businesses. In this task, members of several Chambers of Commerce and mentors from large and medium-sized businesses have been trained to train others and make presentations raising the business community's awareness of preparedness issues and options. These efforts will continue.

Task 2

Develop a written business contingency planning guide. It was reasoned that preparation and distribution of a business contingency planning workbook and a business contingency plan template would be practical and productive contributions to building a more disaster resistant business community. The workbook that has been developed serves as the primary text for Emergency Management's ongoing series of contingency planning workshops. Following the template, small- to middle-sized businesses are able to easily prepare contingency plans tailored to their specific needs.

A copy is available on the South Florida Disaster Resiliency Coalition website.

Conducting workshops will continue to be a priority, as will be the training of industry trainers and the development of mentors to continue planning initiatives after the grant period concludes.

3.3 Strengthening the Role of Local Governments

As has been described earlier in this document, local governments in PBC 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 to just hardening of structures. 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 which 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 for countywide projects resulting from the various discussions with local government include:

1. Projects on the LMS PPL should be incorporated in local government comprehensive plans, capital improvement elements (CIE), at the time the CIE's are on an annual basis in accordance with Section 163.3177 (3) (a), Florida Statutes (F.S.).

2. As permitted under Section 163.3177 (7) (h) & (l), F.S., local governments could incorporate optional comprehensive plan element for public safety, or a hazard mitigation/post-disaster redevelopment plan;

3. Integrate the LMS into the PBC CEMP as appropriate and within the state specified guidelines.

4. Assess existing CRS programs to determine ways to strengthen and improve the local jurisdiction's CRS rating and support non-CRS communities to join the program.

5. Recommend that public building construction, whether it be new construction or renovation of older public structures, incorporate hazard mitigation building practices, whenever financially feasible;

6. Recommend to the appropriate authorities, the incorporation of safe room requirements in the local building code.

7. Update existing PBC post-disaster redevelopment plans, and prepare a model plan as a guide for local jurisdictions.

8. Support BARR in the continuing effort of coordination and mutual support between the PBC, local, and business community, before, during and after a disaster event.

9. The LMS Steering Committee should work with the partner communities and the County to continue ongoing funding and staffing for the continuation of LMS.

10. Recommend emergency building permit procedures to local authorities and jurisdictions.

11. Seek avenues to provide technical assistance in grant writing and engineering for local jurisdictions in the support of LMS projects.

12. Develop a model CEMP mitigation element as a guide for local jurisdictions in mitigation plan development.

13. Seek opportunities and potential funding sources to bury electrical wires, especially in multi-jurisdictional projects.

14. In order to increase shelter capacity countywide, support the retrofitting of all appropriate structures suitable for use as shelters.

Develop and disseminate multi-media outreach program countywide which will support the goals of LMS.

SECTION 4: PROCEDURES

4.1 Project Prioritization Methodology

This section satisfies, in part, the following FEMA requirements:

Requirement: §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Requirement §201.6(c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Requirement: §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

4.1.1 Development and Rationale

The project prioritization methodology is the means by which the LMS Steering Committee or some designated subset of that Committee will develop the single prioritized list of mitigation projects, which is one of the ultimate goals of the LMS effort. The only projects eligible for FEMA approval have to be submitted by a local government who participated in the planning process. These local governments must follow and continue to follow PBC's Local Mitigation Strategy's participation rules in **Section 1**.

Palm Beach County established a scoring procedure when the plan was first written in 1999. The scoring procedure is detailed below along with examples in **Appendix I**. This procedure remains in place thus the County has a structured scoring process for projects seeking alternative funding sources other than federal programs. However, there may be changes made due to new Federal regulations.

The LMS has been proactive in providing its participants with the information necessary to perform a Benefit Cost Analysis that will keep PBC eligible to compete for federal monies nationwide. Projects being submitted for federal funding require a Benefit Cost Analysis to be completed along with an application for submission. The objective is to create an adequate strategy for PBC to prioritize projects for possible funding sources other than federal funds, which would be prioritized based strictly on Benefit Cost Analysis and the criteria that are environmentally sound and technically feasible. The PPL can be referenced in **Appendix E**. In addition, **Appendix F** is a list of potential funding sources for mitigation projects.

To be effective and gain the support of all the communities involved, the criteria used to rank and prioritize proposed mitigation projects must accomplish the following objectives:

1. They must be fair and objective. Mitigation projects proposed by small communities must have equal opportunity to achieve as high a higher priority than mitigation projects proposed by larger communities or the County. Likewise, mitigation projects proposed by economically disadvantaged communities must have the opportunity to achieve as high a priority than those projects proposed by more affluent communities.

2. They must be flexible enough to effectively rank projects mitigating for a variety of hazards. The LMS is an “all hazards” program. The criteria used to rank potential mitigation projects must be capable of ranking individual mitigation projects with diverse goals such as, but not limited to flood mitigation, sea level rise, impacts from climate change, wildfire protection, or hazardous waste spill prevention.

3. They must be functional and tied to real-world considerations such as competitive grant funding requirements. Palm Beach County will be developing a list of prioritized mitigation projects that will have to compete with a prioritized list of similar type projects from other counties in the state.

4. They must be simple, easily understood, and relatively easy to apply. Many potential mitigation projects will have to be prioritized by the Steering Committee or some subset thereof. This means that individual committee members will be scoring many projects. These individuals must be able to work through the project scoring process relatively rapidly for each project they evaluate.

5. They must be individually well defined and specific. Each individual scoring criteria category must be well defined with the possible points to be awarded broken down in as much detail as possible to eliminate arbitrary variation in how various individuals might score the same category.

6. The prioritization process will be an ongoing process as the LMS is continually refined and updated. The criteria must be such that it can be applied in a consistent manner with a minimal learning curve.

These overarching requirements are as follows:

1. Community Benefit The single most important consideration for any mitigation project is “What benefit does the community derive from this effort?” How, and to what extent does this mitigation project benefit the citizens of a community?

2. Community Commitment. What is the community’s level of commitment that is proposing this mitigation project? All mitigation projects have to compete for funding. If the community or governmental entity proposing a given project is not willing to commit substantial time, effort, and funding, the project has less chance of ever being accomplished even if it is a worthy project. There is no point in ranking a project highly that may never be accomplished even if funds are made available.

3. Project Implementation. Is this project technically, financially, and legally feasible? Basically this overarching requirement addresses the ease with which a project can be implemented. How easily can

required permits be obtained? What is the time frame for accomplishing this project's goals? Are there any technical problems that must be overcome to implement this project?

4. The rationale for each scoring criterion on the **Project/Initiative Evaluation Score Sheet**, its connections to known funding sources, and directions on specific numbers of points to award are discussed below.

4.1.2 Community Benefit

4.1.2.1 Flood Mitigation and/or Sea Level Rise – Does the proposed project or initiative mitigate against flooding and/or sea level rise?

Flood Mitigation	Points Awarded (maximum of 5)
Flood and/or Sea Level Rise Damage Reduction	5
Mapping and Regulatory	4
Flood Preparedness	3
Public Information	2
Other	1

4.1.2.2 Project Benefit - Does the project address critical elements of the community infrastructure?

The critical question addressed here is, "does this proposed project help protect the community by hardening some critical element in the community's infrastructure that will reduce the potential loss of life or property damage if a disaster strikes"? Specific programs offering state and federal grant money are available for mitigation projects to make community infrastructure or property critical to public safety more disaster resistant.

Points under this criterion are awarded based on the nature of the facility or infrastructure element being hardened or protected. If the proposed projects mitigate a problem in a primary critical facility such as a hospital, EOC, or emergency shelter it would receive 10 points under this criterion. Primary critical facilities are defined as "Facilities critical to the immediate support of life and public safety." These are the facilities the community cannot afford to have any loss of function, even for a short period of time.

Flooding produces a widespread direct and indirect danger to large segments of the community, while at the same time damaging or potentially damaging such critical infrastructure elements as roads and stormwater drainage systems. Therefore, a project reducing or preventing stormwater accumulation and flooding during storm events would receive 8 points under this criterion.

Secondary critical facilities are defined as, "Facilities that will be critical for community recovery and restoration of services." Projects that help protect these types of facilities will be awarded 6 points.

Public convenience facilities are quality of life facilities such as parks, recreation areas, and non-essential public buildings. Projects protecting these types of public property will be awarded 4 points under this criterion.

Residential structures are defined as private homes. Projects protecting these types of property will be awarded 2 points under this criterion.

Project Benefit	Points Awarded (maximum of 10)
Primary Critical Facilities	10
Stormwater/flooding	8
Secondary critical facilities	6
Public Convenience facilities	4
Residential Structures	2

4.1.3 Community Exposure

4.1.3.1 Does the project mitigate a frequently occurring problem or a problem to which a community is particularly vulnerable?

This criterion attempts to balance the actual risk of a specific disaster occurring versus the community's exposure in terms of life and property damage if the disaster does occur. For example, a nuclear power plant meltdown would be catastrophic if it occurred, but the frequencies with which meltdowns occur is unknown in the U.S. and optimistically extremely low. Therefore, a project proposing to mitigate for possible nuclear power plant meltdown by providing lead lined emergency shelters would score lower than a project which mitigates for a more frequent, but less catastrophic type of disaster, such as the flooding of a library.

Data for this evaluation will come from the Hazard Vulnerability Analysis (HVA) portion of the LMS project, and will be community specific. For example, communities on the coastline experience thunderstorms, lightning, and frequent localized short term flooding, but in most, the exposure in terms of life and property damage is relatively low. Some specific communities, however, such as mobile home parks, or areas with known drainage problems, have much higher exposures to ill effects from thunderstorm hazards. The entire coastline has a high exposure to damage from tropical storms and hurricanes. Category 1 and 2 hurricanes occur with a relatively high frequency, while category 3, 4, and 5 hurricanes are less frequent. All of these factors must be evaluated in weighing the merits of one mitigation project against another.

Specific guidelines for assigning points under this evaluation criterion are as follows:

Community Exposure # of People or $ Value of Property	Frequency or Risk of Occurrence	Points Awarded (maximum of 10)
High	High	10 Points
Moderate	High	8 Points
Low	High	6 Points
High	Moderate	9 Points
Moderate	Moderate	7 Points
Low	Moderate	4 Points
High	Low	5 Points
Moderate	Low	2 Points
Low	Low	1 Points

4.1.4 Cost Effectiveness

4.1.4.1 The benefit/cost ratio of the project is calculated by applying the following Benefit/Cost ratio formula:

(Loss Exposure ($) Before Project - Loss Exposure ($) After Project) ÷ Cost of the Project

"A key criterion for mitigation projects to be eligible for funding is that they be cost effective." This is a direct quote from the FEMA 1996 guidelines for determining the cost-effectiveness of mitigation projects. "Mitigation efforts can be justified only to the extent to which the averted losses in terms of life and property exceeds the cost of a given mitigation project or effort." In other words, if a mitigation project costs more than what it is designed to protect, why do it?

While a positive Benefit/Cost Ratio is an absolute requirement for FEMA funding, it should be a primary consideration in evaluating any mitigation idea. For this reason, it is the single most highly valued component of the project prioritization criteria.

For any mitigation project to receive FEMA money, the mitigation project application will have to include a detailed Benefit/Cost analysis. Depending on the complexity of the proposed project and the amount of funding required, this Benefit/Cost analysis may require engineering drawings and/or evaluation of alternatives. Such a detailed analysis is beyond the scope of the LMS and in most cases beyond FEMA requirements. In 1996, FEMA published a new guideline for mitigation project evaluation titled "How to Determine Cost-Effectiveness of Hazard Mitigation Projects - A New Process for Expediting Application Reviews". The above formula is derived from that publication. It was developed to allow administrators to rapidly screen potential mitigation projects in a three step process:

1. Screen the project by reviewing the application data;

2. Conduct a quick Benefit/Cost analysis; and

a. If the quick analysis yields a Benefit/Cost Ratio greater than one, continue processing the application; or

b. If the Benefit/Cost analysis is less than one, request additional information from the proposer

An example application of the Benefit/Cost formula is as follows:

A community library has an estimated \$90,000 worth of books that may be lost due to storm surge. To shutter the library will cost \$20,000 and will prevent loss from surges associated with category 1 to 3 hurricanes. Category 1 to 3 storms represent 70% of the hurricanes likely to strike this community so the risk of loss is assumed to be reduced by 70%, leaving a remaining exposure of 30% or \$27,000.

Applying the formula:

(\$ 90,000 - \$ 27,000) ÷ \$ 20,000 = 3.15

This project has a Benefit/Cost ratio of 3.15.

The community is also considering raising the floor of this library building by 2 ft at a cost of \$75,000. Such a project would protect the books from storm surge under all but category 5 hurricane conditions, or approximately 85 % of the time. The residual exposure associated with this plan would be 15 % or \$ 13,500.

Applying the formula:

(\$ 90,000 - \$ 13,500) ÷ \$ 75,000 = 1.02

The benefit/cost ratio on this plan is only 1.02. While this is still a positive ratio, the better return on dollars invested is achieved under the first alternative, shuttering the Library.

The higher the Benefit/Cost ratio, the better return per dollar invested is achieved. Under the first example the community is receiving \$3.15 return in terms of lost prevention for every dollar invested. Under the second example the community is receiving only \$ 1.02 return in terms of loss reduction for every dollar invested.

Points under this criterion will be awarded as follows:

Benefit/Cost Ratio	Points (maximum of 20)
4.0 or greater	20 Points
3.0 to 3.9	16 Points
2.0 to 2.9	12 Points
1.0 to 1.9	8 Points
<1.0	0 Points

4.1.5 Area Benefit

4.1.5.1 How many people stand to benefit from the project implementation?

Area Benefit	Points (maximum of 5)
Multiple Jurisdictions	5 points
Community	3 Points
Neighborhood	1 Point

4.1.6 Project Implementation

4.1.6.1 Contained Within the Existing Comprehensive Growth Management Plan (CGMP)-- Is the project or initiative consistent with or incorporated in the existing Comprehensive Growth Management Plan

Is the project or initiative consistent with or incorporated within the existing Comprehensive Growth Plan or equivalent document?

Contained Within the Existing Comprehensive Growth Management Plan (CGMP)	Points (maximum of 10)
Contained within a specific Policy/Plan	10 points
Contained in "Goal" with proposed Policy/ amendment	8 Points
Contained within a broad "Goal	5 Point
Contained in a proposed amendment	3 points
Not in conflict with the CGMP	1 point

4.1.6. 2 Contained Within an Existing Emergency Management Plan or Other Functional Plan Developed by an Official Local Governmental Entity

Has this project or initiative already been proposed as a management initiative or structural improvement in any emergency or growth management plan proposed or adopted by County or local jurisdictions or entity?

This applies to both officially adopted plans and to those plans or amendments to plans which have been proposed but not yet officially adopted. One of the objectives of the LMS is to encourage local governments to officially adopt mitigation measures into their Comprehensive and Emergency Management Plans. If a community wants to improved the score of a proposed mitigation project or initiative it can propose an amendment to its CGMP or CEMP containing the measure.

Contained within an Existing Emergency Management Plan (or other functional plan)	Points (maximum of 20)
Officially adopted	10 Points
Proposed/Not officially adopted	6 Points
Not in conflict with any plan	2 Points

4.1.6.3 Consistency with Existing Regulatory Framework - Is the project consistent with existing legal and regulatory and environmental/cultural framework?

Does the proposed project require any changes or waivers in existing building, zoning, or environmental statutes or ordinances? If changes or waivers are required, there will be an extra step in implementing such a project and the timeline to accomplish the project must be extended accordingly. Projects which are consistent with the existing legal and regulatory framework will receive 5 points. Projects which are in conflict with some aspect of the existing regulatory framework will receive lower point scores depending upon the seriousness and numbers of regulatory barriers to be overcome in implementing the proposed project.

Consistency with Regulatory Framework	Points (maximum of 5)
No regulatory issues	5 Points
Local issues	4 Points
Regional issues	3 Points
State issues	2 Points
Federal issues	1 Point

4.1.7 Community Commitment

4.1.7.1 Public Support - Is there demonstrated public support for this project or recognition of this problem?

The question of how "public support" should be demonstrated has caused much discussion. It has been decided that points under this criterion should be awarded as follows:

Has this project or problem been the subject of:
a) An Advertised Public Meeting = 3; and
b) Written evidence of public support = 2.

Has the project or problem been the subject of both:
a) An advertised public meeting, and
b) Written evidence of public concern or support.

If so, award 5 points.

4.1.7.2 *Funding Availability - Is there a funding source currently available for this particular project?*

Ten points will be awarded to any project for which funding is currently available. If funding is anticipated but currently not available, points will be awarded as follows:

Funding Availability	Points (maximum of 10)
Funds available now	10 Points
Available in 1 year	8 Points
Available in 2 years	6 Points
Available in 3 years	4 Points
Available in 4 years	2 Points
Available in 5 years+	1 Point

4.1.7.3 *Matching Funds - Are matching funds or in-kind services available for this project?*

This criterion has been added because many, if not most, funding sources require local sponsors to put up some form of match either in terms of funds or services.

Points will be awarded under this criterion as follows:

Matching Funds	Points (maximum of 5)
Match of 50% or more	5 Points
40 to 49%	4 Points
30 to 39 %	3 Points
20 to 29 %	2 Points
1 to 20 %	1 Point

4.1.7.4 *Timeframe for Accomplishing Objectives - How long will it take for the proposed mitigation project to accomplish its stated goals?*

Projects which can be accomplished quickly have an inherent advantage over long-term projects, although long-term projects may ultimately be more beneficial to the community. The following weighted scale assigns points to proposed projects based on the length of time that will be required before a community begins to receive benefits from the project.

Timeframe for Accomplishing Objectives	Points (maximum of 5)
1 Year	5 Points
2 Years	4 Points

3 Years	3 Points
4 Years	2 Points
5 Years +	1 Point

In order for the individuals scoring mitigation projects to perform their jobs adequately and in a meaningful time frame, it is critical that those proposing a mitigation project or projects provide as much of the critical information required for scoring as possible when they submit their projects. To help with this the attached **Mitigation Project Proposal Form** has been developed. **Appendix I** contains four examples showing how this scoring process is applied in ranking proposed mitigation projects.

4.2 Tie-Break Procedure

In the case of tie scores, three questions may be applied.

- Ties decided by #1 will be so ranked: remaining ties not broken with question #1 will have question #2 applied.
- Ties decided by question #2 will be so ranked; remaining ties not broken will have question #3 applied.
- Ties decided by question #3 will be so ranked; remaining ties not broken with question #3 will be ranked in the order of the magnitude of effect on the community - these projects will be ranked in accordance with the number of people that will be helped by the project, largest first.

Question #1: Which project has the highest Community Benefit score?

Question #2: Which project has the highest Community Commitment score?

Question #3: Which project mitigates for the most frequently occurring hazard?

4.3 LMS Evaluation Panel

The Evaluation Panel is responsible for reviewing and scoring proposed projects submitted to the LMS as a basis for prioritization. Panelists are solicited by the LMS Coordinator on behalf of the Steering Committee based on LMS member recommendations and are subject to approval by the Steering Committee. Volunteers are also eligible for consideration.

Candidates should possess a technical and administrative understanding of the LMS program and its goals and objectives. In addition, candidates are expected to exercise objectivity and independent judgment in their evaluations and scoring.

4.3.1 Eligibility for Federal Funding

In order to be deemed eligible for federal monies projects must:

- Produce a Benefit Cost Analysis ratio greater than 1, and
- Meet additional program requirements, including being judged to be “environmentally sound” and “technically feasible.”

Federal funding may require additional applications or supporting documents which will be requested based upon each individual federal program.

The LMS Coordinator from the County’s Division of Emergency Management staff serves on the Evaluation Panel.

4.4 Project Prioritization Updating Process

STEP 1
Each year in January and July, the existing countywide PPL will be updated. The approved PPL will be in effect until a new PPL has been adopted by the PBC LMS Steering Committee.

Palm Beach County DEM staff will activate the update process by distributing "Project or Initiative" Proposal Forms to local governments, as well as to non-profits and other entities seeking funding for hazard mitigation-type projects, and by notifying all Evaluation Panel members that the PPL ranking process is being initiated. All applicants will have to submit their proposed projects/initiatives by the submission date in order to have their proposed projects considered for inclusion in the updated PPL. In addition, at the time an applicant submits their proposed projects; they must also identify which of their projects that are already on the existing, adopted PPL have been completed or for which funding is in process.

All proposals will be submitted to the DEM office, on the "Project or Initiative" Proposal Form by the submission date identified in the letter of solicitation. For a project/initiative to be considered, Proposal Forms must be filled out completely. The contact person and fax number listed on the Proposal Form will serve as the official point-of-contact for the applicant.

Once a year in the month of April, the evaluation panel will meet to purge the PPL to ensure outdated projects or those projects funded by local municipalities are removed from the list. The new list will be revised each July.

STEP 2
Once the proposals have been received, DEM staff will review each proposal for completeness. DEM staff will notify, in writing, via email or fax, those applicants who’s Proposal Form(s) have not been completed fully. The applicant will be notified that they have one week from the date of receipt of the notification to submit additional information. If supplemental information is inadequate or no new information is submitted, the proposer will be notified that their project will not be eligible for inclusion on the PPL this cycle.

STEP 3
DEM staff will compile copies of the proposals (includes supporting materials), and transmit copies to the Evaluation Panel members no later than four weeks prior to the scheduled Evaluation Panel meeting.

STEP 4
Each Evaluation Panel member will score all proposal forms. Each member will transmit copies of their scored "Project or Initiative" Proposals Forms to DEM staff, no more than 14 days after they received the forms.

STEP 5
DEM staff will average the attribute scores for each project received from each Evaluation Panel member. DEM staff will create a summary sheet that documents the results of the scoring. A "new" *Draft* PPL will be generated based on the scores received from the Evaluation Panel.

STEP 6
DEM staff will provide each applicant the "new" Draft PPL prior to the LMS Evaluation Panel meeting, and invite applicants to attend and provide comment.

STEP 7
The Evaluation Panel will hold a meeting to review the scoring and finalize the Draft PPL. A quorum of the Evaluation Panel must be present during the meeting, Panel members will discuss possible inaccuracies and/or reliability of information used by proposers, such as obsolete cost data, questions regarding project feasibility, and project tie-breakers (see Project Tie-Break Procedure). Before the meeting concludes, a vote will be conducted to approve the "new" Draft PPL as submitted by the Evaluation Panel or as modified. DEM staff will transmit a copy of the approved "new" Draft PPL to the Steering Committee for approval.

STEP 8
DEM staff will schedule a meeting of the Steering Committee. One week in advance of the scheduled meeting, the "new" Draft PPL will be distributed to the Steering Committee membership.

STEP 9
At the scheduled Steering Committee meeting, the Draft PPL will be presented.

Project applications received after the submission deadline, but before the next project prioritization updating process, may be accepted by the Steering Committee as UNRANKED projects. Prior to the PPL adoption vote, such projects will be presented for consideration. The Steering Committee may vote to include any or all of these projects on the draft PPL as “unranked.” Unranked projects will be listed on the PPL under the sub-heading of Unranked Projects which will appear immediately following the list of ranked projects. Unranked projects will automatically be ranked in the next ranking cycle.

Following discussion of the Draft PPL, the Steering Committee will adopt it as submitted or with modifications. Specific justification is required for any modification to the ranking of the projects as submitted by the Evaluation Panel, excepting inclusion of unranked projects.

STEP 10
DEM staff will distribute copies of the new revised PPL to all appropriate entities.

4.5 Conflict Resolution Procedures

4.5.1 Background

With multiple local governments involved in the development of the PBC LMS, differences of opinions may arise over the course of the program with regard to goals, objectives, policies and projects. In cases where an impasse occurs, a procedure is needed that can be activated to resolve such conflicts. This section describes the procedure that will be used to resolve conflicts arising among the participating governmental entities in the development and implementation of the PBC LMS.
The two types of conflicts that may arise are issues and disputes. Issues are technical problems that are susceptible to informal resolution by DEM staff. Disputes are problems that require formal resolution by neutral third parties. In either case, resolution and settlement are best settled through mutually agreed-upon understanding between the disputing parties. When that is not possible, some form of binding resolution is needed.

The Subcommittee will be comprised of three people: one member of the Subcommittee will be appointed by the Steering Committee Chair, a second person will come from the intergovernmental issues forum and appointed by their chair, and a third member will be someone drawn from the Steering Committee who has been selected by mutual agreement of the Steering Committee chair and the intergovernmental issues forum chair (This individual or their municipality cannot be involved personally in the conflict).

Once the Subcommittee has been selected, DEM, as lead agency will prepare a memorandum delineating the dispute, include supporting documentation when available, and schedule the Subcommittee meeting.

If no resolution could be reached, the issue would then be heard by the entire Steering Committee. The vote of the Steering Committee would be binding. DEM staff shall provide support.

4.5.2 Procedure

The following provides a detailed, step-by-step procedure that would be followed should a dispute arise under the LMS.

Objective: To institute a fair, effective, and efficient process to resolve conflicts among local governments during the development and implementation of the LMS.

During the development or implementation of the LMS, a local government(s) may reach an impasse on a particular issue or position. The local government has an opportunity to exercise the following LMS Conflict Resolution Procedure.

STEP 1
The local government submits a letter of dispute (LOD) to the DEM Director explaining in as much detail as possible, describing their concern and position along with documentation to support their position. Also, they should outline potential alternative solutions.

STEP 2
DEM Director reviews the LOD making sure that it clearly outlines the position of the local government(s) and provides sufficient information supporting their position so the dispute in question can be readily understood by the members of the Conflict Resolution Subcommittee. If DEM staff determines that additional facts are needed to describe the dispute outlined in the LOD, DEM staff will provide, in writing, a letter identifying the information that will clarify the position of the disputing party.

STEP 3
Once the LOD is determined to be complete, DEM staff will notify and arrange a telephone conference call or a meeting of the Steering Committee Chair and IGIF representative to select individuals to serve on the Conflict Resolution Subcommittee (an ad hoc committee) within seven (7) calendar days. Before the selection process is completed, a verification of a willingness to serve will have been completed. Only voting members or alternates of the Steering Committee are eligible to serve on the Subcommittee.

STEP 4
Within a day of the Subcommittee selection, (see STEP 3), DEM staff will send a follow-up letter and/or email to each Subcommittee member confirming their appointment.

STEP 5
Included with the follow-up letter will be the LOD and any supportive materials provided by the disputing party.

STEP 6
In an effort to expedite the process, DEM staff will make every attempt to schedule the meeting within two (2) calendar weeks from the date the LOD was determined complete.

STEP 7
The conflict resolution meeting is held. DEM will provide staff to document the proceedings of the meeting. Every effort on the part of the two parties will attempt to resolve the impasse at the meeting.

STEP 8
If resolution is achieved, DEM staff will prepare a memorandum documenting the issue and the mutually agreed upon resolution. The memorandum will contain three signature blocks, one for the Chair of the Subcommittee and two for the representatives of the disputing parties. By their signature, all parties will formally agree to the mediated result. A copy will be provided to each party and another copy filed at the DEM. If resolution is still not achieved, the process will move to STEP 9.

STEP 9
If no resolution is achieved at the meeting, the Subcommittee will develop an alternative proposal which will be proffered to the disputing party within seven (7) days following the conclusion of the conflict resolution meeting.

STEP 10

If the impasse is not resolved at the Subcommittee level, DEM will schedule a meeting of the full LMS Steering Committee. In an effort to continue to try to resolve the impasse expeditiously, DEM staff will make every attempt to schedule the meeting within two (2) calendar weeks from the date that a solution cannot be achieved at the Subcommittee level. 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 11

A meeting of the Steering Committee is held. The representative of each disputing party will present their positions and the Chair of the Subcommittee will present the views of Conflict Resolution Subcommittee. At the end of the meeting, if no mutually acceptable compromise is achieved, the Steering Committee will vote to accept one solution from among the offered solutions or those that may develop at this special Steering Committee meeting. This resolution vote of the Steering Committee will be final.

The outcome of the meeting will be detailed in a memorandum of understanding that will be prepared by DEM. This memorandum will be signed by the Steering Committee Chair. Thereafter, a disputing party can exercise the legal remedy of going to court.

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Appendix A: Risk & Vulnerability Analyses Data

The risk and vulnerability data presented in this Appendix are submitted in partial fulfillment of the following FEMA requirements:

> **RISK ASSESSMENT: §201.6(c)(2):** The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.
>
> **Requirement §201.6(c)(2)(iii):** For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.
>
> **Requirement §201.6(c)(2)(i):** The risk assessment shall include a] description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
>
> **Requirement §201.6(c)(2)(ii):** The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Additional information relating to these requirements is contained in Section 3, in the Palm Beach County Hazard Environment, in Appendix C, and in the new hazard write-up sections of the Plan.

This Appendix presents the results of updated risk, vulnerability and impact analyses for the original hazards identified in the 2004 Plan. The summary tables for these analyses are indicated below:

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Table A-1: Relative Vulnerability to Hazards, by Local Government

Hazard Category **Community Vulnerability** **H: High** **M: Medium** **L: Low** **V: Very Low**	**Unincorporated County**	**MUNICIPALITIES** Atlantis	Belle Glade	Boca Raton	Boynton Beach	Briny Breezes	Cloud Lake	Delray Beach	Glen Ridge	Golf	Greenacres	Gulf Stream	Haverhill	Highland Beach	Hypoluxo	Juno Beach	Jupiter	Jupiter Inlet Colony	Lake Clarke Shores	Lake Park	Lake Worth	Lantana	Loxahatchee Groves	Manalapan	Mangonia Park	North Palm Beach	Ocean Ridge	Pahokee	Palm Beach	Palm Beach Gardens	Palm Beach Shores	Palm Springs	Riviera Beach	Royal Palm Beach	South Bay	South Palm Beach	Tequesta	Wellington	West Palm Beach
NATURAL HAZARDS																																							
Flood	H	M	H	H	H	M	M	H	M	M	M	M	M	M	L	M	H	M	M	H	H	H	H	L	M	H	L	M	H	H	M	M	H	L	M	H	M	H	H
Hurricane/tropical storm	H	M	H	H	H	H	M	H	M	M	M	H	M	H	M	H	H	H	M	H	H	H	H	M	M	H	H	H	H	M	H	M	H	M	H	H	M	M	H
Tornado	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Severe thunderstorm and lightning	H	M	M	M	M	H	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	H	M	M	M	M	H	M	M	M	M	M	H	M	M	M	M	H
Drought	H	L	H	M	M	L	L	M	H	H	L	M	L	H	L	M	M	M	L	L	L	L	H	L	L	M	L	H	M	M	L	M	L	L	H	L	L	H	M
Temperature extremes	M	L	L	L	M	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	L	L	M	L	L	H	L	L	L	M	L	L	L	L	L	H	L	M	M
Agricultural pests and disease	H	V	H	L	L	L	V	L	V	V	L	L	V	V	V	L	M	V	V	V	V	V	M	V	V	L	V	H	L	M	V	V	V	V	H	L	V	M	L
Wildfire/urban interface zone	H	L	H	M	L	V	L	L	M	M	L	L	L	V	V	L	M	V	V	V	L	L	M	V	V	L	V	H	V	M	V	V	L	M	H	V	V	M	M
Muck fire	H	V	H	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	L	V	V	V	V	H	V	V	V	V	V	L	H	V	V	L	L
Soil/beach erosion	M	L	M	M	M	M	V	M	H	H	V	M	V	H	V	H	H	V	L	V	M	M	L	V	M	M	H	V	H	M	M	L	H	V	V	H	M	V	V
Seismic hazards (sinkholes/soil failure)	L	V	V	V	M	V	V	V	M	M	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Tsunamis	L	M	V	H	H	H	M	H	M	M	L	M	L	H	H	H	H	H	H	H	H	H	V	H	L	H	H	V	H	M	H	L	L	V	V	H	V	V	L
TECHNOLOGICAL HAZARDS																																							
Hazardous materials accident	M	L	M	M	M	V	L	H	H	H	M	V	M	V	H	L	H	V	M	M	M	M	M	H	M	M	V	L	V	M	V	M	H	L	M	L	V	M	H

Hazard Category Community Vulnerability H: High M: Medium L: Low V: Very Low	MUNICIPALITIES																																						
	Unincorporated County	Atlantis	Belle Glade	Boca Raton	Boynton Beach	Briny Breezes	Cloud Lake	Delray Beach	Glen Ridge	Golf	Greenacres	Gulf Stream	Haverhill	Highland Beach	Hypoluxo	Juno Beach	Jupiter	Jupiter Inlet Colony	Lake Clarke Shores	Lake Park	Lake Worth	Lantana	Loxahatchee Groves	Manalapan	Mangonia Park	North Palm Beach	Ocean Ridge	Pahokee	Palm Beach	Palm Beach Gardens	Palm Beach Shores	Palm Springs	Riviera Beach	Royal Palm Beach	South Bay	South Palm Beach	Tequesta	Wellington	West Palm Beach
Radiological accidents (including nuclear power plant accidents)	L	V	V	V	V	V	V	V	V	V	V	V	V	V	V	L	L	L	V	V	V	V	V	V	V	V	V	V	V	V	V	L	L	V	V	V	V	V	L
Communications failure	M	V	L	M	M	V	V	M	L	L	V	V	V	V	V	V	M	V	L	M	M	M	M	V	L	V	V	L	V	M	L	L	M	L	L	M	M	V	M
Hazardous material release	M	L	M	M	H	M	M	H	L	L	M	V	L	V	L	L	M	L	M	M	M	M	L	L	L	M	V	L	V	M	V	L	M	M	M	L	L	M	H
Transportation system accident	H	L	H	M	H	V	L	H	L	L	V	V	M	V	L	L	H	V	M	M	M	M	M	L	M	M	V	L	V	V	V	L	H	L	H	L	M	M	H
Wellfield contamination	M	L	V	M	M	V	M	M	H	H	V	V	V	V	V	L	M	V	L	L	L	L	M	V	L	M	V	V	V	M	V	V	M	L	V	V	L	M	H
Power failure (outages)	M	V	M	M	M	V	V	M	M	M	V	V	V	V	V	L	M	V	V	V	V	V	M	V	V	M	V	M	V	M	L	M	L	M	M	H	M	L	M
Herbert Hoover Dike	M	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	M	L	L	L	M	H	L	L	M	L
HUMAN CAUSED HAZARDS																																							
Civil disturbance	M	V	L	L	M	V	V	M	V	V	V	V	V	V	V	V	L	V	V	L	L	L	L	V	L	L	V	V	V	L	V	L	L	V	V	V	L	V	M
Terrorism and sabotage	L	V	V	L	L	V	V	L	V	V	L	V	V	V	V	L	L	V	V	L	L	L	L	V	L	V	V	V	M	V	V	L	L	V	V	V	L	V	M
Immigration crisis	M	V	M	L	M	V	V	M	V	V	V	V	V	V	V	V	L	V	V	L	L	L	L	V	V	V	L	M	V	V	M	L	M	V	M	L	V	V	M

Table A-2: Relative Probability of Hazards, by Local Government

Hazard Category Community Vulnerability H: High M: Medium L: Low V: Very Low	Unincorporated County	MUNICIPALITIES Atlantis	Belle Glade	Boca Raton	Boynton Beach	Briny Breezes	Cloud Lake	Delray Beach	Glen Ridge	Golf	Greenacres	Gulf Stream	Haverhill	Highland Beach	Hypoluxo	Juno Beach	Jupiter	Jupiter Inlet Colony	Lake Clarke Shores	Lake Park	Lake Worth	Lantana	Loxahatchee Groves	Manalapan	Mangonia Park	North Palm Beach	Ocean Ridge	Pahokee	Palm Beach	Palm Beach Gardens	Palm Beach Shores	Palm Springs	Riviera Beach	Royal Palm Beach	South Bay	South Palm Beach	Tequesta	Wellington	West Palm Beach
NATURAL HAZARDS																																							
Flood	H	M	M	H	H	M	M	H	M	M	M	H	H	H	H	H	H	H	M	H	H	M	M	H	M	H	H	M	H	H	H	M	H	L	M	H	M	M	H
Hurricane/tropical storm	H	M	M	H	H	H	M	H	M	M	M	H	M	H	H	H	H	H	M	H	H	M	H	H	M	H	H	M	H	M	H	M	H	M	M	H	M	M	H
Tornado	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	M	L	L	L	L	M	L	M	M	M	L	L	L	M	M	M	L	M	H
Severe thunderstorm/ lightning	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	H	H
Drought	H	L	H	L	M	L	L	M	L	L	L	L	L	L	L	L	M	L	L	L	L	L	M	L	L	L	L	H	M	M	L	L	L	L	H	L	L	H	M
Temperature extremes	M	L	M	L	L	V	L	L	L	L	L	V	L	V	V	V	H	V	L	V	V	L	M	V	L	L	V	M	L	L	V	L	L	L	M	L	L	M	M
Agricultural pests and disease	H	V	H	L	M	V	V	M	V	V	L	V	L	V	V	V	M	V	L	V	V	L	M	V	L	V	V	H	L	L	V	L	L	V	H	L	V	M	L
Wildfire/urban interface zone	H	V	H	L	M	V	V	L	V	V	L	V	L	V	V	V	M	V	L	V	L	L	H	V	L	L	V	H	V	L	V	V	L	M	H	V	V	M	M
Muck fire	H	V	H	V	L	V	V	L	V	V	V	V	V	V	V	V	V	V	V	V	V	V	L	V	V	V	V	V	H	V	V	V	L	L	H	V	V	L	L
Soil/beach erosion	M	V	L	M	M	M	V	M	V	V	V	M	V	M	M	H	H	H	V	V	M	V	V	H	V	M	H	L	H	V	H	V	H	V	L	H	M	V	L
Seismic hazards (sink holes/soils failure)	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Tsunamis	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	L	V	V	V	V	V	L
TECHNOLOGICAL HAZARDS																																							
Hazardous materials accident	M	L	L	M	M	V	V	L	L	V	V	V	V	V	V	V	L	V	V	L	L	V	L	V	L	M	V	M	V	L	V	L	M	L	M	L	V	M	H

Hazard Category **Community Vulnerability** **H: High** **M: Medium** **L: Low** **V: Very Low**	**Unincorporated County**	**MUNICIPALITIES** Atlantis	Belle Glade	Boca Raton	Boynton Beach	Briny Breezes	Cloud Lake	Delray Beach	Glen Ridge	Golf	Greenacres	Gulf Stream	Haverhill	Highland Beach	Hypoluxo	Juno Beach	Jupiter	Jupiter Inlet Colony	Lake Clarke Shores	Lake Park	Lake Worth	Lantana	Loxahatchee Groves	Manalapan	Mangonia Park	North Palm Beach	Ocean Ridge	Pahokee	Palm Beach	Palm Beach Gardens	Palm Beach Shores	Palm Springs	Riviera Beach	Royal Palm Beach	South Bay	South Palm Beach	Tequesta	Wellington	West Palm Beach
Radiological accidents (including nuclear power plant accidents)	V	V	V	V	V	V	V	L	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Communications failure	M	V	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	V	L	L	L	L	L	L	M	V	L	M
Hazardous material release	L	L	L	L	L	V	L	H	L	V	L	V	V	V	V	L	L	V	V	L	L	V	L	V	M	M	V	L	V	L	V	V	L	L	L	L	L	M	H
Transportation system accident	H	L	M	M	M	V	L	H	L	V	L	V	L	V	V	V	L	V	V	L	L	L	M	V	M	M	V	M	V	M	V	V	M	L	M	L	L	M	H
Wellfield contamination	M	L	V	M	M	V	V	M	L	V	V	V	V	V	V	V	L	V	V	L	L	V	M	V	M	L	V	L	V	L	V	V	M	L	L	V	V	M	H
Power failure (outages)	M	M	V	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	L	M	M	M	M	M	M	L	M	M	M	M	M	M	M	H	M	V	M
Herbert Hoover Dike Breach	M	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	M	L	L	L	M	H	L	L	M	M
HUMAN CAUSED HAZARDS																																							
Civil disturbance	M	V	L	L	L	V	V	M	V	V	L	V	V	V	V	V	L	V	V	L	L	V	V	V	L	L	V	L	L	L	V	V	L	V	L	V	V	V	M
Terrorism and sabotage	L	V	V	L	L	V	V	L	V	V	V	V	V	V	V	V	L	V	V	V	L	V	V	L	V	V	V	L	L	V	V	V	L	V	L	V	V	V	M
Immigration crisis	L	V	L	L	L	L	V	M	V	V	V	L	V	L	L	L	L	L	V	V	L	V	L	L	V	L	L	V	V	V	L	V	L	V	L	L	V	V	M

Table A-3: Risk Assessment by Hazard and Jurisdiction

Hazard Category Community Vulnerability H: High M: Medium L: Low V: Very Low	Unincorporated County	MUNICIPALITIES Atlantis	Belle Glade	Boca Raton	Boynton Beach	Briny Breezes	Cloud Lake	Delray Beach	Glen Ridge	Golf	Greenacres	Gulf Stream	Haverhill	Highland Beach	Hypoluxo	Juno Beach	Jupiter	Jupiter Inlet Colony	Lake Clarke Shores	Lake Park	Lake Worth	Lantana	Loxahatchee Groves	Manalapan	Mangonia Park	North Palm Beach	Ocean Ridge	Pahokee	Palm Beach	Palm Beach Gardens	Palm Beach Shores	Palm Springs	Riviera Beach	Royal Palm Beach	South Bay	South Palm Beach	Tequesta	Wellington	West Palm Beach
NATURAL HAZARDS																																							
Flood																																							
Frequency																																							
Vulnerability	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	H	H
Exposure	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	H	H
Risk	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	H	H
Hurricane/Tropical Storm																																							
Frequency	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	H	H
Vulnerability	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	H	H
Exposure	M	H	M	H	H	H	H	H	H	H	M	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H	H	M	M	H	M	M	H
Risk	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	H	H
Tornado																																							
Frequency	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	L	M	M	M	M	M	M	M
Vulnerability	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	L	L	L	L
Exposure	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Risk	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Thunderstorm/Lightning																																							
Frequency	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H

Hazard Category Vulnerability Rating H: High M: Medium L: Low	**Unincorporated County**	Atlantis	Belle Glade	Boca Raton	Boynton Beach	Briny Breezes	Cloud Lake	Delray Beach	Glen Ridge	Golf	Greenacres	Gulf Stream	Haverhill	Highland Beach	Hypoluxo	Juno Beach	Jupiter	Jupiter Inlet Colony	Lake Clarke Shores	Lake Park	Lake Worth	Lantana	Loxahatchee Groves	Manalapan	Mangonia Park	North Palm Beach	Ocean Ridge	Pahokee	Palm Beach	Palm Beach Gardens	Palm Beach Shores	Palm Springs	Riviera Beach	Royal Palm Beach	South Bay	South Palm Beach	Tequesta	Wellington	West Palm Beach
	MUNICIPALITIES																																						
Vulnerability	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
Exposure	M	M	H	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	H	M	M	M	M	M	H	H	M	M	H	M
Risk	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Drought																																							
Frequency																																							
Vulnerability	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	M	H	H	H	H	M	H	H
Exposure	M	M	H	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	H	M	M	M	M	M	H	H	M	M	M	M
Risk	M	M	H	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	H	M	M	M	M	M	H	H	M	M	M	M
Temperature Extremes																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Vulnerability	M	M	H	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	H	M	M	M	M	M	M	H	M	L	M	M
Exposure	M	M	H	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	H	M	M	M	M	M	M	H	M	L	M	M
Risk	M	M	H	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	H	M	M	M	M	M	M	H	M	L	M	M
Tsunamis																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Vulnerability	M	M	L	H	H	H	M	H	M	L	L	H	L	H	M	H	H	H	M	H	H	M	L	H	M	H	H	L	H	M	H	L	H	L	L	H	L	L	H
Exposure	M	M	L	H	H	H	M	H	M	L	L	H	L	H	M	H	H	H	M	H	H	M	L	H	M	H	H	L	H	M	H	L	L	L	L	H	M	L	H
Risk	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Agricultural Pests/Diseases																																							
Frequency	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	L	M	M	M	M	L	M	M

Hazard Category Vulnerability Rating H: High M: Medium L: Low	**Unincorporated County**	Atlantis	Belle Glade	Boca Raton	Boynton Beach	Briny Breezes	Cloud Lake	Delray Beach	Glen Ridge	Golf	Greenacres	Gulf Stream	Haverhill	Highland Beach	Hypoluxo	Juno Beach	Jupiter	Jupiter Inlet Colony	Lake Clarke Shores	Lake Park	Lake Worth	Lantana	Loxahatchee Groves	Manalapan	Mangonia Park	North Palm Beach	Ocean Ridge	Pahokee	Palm Beach	Palm Beach Gardens	Palm Beach Shores	Palm Springs	Riviera Beach	Royal Palm Beach	South Bay	South Palm Beach	Tequesta	Wellington	West Palm Beach
	MUNICIPALITIES																																						
Vulnerability	H	M	H	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	H	M	M	M	L	M	M	M	H	M	M	M
Exposure	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	L	H	L	L	L	L	L	L	H	L	L	L	L
Risk	M	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	L	H	L	L	L	L	L	L	H	L	L	L	L
Wildfire/Urban Interface																																							
Frequency	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	L	L	M	L	L	L	L	L	L	M	L	L	L	M	L	L	L	M	L
Vulnerability	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	L	L	M	L	L	L	L	L	L	M	L	L	L	M	L	L	L	M	L
Exposure	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Risk	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	L	L	M	L	L	L	L	L	L	M	L	L	L	M	L	L	L	M	L
Muck Fires																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Vulnerability	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Exposure	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Risk	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Soil /Beach Erosion																																							
Frequency	L	L	L	M	M	L	L	L	M	L	L	L	L	M	L	M	M	L	L	M	M	L	L	M	L	M	M	L	M	L	M	L	M	L	L	L	M	L	L
Vulnerability	L	L	L	H	H	L	L	L	H	L	L	L	L	H	L	H	H	L	L	H	H	L	L	H	L	H	H	L	H	L	H	L	H	L	L	L	H	L	L
Exposure	L	L	L	M	M	L	L	L	M	L	L	L	L	M	L	H	H	L	L	H	H	L	L	H	L	H	H	L	H	L	H	L	H	L	L	L	H	L	L
Risk	L	L	L	M	M	L	L	L	M	L	L	L	L	M	L	M	M	L	L	M	M	L	L	M	L	M	M	L	M	L	M	L	M	L	L	L	M	L	L
Seismic Hazards																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L

Hazard Category Vulnerability Rating H: High M: Medium L: Low	Unincorporated County	MUNICIPALITIES																																				
		Atlantis	Belle Glade	Boca Raton	Boynton Beach	Briny Breezes	Cloud Lake	Delray Beach	Glen Ridge	Golf	Greenacres	Gulf Stream	Haverhill	Highland Beach	Hypoluxo	Juno Beach	Jupiter	Jupiter Inlet Colony	Lake Clarke Shores	Lake Park	Lake Worth	Lantana	Loxahatchee Groves	Manalapan	Mangonia Park	North Palm Beach	Ocean Ridge	Pahokee	Palm Beach	Palm Beach Gardens	Palm Beach Shores	Palm Springs	Riviera Beach	Royal Palm Beach	South Bay	South Palm Beach	Tequesta	Wellington	West Palm Beach
Vulnerability	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Exposure	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Risk	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
TECHNOLOGICAL HAZARDS																																							
Hazardous Materials Accident																																							
Frequency	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Vulnerability	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Exposure	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Risk	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Radiological Accidents																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Vulnerability	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Exposure	M	L	L	L	L	L	L	L	L	L	L	L	M	L	L	M	M	M	M	L	M	L	L	L	L	M	L	L	M	M	M	L	M	L	L	L	L	L	M
Risk	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Communications Failure																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Vulnerability	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	L	M	M	M	M	M	M	M
Exposure	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	L	M	M	M	M	M	M	M
Risk	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	L	M	M	M	M	M	M	M

Hazard Category Vulnerability Rating H: High M: Medium L: Low	Unincorporated County	Atlantis	Belle Glade	Boca Raton	Boynton Beach	Briny Breezes	Cloud Lake	Delray Beach	Glen Ridge	Golf	Greenacres	Gulf Stream	Haverhill	Highland Beach	Hypoluxo	Juno Beach	Jupiter	Jupiter Inlet Colony	Lake Clarke Shores	Lake Park	Lake Worth	Lantana	Loxahatchee Groves	Manalapan	Mangonia Park	North Palm Beach	Ocean Ridge	Pahokee	Palm Beach	Palm Beach Gardens	Palm Beach Shores	Palm Springs	Riviera Beach	Royal Palm Beach	South Bay	South Palm Beach	Tequesta	Wellington	West Palm Beach
Hazardous Material Release																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Vulnerability	M	M	M	M	M	L	M	M	M	M	M	L	M	L	M	L	M	M	M	M	M	M	L	L	M	M	L	M	L	M	M	M	M	M	M	L	L	M	M
Exposure	M	M	M	M	M	L	M	M	M	M	M	L	M	L	M	L	M	M	M	M	M	M	L	L	M	M	L	M	L	M	M	M	M	M	M	L	L	M	M
Risk	M	M	M	M	M	L	M	M	M	M	M	L	M	L	M	L	M	M	M	M	M	M	L	L	M	M	L	M	L	M	M	M	M	M	M	L	L	M	M
Transportation Accident																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Vulnerability	M	L	M	M	M	L	L	M	M	L	L	L	M	L	M	L	M	L	L	M	M	M	M	L	M	L	L	M	L	M	L	L	M	L	M	L	M	L	M
Exposure	M	L	M	M	M	L	L	M	M	L	L	L	M	L	M	L	M	L	L	M	M	M	L	L	M	L	L	M	L	M	L	L	M	L	M	L	M	L	M
Risk	M	L	M	M	M	L	L	M	M	L	L	L	M	L	M	L	M	L	L	M	M	M	M	L	M	L	L	M	L	M	L	L	M	L	M	L	M	L	M
Wellfield Contamination																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Vulnerability	M	L	L	M	M	L	L	M	L	L	L	M	L	L	L	L	M	L	L	M	L	L	M	L	M	L	L	L	L	M	L	L	L	L	L	L	L	M	M
Exposure	M	L	L	M	M	L	L	M	L	L	L	M	L	L	L	L	M	L	L	M	L	L	M	L	M	L	L	L	L	M	L	L	L	L	L	L	L	M	M
Risk	M	L	L	M	M	L	L	M	L	L	L	M	L	L	L	L	M	L	L	M	L	L	M	L	M	L	L	L	L	M	L	L	L	L	L	L	L	M	M
Power Failure (Outages)																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	L	L	L	L	M	L	L	L	L	L	L	L
Vulnerability	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Exposure	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Risk	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M

Hazard Category **Vulnerability Rating** H: High M: Medium L: Low	MUNICIPALITIES Unincorporated County	Atlantis	Belle Glade	Boca Raton	Boynton Beach	Briny Breezes	Cloud Lake	Delray Beach	Glen Ridge	Golf	Greenacres	Gulf Stream	Haverhill	Highland Beach	Hypoluxo	Juno Beach	Jupiter	Jupiter Inlet Colony	Lake Clarke Shores	Lake Park	Lake Worth	Lantana	Loxahatchee Groves	Manalapan	Mangonia Park	North Palm Beach	Ocean Ridge	Pahokee	Palm Beach	Palm Beach Gardens	Palm Beach Shores	Palm Springs	Riviera Beach	Royal Palm Beach	South Bay	South Palm Beach	Tequesta	Wellington	West Palm Beach
Herbert Hoover Dike Breach																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Vulnerability	M	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	M	H	L	L	M	L
Exposure	M	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	M	H	L	L	M	L
Risk	M	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	M	H	L	L	M	L
HUMAN CAUSED HAZARDS																																							
Civil Disturbance																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Vulnerability	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Exposure	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Risk	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Terrorism and Sabotage																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Vulnerability	M	L	M	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	M	M	L	L	M	L	M	L	L	L	M
Exposure	M	L	M	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	M	M	L	L	M	L	M	L	L	L	M
Risk	M	L	M	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	M	M	L	L	M	L	M	L	L	L	M
Immigration Crisis																																							
Frequency	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Vulnerability	M	L	M	L	M	L	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	M	L	M	L	M	L	L	L	M
Exposure	M	L	M	L	M	L	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	M	L	L	M	L	M	L	M	L	L	L	M
Risk	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L

Table A-4: Impact Analysis

An impact analyses was conducted to assess the potential for detrimental impacts from all identified natural, technological and human caused hazards. Results of these analyses are summarized below. Impacts were categorized into the following groupings: health and safety of the resident population in the affected area; health and safety of incident responders; impacts on the continuity of government and non-government operations; impacts to property, facilities and infrastructure; impacts to the critical community services; impacts to the environment; economic and financial impacts; impacts on regulatory and contractual obligations; and impacts negatively affecting the County's reputation, image, and/or ability to attract public and commercial interests.

An impact rating of "Low" for any hazard type means the hazard is not likely to have any measurable or lasting detrimental impact of a particular type and consequences will likely be rectified promptly with locally available resources. An impact rating of "Medium" means there will likely be a measurable detrimental impact which may require some time to rectify and may require outside resources and/or assistance.

An impact rating of "High" means the impact will likely be severe and of longer duration, and require substantial time, resources, and/or outside assistance to rectify. Multiple ratings indicate detrimental impacts might easily vary within the range indicated.

Hazard	Health & Safety Residents	Health & Safety Responders	Continuity of Operations	Property, Facilities Infra-structure	Historical Resources	Delivery of Services	Environ-ment	Economic & Financial Conditions	Regulatory Contractual Obligations	Reputation of County
Natural										
Flood	Medium	Medium	Low	Medium	Medium/	Medium	Medium	Medium	Low	Low
Tropical Storm	Medium	Medium	Low	Medium	Medium	Medium	Medium	Medium	Low	Low
Hurricane Cat 1	Medium	Medium	Low	Medium	Medium	Medium	Medium	Medium	Low	Low
Hurricane Cat 2	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Low	Low
Hurricane Cat 3	Medium/ High	Medium/ High	Medium/ High	Medium/ High	Medium/ High	Medium/ High	High	Medium/ High	Medium	Low/ Mediu
Hurricane Cat 4	High	High	High	High	High	High	High	High	High	Medium / High
Hurricane Cat 5	High	High	High	High	High	High	High	High	High	Medium / High
Tornado	Low/ Medium	Medium	Low	Low/ Mediu	Low/High	Low	Low/ Medium	Medium	Low	Low
Severe Thunder Storm/Lightning	Low	Low	Low	Low	Low/ Medium	Low	Low	Low	Low	Low
Drought	Low	Low	Low	Low	Low	Low	Low/ Medium	Medium/ High	Low	Low
Temp. Extremes	Low/ Medium	Low	Low	Low	Low	Low	Low/ Medium	Medium	Low	Low
Agricultural Pest/Disease	Low	Low	Low	Low	Low	Low	Low/ Medium	Medium/ High	Low	Low/ Mediu
Wildfire/Urban Interface Zone	Low/ Medium	Medium/ High	Low	Medium / High	Low	Low	Low/ Medium	Medium/ High	Low	Low
Muck Fires	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Soil/Beach Erosion	Low	Low	Low	Low/ Mediu	Low/High	Low	Medium/ High	Medium/ High	Low	Low/ Mediu
Seismic Hazards (Sinkhole soil failure)	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low

Hazard	Health & Safety Residents	Health & Safety Responders	Continuity of Operations	Property, Facilities Infra-structure	Historical Resources	Delivery of Services	Environ-ment	Economic & Financial Conditions	Regulatory Contractual Obligations	Reputation of County
Technological										
Hazardous Materials Accident	Medium/ High	Medium/ High	Low/ Medium	Low	Low	Low	Medium/ High	Low/ Medium	Low	Low
Radiological Accidents	Low/ Medium	Low/ Medium	Low	Low	Low	Low	Low/ Medium	Low/ Financial	Low	Low/ Medium
Communication Failure	Medium	Medium	Medium/ High	Low	Low	Medium/ High	Low	Medium/ High	Low	Low
Hazardous Material Release	Medium/ High	Medium/ High	Low/ Medium	Low	Low	Low	Medium/ High	Low/High	Medium	Low/ Medium
Transportation Accidents	Low/High	Low/High	Low/High	Low/High	Low	Low/ Medium	Low	Low/High	Low	Low/ Medium
Wellfield Contamination	Low/ Medium	Low	Low	Low/ Medium	Low	Low/ Medium	Medium/ High	Low/ Medium	Low	Low
Power Failure (Outage)	Medium/ High	Medium/ High	Medium/ High	Low/ Medium	Low	Medium/ High	Low	Medium/ High	Low	Low/ Medium
Human Caused										
Civil Disturbance	Low/High	Low/High	Low/High	Low/High	Low	Low/High	Low	Low/High	Low	Low/High
Terrorism & Sabotage	Medium/ High	High	Medium/ High	Low/High	Low	Medium/ High	Low/High	Low/High	Low/ Medium	Medium/ High
Immigration Crisis	Low/ Medium	Low/ Medium	Low	Low	Low	Low	Low	Low/ Medium	Low	Low/ Medium

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Table A-5: Data sources used for the Palm Beach County Hazard Vulnerability and Risk Assessment

Source	Data Type
Natural Hazards	
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
NOAA Tropical Cyclone Database	Historical hurricane data
Colorado State University (Dr. Gray online site)	Hurricane probability
NASA Natural Disaster Reference Database	Historical data on all types of natural hazards
National Weather Service	Weather statistics
National Climate Data Center - On-Line Data Base	Weather statistics
Atlantic Ocean and Meteorological Laboratory, Hurricane Research Division	Hurricane forecast models
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 Palm Beach County (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	Storm effects data
Independent Insurance Agents of America (Natural Disaster Risk Database)	Probability data and estimated exposure Building code recommendations to reduce exposure
Florida Division of Emergency Management	*The Arbiter of Storms (TAOS)@* maps and computer model projections as well as technical support and data

Source	Data Type
Florida Department of Environmental Protection	Environmental risk, exposure to hurricanes, environmental effects and hazards
Florida Game and Fresh Water Fish Commission	Hurricane effects of 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 statewide unified building code
Palm Beach County Airports Department	Weather data and hurricane protection procedures
Palm Beach County Comprehensive Growth Management Plan	Land management, zoning, and hurricane mitigation related ordinances
Palm Beach County Planning, Zoning, and Building Department	Building codes and zoning ordinances
Palm Beach County Property Appraiser	Tax assessor records for use in determining dollar value of exposed property
Palm Beach County Automated Information Management	Map products and GIS data
Palm Beach County Engineering and Public Works Department	Engineering, drainage, road elevations, and storm water data
Palm Beach County Environmental Resources Management Department	Environmental and beach erosion data
Palm Beach County Fire and Rescue	Critical facilities locations and emergency management plans
Palm Beach County Health Department	Critical facilities and health risk data
Palm Beach County School Board	Schools, shelter, and critical facilities data and emergency management plans
Palm Beach County Law Library	Building codes and ordinances
Palm Beach County Parks & Recreation Department	Environmental and recreational data and potential impacts data
Palm Beach County Public Safety Department Division of Emergency Management	Emergency management plans, historical data, critical facilities, special needs, and general guidance
Palm Beach County Division of Criminal Justice	County prison population and emergency

Source	Data Type
	management plans
Division of Animal Regulation	Animal protection, regulation, and control plans following natural disasters (hurricanes)
Palm Beach County Sheriff Department	Emergency management plans and law enforcement procedures following a natural disaster
Palm Beach County Tourist Development Council	Potential economic loss and specific areas of economic vulnerability
Palm Beach County Water Utilities	Critical facilities locations and emergency management procedures
Palm Beach County Red Cross	Historical data, shelter data, and emergency management plans
Florida Power and Light and Other Municipal/Private Power Companies (Lake Worth Utilities, etc.)	Power grid vulnerabilities, structure, and emergency management plans
Home Depot/Lowes	Emergency management supply plans for preparation and recovery
Publix/Winn Dixie	Emergency food supply plans
Southern Bell	Emergency communication maintenance plans
AT&T Wireless Services	Emergency communication maintenance plans
U. S. Cellular Wireless Communications	Emergency communication maintenance plans
The Palm Beach Post	Historical hurricane data
Local Radio and Television Stations	Critical facilities location 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 hazard
The Tornado Project On-Line	Historical data
Optical Transient Detector Data Base	Lightning associated with thunder storms (lightning statistics)
NASA Natural Disaster Reference Database	Historical data all types of natural hazards
National Weather Service	Weather statistics
National Climate Data Center - On-Line Data Base	Weather statistics
NOAA Wind Related Fatalities Data Base	Wind related fatalities

Source	Data Type
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 thunder storms and tornadoes
Florida Division of Emergency Management	Incident reports and historical data
South Florida Water Management District	Climatic data
Palm Beach County Airports Department	Weather data and protection plans and procedures during thunderstorms and tornadoes
Palm Beach County Fire and Rescue	Thunderstorm and tornado fire and fatality data
Palm Beach County Public Safety Department Division of Emergency Management	Thunderstorm and tornado historical data
Palm Beach County Division of Emergency Management	Historical data on thunderstorm and tornado related medical emergencies
Palm Beach County Red Cross	Historical data on impacts
Florida Power and Light and Other Municipal/Private Power Companies (Lake Worth Utilities, etc.)	Historical data on impacts to the power grid
Southern Bell	Historical data on communication impacts
AT&T Wireless Services	Historical data on communications disruptions
U. S. Cellular Wireless Communications	Historical data on communications disruptions
The Palm Beach Post	Historical data general
Local Radio and Television Stations	Historical data on losses and possible future losses
NASA Natural Disaster Reference Database	Lightning statistics
National Weather Service	Lightning strike data
National Climate Data Center - On-Line Data Base	Lightning strike data
NOAA Lightning Related Fatalities Data Base	Lightning fatalities
National Lightning Safety Institute (NLSI)	Lightning research and protection measures
Florida State University	Data and expertise concerning all natural hazards
Florida Atlantic University	Data and expertise concerning all natural hazards

Source	Data Type
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
Palm Beach County Airports Department	Lightning data and protective measures
Palm Beach County Fire and Rescue	Lightning related fires and injuries
Palm Beach County Parks & Recreation Department	Data on lightning related losses
Palm Beach County Public Safety Department Division of Emergency Management	Lightning protection procedures
Palm Beach County Sheriff Department	Data on communication disruption
Florida Power and 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
The Palm Beach Post	Historical data on significant lightning related events
Flooding	
Association of State Floodplain Managers	Floodplain data, flooding statistics, and mitigation approaches
Natural Hazards Research Center	Technical data on all natural hazards
NOAA Flood Related Fatalities Data Base	Flood related fatalities
NOAA Hydrologic Information Center	Hydrologic data
NOAA Tropical Cyclone Database	Rainfall associated with storm type 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

Source	Data Type
National Climate Data Center - On-Line Data Base	Weather/rain fall historical data
National Flood Proofing Committee Data Base	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 plane
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 Data Base	Historical flooding data
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 Palm Beach County
Florida Association of Floodplain Managers	Flooding 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
Palm Beach County Planning, Zoning, and Building Department	Zoning ordinances and building codes that affect flood protection
Palm Beach County Property Appraiser	Property value within flood zones
Palm Beach County Automated Information Management	Historical flooding and critical facilities in flood zones

Source	Data Type
Palm Beach County Engineering and Public Works Department	Highway and storm water management procedures
Palm Beach County Environmental Resources Management Department	Water resources and flooding data
Palm Beach County Fire and Rescue	Flooding associated fires and injuries
Palm Beach County Health Department	Disease risk and contamination potential associated with flooding
Palm Beach County Parks & Recreation Department	Recreational resources at risk due to flooding
Palm Beach County Public Safety Department Division of Emergency Management	Historical flooding data and emergency management procedures
Division of Animal Regulation	Animal control problems associated with flooding
Palm Beach County Sheriff Department	Emergency management procedures associated with flooding
Palm Beach County Water Utilities	Critical facilities at risk due to flooding and potential impacts
Independent Drainage Districts	All independent drainage districts will be contacted for historical data and identified areas at risk
Palm Beach County Red Cross	Historical flooding data and repetitively damaged structures data
Florida Power and Light	Flooding emergency plans and critical facilities at risk
The Palm Beach Post	Historical data on flooding incidents
Freezing Temperatures	
National Climate Data Center - On-Line Data Base	Historical records on freezing temperatures
National Weather Service	Historical records on freezing temperatures
U. S. Department of Agriculture - County Extension Agents	Local agricultural data on frequency, impacts, and financial losses due to freezing temperatures
Florida Citrus Commission	Frequency and amount of financial losses to citrus crops due to freezing temperatures and long term industry impacts
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	Frequency and amount of financial losses to all

Source	Data Type
Services	agricultural business as a result of freezing temperatures
Florida Farm Bureau	Frequency and amount of financial losses to all agricultural business as a result of freezing temperatures and current mitigation and risk reduction strategies
Florida State University	Agricultural research and new mitigative strategies to reduce freeze impacts
Florida Atlantic University	Freeze 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 freezing and environmental consequences of current agricultural mitigation strategies
South Florida Water Management District	Climate records and water demands associated with freeze mitigation
Palm Beach County Department of Agriculture	Historical impact and financial losses resulting from freezing temperatures in Palm Beach County
Palm Beach County Citrus and Farming Interest	Historical freeze losses and current mitigation strategies
Palm Beach County Red Cross	Impacts to poor and homeless due to freezing temperatures
Wildfires/Urban interface Zone and Muck Fires	
National Weather Service	Climate data/drought predictions
National Interagency Coordination Center Reports	Wildfire repots
National Climate Data Center - On-Line Data Base	Climate data
U. S. Forest Service	Wildfire 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 Geological Society	Soil types/muck deposits

Source	Data Type
The Wildfire Assessment System	Wildfire statistics and containment procedures
Florida Forest Protection Bureau	Florida specific wildfire statistics and current preventative practices
Florida Department of Environmental Protection	Natural resources at risk and protective measures
Florida Fire Chief's Association	Florida specific wildfire statistics, fire fighting technology, and potential mitigative measures for Florida communities
South Florida Water Management District	Water resources and right of way management practices
Palm Beach County Department of Agriculture	Land use patterns in Palm Beach County to establish areas at risk
Palm Beach County Planning Zoning & Building Department	Land use patterns in Palm Beach County to establish areas at risk
Palm Beach County Parks & Recreation Department	Land use patterns in Palm Beach County to establish areas at risk
Palm Beach County Fire Rescue - Fire Prevention Bureau	Land use patterns in Palm Beach County to establish areas at risk and current or in-place protective measures
Wildfire Magazine Data Base	Wildfire statistics
Palm Beach Post	Historical data on Palm Beach County wildfires/muck fires
Drought and High Temperatures	
National Weather Service	Climate data and drought predictions
National Climate Data Center - On-Line Data Base	Climate data
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	Agricultural losses due to droughts and current

Source	Data Type
Services	irrigation technology
South Florida Water Management District	Water allocations during drought conditions
Palm Beach County Department of Agriculture	County specific economic losses from drought and current economic vulnerability
Palm Beach County Parks & Recreation Department	Recreational resources impacted by droughts
Palm Beach County Water Utilities	Impacts from droughts of the potable water supplies and impacts in urban areas Water rationing plans
Municipal water utilities	Impacts of and water allotment plans during times of droughts in cities Water rationing plans
Coastal & Beach Erosion	
Florida Inland Navigational District	Maintenance records for the Intracoastal Waterway and other Palm Beach County navigable waters
South Florida Water Management District	Canal maintenance and erosion
Palm Beach County Environmental Resources Department	Environmental problems associated with erosion control and natural resources threatened by erosion
Palm Beach County Engineering and Public Works Department	Current erosion prevention measures
Palm Beach County Parks & Recreation Department	Current erosion prevention measures
Palm Beach County Coastal Municipalities	Current erosion prevention measures
Jupiter Inlet District	Information on beach erosion in and around Jupiter Inlet
Port of Palm Beach	Information on beach erosion in and around channel and inlet
Agricultural Pest and Diseases	
U. S. Forest Service	Forest diseases and current problem/preventative measures
U. S. Dept. of Agriculture - County Extension Agents	Local agricultural pest and potential exotic treats
U. S. Customs	Current programs to prevent introduction of agricultural pest and diseases
Florida Farm Bureau	Economic losses due to agricultural pest and diseases

Source	Data Type
Florida Citrus Commission	Citrus losses due to agricultural pest 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
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 pest and diseases and current control technology
Palm Beach County Department of Agriculture	Economic losses and current control programs
Palm Beach County Parks & Recreation Department	Pest control programs on public lands
Seismic Hazards	
U. S. Geological Survey	Geologic structure and seismic risk
Florida Geological Society	Geologic structure and soil characteristics
Technological Hazards	
Radiological Hazards	
U. S. Nuclear Regulatory Commission	Nuclear power plant regulation, accident statistics, and emergency procedures
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 & Local Emergency Data Users Group Data Base	Radiological accident management database
Florida Power and Light Emergency Plan	Industry emergency management plans
Palm Beach County Division of Emergency Management Comprehensive Emergency Management Plan (CEMP)	Local radiological emergency management plan
Hospital Plans - Both Radiological Materials	Local radiological emergency plans and

Source	Data Type
Disposal (Hazardous Waste) and Mass Radiation Casualties or Nuclear Accident Plans	safeguards
Hazardous Materials	
Federal Emergency Management Agency	Hazardous material emergency management guideline
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 (On-line)	Hazardous materials data
Material Safety Data Sheets (On-line)	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 & Local Emergency Data Users Group Database	Spill and release of hazardous materials statistics
Florida Fire Chiefs Association	Hazardous material emergency plans and containment procedures Spill/release statistics
Palm Beach County Division of Emergency Management	Methodology for handling hazardous material releases
Palm Beach County Fire Rescue	Methodology for handling hazardous material releases
Municipal Fire and Police Departments	Methodology for handling hazardous material releases

Source	Data Type
Palm Beach 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
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
Palm Beach County Airports Department	Aircraft accident statistics and airport safety procedures
Palm Beach International Airport	Aircraft accident statistics and airport safety procedures
Port of Palm Beach Port Authority	Port management, accident statistics, and emergency management procedures
Palm Beach 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
Palm Beach County Fire Rescue	Accident statistics involving injuries in Palm Beach County
Municipal police and fire departments	Accident statistics involving injuries in the cities

Source	Data Type
Power/Communications/Computer Grid System Failures	
Florida Power and Light Emergency Management Plans and Historical Database	Historical data and emergency management plans
Bell South Emergency Management Plan and Historical Database	Historical data and emergency management plans
Cellular and Satellite Communication Companies	Historical data and emergency management plans
The Banking Industry (Large Area Network - LANs Protection and Emergency Restoration Plans, as well as historical data on system failures)	Historical data and emergency management plans
Human Caused Hazards	
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
Palm Beach County Sheriff's Department	Historical data and situation plans
Municipal Police Departments	Historical data and situation plans
Palm Beach County Fire Rescue	Historical data and situation plans
Palm Beach County Division of Emergency Management	Historical data and situation plans
Terrorism and Sabotage	
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

Source	Data Type
Florida Department of Law Enforcement	Historical data, situation plans, and risk analysis
Florida Department of Health Education and Welfare	Population demographics
Palm Beach County Sheriff Department	Historical data, situation plans, and risk analysis
Municipal Police Departments	Historical data, situation plans, and risk analysis
Palm Beach County Fire Rescue	Historical data, situation plans, and risk analysis
Palm Beach County Division of Emergency Management	Historical data on injuries
American Society for Industrial Security	Risk analysis techniques and database
Mass Migration	
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
Palm Beach County Sheriff Department	Historical data, situation plans, risk analysis, and interagency coordination
Municipal Police Departments	Historical data, situation plans, risk analysis, and interagency coordination
Palm Beach County Fire Rescue	Situation plans and interagency coordination
Palm Beach County Division of Emergency Management	Historical data and medical risk analysis
Miscellaneous Data Sources	
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	Disease risk

Source	Data Type
Florida Department of Law Enforcement	Historical data
Florida Department of Health Education and Welfare	Historical data
Florida Department of Labor	Historical data
Palm Beach County Sheriff Department	Historical data
Municipal Police Departments	Historical data
Palm Beach County Fire Rescue	Historical data
Palm Beach County Health Department	Historical data

Appendix B: Countywide Mitigation Initiatives

Appendix B provides a description of representative mitigation programs and initiatives undertaken by PBC and its jurisdictions and the principles guiding intergovernmental coordination. These programs and initiatives served as the basis for the mitigation projects outlined in Appendix E. This appendix includes:

Section B-1 Mitigation Initiatives of PBC

This section addresses the following FEMA requirements:

> **Requirement §201.6(c)(3)(i):** The hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
>
> **Requirement §201.6(c)(3)(ii):** The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. The mitigation strategy must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.
>
> **Requirement: §201.6(c)(3)(iii):** The mitigation strategy section shall include an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization *shall* include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

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Appendix B-1: PBC Initiatives

Palm Beach County and its 38 municipalities participate in a full range of federal, state and local mitigation programs and initiatives. Representative of these programs and initiatives are the LMS, Community Rating System (CRS), National Flood Insurance Program (NFIP), Flood Mitigation Assistance Program (FMAP), Pre-Disaster Mitigation Program (PDM), Hazard Mitigation Grant Program (HMGP), Emergency Management Preparedness & Assistance Program (EMPA), CERT, Continuity of Operations, Post Disaster Redevelopment Planning (PDRP), ESF18, Private-Public Partnership, counter-terrorism, radiological emergency preparedness initiatives, hazardous materials, etc. The overarching purpose of these activities is the elimination or mitigation of hazards presenting significant risk to PBC and its residents. At this writing, PBC is involved in a detailed self-assessment and upgrade (as necessary), of its mitigation programs and activities in the context of the jurisdiction's overall Emergency Management program as part of its efforts to meet or exceed the national standards required to become accredited under the Emergency Management Accreditation Program (EMAP). The County hopes to be among the first Florida communities fully accredited under EMAP.

The LMS program and its companion mitigation programs are described in greater detail in Section 4.1.4.

A major mitigation priority of the LMS is the reduction of repetitive flood losses to properties. The County and its CRS participating municipalities track repetitive loss properties countywide on an ongoing basis using data gathered annually from FEMA and the State's Focus reports. For mitigation planning and strategy development purposes, LMS maintains updated GIS maps and informational databases of repetitive loss property locations relative to historical flood areas and designated Special Flood Hazard Areas. Repetitive loss properties are an ongoing discussion and planning priority for the LMS, CRS, and Flood Mitigation Technical Advisory committees. These committees, comprised of public and private sector representatives, are encouraged to develop and promote mitigation project ideas and strategies. At this writing, approximately 40 flood mitigation projects were in various stages of execution or on the drawing board of the Technical Advisory Committee.

In accordance with CRS guidelines, letters are mailed annually to repetitive loss property owners by PBC and municipalities explaining NFIP program benefits, the availability of mitigation assistance funding through the FMAP and other mitigation assistance programs. Non CRS members of the LMS are encouraged to stay in compliance with NFIP standards.

Information and support is provided in a variety of forms to potential FMA applicants to assist them in developing projects and preparing application packages. Through PBC's new LMS committee structure, the Technical Advisory Committee is available to offer technical guidance and assistance to applicants, including assistance in preparing benefit-cost analyses.

Mitigation projects are prioritized and implemented according to their direct potential for loss reduction or for their potential in contributing to longer-term, comprehensive plans and strategies for loss reduction. Once projects are underway, it is the responsibility of each jurisdiction to support and monitor performance in accordance with FEMA, state and local guidelines and codes and to oversee and coordinate documentation and funding processes.

In addition to support of projects, mitigation is encouraged and promoted through a variety of community awareness and education activities including presentations, workshops, expos, panel discussions, plan reviews, publications, websites, etc. prepared and presented utilizing networks of public-private sector partners. As opportunities present themselves, lending institutions and insurers are urged to provide financial incentives for mitigation. Jurisdictions are urged to accelerate permitting and inspections and, if allowable, to waive or reduce fees for mitigation projects. In addition to mitigation incentives, millions of dollars of annual insurance premium savings are realized by a significant segment of PBC residents residing within the County's CRS participating jurisdictions.

Involvement of Planning, Zoning, and Building, Fire-Rescue and other departments in LMS activities, including committee participation, bolsters communication among key agencies and the LMS and ensures that mitigation interests are appropriately represented in local building codes, fire codes, land-use ordinances, flood loss prevention ordinances, and other governing documentation.

The PBC LMS plan articulates the goals and objectives of the County and its municipalities to avoid and/or reduce long - term vulnerability to hazards identified by the hazard identification and risk assessment processes. More detailed descriptions of the strategies, programs and actions are contained in the body of the plan and reflected in the list of prioritized projects in Section 5 and Appendix E. Under the revised committee structure of the LMS program, increased attention is given to expanding and refining hazard-specific mitigation strategies exclusive of jurisdictional boundaries, capabilities and interests and to giving appropriate attention to mitigation in planning future land uses (see Appendix D).

The process and criteria employed for ranking mitigation projects and initiatives are described in detail in Section 4.0 of the LMS plan. In response to new federal guidelines applying to grant awards through the Pre Disaster Mitigation, Flood Mitigation Assistance and HMGPs, particular emphasis is given to technically feasible and environmentally responsible projects having attractive ratios of loss reduction benefits to cost. Projects involving worthy benefits that are difficult to quantify, are still given serious consideration in light of different sets of criteria and are referred to appropriate alternative funding sources not requiring stringent benefit-cost justifications.

Short-term and long-term recovery strategies are addressed by the County and municipal Continuity of Operations Plans, the Comprehensive Emergency Management Plan, the Post-Disaster Redevelopment Plan, and specialized plans and procedures covering key recovery issues such as debris removal, public services resumption, temporary housing, unmet needs, etc. These plans, procedures and projects address and provide guidance on priorities, processes, schedules, resource requirements, restoration and redevelopment of critical facilities, infrastructure, services, and economic redevelopment.

The PBC Comprehensive Plan includes the following elements: Land Use, Transportation, Housing, Utility, Recreation and Open Space, Conservation, Coastal Management, Intergovernmental Coordination, Capital Improvement, Economic, Fire-Rescue, Public School Facilities, Health and Human Services, Library Services and Historic Preservation. These elements define the components of the community and the interrelationship among them, integrating the complex relationships of each of these elements in reference to the people who live, work and visit PBC. Linkages of the COMP plan and LMS have been incorporated into the COMP plan.

Post-disaster mitigation initiatives are developed in response to needs and opportunities identified through collective federal, state and local inputs following the guidance offered by the Post Disaster Redevelopment Plan. The County and LMS members are also available to work state and federal Mitigation Assessments Teams. It is PBC's goal following disasters to rebuild to a higher standard (meeting or exceeding codes) and, whenever practicable, to apply sound mitigation practices to reduce future risk.

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Appendix C: Hazard & Risk Assessment Maps

Appendix C contains hazard boundary and risk assessment maps. Using County and municipal GIS capabilities, facility inventory lists and property appraiser databases, and other local, regional, state and national agency databases, the LMS is able to map any location-specific hazard risk or event and estimate associated physical and financial losses, on demand. A representative sample of hazard maps available for risk assessment, strategy development, and other mitigation planning activities are presented in the following sections of this appendix.

The maps and data in this appendix are presented in partial fulfillment of the following FEMA requirements:

Requirement §201.6(c)(2)(i): The risk assessment shall include a description of the type of all natural hazards that can affect the jurisdiction.

Requirement §201.6(c)(2)(i): The risk assessment shall include a description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan shall **include** information on previous occurrences of hazard events and on the probability of future hazard events.

Requirement §201.6(c)(2)(ii): The risk assessment shall include a description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.

Requirement §201.6(c)(2)(ii): The risk assessment must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area.

Requirement §201.6(c)(2)(ii)(B): The plan should describe vulnerability in terms of an estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate.

Requirement §201.6(c)(2)(ii)(C): The plan should describe vulnerability in terms of providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Requirement §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

Further risk assessment detail pertinent to these FEMA requirements are contained in Appendix A, in the PBC Hazard Environment section, and in the newly formatted, completed or nearly completed hazard write-ups.

The maps listed in this appendix are cited below. There are three sets of maps included in this appendix.

PALM BEACH COUNTY HAZARD MAP PRIMARY DATA SOURCES		
Map	**Source**	**Date**
FIRM "A" Zones	FEMA	Jun. 2014
Historical Flood Prone Areas	SFWMD	Jun. 2014
Storm Surge Areas	USACE	Jun. 2014
Evacuation Zones	DEM/USACE	Jun. 2014
Coastal Erosion Boundary	PBC ERM	Jun. 2014
Hebert Hoover Dike Breach Reach	SFWMD	Jun. 2014
Wellfield Protection Zones	PBC ERM	Jun. 2014
Wildland Fire Areas	Division of Forestry/PBCFR	Jun. 2014
Radiological Ingestion Pathway Zone	FP&L	Jun. 2014
Muck Fire Areas	PBC ERM	Jun. 2014
Transportation Areas	PBC GIS	Jun. 2014
Hurricane Peak Wind Potentials	NWS/NHC	Jun. 2014
Other Countywide Hazard Threats (Tornado, Extreme Temps, etc.)	PBC GIS	Jun. 2014
Agricultural Pests	PBC ERM	Jun. 2014
Tsunami Buffer	Tsunami Society	Jun. 2014

PALM BEACH COUNTY HAZARD MAPS WITH JURISDICTIONAL BOUNDARIES

Part 4: Hazard Maps Page (Behind Appendices) Page

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Appendix D: Incorporation into Other Planning Mechanisms

This appendix addresses the following FEMA requirement:

Requirement §201.6(c)(4)(ii): The plan shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, where appropriate.

Under the direction of the LMS Steering Committee and the LMS Coordinator, the ad hoc Plan Integration Committee interfaces with appropriate governmental and non-governmental agencies and offices to ensure LMS goals, objectives, and priorities are consistent with and cross-referenced with those articulated in other existing plans. In addition the LMS will seek opportunities at the regional, county and municipal levels to:

- Update plans, policies, regulations and other directives to include hazard mitigation priorities
- Encourage the adoption of mitigation priorities within capital and operational budgets and grant applications
- Share information on grant funding opportunities
- Offer guidance for carrying out mitigation actions
- Explore opportunities for collaborative mitigation projects and initiatives

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Appendix E: Prioritized Project Lists

Appendix E contains the latest update of PBC's LMS Prioritized Project List (PPL). The list of projects is ever changing as projects completed through self- funding or with grant assistance are dropped and new proposed and planned projects are added. Jurisdictions and other potential project sponsors, particularly those not having projects on the current list, are encouraged to submit projects. The expectation is that all potential applicants be represented on the PPL with projects that address identified local hazards, vulnerabilities, and mitigation strategies. As municipalities complete projects they will be encouraged to submit new ones. At any given time a few communities will not have listed projects. The current project list contains 71 mitigation projects. However, not every municipality has a "brick and mortar" mitigation project. All municipalities provide outreach to their citizens. In addition, the County also provides outreach to all citizens throughout the County and within the municipalities. This outreach includes information on all hazards that are common to Palm Beach County, not just hurricanes, as well as additional information on how residents and communities can mitigate against these hazards.

Twice a year, in May and November, new projects for the PPL are evaluated and scored to be added to the PPL. Additionally, once a year in November, projects that have been on the list over four (4) years will be evaluated for potential removal from the PPL. These projects can be resubmitted with current information and will be re-scored during the next evaluation period.

Each year the evaluation committee meets in November to review the project evaluation process. This ensures that the process is current and adaptable to meet the needs of the community.

All projects on the list are maintained and monitored by the County LMS Coordinator. Once a project is funded, the project is removed from the pending list and placed on a list of active projects. Then once the project is completed, the projects will be placed on a completed list. Potential Projects funding sources include but are not limited: 406 HMP: Hazard Mitigation Program (FEMA), 404 HMGP: Hazard Mitigation Grant Program (FEMA), 426 PAAP: Public Assistance Alternative Procedures (FEMA), CDBG-DR (HUD), PDM: Pre-Disaster Mitigation (FEMA), and FMA: Flood Mitigation Assistance (FEMA).

The PPL shows the ranking of the project with the lower the number,(the higher priority), the type of project, the municipality that submitted the project, the department in the municipality that will head the project, the primary funding source sought (while there may be a number of funding sources available, for the purpose of those projects, they are seeking HMGP dollars, but maintain the flexibility to us other funding as it is announced and becomes available), status of project, hazard that project will mitigate against, and duration until the project is completed once funded and started.

The appendix satisfies, in part, the following FEMA requirements:

Requirement: §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Requirement §201.6(c)(3)(iv): For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Requirement: §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

Other sections and appendices addressing these requirements include appendices F, G, and J and Section 3 and Section 5.

About the Prioritized Project List

Normally the PPL is updated twice a year... in the spring and in the fall. Projects are added, deleted, modified, scored, and ranked in accordance with the procedures described in Section 4.

The process and criteria used to rank projects are described in detail in Section 4. The current criteria emphasize: "community benefit" (Does the project promise tangible benefits to the community?); "project benefit" (Does the project address critical elements of the community infrastructure?); "community exposure" (Does the project mitigate an identified hazard to which the community is particularly vulnerable?); "cost effectiveness" (Does the project meet or exceed the thresholds of benefit to cost ratios using accepted methodologies?); "community commitment" (Is the project consistent with or incorporated in other plans, including COMP plans, CEMPs?); "public support" (Is there demonstrated public support for the project?); and "project implementation considerations" (What further is required to accomplish implementation?

The feasibility and benefits of ranking "like" projects rather than forcing a single list of highly dissimilar projects has been discussed by the LMS Evaluation Panel and will continue to be explored.

The current procedure for prioritizing projects will be retained until any enhancements are fully developed, deemed acceptable under the rules of LMS by FEMA and the FDEM, and adopted by the LMS Steering Committee.

PALM BEACH COUNTY
LMS PRIORITIZED PROJECT LIST
(June 2014)

Rank	Project Description	Jurisdiction	Responsible Agency	Potential Funding Source(s)	New, Deferred, Completed or Deleted	Hazard Being Mitigated	Timeframe for Completion
1	Greenbriar Blvd Localized Flood Reduction Project	Wellington	Public Works	HMGP	New	Flooding	Two Years
2	Forest Hill Blvd Localized Flood Reduction Project	Wellington	Public Works	HMGP	New	Flooding	Two Years
3	ITID MO Canal Reinforcement and Revetment Repair	Indian Trail Improvement District	Public Works	HMGP	New	Flooding	Two Years
4	North and South Rd Stormwater Improvement	Boynton Beach	Public Works	HMGP	New	Flooding	One Year
5	South Shore Blvd Flood Reduction Project	Wellington	Public Works	HMGP	New	Flooding	Two Years
6	Lake Shore Drainage Improvements	Lake Park	Public Works	HMGP	New	Flooding	One Year
7	Pump Station Hardening	Indian Trail Improvement District	Public Works	HMGP	New	Flooding	One Year
8	New City Services Complex/EOC	Lake Worth	Public Works	HMGP	New	Severe Weather	One Year
9	Emergency Equipment	Pahokee	Public Works	HMGP	New	Severe Weather	One Year
10	EOC Retrofit	Lantana	Public Works	HMGP	New	Severe Weather	One Year
11	North Flagler Improvements	West Palm Beach	Public Works	HMGP	New	Flooding	One Year

Rank	Project Description	Jurisdiction	Responsible Agency	Potential Funding Source(s)	New, Deferred, Completed or Deleted	Hazard Being Mitigated	Timeframe for Completion
12	Washington Rd Improvements	West Palm Beach	Public Works	HMGP	New	Flooding	One Year
13	North F St between 3rd Ave and 6th Ave North Drainage	Lake Worth	Public Works	HMGP	New	Flooding	One Year
14	2nd Ave North to 1st So, F St to Dixie Drainage	Lake Worth	Public Works	HMGP	New	Flooding	One Year
15	Public Works Retrofit	Wellington	Public Works	HMGP	New	Flooding	One Year
16	NorthLakeside/Duke/Notre Dame/Wellesley Dr Drainage	Lake Worth	Public Works	HMGP	New	Flooding	One Year
17	Community Center Wind Retrofit	Wellington	Public Works	HMGP	New	Severe Weather	One Year
18	Property Acquisition	Mangonia Park	Public Works	HMGP	New	Flooding	One Year
19	10th Ave N to 13th Ave N, E and F Streets Drainage	Lake Worth	Public Works	HMGP	New	Flooding	One Year
20	EOC Construction/Retrofit	Lantana	Public Works	HMGP	New	Severe Weather	One Year
21	22nd Ave N and Park Street Drainage	Lake Worth	Public Works	HMGP	New	Flooding	One Year
22	Gregory Rd Improvements	West Palm Beach	Public Works	HMGP	New	Flooding	One Year
23	South Flagler Improvements	West Palm Beach	Public Works	HMGP	New	Flooding	One Year
24	3rd Ave S to 5th Ave S Drainage	Lake Worth	Public Works	HMGP	New	Flooding	One Year
25	Lake Ave to 1st Ave South Drainage	Lake Worth	Public Works	HMGP	New	Flooding	One Year

Rank	Project Description	Jurisdiction	Responsible Agency	Potential Funding Source(s)	New, Deferred, Completed or Deleted	Hazard Being Mitigated	Timeframe for Completion
26	15th Ave North and Dixie Drainage	Lake Worth	Public Works	HMGP	New	Flooding	One Year
27	EOC/Hurricane Community Center	South Bay	Public Works	HMGP	New	Severe Weather	One Year
28	Repair of City's Stormwater System	South Bay	Public Works	HMGP	New	Flooding	One Year
29	Caroline Ave Improvements	West Palm Beach	Public Works	HMGP	New	Flooding	One Year
30 (Tie)	Town Hall Retrofit	Jupiter	Public Works	HMGP	New	Severe Weather	One Year
30 (Tie)	Saratoga Drainage Improvement	Royal Palm Beach	Public Works	HMGP	Added	Flooding	One Year
32	Heart of Boynton Stormwater Study & Improvement	Boynton Beach	Public Works	HMGP	New	Flooding	One Year
33	10th Ave S and South N Street Drainage	Lake Worth	Public Works	HMGP	New	Flooding	One Year
34	10th Ave S and G Street Drainage	Lake Worth	Public Works	HMGP	New	Flooding	One Year
35	Primary East-West Conveyance Improvements	Indian Trail Improvement District	Public Works	HMGP	New	Flooding	One Year
36	Retrofit City Hall	South Bay	Public Works	HMGP	New	Severe Weather	One Year
37	6th Ave South and F Street Drainage	Lake Worth	Public Works	HMGP	New	Flooding	One Year
38	Palmetto Ave and South Pine Street	Lake Worth	Public Works	HMGP	New	Flooding	One Year
39	Elevate Lift Stations	Mangonia Park	Public Works	HMGP	New	Flooding	One Year

Rank	Project Description	Jurisdiction	Responsible Agency	Potential Funding Source(s)	New, Deferred, Completed or Deleted	Hazard Being Mitigated	Timeframe for Completion
40	10th Ave North Drainage Improvements	Greenacres	Public Works	HMGP	New	Flooding	One Year
41	Caroline Area Improvements	West Palm Beach	Public Works	HMGP	New	Flooding	One Year
42	Town Hall Impact Retrofit	Jupiter	Public Works	HMGP	New	Severe Weather	One Year
43	18th Ave S and South and Palmway Drainage	Lake Worth	Public Works	HMGP	New	Flooding	One Year
44	Pineapple Park Improvements	West Palm Beach	Public Works	HMGP	New	Flooding	One Year
45	Lift Stations	Mangonia Park	Public Works	HMGP	New	Flooding	One Year
46	City Hall Retrofit	Lake Worth	Public Works	HMGP	New	Severe Weather	One Year
47	Public Works Hardening	Belle Glade	Public Works	HMGP	New	Severe Weather	One Year
48	City Hall Retrofit Hardening	Belle Glade	Public Works	HMGP	New	Severe Weather	One Year
49	Individual Mitigation Measures	Mangonia Park	Public Works	HMGP	New	Flooding	One Year
50	Lake Shore Civic Center Retrofit	Belle Glade	Public Works	HMGP	New	Flooding	One Year
51	West Ave A Drainage	Belle Glade	Public Works	HMGP	New	Flooding	One Year
52	Northeast Ave H Drainage	Belle Glade	Public Works	HMGP	New	Flooding	One Year
53	City Hall, Police, Fire Station Wind Retrofit	Palm Beach Gardens	Public Works	HMGP	New	Severe Weather	One Year

Rank	Project Description	Jurisdiction	Responsible Agency	Potential Funding Source(s)	New, Deferred, Completed or Deleted	Hazard Being Mitigated	Timeframe for Completion
54	PO4 Chemical Building Hardening	Mangonia Park	Public Works	HMGP	New	Severe Weather	One Year
55	Southeast Ave K Drainage	Belle Glade	Public Works	HMGP	New	Flooding	One Year
56	Sheriff's Office Wind Retrofit	Lake Park	Public Works	HMGP	New	Flooding	One Year
57	Drainage Improvements at City Hall	Belle Glade	Public Works	HMGP	New	Flooding	One Year
58	Reed Road & Miller Way Stormwater Drains	Lake Park	Public Works	HMGP	New	Flooding	One Year
59	10th Street Stormwater Improvement	Lake Park	Public Works	HMGP	New	Flooding	One Year
60	Radio Communications Tower	Palm Beach Gardens	Public Works	HMGP	New	Severe Weather	One Year
61	Town Hall Emergency Generator	Glen Ridge	Public Works	HMGP	New	Severe Weather	One Year
62	Community/Emergency Shelter	Lake Park	Public Works	HMGP	New	Severe Weather	One Year
63	Stormline Camera	Lake Park	Public Works	HMGP	New	Severe Weather	One Year
64	EOC Construction	Belle Glade	Public Works	HMGP	New	Severe Weather	One Year
65	EOC Radiological Mitigation Study	Palm Beach County	Public Works	HMGP	New	Radiological	One Year
66	Update Master Drainage Plan	Lake Park	Public Works	HMGP	New	Flooding	One Year
67	Landscape Hardscape	Lake Worth	Public Works	HMGP	New	Severe Weather	One Year

Rank	Project Description	Jurisdiction	Responsible Agency	Potential Funding Source(s)	New, Deferred, Completed or Deleted	Hazard Being Mitigated	Timeframe for Completion
68	Demo of Vacant Properties	Lake Worth	Public Works	HMGP	New	Severe Weather	One Year

Projects deleted, deferred, or completed from Jan 2012 – Sept 2014

N/A	RamblewoodCir/Harwich Ct. Storm Sweer Enhancement	City of Greenacres	Public Works	City funded the project	deleted	Flooding	One Year
N/A	Community Hall Retrofit	City of Greenacres	Public Works	City funded the project	deleted	Severe Weather	One Year
N/A	Hills Drainage	Mangonia Park	Public Works	City funded the project	deleted	Flooding	One Year
N/A	53rd St Drainage – Hill East	Mangonia Park	Public Works	City funded the project	deleted	Flooding	One Year
N/A	53rd St Drainage – Hill West	Mangonia Park	Public Works	City funded the project	deleted	Flooding	One Year
N/A	RamblewoodCir/Harwich Ct. Storm Sweer Enhancement	City of Greenacres	Public Works	City funded the project	deleted	Flooding	One Year
N/A	Community Hall Retrofit	City of Greenacres	Public Works	City funded the project	deleted	Severe Weather	One Year
N/A	Hills Drainage	Mangonia Park	Public Works	City funded the project	deleted	Flooding	One Year
N/A	53rd St Drainage – Hill East	Mangonia Park	Public Works	City funded the project	deleted	Flooding	One Year
N/A	53rd St Drainage – Hill West	Mangonia Park	Public Works	City funded the project	deleted	Flooding	One Year

Appendix F: Funding and Data Sources

This appendix partially fulfills the following FEMA requirement:

Requirement §201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

Requirement §201.6(c)(3)(ii): The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Requirement §201.6(c)(3)(i): The hazard mitigation strategy shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Palm Beach County seeks to utilize every available funding source to provide comprehensive mitigation funding to mitigation projects. We do this by utilizing resources at the local, state, and federal levels and by being in continued contact with funding agencies and partners throughout the region.

Key information concerning mitigation dollars is referenced below:

Principal federal and state assistance programs used for mitigation activities include the Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA), and EMPA. Public Assistance projects, although they may have a mitigation component, are primarily managed outside the LMS process by the Public Assistance Unit of the Operations Section. The LMS monitors and assists PA projects as appropriate. Pre-Disaster Mitigation (PDM) grants are pursued pre-event. Small Business Administrative loans are coordinated through the Division of Emergency Management, but typically do not involve the LMS. Given the level of activity generated by Hurricanes Frances and Jeanne in 2004, Hurricane Wilma in 2005, and Tropical Storm Fay in 2008 HMGP handled most of the need for near-term mitigation funds. Other funding sources beyond the above (e.g. Community Development Block Grants) have not as yet been fully utilized for structural mitigation, although Economic Development Administration and Public Entity Risk Institute grant funds and private sector donations were used for the establishment of a state-of-the-art community wide Post Disaster Redevelopment Plan and business preparedness initiatives designed to build a more disaster resilient community and economy..

HMGP, FMA, EMPA, and PDM projects are subject to the standard LMS submission and prioritization process. However, hazard specific HMGP projects, submitted specifically in response to county allocations, are, at the discretion of the LMS Steering Committee and Evaluation Panel may be prioritized using other criteria relevant to flood mitigation and wind retrofit project s. In response to Hurricanes Frances & Jeanne, the LMS's Flood Mitigation Technical Advisory Committee played an important role in prioritizing HMGP flood mitigation projects.

Once projects are submitted to DEM Management and FEMA those funding agencies work directly with applicant jurisdictions and organizations. The LMS monitors project status and assists and works with applicants and funding agencies to resolve issues and problems that may arise.

A list of all potential mitigation funding sources is maintained by DEM and updated regularly on SharePoint.

Appendix G: Local Mitigation Strategy Coordination

Appendix G provides information on the LMS process works and is coordinated. Included is a roster of individuals that represent each municipality in Palm Beach County to the LMS Working Group. Larger municipalities may have more than one representative. In that case, the primary will be identified. In addition, this appendix will also have copies of press releases to the public informing them of when and where working groups will be held, meeting minutes and agendas are included to show the level of participation and coordination that the county enjoys.

PALM BEACH COUNTY
LMS REPRESENTATIVES
Updated September 18, 2014

CITY OF BOYNTON BEACH

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Lejeune, Carisse	Assistant City Manager	X		100 E Boynton Beach Blvd Boynton Beach FL	(561) 742-6012	lejeunec@bbfl.us
Eric Johnson	Planner		X	100 E Boynton Beach Blvd Boynton Beach FL	(561) 742-6012	johnsone@bbfl.us
Debbie Majors	Grants Coordinator		X	100 E Boynton Beach Blvd Boynton Beach FL	(561) 742-6241	majorsd@bbfl.us

TOWN OF BRINY BREEZES

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
John Skrandel	Town Attorney		X	4802 N. Ocean Blvd, Briny Breezes, FL 33435	(561) 863-1605, (561) 797-8963 cell	jfspa@msn.com
Michael Hill	Mayor		X	4802 N. Ocean Blvd, Briny Breezes, FL 33435	(561) 251-3229, (561) 347-6757 cell	mhill1221@comcast.net
Susan Thaler	Council President	X		4802 N. Ocean Blvd, Briny Breezes, FL 33435	703 201 8087	brinybreezes.thaler@yahoo.com
Barbara Molina	Town Clerk Pro Tem		X	4802 N. Ocean Blvd, Briny Breezes, FL 33435	561 703 5116	brinybreezes.molina@yahoo.com
Carol Lang	Deputy Town Clerk		X	4802 N. Ocean Blvd, Briny Breezes, FL 33435	(561) 272-5495	brinytownclerk@yahoo.com

TOWN OF CLOUD LAKE

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Gravelin, Dorothy	Town Clerk	X		100 Lang Road, West Palm Beach, FL 33406-3222	(561) 686-2815	townofcloudlake@msn.com
Donna Erisey	Mayor		X	100 Lang Road, West Palm Beach, FL 33406-3222	(561) 686-2815	townofcloudlake@msn.com
Marion Chateau-Flagg	Vice Mayor		X	100 Lang Road, West Palm Beach, FL 33406-3222	(561) 686-2815	townofcloudlake@msn.com
Slatery, Patrick	Council Member		X	100 Lang Road, West Palm Beach, FL 33406-3222	(561) 686-2815	townofcloudlake@msn.com

CITY OF DELRAY BEACH

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Terry Stewart	City Manager Interim	X		100 NW First Avenue, Delray Beach, FL 33444	(561) 243-7010	stewart@mydelray.com
Mark McDonnell	Assistant PZ&B Director		X	100 NW First Avenue, Delray Beach, FL 33444	(561) 243-7043	Mcdowell@mydelray.com
Scott Pape	Senior Planner		X	100 NW First Avenue, Delray Beach, FL 33444	(561) 243-7321	pape@mydelraybeach.com

TOWN OF GLEN RIDGE

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Michelle Suiter	Town Manager	X		1501 Glen Road, West Palm Beach, FL 33406	(561) 697-8868	glenridgetownof@bellsouth.net

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CITY OF GREEN ACRES

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Carlos Cedeno	Public Works Director	X		5750 Melaleuca Lane Greenacres FL 33463	(561) 642-2074	ccedeno@ci.greenacres.fl.us

VILLAGE OF GOLF

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Laura Hannah	Village Manager	X		21 Country Road, Village of Golf, FL 33436	(561) 732-0236	lhannah@villageofgolf.org

TOWN OF GULF STREAM

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
William Thrasher	Town Manager	X		100 Sea Road, Gulf Stream, FL 33483	(561) 276-5116	bthrasher@gulf-stream.org
Rebecca Tew	Town Accountant		X	100 Sea Road, Gulf Stream, FL 33483	(561) 276-5116	rtew@gulf-stream.org

TOWN OF HAVERHILL

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Janice Rutan	Town Administrator		X	4585 Charlotte St, Haverhill, FL 33417	(561) 689-0370	jrutan@townofhaverhill-fl.gov
Jeff Renault	Town Engineer	X		4585 Charlotte St, Haverhill, FL 33417	(561) 689-0370	renault4953@att.net
Joseph Roche	Public Safety Director		X	4585 Charlotte St, Haverhill, FL 33417	(561) 689-0370	jroche@townofhaverhill-fl.gov

TOWN OF HIGHLAND BEACH

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Kathleen Weiser	Town Manager	X		3614 South Ocean Blvd, Highland Beach, FL 33487	(561) 278-4548	kweiser@ci.highland-beach.fl.us
Beverly Brown	Town Clerk		X	3614 South Ocean Blvd, Highland Beach, FL 33487	(561) 278-4548	bbrown@ci.highland-beach.fl.us
Zoie Burgess	Assistant to Town Manager		X	3614 South Ocean Blvd, Highland Beach, FL 33487	(561) 278-4548	zburgess@ci.highland-beach.fl.us

TOWN OF HYPOLUXO

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Barbara Searls	Town Clerk	X		7580 South Federal Highway, Hypoluxo, FL 33462	(561) 582-0155	bsearls@hypoluxo.org
Ken Schultz	Mayor		X	7580 South Federal Highway, Hypoluxo, FL 33462	(561) 582-0155	mayor@hypoluxo.org

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TOWN OF JUNO BEACH

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Andrea Dobbins	Project Coordinator	X		340 Ocean Dr. Juno Beach, FL 33408	(561) 656-0326	adobbins@juno-beach.fl.us
Tony Meriano	Public Works		X	340 Ocean Dr. Juno Beach, FL 33408	(561) 656-0310	ameriano@juno-beach.fl.us

TOWN OF JUPITER

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Roger Held	Building Dept Director		X	210 Military Trail, Jupiter, FL 33458	(561) 741-2669	roger@jupiter.fl.us
Tim Lynch	Plans Examiner		X	210 Military Trail, Jupiter, FL 33458	(561) 741-2469	timl@jupiter.fl.us
David Rotar	Utilities Service Mgr	X		210 Military Trail, Jupiter, FL 33458	(561) 741 2705	davidr@jupiter.fl.us

JUPITER INLET COLONY

John Pruitt	Chief		X	1 Colony Road, Jupiter, FL 33469	(561) 746-3787	pruittj@jupiterinletcolony.org
Dale Allen	Officer	X		1 Colony Road, Jupiter, FL 33469	(561) 746-3787	allend@jupiterinletcolony.org

TOWN OF LAKE CLARKE SHORES

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Chief Wes Smith	Chief of Police		X	1701 Barbados Road, Lake Clarke Shores, FL 33406	(561) 964-1515	wsmith@lakeclarke.org
Tammy House	Deputy Clerk		X	1701 Barbados Road, Lake Clarke Shores, FL 33406	(561) 964-1515	thouse@lakeclarke.org
Dan Clark	Town Manager/Admin		X	1701 Barbados Road, Lake Clarke Shores, FL 33406	(561) 964-1515	dclark@lakeclarke.org
Mary Pinkerman	Town Clerk	X		1701 Barbados Road, Lake Clarke Shores, FL 33406	(561) 964-1515	mpinkerman@lakeclarke.org

TOWN OF LAKE PARK

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Dale Sugerman	Town Manager	X		535 Park Avenue, Lake Park, FL 33403	(561) 881-3300	dsugerman@lakeparkflorida.gov
Richard Pittman	Project Manager		X	535 Park Avenue, Lake Park, FL 33403	(561) 881-3345	rpittman@lakeparkflorida.gov
David Hunt	Director of Public Works		X	535 Park Avenue, Lake Park, FL 33403	(561) 881-3345	dhunt@lakeparkflorida.gov

CITY OF LAKE WORTH

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Jamie Brown	Public Service Director		X	7 North Dixie Highway, Lake Worth, FL 33460	(561) 586-1720	jbrown@lakeworth.org

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Dwayne Estelle	Risk Manager		X	7 North Dixie Highway, Lake Worth, FL 33460	(561) 533-7382	destelle@lakeworth.org
Karla White	Public Services Manager	X		7 North Dixie Highway, Lake Worth, FL 33460	(561) 586-1720	kwhite@lakeworth.org

TOWN OF LANTANA

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Robert Hagerty	Commander	X		500 Greynolds Circle, Lantana, FL 33462	(561) 540-5000	rhagerty@lantana.org
Debbie Manzo	Town Manager		X	500 Greynolds Circle, Lantana, FL 33462	(561) 540-5010	dmanzo@lantana.org

TOWN OF LOXAHATCHEE GROVES

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Mark Kutney	Town Manager	X		14579 Southern Blvd, Suite 2, Loxahatchee Groves, FL 33470	(561) 793-2418	mkutney@loxahatcheegrovesfl.gov
Janet K. Whipple	Town Clerk		X	14579 Southern Blvd, Suite 2, Loxahatchee Groves, FL 33470	(561) 793-2418	Jwhipple@loxahatcheegrovesfl.gov

TOWN OF MANALAPAN

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Linda Stumpf	Town Manager	X		600 South Ocean Boulevard, Manalapan, FL 33462	(561) 383-2540	lstumpf@manalapan.org
Lisa Petersen	Town Clerk		X	600 South Ocean Boulevard, Manalapan, FL 33462	(561) 383-2541	lpetersen@manalapan.org

TOWN OF MANGONIA PARK

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Sherry Albury	Town Clerk		X	1755 E Tiffany Drive, Mangonia Park, FL 33407	(561) 848-1235	salbury@townofmangoniapark.com
Lee Leffingwell	Town Manager	X		1755 E Tiffany Drive, Mangonia Park, FL 33407	(561) 848-1235	lleffingwell@townofmangoniapark.com
Christa Simmons	Deputy Town Clerk		X	1755 E Tiffany Drive, Mangonia Park, FL 33407	(561) 848-1235	cjsimmons@townofmangoniapark.com
Katrina Martin	Deputy Town Clerk		X	1755 E Tiffany Drive, Mangonia Park, FL 33407	(561) 848-1235	Kmartin@townofmangoniapark.com

VILLAGE OF NORTH PALM BEACH

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Jim Kelly	Village Manager	X		9887 Fuschia Drive, Palm Beach Gardens 33410	(561) 841-3361	jkelly@village-npb.org
Chuck Huff	Assistant Emergency Manager		X	9887 Fuschia Drive, Palm Beach Gardens 33410	(561) 348-0697	chuff@village-npb.org

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CITY OF ATLANTIS

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Mo Thornton	City Manager	X		260 Orange Tree Drive Atlantis FL, 33462	(561) 965-1744	mthornton@atlantisfl.gov
Kristen Puhalainen	City Clerk		X	260 Orange Tree Drive Atlantis FL, 33462	(561) 965-1744	kpuhalainen@atlantisfl.gov
Steve Mazuk	Utilities		X	260 Orange Tree Drive Atlantis FL, 33462	(561) 965-1744	smazuk@atlantisfl.gov
Robin Ackerman	Support Service Manager		X	260 Orange Tree Drive Atlantis FL, 33462	(561) 965-1744	robinapd@bellsouth.net
Chief Robert Mangold	Police Chief		X	260 Orange Tree Drive Atlantis FL, 33462	(561) 965-1700	rmangold@atlantisfl.gov

CITY OF BELLE GLADE

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Lomax Harrelle	City Manager		X	110 Dr. Martin Luther King Jr Blvd W, Belle Glade, FL 33430	(561) 992-1601	lharrelle@belleglade-fl.com
Beverly Scott	Assistant to the City Manager		X	110 Dr. Martin Luther King Jr Blvd W, Belle Glade, FL 33430	(561) 992-1623	bscott@belleglade-fl.com
Marcos Montes de Oca	Public Works	X		110 Dr. Martin Luther King Jr Blvd W, Belle Glade, FL 33430	(561) 992-2216	mmontes@belleglade-fl.com
Debra R Buff	City Clerk		X	110 Dr. Martin Luther King Jr Blvd W, Belle Glade, FL 33430	(561) 992-1609	dbuff@belleglade-fl.com

CITY OF BOCA RATON

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Leslie Harmon	Grants Administrator	X		City Hall 201 W. Palmetto Park Rd, Boca Raton, FL 33432	(561) 393-7857	lharmon@myboca.us
Michael LaSalle	Assistant Fire Chief		X	6500 Congress Ave. Suite 200, Boca Raton, FL 33487	(561) 982-4044	mlasalle@myboca.us

CITY OF WEST PALM BEACH

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Ralph Wall	Senior Systems Analyst	X		401 Clematis Street, West Palm Beach, FL 33401	(561) 805-6661	rwall@wpb.org
Tracy Ward	Storm Water Engineering Project Coordinator		X	401 Clematis Street, West Palm Beach, FL 33401	(561) 494-1120	tward@wpb.org
Steven Hoffmann	Grants Compliance Officer		X	401 Clematis Street, West Palm Beach, FL 33401	(561) 822-1343	shoffmann@wpb.org
Allan Ortman	Emergency Manager		X	1009 Banyan Blvd, West Palm Beach, FL 33401	(561) 822-2220	aortman@wpb.org

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CITY OF BOYNTON BEACH

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Lejeune, Carisse	Assistant City Manager	X		100 E Boynton Beach Blvd Boynton Beach FL	(561) 742-6012	lejeunec@bbfl.us
Eric Johnson	Planner		X	100 E Boynton Beach Blvd Boynton Beach FL	(561) 742-6012	johnsone@bbfl.us
Debbie Majors	Grants Coordinator		X	100 E Boynton Beach Blvd Boynton Beach FL	(561) 742-6241	majorsd@bbfl.us

TOWN OF BRINY BREEZES

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
John Skrandel	Town Attorney		X	4802 N. Ocean Blvd, Briny Breezes, FL 33435	(561) 863-1605, (561) 797-8963 cell	jfspa@msn.com
Michael Hill	Mayor		X	4802 N. Ocean Blvd, Briny Breezes, FL 33435	(561) 251-3229, (561) 347-6757 cell	mhill1221@comcast.net
Susan Thaler	Council President	X		4802 N. Ocean Blvd, Briny Breezes, FL 33435	703 201 8087	brinybreezes.thaler@yahoo.com
Barbara Molina	Town Clerk Pro Tem		X	4802 N. Ocean Blvd, Briny Breezes, FL 33435	561 703 5116	brinybreezes.molina@yahoo.com
Carol Lang	Deputy Town Clerk		X	4802 N. Ocean Blvd, Briny Breezes, FL 33435	(561) 272-5495	brinytownclerk@yahoo.com

TOWN OF CLOUD LAKE

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Gravelin, Dorothy	Town Clerk	X		100 Lang Road, West Palm Beach, FL 33406-3222	(561) 686-2815	townofcloudlake@msn.com
Donna Erisey	Mayor		X	100 Lang Road, West Palm Beach, FL 33406-3222	(561) 686-2815	townofcloudlake@msn.com
Marion Chateau-Flagg	Vice Mayor		X	100 Lang Road, West Palm Beach, FL 33406-3222	(561) 686-2815	townofcloudlake@msn.com
Slatery, Patrick	Council Member		X	100 Lang Road, West Palm Beach, FL 33406-3222	(561) 686-2815	townofcloudlake@msn.com

CITY OF DELRAY BEACH

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Terry Stewart	City Manager Interim	X		100 NW First Avenue, Delray Beach, FL 33444	(561) 243-7010	stewart@mydelray.com
Mark McDonnell	Assistant PZ&B Director		X	100 NW First Avenue, Delray Beach, FL 33444	(561) 243-7043	Mcdowell@mydelray.com
Scott Pape	Senior Planner		X	100 NW First Avenue, Delray Beach, FL 33444	(561) 243-7321	pape@mydelraybeach.com

TOWN OF GLEN RIDGE

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Michelle Suiter	Town Manager	X		1501 Glen Road, West Palm Beach, FL 33406	(561) 697-8868	glenridgetownof@bellsouth.net

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TOWN OF OCEAN RIDGE

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Ken Schenck	Town Manager	X		6450 North Ocean Boulevard, Ocean Ridge, FL 33435	(561) 732-2635	kschenck@oceanridgeflorida.com
Karen Hancsak	Town Clerk		X	6450 North Ocean Boulevard, Ocean Ridge, FL 33435	(561) 732-2635	khancsak@oceanridgeflorida.com

CITY OF PAHOKEE

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Alvin Johnson	Director of Public Works	X		207 Begonia Drive, Pahokee, FL 33476	(561) 924-7382	ajohnson@cityofpahokee.com
Erica Washington	Director of Community Development	X		207 Begonia Drive, Pahokee, FL 33476	(561) 924-5534 x27	eredmon@cityofpahokee.com
Ebony Bruton	Director of Finance		X	207 Begonia Drive, Pahokee, FL 33476	(561) 924-5534 x2414	ebruton@cityofpahokee.com

TOWN OF PALM BEACH

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Jay Boodheshwar	Dir of Rec & Spec Projects	X		360 South County Road, Palm Beach, FL 33480	(561) 838-5485	jboodheshwar@townofpalmbeach.com
Mike Galvin	Emergency Management Coordinator		X	360 South County Road, Palm Beach, FL 33480	(561) 373-0639	cumara27@aol.com

CITY OF PALM BEACH GARDENS

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Angela Brown	Ops Manager	X		10500 North Military Trail, Palm Beach Gardens, FL 33410	561-804-7010	abrown@pbgfl.com
Todd Engle	City Engineer		X	10500 North Military Trail, Palm Beach Gardens, FL 33410	561-804-7012	tengle@pbgfl.com

TOWN OF PALM BEACH SHORES

Evyonne Browning	Town Clerk	X		247 Edwards Lane, Palm Beach Shores, FL 33404	(561) 844-3457	Ebrowning@pbstownhall.org
Sue Franklin	Deputy Town Clerk		X	247 Edwards Lane, Palm Beach Shores, FL 33404	(561) 844-3457	Sfranklin@pbstownhall.org
Wendy Crabtree	Building Clerk		X	247 Edwards Lane, Palm Beach Shores, FL 33404	(561) 844-3457	wcrabtree@pbstownhall.org
Cynthia Lindskoog	Town Manager		X	247 Edwards Lane, Palm Beach Shores, FL 33404	(561) 844-3457	Clindskoog@pbstownhall.org

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Together Emergencies Are Managed

VILLAGE OF PALM SPRINGS

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Kim Glass-Castro	Director, Land Development	X		226 Cypress Lane, Palm Springs, FL 33461	(561) 965-4010	kglas-castro@vpsfl.org
Rich Reade	Village Manager		X	226 Cypress Lane, Palm Springs, FL 33461	(561) 965-4010	rreade@vpsfl.org
John Rouse	Assistant Public Service Director		X	226 Cypress Lane, Palm Springs, FL 33461	(561) 965-4010	jrouse@vpsfl.org
William Golson	Leisure Services Director		X	226 Cypress Lane, Palm Springs, FL 33461	(561) 965-4010	bgolson@vpsfl.org

VILLAGE OF ROYAL PALM BEACH

Paul Webster	Director of Public Works	X		10996 Okeechobee Blvd, Royal Palm Beach, FL 33411	(561) 790-5123	pwebster@royalpalmbeach.com
Christopher Marsh	Village Engineer		X	1050 Royal Palm Beach Blvd., Royal Palm Beach, FL 33411	(561) 790-5161	cmarsh@royalpalmbeach.com

CITY OF RIVIERA BEACH

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Terrence Bailey	City Engineer	X		2391 Avenue "L", Riviera Beach, FL 33404	(561) 845-3472	tbailey@rivierabch.com
Brynt Johnson	Director of Public Works		X	2391 Avenue "L", Riviera Beach, FL 33404	(561) 845-4080	bjohnson@rivierabch.com

CITY OF SOUTH BAY

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Edgar Kerr	Public Works Director	X		335 SW 2nd Avenue, South Bay, FL 33493	(561) 261-6576	kerre@southbaycity.com

TOWN OF SOUTH PALM BEACH

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Rex Taylor	Town Manager		X	3577 South Ocean Blvd, South Palm Beach, FL 33480	(561) 588-8889	rtaylor@southpalmbeach.com
Chief Carl Webb	Chief of Police	X		3577 South Ocean Blvd, South Palm Beach, FL 33480	(561) 586-2122	chiefwebb@southpalmbeach.com

VILLAGE OF TEQUESTA

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
James Weinand	Fire Chief	X		345 Tequesta Dr, Tequesta, FL 33469	(561) 768-0450	jweinand@tequesta.org
Nusa Zacarias	Director of Communications		X	345 Tequesta Dr, Tequesta, FL 33469	(561) 768-0450	nzacariase@tequesta.org

VILLAGE OF WELLINGTON

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS

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Nicole Evangelista	Emergency Manager		X	12300 Forest Hill Blvd., Wellington, FL 33414	(561) 791-4733	nevangelista@wellingtonfl.gov
Jim Barnes	Deputy Manager		X	12300 Forest Hill Blvd., Wellington, FL 33414	(561) 753-2504	jbarnes@wellingtonfl.gov
Paul Scofield	Village Manager	X		12300 Forest Hill Blvd., Wellington, FL 33414	(561) 791-4086	pauls@wellingtonfl.gov
Tanya Quickel	CFO		X	12300 Forest Hill Blvd., Wellington, FL 33414	(561) 791-4113	tquickel@wellingtonfl.gov

CITY OF WEST PALM BEACH

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Jonathan Bramley	Director of Engineering Services		X	401 Clematis St, West Palm Beach, FL 33401	(561) 822-2222	jbramley@wpb.org
Ralph Wall	Senior Systems Analyst	X		401 Clematis St, West Palm Beach, FL 33401	(561) 805-6661	rwall@wpb.org
Steven Hoffmann	Grant Compliance		X	401 Clematis St, West Palm Beach, FL 33401	(561) 822-1343	shoffmann@wpb.org
Jeffrey Renault	Storm Water Manager/Senior Project Engineer		X	401 Clematis Street, West Palm Beach, FL 33401	(561) 494-1112	jrenault@wpb.org
Manuel J Gonzalez	Utilities Engineering Project Coordinator		X	401 Clematis Street, West Palm Beach, FL 33401	(561) 494-1085	mgonzalez@wpb.org

Northern Palm Beach County Improvement District

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Ken Roundtree, LMS Chair	Director of Operations	X		359 Hiatt Dr Palm Beach Gardens FL 33418	(561) 624-7830	ken@npbcid.org

Indian Trial Improvement District

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Jim Shallman	Administration	X		13476 61st ST North	(561) 721-4827	jshallman@indiantrail.com

Palm Beach County Division of Emergency Management

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Kelvin Bledsoe - LMS Coordinator	Special Projects Coordinator/LMS Coordinator	X		20 South Military Trl West Palm Beach FL 33415	561-712-6481	Kbledsoe@pbcgov.org

Treasure Coast Regional Planning Council

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Kate Boer	Emergency Programs Coordinator			421 SW Camden Ave Stuart FL 34994	(772) 834-1587	kboer@tcrpc.org

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South Florida Water Management District

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Jane Tatum	Assistant to Senior Emergency and Security Management				(561) 682-2215	jtatum@sfwmd.gov
Beth McElroy	EM Specialist					

Lynn University

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Dr. Karen Casey	Emergency Management Project Director				(561) 237-7798	kcasey@lynn.edu

Florida Atlantic University

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Dr. Ali Farazmond	Professor and Editor				(561) 289-0374	afarazma@fau.edu
Dr. Martha Mehallis	Professor and Editor					mehallis@fau.edu

Palm Beach State College

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
John Smith	Director of Security				(561) 868-3910	smithj@palmbeachstate.edu
Larry Leskovjan	Manager, Safety/Risk				(561) 868-4015	leskovjl@palmbeachstate.edu

Palm Beach County Disaster Recovery Coalition

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Jennifer Beckman	Director				(561) 375-6682	beckmanj@pbcdrc.org

American Red Cross Greater Palm Beach Chapter

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Mark Goggin	Director, Emergency Services				(561) 650-9102	gogginm@redcross-pbc.org

Palm Beach County Library System

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Sharron Hill	Assistant Director				(561) 233-2725	
Kenny Rampersad	Director of Finance & Facilities				(561) 233-2701	krampers@pbcgov.org

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Palm Beach County Sheriff's Office

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
David Pervenecki	Lieutenant				(561) 712-6339	perveneckid@pbso.org

Palm Beach County Fire-Rescue

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Nigel Baker	Division Chief			405 Pike Road, West Palm Beach, 33411	(561) 616-7006	nbaker@pbcgov.org

Palm Beach County Planning, Zoning and Building

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Doug Wise	Building Official	X			(561) 233-5192	dwise@pbcgov.org
Richard Gathright	Bldg Director	X			561-233-5195	rgathrig@pbcgov.org

Florida Division of Emergency Management

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Mike Resto	Area 7 Coordinator	X			(850) 519-1469	mike.resto@em.myflorida.com

Calvin, Giordano & Associates

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Helene Wetherington	Director of Emergency Management	X			(954) 921-7781	hwetherington@calvin-giordano.com

NCCI Holdings

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Kathie Kearney	Risk Manager				(561) 893-1191	kathie_Kearney@ncci.com

Urban League of Palm Beach County

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Tammy Anderson	Vice President	X		1700 N. Australian Ave., West Palm Beach, FL 33411	(561) 833-1461 x3007	Tanderson@ulpbc.org

Tropical Shipping

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Rick Murrell	President/Chairman				(561) 881-3999	rmurrell@tropical.com

Property Damage Consultants

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Rick Berman					(561) 330-3399	

PALM BEACH COUNTY
LMS REPRESENTATIVES
Updated September 18, 2014

Valente Advisers

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Mickie Valente	President				(727) 723-4240	

Business Development Board

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Kelly Smallridge	President				(561) 835-1160	

Palm Beach County Economic Office

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Sherry Howard	Director				(561) 355-3624	

Office of Small Business Assistance

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Hazel Oxendine	Director				(561) 616-6840	

Bank Atlantic - Contingency Planning

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Rebecca Cohen	President of Association of Contingency Planners					

Palm Beach County Administration - Water Resources

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Ken Todd	H2O Resource Mgr	X				ktodd@pbcgov.org

Palm Beach County Health Department

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Al Grasso	EM Prep Coord.	X		800 Clematis Street	561-671-4016	alfred_grasso@doh.state.fl.us

Insurance Services Office Inc

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Hedi Liles	ISO/CRS Specialist					

PALM BEACH COUNTY
LMS REPRESENTATIVES
Updated September 18, 2014

Westgate/Belvedere CRA

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Elizee Michel	Executive Director	X				emichel@pbcgov.org

Inspector General

NAME	TITLE	PRIMARY	SECONDARY	ADDRESS	PHONE#	EMAIL ADDRESS
Maximo Heredia						mheredia@pbcgov.org
Hank Hardel						hhagel@pbcgov.org

News Release

Public Affairs Department
P.O. Box 1989
West Palm Beach, FL 33402-1989
(561) 355-2754
FAX: (561) 355-3819
www.pbcgov.com

For release: 5/29/14
Contact: Rob Shelt, 561-712-6317

Palm Beach County Local Mitigation Strategy General Meeting

On June 11, 2014 at 10:00 a.m., the Palm Beach County Local Mitigation Strategy (LMS) Working Group will hold a general meeting of its public and private-sector membership. This meeting is open to the public. The meeting will be held at the following location:

City of South Bay
335 SW 2nd Ave
South Bay, FL 33493

The LMS Working Group is coordinated by the Palm Beach County Department of Public Safety's Division of Emergency Management. The LMS Working Group is comprised of county, municipal, and community partners, that prepares and promotes local strategies and projects to reduce long-term risks to life and property from natural, technological, and human-caused disasters. The resulting pre and post disaster mitigation strategies and projects are supported by a variety of state and federal programs and funding sources, in accordance with the Disaster Mitigation Act of 2000.

Topics will include updates on the LMS program, mitigation funding streams, and the Project Priority List (PPL). Public attendance and comments are welcome and encouraged.

###

Public Affairs Department
P.O. Box 1989
West Palm Beach, FL 33402-1989
(561) 355-2754
FAX: (561) 355-3819
www.pbcgov.com

News Release

For immediate release: December 2, 2013

Contact: Kelvin Bledsoe
Special Projects Coordinator
(561) 712-6481
Kbledsoe@pbcgov.org

Palm Beach County Local Mitigation Strategy General Meeting

The Working Group of the Palm Beach County Local Mitigation Strategy (LMS) will hold a general meeting of its public and private-sector membership at 10:00 a.m. on December 4, 2013, In the Village of Royal Palm Beach, 1050 B (Farber training Facility) Royal Palm Beach Blvd, Royal Palm Beach.

The LMS, comprised of County, municipal and community partners, prepares and promotes local strategies and projects to reduce long-term risks to life and property from natural and man-made disasters. Resulting pre and post disaster mitigation strategies and projects are supported by a variety of State and Federal programs and funding sources, in accordance with the Disaster Mitigation Act of 2000.

Topics at the December 4th meeting will include updates on the LMS program, mitigation funding streams, and the Project Priority List.

Public attendance and comments are welcome.

###

Public Affairs Department
P.O. Box 1989
West Palm Beach, FL 33402-1989
(561) 355-2754
FAX: (561) 355-3819
www.pbcgov.com

News Release

For immediate release: August 6, 2013
Contact: Kelvin Bledsoe
Special Projects Coordinator
(561) 712-6481
Kbledsoe@pbcgov.org

Palm Beach County Local Mitigation Strategy General Meeting

The Working Group of the Palm Beach County Local Mitigation Strategy (LMS) will hold a general meeting of its public and private-sector membership at 10:00 a.m. on August 7, 2013, at Flagler Gallery, 401 Clematis Ave, West Palm Beach.

The LMS, comprised of County, municipal and community partners, prepares and promotes local strategies and projects to reduce long-term risks to life and property from natural and man-made disasters. Resulting pre and post disaster mitigation strategies and projects are supported by a variety of State and Federal programs and funding sources, in accordance with the Disaster Mitigation Act of 2000.

Topics at the Aug 31st meeting will include updates on the LMS program, mitigation initiatives, and expected mitigation grants.

Public attendance and comments are welcome.

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News Release

Public Affairs Department
P.O. Box 1989
West Palm Beach, Fl. 33402-1989
(561) 355-2754
FAX: (561) 355-3819
www.pbcgov.com

Electronic Press Release

For immediate release: December 8, 2012
Contact: Jesse Spearo
Special Projects Coordinator
(561) 712-6481
jspearo@pbcgov.org

Palm Beach County Local Mitigation Strategy General Meeting

The Steering Committee of the Palm Beach County Local Mitigation Strategy (LMS) will hold a general meeting of its public and private-sector membership 10:00 AM to Noon on December 5th, 2012 at the City of Lantana.

The LMS, comprised of County, municipal and community partners, prepares and promotes local strategies and projects to reduce long-term risks to life and property from natural and man-made disasters. Resulting pre and post disaster mitigation strategies and projects are supported by a variety of State and Federal programs and funding sources, in accordance with the Disaster Mitigation Act of 2000.

Topics at the December 5th meeting will include an update on the project prioritization list, status of municipal adoption of the LMS Plan. Additional topics will be upcoming training for members and partners. The featured speaker will be Pam Mac'kie, from the South Florida Water Management District.

Public attendance and comments are welcome.

###

Together Emergencies Are Managed

EM

Palm Beach County Public Safety Department Division of Emergency Management Local Mitigation Strategy (LMS) Working Group Meeting

AGENDA

June 11, 2014

10:00AM-12:00PM

City of South Bay
335 SW 2nd Avenue
South Bay, FL 33493

- Call to Order and Introductions
  - Ken Roundtree, LMS Chair
    Northern Palm Beach County Improvement District
- Welcome
  - Leondrae Camel, City Manager
    City of South Bay
- Flood Mitigation Projects
  - Westgate CRA Presentation
    Elizee Michel, Executive Director, Westgate CRA
- Governor's Hurricane Conference
- Grant Funding Opportunities
  - Residential Construction Mitigation Program
- Project Prioritization List Update
- Project Submissions Timetable
- LMS Plan Update
- Evaluation Committee Revisions
- LMS Times
- Resolution Revision
- Next Meeting
  - December 10, 2014
    Location TBD
- Upcoming Training
- Survey
- Questions/Comments
- Adjourn

Together
Emergencies
Are
Managed

Palm Beach County
Division of Emergency Management/Public Safety Department
Local Mitigation Strategy (LMS) Working Group Meeting

AGENDA

December 4, 2013

10:00AM-12PM

Village of Royal Palm Beach
1050-B Royal Palm Beach Blvd
(Farber Training Facility)
Royal Palm Beach, FL 33411

- Call to Order and Introductions - Chair
- Welcome- Village of Royal Palm Beach
- Grant funding opportunity (Residential Construction Mitigation Grant Program (RCMP))
- Project Prioritization List (PPL) Update
- Project submissions time table for May 2014
- LMS Plan update
- Steering Committee revisions
- Evaluation Committee revisions
- Future Meeting Date
- Committee alternates
- Special Recognition
- Upcoming Training
- Questions/Comments
- Adjournment

PALM BEACH COUNTY FLORIDA

Palm Beach County
Local Mitigation Strategy (LMS) Working Group Meeting

AGENDA

August 7, 2013

10:00AM-12PM

City of West Palm Beach
Flagler Gallery-City Hall
401 Clematis Ave
West Palm Beach, FL 33401

- Call to Order and Introductions - Chair
- Welcome- City of West Palm Beach – Ralph Wall
- Grant Money Available for LMS
- June 2013 Project Prioritization List (PPL) Update
- Update: Phase II for projects on PPL
- LMS Quick Reference Refresher-Why is the LMS Important
- LMS Plan up-date 2014
- Project submissions time table
- Steering and Evaluation committee Transition
- Participation Requirements
- Future Meeting Date
- Upcoming Training
  - *Sept 9/10 Mass Fatalities Incident Response*
  - *Sept 9/10 ICS400/G400 Advanced Incident Command System Command & General Staff*
  - *Sept 11/13 ICS300/G300 Intermediate Incident Command System for Expanding Incidents*
- Questions/Comments
- Adjournment

Palm Beach County

Local Mitigation Strategy (LMS) Working Group Meeting

AGENDA

December 5, 2012

10:00AM-12PM

Town of Lantana
Town Hall
500 Greynolds Cir
Lantana, FL 33462

- Call to Order and Introductions
- Welcome-Town of Lantana Manager Debbie Manzo
- Grant Money Available for LMS Update
- LMS Times Newsletter Fall Issue
- Hazards - Year in Review
- Update of Ongoing Projects
- Current and Expected Funding Sources
- 2012 Project Prioritization List (PPL) Update
- Upcoming Training
  - *G-393 Mitigation for Emergency Managers,* December 10 – 11 and January 30 -31
  - *G-278 Benefit-Cost Analysis: Entry Level Training,* March 6 - 7
  - *BRO-001 Hurricane Resilient Community Planning and Design*, March 19 – March 20
- Featured Speaker – Pam Mac'Kie, South Florida Water Management District
- Mitigation Success Stories
- Participation Requirements
- Future Meeting Dates & 2014 LMS Plan Update
- Questions/Comments
- Adjournment

Sign-in Sheet

LMS Working Group

June 11, 2014
335 SW 2nd Ave
City of South Bay, Fl 33439

Name..........................	Phone Num	Email Address................	City or organization............
John Skrandel	561 863 1605	JFSPA@MSN.COM	Town of Briny Breezes
Lucine Dadrian	561-682-2685	ldadrian@sfwmd.gov	SFWMD
BILL GOLSON	561-964-8820	bgolson@vpsfl.org	VILLAGE OF PALM SPRINGS
Michael Fox	561, 233 5266	mfox@pbcgov.org	PBC Building Division PBC-PZB
Elizée Michel	561-640 8181	emichel@pbcgov.org	Westgate CRA
Joey Cooper	561-315-3639	jscooper@PBCgov.org	Battalion Chief PBC Fire Rescue
Ebony Burton	561 924-5534 ext 24	eburton@cityofpahokee.com	City of Pahokee

Sign-in Sheet

LMS Working Group

June 11, 2014
335 SW 2nd Ave
City of South Bay, Fl 33439

Name……………………	Phone Num ………	Email Address……………	City or organization…………
Zoie Burgess	561 278-4548	zburgess@ ci.highland-beach.fl.us	Highland Beach
Alvin Johnson	561 261-7693	ajohnson@ CityofPahokee .com	Pahokee
Carisse LeJeune	561-742-6402	~~cityo~~ lejeunec@ bbfl.us	Boynton Beach
Dan Clark	561-722-8110	DCLARK@ LakeClarke. org	
Wade Neilson	561-642-2071	City of Greenacres	
Ken Rountree	561-624-7830	Northern Palm Beach County Imp. District	None Necessary
Jay Boodheshwar	838-5485	jboodheshwar@ townofpalmbeach.com	Town of Palm Beach.

Sign-in Sheet

LMS Working Group

December 4, 2013
Farber training facility
Village of Royal Palm Beach, Fl 33411

Name………………………	Phone Num………	Email Address…………	City or organization………	New member ?
Angela Brown	5618047940	abrown@ pbgfl.com	Palm Beach Gardens	
Zoie Burgess	561-278-4548		Highland Beach	
Michael Fox	561.233.5246	mfox@ pbcgov.org	PBC	—
Michelle Suiter	697-8668	[illegible]@ bellsouth.net	Glen Ridge	
Heidi Garcia	578-0106	[illegible]@indiantrail.com	ITID	
Tammy McDonald Anderson	561 833-1461 x3004	tanderson@ ulpbc.org	ULPBC	
Leslie Harmon	561 393-7857	Lharmon@mybbca.us	City of Boca Raton	
Erica Washington	561 924-5584	[illegible]@ cityofpahokee	City of Pahokee	
Alvin Johnson	924-7626	a.johnson@cityofpahokee	City of Pahokee	
Carisse LeJeune	742-6012	lejeunec@bbfl.us	City of Boynton	
Carisse LeJeune	"	"	Town of Hypoluxo	

Sign-in Sheet

LMS Working Group

December 4, 2013
Farber training facility
Village of Royal Palm Beach, Fl 33411

Name…………………………	Phone Num………	Email Address…………	City or organization………	New member ?
Lucine Dadrian	561-682-2685	ldadrian@sfwmd.gov		
John Bonde	561-791-4002	jbonde@wellingtonfl.gov	Wellington	
Beth McElroy	561-687-2268		SFWMD	
Jay Boodheshwar	561 838-5485		Town of Palm Beach	
Mark McDonnell	561 243-7040	mcdonnell@mydelraybeach.com	City of Delray Beach	
Robert Hagerty	561 540 5713	RHagerty@lantana.org	Town of Lantana	
Edgar W. Kerr	561-261-6576	Kerr@southbaycity.com	City of South Bay	
Chris Marsh	561-790-5161	CMarsh@RoyalPalmBeach.com	Village of Royal Palm	
Mary Pinkerman	561-964-1515	mpinkerman@lakeclarke.org	Lake Clarke Shores	
Ken Pennatrec	561 624-7830	Ken@NPBCID.org	NPBCID	
Carlos Celedon	561 642-2074	cceledon@cityofgreenacres.fl.us	Greenacres	

Sign-in Sheet

LMS Working Group

December 4, 2013
Farber training facility
Village of Royal Palm Beach, Fl 33411

Name………………………	Phone Num………	Email Address…………	City or organization………	New member ?
MARCOS MONTESDEOCA	561 449-4448	mmontes@bellesglade-fl.com	CITY OF Belle Glade	N
MARK KUTNEY	561 793-2418	MKUTNEY@LOXAHATCHEEGROVESFL.COM	TOWN OF LOX GROVES	N
Kelvin Bledsoe	561-712-6481	Blitzthesigma@Aol.com	PBCDEM	N

LMS Working Group
Sign-in Sheet
August 7, 2013
Flagler Gallery
City Hall
West Palm Beach, Fl 33401

Name..........................	Phone Num......	Email Address..................	City or organization......	LMS Group Member: yes or no
Jay Boodheshwar	561 838-5485	jboodheshwar@townofpalmbeach.com	Town of Palm Beach	yes
Erica Washington	561 924-5534	ewashington@cityofpahokee.com	City of Pahokee	yes
Ebony Bruton	" "	ebruton@cityofpahokee.com	" "	yes
Alvin Johnson	" "	ajohnson@cityofpahokee.com		YES
Mike Snook	965-4010	MSnook@VPSFl.org	Palm Springs	Yes
John Rouse	965-4010	JRouse@VPSFl.org	Palm Springs	yes
Ralph Wall	805-6661	rwall@wpb.org	West Palm Beach	Yes
David Rotar	561 748-2705	david.r@jupiter.fl.us	Town of Jupiter	yes
Sandra Semande	561-721-4823	ssemande@indiantrail.com	ITID	yes
Pamela Ramkalawan	954-233-2064	Pamela.Ramkalawan@td.com	TD Bank	Yes
Mary Pinkerman	561-964-4515	mpinkerman@lakeclarke.org	Lake Clarke Shores	Yes
Paul Dorling	561 243-7043	dorlingp@mydelraybeach.com	City of Delray Beach	YES
Carisse LeJeune	561-742-6010	LeJeuneC@bbfl.us	City Boynton	Yes
Jim Beckman	561 310-2033	beckmanj@pbcdrc.org	Disaster Recovery Coalition	yes
Ken Schenck	561 732-2635	kschenck@oceanridgeflorida.com	Ocean Ridge	Yes
Jerome Skrandel	561-863-1605	JFSPA@MSN.COM	Town of Briny Breezes	YES
Edgar W. Kerr	561-261-6576	kerre@southbaycity.com	South Bay	yes

Page 1 of 2

LMS Working Group
Sign-in Sheet
August 7, 2013
Flagler Gallery
City Hall
West Palm Beach, Fl 33401

Name.........................	Phone Num......	Email Address..................	City or organization......	LMS Group Member yes or no
Barbara Searls	582-0155	bsearls@hypoluxo.org	Hypoluxo	yes
Michelle Soifer	697-8868	[illegible]	Glen Ridge	Yes
Tara Piana	561-383-1128	tara.piana@2iyotc.org	Lantana	yes
Pablo Mirabal	561 533-1026	pablo@211pbtc.org	211	yes
Osrai Alvarez	561 712-6324	OAlvarez@pbcgov.org	DEM County	Yes
John A Hohman	561 6848718	Boundary Surveying @comcast.net	Cloud Lake	yes
Christa Simmons	848-1235	csimmons@townofmangoniapark.com	Mangonia Park	yes
Andrea Dobbins	656-0324	adobbins@juno-beach.fl.us	Juno Beach	yes
Zoie Burgess	278-4548	zburgess@ci.highland-beach.fl.us	Highland Beach	Yes
Ken Rountree	624-7830	Ken@NPBCID.ORG	Northern Palm Beach Cty. Imp. Dist.	Yes
Jeff Renault	626-8806	renault4453@att.net	Haverhill	Yes
Joe Roche	689-0370	[illegible]	Haverhill	Yes
Bill Johnson	712-6321	wpjohnson@pbcgov.org	PBC	yes
Dorothy Gravelin	686-2815	[illegible]cloudlake@msn.com	Cloud Lake	Yes
Doug Wise	561 876-1295	~~[illegible]~~ @pbcgov.org	PBC	Yes
Beverly Scott	561-996-0100	bscott@bellegladefl.com	Belle Glade	yes
Carlos Cedeño	561 642-2074	ccedeno@ci.greenacres.fl.us	Greenacres	Yes

John Bowde Yes

LMS Working Group

Sign-in Sheet

LMS Steering Committee

August 7, 2013
Flagler Gallery
City Hall
West Palm Beach, Fl 33401

Name………………….. ……….	Phone Num…… …..	Email Address……………… ……….	City or organization…… ……..	LMS Group Member: yes or no
Marcos Montes De Oca	561-449-4448	mmontes@belle glade-fl.com	Belle Glade	Yes
John Bonde	561-791-4002	jbonde@wellingtonfl.gov	Village of Wellington	YES
Doug Wise	561 ??? 5192	dwise@pbcgov.org	PBC	YES
Beth McElroy	561-682-2268	emcelroy@sfwmd.gov	SFWMD	yes

Page 1 of 2

Gaines Park Community Center, WPB

LMS Working Group Meeting

Wednesday, July 11th. 2012

#	Sign	NAME	AGENCY	PHONE	EMAIL
1	[illegible]	Cale Curtis	Highland Beach	561 278 4548	ccurtis@ci.highland-beach.fl.us
2	Roger M Crane	Roger M Crane	So. Palm Beach	586-2122	Chiefspbpd@aol.com
3	Joanne Burnsed	Joanne Burnsed	Village of Tequesta	768 0450	JBurnsed@tequesta.org
4	[illegible]	Brett Johnson	Village of Royal Palm Beach	790-5163	bjohnson@royalpalmbeach.com
5	Ken Roundtree	[illegible]	NPB CID	624-7830	Ken@NPBCID.org
6	John Bonde		Wellington	791-4002	Jbonde@wellingtonfl.gov
7	Gordon Hartman	[illegible]	Lake Worth	533-7387	ghartman@lakeworth.org
8	Ken Todd	Ken Todd	PBC	355-4600	Ktodd@pbcgov.org
9	Joseph Roche	Joe Roche	Town of Haverhill	689-0370	on file
10	Mary Finkerman	Mary Finkerman	Lake Clarke Shores	964-1515	
11	Ralph Wall	[illegible]	City of West Palm Beach	561-805-6641	rwall@wpb.org
12	Bryant Johnson	[illegible]	City of Riviera Beach	845-4080	bjohnson@rivierabch.com
13	Paul Dorling	Paul Dorling	City of Delray Beach	243-7043	pdorling@mydelraybeach.com
14	Allan Ortman	[illegible]	Town of Palm Beach	822-2220	
15	Bill Golson	[illegible]	Palm Springs		
16	Richard Gathright	[illegible]	Palm Beach County Bldg	233-5155	rgathrig@pbcgov.org
17	Andrea Dobbins	[illegible]	Juno Beach	656-0326	adobbins@juno-beach.fl.us
18	Patricia Barber	[illegible]	Town of Manalapan	383 2546	pbarber@manalapan.org
19	Ken Schenck	[illegible]	Ocean Ridge	272-2635	kschenck@oceanridgeflorida.com
20	[illegible]	Jude Goudreau	Atlantis	561 965 1744	
21	Kelly Avery	Kelly Avery	Town of Gulf Stream	561-276-5116	kavery@gulf-stream.org
22	[illegible]	Jay Boodheshwar	Town of Palm Beach	838-5445	jboodheshwar@townofpalmbeach.com
23	[illegible]	Peter Newman	PBC Health Dept	603-8542	Peter_Newman@doh.state.fl.us
24	[illegible]	Lee LeFavarell	Town of Mangonia Park	848-1235	[illegible]
25	[illegible]	David Thatcher	Town of Lantana	540-5033	dthatcher@lantana.org
26	[illegible]	Tracy Ward	City of West Palm Beach	494-1122	tward@wpb.org
27	Dorothy Gravelin	Dorothy Gravelin	Cloud Lake	686-2815	townofcloudlake@msn.com
28	Dorothy Gravelin	Dorothy Gravelin	Glen Ridge	697-8868	glenridgetownof@bellsouth.net

EOC Sign In Sheet

- Flip Over -

Sign In Sheet

Gaines Park Community Center, WPB
LMS Working Group Meeting
Wednesday, July 11th. 2012

#	Sign	NAME	AGENCY	PHONE	EMAIL
29	Barbara Searle	Barbara Searle	Town of Hypoluxo	582-0155	bsearle@hypoluxo.org
30	[illegible]	Jim Shalloway	LWDD	721-4827	jshalloway@lwdd.com
31	Buffy Truesdale		DEM	712-6325	btruesda@pbcgov.org
32	[illegible]	Paul Blackson	PBCFR	616-7009	pblackso@pbcgov.org
33	[illegible]	Angela Brown	PBG	804-7010	abrown@pbgfl.com
34	[illegible]	Carlos Cedeno	Greenacres	642-2074	ccedeno@ci.greenacres.fl.us
35	[illegible]	JEROME SKRANDEL	BRINY BREEZES	863-1605	JFSPA@MSN.COM
36	[illegible]	David Pervenecki	PBSO	712-6339	~~JFSPA@MSN.COM~~
37					
38	Robin Ackerm	Robin Ackerm	City of Atlantis	965-1700	RobinAPD@atlantis.org
39	[illegible]	Leslie Harmon	City of Boynton Beach	On File	HARMONL@ci.boynton-beach.fl.us
40	[illegible]				
41	Beverly Scott	Beverly Scott	City of Belle Glade	996-0100	bscott@belleglade-fl.com
42	Lerannie Criswell	[illegible]	City of Pahokee	924-5534	lcriswell@cityofpahokee.com
43	Edgar Kerr	[illegible]	City of South Bay	996-6751	kerre@southbayfl.org
44	[illegible]	[illegible]	Town of Lantana	752-3411	[illegible]
45	Alvin Johnson	[illegible]	City of Pahokee	261-7093	ajohnson@cityofpahokee.com
46	[illegible]	Raymond woods	PBG	248-8495	R.J.Woods75@yahoo.com
47	[illegible]	BILL JOHNSON	PBC DEM	712-6321	wpjohnso@pbcgov.org
48	Richard Pittman	Richard Pittman	Town of Lake Park	881-3347	rpittman@lakeparkflorida.gov
49	[illegible]	Jesse Spears	PBC DEM	712-6481	jspears@pbcgov.org
50	Mary Blakeney	Mary Blakeney	PBC DEM	712-6549	mblakene@pbcgov.org
51					
52					
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EOC Sign In Sheet 2 of 2 Sign In Sheet

LMS Working Group
Meeting Summary
June 11, 2014
South Bay

Attendees:

- Palm Beach County DEM
- Town of Briny Breezes
- Town of Cloud Lake
- Town of Glen Ridge
- Town of Mangonia Park
- Palm Beach County Planning, Zoning, and Building
- Palm Beach County Fire Rescue
- Institute For Sustainable Communities
- City of Pahokee
- Town of Briny Breezes
- Town of Lake Clarke Shores
- City of Boynton Beach
- Town of Palm Beach
- Village of Palm Springs
- City of South Bay
- Town of Jupiter
- Northern Palm Beach County Improvement District
- Indian Trail Improvement District
- Village of Royal Palm Beach
- South Florida Water Management District
- Westgate CRA
- City of Lake Worth
- City of Riviera Beach
- Town of Loxahatchee Groves
- City of West Palm Beach
- City of Greenacres
- Town of Juno Beach

Absent:

- City of Atlantis
- Town of Gulfstream
- Town of Lake Park
- Town of South Palm Beach
- Palm Beach Sheriff's Office
- American Red Cross
- Palm Beach County Water Resources
- Palm Beach County Department of Health
- Village of Tequesta
- Village of Golf
- Town of Palm Beach Shores
- Town of Manalapan
- Town of Palm Beach Shores
- Lynn University
- Florida Atlantic University
- Palm Beach State College
- Disaster Recovery Coalition
- Town of Haverhill
- Town of Ocean Ridge
- Town of Jupiter Inlet Colony
- Town of Lantana
- City of Belle Glade
- City of Delray Beach
- Town of Highland Beach
- Town of Hypoluxo
- Glenmoore
- City of Boca Raton
- City of Palm Beach Gardens

Background:

The LMS Working Group is comprised of the full body of the LMS, representing a broad cross section of public sector and private sector organizations and individuals, including the general public. The Working Group serves as an umbrella organization for coordinating all mitigation programs and activities, supplies the staffing and expertise for the standing and ad hoc committees of the LMS, and is the primary mechanism and forum for exchanging information and mobilizing the vast expertise and resources of the community.

Highlights:

- Ken Roundtree, The LMS Steering Committee Chair, opened the meeting with a greeting and provided thanks to the City of South Bay for hosting the meeting. In addition, he had everyone in the room introduce themselves and state the organization they represent.
- Mr. Roundtree then introduced Leondrae Camel, the City manager, of South Bay who provided us greetings from the City.
- Kelvin Bledsoe, LMS Coordinator for Palm Beach County (PBC), introduced Elizee Michel, the Executive Director of the Westgate CRA who provide the group with a presentation on mitigation projects the Westgate CRA have either completed or are currently underway, much of it being funded by Hazard Mitigation Grant Program funding.
- Mr. Bledsoe gave a brief description of what he presented at the Governor's Hurricane conference.
- Information on the Residential Construction Grant Program was discussed. The RFP had been released and Mr. Bledsoe stated that he would send it out to all working group members the following day.
- The PPL list has been up-dated and will be sent to the state by June 19, 2014. A complete list of the new PPL will be sent out to all working group members on Friday June 13, 2014.
- The project submission timeline was discussed. The next window to submit projects will be October 7, 2014 through November 6, 2014. There are presently 71 projects on the PPL with the addition of the project submitted by the Village of Royal Palm Beach which ranked 30 out of 71.
- The 2009 LMS plan is currently being revised and is due to the State by July 30, 2014 in draft form.
- The LMS Evaluation committee made some changes to the scoring procedure for projects to reflect the growing concerns of Sea Level Rise. Carisse LeJeune, Assistant City Manager, Boynton Beach, briefed the changes in the scoring system as well as the proposed resolution for adoption once the LMS Update has been reviewed by the state.
- The summer addition of the LMS times will be published on July 1, 2014. Members are asked to provide articles. In addition, the group was informed that the April issue of the LMS Times went up to FEMA and received a good response
- Next meeting date for the LMS Working group is scheduled for December 10, 2014. The location will either be the City of Haverhill or the town of Palm Beach.
- While no training opportunities were presented at the meeting, members interested in training should go to: **http://trac.floridadisaster.org/trac/loginform.aspx** for disaster training information..
- Jeff Goldberg, DEM Planning Manager, advised the Working Group that a survey will be distributed within two weeks to ascertain what type of information or trainings that they would like to receive at future meetings.

Submitted by
Kelvin Bledsoe, LMS Coordinator

Approved by
Ken Roundtree, LMS Steering Committee Chair

LMS Working Group
Meeting Summary
August 7, 2013
West Palm Beach – City Hall (Flagler Gallery)

Attendees:

- Palm Beach County DEM
- City of Belle Glade
- Town of Briny Breezes
- Town of Cloud Lake
- City of Delray Beach
- Disaster Recovery
- Town of Glen Ridge
- City of Greenacres
- Town of Haverhill
- Town of Highland Beach
- Town of Hypoluxo
- City of Pahokee
- Juno Beach
- Town of Briny Breezes
- Town of Juno Beach
- Town of Lake Clarke Shores
- City of Boynton Beach
- Town of Lantana
- Town of Mangonia Park
- TD Bank
- Palm Springs
- Town of Ocean Ridge
- Town of Palm Beach
- Village of Palm Springs
- City of South Bay
- Village of Wellington
- City of West Palm Beach
- Town of Jupiter
- Northern Palm Beach County Improvement District
- Indian Trail Improvement District
- Village of Royal Palm Beach
- 211
- Town of Jupiter Inlet Colony
- South Florida Water Management District

Absent:

- City of Atlantis
- City of Boca Raton
- Town of Gulfstream
- Town of Lake Park
- City of Lake Worth
- City of Palm Beach Gardens
- City of Riviera Beach
- Town of Loxahatchee Groves
- Town of South Palm Beach
- Palm Beach County Fire
- Palm Beach Sheriff's Office
- American Red Cross
- Palm Beach County Water Resources
- Palm Beach County Planning, Zoning, and Building
- Palm Beach County Department of Health
- Village of Tequesta
- Village of Golf
- Town of Palm Beach Shores
- Town of Manalapan
- Town of Palm Beach Shores
- Lynn University
- Florida Atlantic University
- Palm Beach State College

Background:

The LMS Working Group is comprised of the full body of the LMS, representing a broad cross section of public sector and private sector organizations and individuals, including the general public. The Working Group serves as an umbrella organization for coordinating all mitigation programs and activities, supplies the staffing and expertise for the standing and ad hoc committees of the LMS, and is the primary mechanism and forum for exchanging information and mobilizing the vast expertise and resources of the community.

Highlights:

- Kelvin Bledsoe, LMS Coordinator for Palm Beach County (PBC), facilitated the first of two Working Group meetings for 2013.
- Ken Roundtree, LMS Chair + Director of Operations for Northern Palm Beach County Improvement District, welcomed the Working Group and thanked our host Ralph Wall, City of West Palm Beach.
- Ralph Wall, West Palm Beach City provided comments on behalf of the City and welcomed us to his facility
- Kelvin Bledsoe discussed the Flood Mitigation Assistance Program grant
- The PPL list Was mentioned and explained by Kelvin Bledsoe
- The project submission date window was listed. The window will be open for new projects from October 7, 2013 and closes Nov 6, 2013
- Kelvin Bledsoe, The Local Mitigation Strategy Coordinator provided a slide show on the LMS project and history and stressed the fact that for a City to be eligible to receive funds from FEMA through the LMS process that they needed to be active members of the LMS. Active membership was defines:
  1) Participation of the representative or officially designated alternate(s) in three (3) out of four (4) Steering Committee meetings where plan revisions will be addressed;
  2) For the General Membership the participation requirements dictates that all jurisdictional representatives attend **both** Working Group Meetings.
  3) Consecutive absences will be cause for disqualification for the LMS, subject to appeal and review by the LMS Chair.
  4) All rights and privileges will be terminated during a period of disqualification and formal reapplication;
  5) Participation in subcommittee meetings may be substituted for Steering Committee attendance in meeting the 3 out of 4 rule pending approval by the Chair;
  6) While suspended, member cannot submit projects for review.

- A committee was established to write and update the LMS plan for 2015.
- Lists were put out for individuals who wanted to serve on the LMS Steering Committee, the Evaluation Committee, or Working Group.

- The next steering committee meeting (September 18, 2013 – Emergency Management Building) and Evaluation committee (November 7, 2013 – Emergency Management building) dates were announced.
- Additional meeting announcements included the dates of the December Steering committee (December 11, 2013), and December LMS Working Group Meeting (December 4, 2013 – 1050 B Royal Palm Beach Blvd, Royal Palm Beach – 10:00 am,)
- The chair explained that each member needed to have an alternate assigned
- Our next LMS Group Meeting will have a guest Speaker
- **TRAINING REMINDER – Signup at: http://trac.floridadisaster.org/trac/loginform.aspx** **"Get your mitigation on," workshop.** November 14, 2013 9:00 a.m. – 4:00 p.m. Martin County Publix Safety Complex, Stuart, Fl

Submitted by
Kelvin Bledsoe, LMS Coordinator

Approved by
Ken Roundtree, LMS Steering Committee Chair

LMS Working Group
Meeting Summary
December 4, 2013
Royal Palm Beach

Attendees:

- Palm Beach County DEM
- City of Belle Glade
- Town of Briny Breezes
- Town of Cloud Lake
- City of Delray Beach
- Town of Glen Ridge
- City of Greenacres
- Town of Highland Beach
- Town of Hypoluxo
- City of Pahokee
- Town of Briny Breezes
- Town of Lake Clarke Shores
- City of Boynton Beach
- Town of Lantana
- Town of Palm Beach
- Village of Palm Springs
- City of South Bay
- Village of Wellington
- Town of Jupiter
- Northern Palm Beach County Improvement District
- Indian Trail Improvement District
- Village of Royal Palm Beach
- South Florida Water Management District
- Urban League Of Palm Beach County
- Glenmoore
- Westgate CRA
- City of Boca Raton
- City of Lake Worth
- City of Palm Beach Gardens
- City of Riviera Beach
- Town of Loxahatchee Groves

Absent:

- City of Atlantis
- Town of Gulfstream
- Town of Lake Park
- Town of South Palm Beach
- Palm Beach County Fire
- Palm Beach Sheriff's Office
- American Red Cross
- Palm Beach County Water Resources
- Palm Beach County Planning, Zoning, and Building
- Palm Beach County Department of Health
- Village of Tequesta
- Village of Golf
- Town of Palm Beach Shores
- Town of Manalapan
- Town of Palm Beach Shores
- Lynn University
- Florida Atlantic University
- Palm Beach State College
- Disaster Recovery
- Town of Haverhill
- Town of Juno Beach
- Town of Mangonia Park
- Town of Ocean Ridge
- City of West Palm Beach
- Town of Jupiter Inlet Colony
-

Background:

The LMS Working Group is comprised of the full body of the LMS, representing a broad cross section of public sector and private sector organizations and individuals, including the general public. The Working Group serves as an umbrella organization for coordinating all mitigation programs and activities, supplies the staffing and expertise for the standing and ad hoc committees of the LMS, and is the primary mechanism and forum for exchanging information and mobilizing the vast expertise and resources of the community.

Highlights:

- Kelvin Bledsoe, LMS Coordinator for Palm Beach County (PBC), facilitated the December 4, 2013 Working Group meeting.
- Ken Roundtree, LMS Chair + Director of Operations for Northern Palm Beach County Improvement District, welcomed the Working Group and thanked our host, Chris marsh and the Village of Royal Palm Beach
- Chris Marsh, Village of Royal Palm Beach - provided comments on behalf of the City and welcomed us to his facility
- Jeff Goldberg, Planning Manager for the Division of Emergency Management was introduced
- Kelvin Bledsoe discussed funding opportunities with the Residential Construction Mitigation Grant Program.
- The PPL list was reviewed mentioned and explained by Kelvin Bledsoe. The list will be scrubbed to remove projects that are either being funded by local cities or are no longer valid. Coordinating will be made with cities that have projects on the list. The list will be revised by January 31, 2014 and sent to Florida Division of Emergency Management.
- The project submission date windows were listed and discussed. It was determined that DEM would provide all cities with the evaluation work sheet to assist them submitting stronger projects proposals.
- Future meeting dates of the Steering Committee and working group meetings for 2014 were discussed and listed.
- LMS update was discussed with time lines listed on when portions of the plan would be revised or up-dated.
- It was discussed that the working group meetings were mandatory and that those cities that have missed two in a row would be evaluated and possible have any projects they have the PPL list removed.
- The LMS revisions committee was mentioned by name.
- John Bonde from the Village of Wellington was presented a $50 Home Depot gift certificate for his years of service to the LMS committees that he served on to include serving as the chair of the LMS evaluation committee. John will be retiring this month. He will be missed.
- The chair explained that each member needed to have an alternate assigned
- **Training opportunities were presented to the group. Those interested in disaster training should go to : http://trac.floridadisaster.org/trac/loginform.aspx**

Submitted by
Kelvin Bledsoe, LMS Coordinator

Approved by
Ken Roundtree, LMS Steering Committee Chair

LMS Working Group
Meeting Summary
December 5, 2012
Town of Lantana – Town Hall

Attendees:

- Palm Beach County DEM
- City of Atlantis
- City of Belle Glade
- City of Boca Raton
- Town of Briny Breezes
- Town of Cloud Lake
- City of Delray Beach
- Town of Glen Ridge
- City of Greenacres
- Town of Gulfstream
- Town of Haverhill
- Town of Highland Beach
- Town of Hypoluxo
- Town of Juno Beach
- Town of Lake Clarke Shores
- Town of Lake Park
- City of Lake Worth
- City of Boynton Beach
- Town of Lantana
- Town of Mangonia Park
- Beach City of Pahokee
- Town of Ocean Ridge
- Town of Palm Beach
- City of Palm Beach Gardens
- Village of Palm Springs
- City of Riviera Beach
- City of South Bay
- Town of South Palm Beach
- Village of Wellington
- City of West Palm Beach
- Town of Loxahatchee Groves
- Town of Jupiter
- Palm Beach County Fire Rescue
- Palm Beach Sheriff's Office
- American Red Cross
- Northern Palm Beach County Improvement District
- Indian Trail Improvement District
- Palm Beach County Water Resources
- Palm Beach County Planning, Zoning, and Building
- Palm Beach County Department of Health
- Village of Tequesta
- Village of Royal Palm Beach

Absent:

- Town of Jupiter Inlet Colony
- Village of Golf
- Town of Palm Beach Shores
- Village of North Palm Beach

Background:

The LMS Working Group is comprised of the full body of the LMS, representing a broad cross section of public sector and private sector organizations and individuals, including the general public. The Working Group serves as an umbrella organization for coordinating all mitigation programs and activities, supplies the staffing and expertise for the standing and ad hoc committees of the LMS, and is the primary mechanism and forum for exchanging information and mobilizing the vast expertise and resources of the community.

Highlights:

- Jesse Spearo, LMS Coordinator for Palm Beach County (PBC), facilitated the second of two Working Group meetings for 2012.
- Debbie Manzo, Town Manager, welcomed the Working Group and highlighted many great aspects of the town.
- Information was provided on current HMGP funding from TS Debbie. All applicants with projects listed on the most current Project Prioritization List (PPL) are able to apply through *egrants* for HMGP Tier III funds. Submission deadline is February 15, 2013.
- The updated Project Prioritization List (PPL) will be released by December 20th and can be found in the LMS Corner.
- There are currently 13 mitigation projects ongoing in Palm Beach County from Frances, Jeanne, Wilma, and Fay.
- Several jurisdictions including Town of Juno Beach, City of Boynton Beach, Village of Wellington, and City of Greenacres briefed the Working Group on the status of their mitigation projects.
- PBC Division of Emergency Management has funds available from the State Homeland Security Grant Program (SHSGP) for a partial plan update. It was identified that the best use for the funds may be for a portion of the LMS Plan Section III – Hazard and Vulnerability Analysis. Project work will be completed by the end of March 2013.
- Featured Speaker, Pam Mac'Kie – South Florida Water Management District, discussed the complex nature of flood events and the movement of water throughout the region. Ms. Mac'Kie is available to speak to community organizations, municipal officials, as well as elected officials on these complex topics. Please contact Ms. Mac'Kie at the following to schedule a meeting: Pam Mac'Kie (561) 682-2655 or pmackie@sfwmd.gov
- **TRAINING REMINDER – Signup at: http://trac.floridadisaster.org/trac/loginform.aspx**
  - ***G-393 Mitigation for Emergency Managers*, January 30 -31 – Broward County EOC**
  - ***G-278 Benefit-Cost Analysis: Entry Level Training*, March 6 – 7 – Palm Beach County EOC**
  - ***BRO-001 Hurricane Resilient Community Planning and Design*, March 19 – March 20 – Broward County EOC**

Submitted by
Jesse Spearo, LMS Coordinator

Together
Emergencies
Are
Managed

EM

Palm Beach County
Public Safety Department
Division of Emergency Management
Local Mitigation Strategy (LMS)
Steering Committee Meeting

AGENDA

September 10, 2014

11:00AM-12:30 PM
EOC
20 S. Military Trail
West Palm Beach , FL 33415

- Call to Order: Welcome/Introductions - Chair
- Last Meeting Summary
- LMS Program update - Jeff Goldberg
  - Meeting Frequently changes
  - Roberts Rules of Order
  - Resolution
- Grant funding opportunities
- Project Prioritization List (PPL) Update
- LMS Times
- Upcoming Training
- Questions/Comments
- Next meeting date
- Adjournment

PALM BEACH COUNTY FLORIDA

Palm Beach County
Division of Emergency Management
LMS Steering Committee Meeting Minutes
Wednesday, September 10, 2014 –11:00 a.m.
DEM Conference Room 3

Attendees:

Andrea Jamel – DSM Disaster Consultants	Kelvin Bledsoe – PBCDEM
Rebecca Creighton – Delray Medical Center	Jeff Goldberg – PBCDEM
Carlos Cedeno – Greenacres	Karla White – City of Lake Worth
David Rotar – Jupiter	Doug Wise – PBCPZ&B
Debbie Manzo -Lantana	Ed Kerr – South Bay
Ken Roundtree – Northern PBC Imp. Dist	John James – PBC Medical Society
Alvin Johnson – Pahokee	Jennifer Beckman – DRC
Uyen Dang – Royal Palm Beach	

1) **Call to Order: Welcome/Introductions – Ken Roundtree, LMS Chairman**
   - Ken Roundtree called meeting to order
   - Introductions of all attendees

2) **Last Meeting Summary**
   - A review of the LMS Steering Committee minutes from June 4, 2014 was conducted for accuracy.
   - Two corrections made: Bullet 6, second sentence, change school to score; Bullet 7, third sentence, change suspense to response.
   - See ***Attachment 1 Meeting Summary Corrected Copy***
   - All other items approved from the last meeting held on June 4, 2014.

3) **LMS Program Update – Jeff Goldberg**
   - **Meeting Frequently Changes** – will meet quarterly and keep time of 11:00 a.m. – 12:30 p.m.
   - **Roberts Rules of Order** – will follow guidelines and rules for fair and orderly meetings.
   - **Resolution** – Jeff spoke with Vanessa at the State and reports that modifications are minor. The evaluation will be conducted today or tomorrow and the State will advise when passed. We now have 38 municipalities. See ***Attachment 2 Resolution Draft*** for changes in red. This will go before the Board by December 16th. Some of the changes include using the wording local mitigation vs. unified and spelling out the word FEMA. When the State notifies Jeff of approval he will send to all members. The resolution will then be sent to the State and FEMA will generate a letter. At that

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point, we will have an approved LMS which goes to the Board. Executed resolutions are needed by mid-November.

- Motion to accept changes and adding amendment - all in favor - motion passed.
- The question was raised: What is required of 298 Districts and how do we incorporate them into LMS? Members of the committee are advised of updates. Ken Todd might be able to reach out to the districts since he is working with mapping. Jeff will obtain clarifications from the State.

4) Grant Funding Opportunities - Kelvin Bledsoe

- Kelvin spoke with the State of Florida and their mitigation person is advising that monies are available. Discussion from the group was that it's difficult to obtain funding after applying. It's not worth the hassle - it takes months. However, the process has been streamlined. The State is is open to assist - let's request they attend our December 10th Working Group to discuss new procedures and give information on grants. Jennifer Beckman notes Community Block Grants are available. Kelvin will develop questions for the State prior to their arrival and will obtain additional information on funding.

5) Project Prioritization List (PPL) Update

- The Evaluation Committee met and evaluated Village of Royal Palm Beach – 31 projects.
- City of Greenacres removed some projects - now at 71. They have until October 7th to submit – an open window of 30 days. This is chaired by Carlos Cedeno of Greenacres.

6) Quarterly LMS Times – Kelvin Bledsoe

- The LMS Times is an opportunity for municipalites to highlight their achievements. Kelvin encouraged members to submit articles.
- Sidenote: Health Care Industry reps are needed - Jeff reached out to Rebecca from Delray and John James from PBC Medical Society was in attendance. He introduced himself.
- Jennifer Beckman from DRC advised she can submit an article, as well as Doug Wise from PZ&B. Pictures are welcome to include in the LMS Times. The next publication is October 1st and submissions are needed by October 10
- It was asked if the LMS can be placed on the website. Currently, the Admin Finance section handles the website. However, the Planning section will soon be in charge of updating the website.

7) Upcoming Training – Kelvin Bledsoe

- There is an excellent Benefits/Cost Analysis class offered by the State - Jeff will get more information for the group.
- SFWMD hosting CFM (Certified Flood Plan Manager) exam (4 hour) at district offices. They will send Kelvin the email to distribute.

Page 2 of 3

8) Questions/Comments

- Flood zone questions came up and they can be addressed to Doug. There is confusion with the 100 year flood plans, as well as the low-risk and high-risk. DEM can forward calls to the flood information hotline. We can incorportae the hotline number into the DEM website "Make a Plan" information. Search engine features would be helpful to have on the DEM website as well.
- Updates by Doug include flood zones that are changing for Palm Beach County. The maps are online. Please look at properties and direct any questions to the flood plan hotline. Kelvin will distribute the hotline number as inquiries arise. The meetings are tonight in Belle Glade with residents.
- PBC not content with the flood maps. SFWMD did not model C51 flood stages. There is an appeals process of 90 days and FEMA will address each appeal. There is a 6 month window and then maps will be final. 65,000 are going in - residents will need to acquire flood insurance. 35,000 do not touch flood plains. South County areas seem to be the winners - Greenacres, Palm Springs, and the Acreage all look good. Homes built after 1980 should be elevated and okay. Ken Todd can be contacted for assistance.
- More Working Group meetings are desired. We will conduct 4 meetings per year.
- We will keep the Steering Committee meeting time of 11:00 a.m. since it may conflict with DEM team meetings on occasion.
- Our LMS meetings are of high caliber and we thank all of the members.
- CRS questions such as re-certification, flood warning systems, alerts, and coordinating of activities are now handled by Brian Hanley, DEM.
- Annual conference meeting is set for February 2015 in Orlando. If the group want to present a best practice panel, please advise Jeff.

9) Next Meeting Date: December 3, 2014.

Adjournment: 12:13 p.m.

Palm Beach County

Local Mitigation Strategy (LMS) Steering Committee Meeting

AGENDA

June 4, 2014

11:00AM-12:30PM

Palm Beach County EOC

- Call to Order and Introductions
- Prior Steering committee meeting notes
- Governor's Hurricane Conference presentation
- LMS Evaluation Committee – Updated PPL
- Funding Sources
- Future committee Meeting Dates
- LMS Plan Update - Schedule
- LMS Times
- New LMS Review Tool
- Questions/Comments
- Adjournment
- Upcoming Training

PALM BEACH COUNTY FLORIDA

LMS Steering Committee

Meeting Summary

June 4, 2014

Attendees:

Andrea Jamel – DSM Disaster Consultants	Kelvin Bledsoe – PBCDEM
Mike Resto – FDEM	Jeff Goldberg – PBCDEM
Carlos Cedeno – Greenacres	Nigel Baker – PBCFR
David Rotar – Jupiter	Doug Wise – PBCPB&Z
Debbie Manzo -Lantana	Ed Kerr – South Bay
*Ken Roundtree – Northern PBC Imp. Dist	Allen Ortman – West Palm Beach
Alvin Johnson – Pahokee	Ralph Wall - West Palm Beach
Larry Leskovjan- Palm Beach State College	

Background:

The LMS Steering Committee serves as the Local Mitigation Strategy (LMS) program Board of Directors; therefore, is the primary decision and policy body for LMS sponsored mitigation activity. This committee meets on quarterly basis for the purpose of reviewing the plan and identifying update requirements.

Highlights:

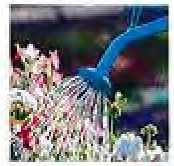
- Ken Roundtree welcomed the group and thanked everyone for coming.
- A review of the LMS Steering Committee minutes from the March 5, 2014 was conducted for accuracy. One correction to be made regarding attendees.
- Kelvin Bledsoe gave an overview his presentation at the Governor's Hurricane Conference in Orlando. The presentation was "Integrating Climate Change Into Your Emergency Plans." Mr. Bledsoe explained how this was being accomplished in Palm Beach County. By integrating the term "sea level rise" into our local scoring criteria so that it reads "Flooding and/or Sea Level Rise we ensure the system was fair to cities that do not have a sea level rise issue.
- Mr. Bledsoe presented the proposed resolution for adopting the LMS to the committee. After a great discussion it was determined that the term "sea level rise" would be removed from paragraph 4 since it already appeared in paragraph 1.
- Good discussion was held on the best way to stay engaged in sea level rise integration.
- The PPL list was briefed regarding the inclusion of a project submitted by the Village of Royal Palm Beach. That project ranked 30 out of 71 with a school of 65.2.
- The grant opportunities for the Pre-Disaster Mitigation and the Flood Mitigation Assistance grant programs. Both are due on June 6, 2014. Due to the match requirements and the short suspense time, Palm Beach County will not be going after either of those grants but will be preparing not to apply next year. In addition the Residential Construction Grant Program was briefed. There was also a discussion on developing a method and possible committee for going after mitigation funding opportunities for the next FY cycle.

- LMS Plan update was discussed with a review of the time lines developed.
- The Florida Division of Emergency Management (FDEM) has introduced a crosswalk/evaluation tool to assist in updating LMS plans. That tool will be emailed with the meeting summary.
- The Summer Edition of the LMS Times newsletter will be published July 1, 2014. Committee members are encouraged to submit photos and articles on mitigation.
- There will be a State Hazard Mitigation Plan Advisory Team webinar scheduled for June 10, 2014 from 1:00 PM – 4:00 PM. Webinar information will be emailed.
- Future committee meeting dates are as follows:
  - Next LMS **Working Group** Meeting: **June 11, 2014.**
  - Next **Steering Committee** Meeting: **September 10, 2014**
- The meeting was adjourned at 12:15 p.m.

Summary:

Provided by Kelvin Bledsoe, LMS Coordinator

Approved by, Ken Roundtree, LMS Chairman*



Palm Beach County

Local Mitigation Strategy (LMS) Steering Committee Meeting

AGENDA

March 5, 2014

11:00AM-12:30PM

Palm Beach County EOC

- Call to Order and Introductions
- Prior Steering committee meeting notes
- Sea Level Rise – Carisse LeJeune
- Funding Sources
- Future committee Meeting Dates
- PPL List Scrub
- LMS Plan Update Schedule
- Emergency Management Plans
- LMS Times Article request and publishing dates
- New Members
- Evaluation Committee
- Questions/Comments
- Adjournment
- Upcoming Training

LMS Steering Committee

Meeting Summary

March 5, 2014

Attendees:

Marcos Monfosnada – Belle Glade
Carisse Lejeune – Boynton Beach
Andrea Jamel – DSM Disaster Consultants
Dwayne Estelle – Lake Worth
Kelvin Bledsoe – PBCDEM
Larry Leskovjan- Palm Beach State College
Dan Beasley – PBCFR
*Ken Roundtree – Northern PBC Imp. Dist
Vicky Delbosquezve - South Bay
Ralph Wall - West Palm Beach
Mary Bacallao- Belle Glade
Carlos Cedeno – Greenacres
David Rotar – Jupiter
Alvin Hohnson – Pahokee
Jeff Goldberg – PBCDEM
Ken Todd – PBC
Doug Wise – PBCPB&Z
Ed Kerr – South Bay
Vyen Dang – Royal Palm Beach

Background:

The LMS Steering Committee serves as the Local Mitigation Strategy (LMS) program Board of Directors; therefore, serves as the primary decision and policy body for LMS sponsored mitigation activity. This committee meets on quarterly basis for the purpose of reviewing the plan and identifying update requirements.

Highlights:

- Ken Roundtree welcomed everyone to the first Steering Committee Meeting of the year and thanked everyone for coming. He had everyone introduce themselves.
- A review of the last LMS meeting minutes held December 11, 2013 was conducted.
- Carisse Lejeune, the Assistant City Manager for the City of Boynton Beach, provided an outstanding presentation on Sea Level Rise. She detailed the potential affects and impacts on Palm Beach County. She also provided hand-outs with additional information.
- At the time of the meeting there were no funding opportunities available. However, I received an email from the state with potential funding opportunities for coastal communities. (below)

Dear Community Resiliency Network,

I'd like to pass along information regarding a CReST grant opportunity for coastal resiliency efforts funded via NOAA. This particular opportunity is available to resiliency work being done along Florida's Gulf Coast. You can review the specific requirements here if you are interested: http://www.grants.gov/web/grants/view-opportunity.html?oppId=252013

Applications are due by April 11, 2014, and the max award is $100,000. Here is a short description provided at the above link:

"The purpose of this notice is to solicit grant proposals from eligible organizations to implement activities that enhance resilience of coastal communities to natural hazard and climate risks through a local, regional, or national network. Proposals submitted in response to this announcement shall provide beneficial public outcomes for coastal communities related to addressing existing and future risks to the natural environment, infrastructure, local economies, and vulnerable populations. Proposals must also leverage, enhance, or create a human or technical network in which one or more coastal hazard issues can be addressed through partnerships to enhance communication, cooperation, coordination, and/or collaboration."

- Future committee meeting dates were presented:
  - Next LMS **Steering Committee** meeting: **June 4, 2014**.
  - Next LMS **Working Group** Meeting: **June 11, 2014.**
- LMS Update was discussed with a review of the time lines developed.
- The spring edition of the LMS Times newsletter will be published April 1, 2014. Committee members are encouraged to submit photos and articles on mitigation.
- It was announce that our new LMS Evaluation sub-committee Chair, is Carlos Cedeno', from the City of Greenacres. Addition chair member were named as well.
- Jeff Goldberg mentioned training opportunities to the group and highlighted an up-coming mitigation class
  - G393- Mitigation for Emergency Managers at the Broward EOC on March 20 and 21, 2014. Please sign up through SERT TRAC at http://trac.floridadisaster.org. If you have trouble registering, please contact Gustavo Vilchez, PBCDEM Training Coordinator at 561-712-6483
- The meeting was adjourned at 12:05 p.m.

Summary:
Provided by Kelvin Bledsoe, LMS Coordinator
Approved by, Ken Roundtree, LMS Chairman*

Page **2** of **2**

Palm Beach County

Local Mitigation Strategy (LMS) Steering Committee Meeting

AGENDA

December 11, 2013

11:00AM-12:30PM
Palm Beach County EOC

- Call to Order and Introductions
- Prior Steering committee meeting notes
- Hazard Realignment Presentation
- Funding Sources
- Future committee Meeting Dates
- LMS Plan Update
- LMS Times
- Member Transition
- Questions/Comments
- Adjournment
- Upcoming Training

PALM BEACH COUNTY FLORIDA

LMS Steering Committee

Meeting Summary

December 11, 2013

Attendees:

David Rotar – Jupiter
Ralph Wall - West Palm Beach
Ken Roundtree - Northern PBC Imp. Dist.
Larry Leskovjan- Palm Beach State College
Karla White – City Of Lake Worth
Kelvin Bledsoe – PBC DEM
Dwayne Estelle – City Of Lake Worth
Bill Johnson – PBC DEM
Jeff Goldberg – PBC DEM

Background:

The LMS Steering Committee serves as the Local Mitigation Strategy (LMS) program board of directors; therefore, serves as the primary decision and policy body for LMS sponsored mitigation activity. This committee meets on quarterly basis for the purpose of reviewing the plan and identifying update requirements.

Highlights:

- Ken Roundtree welcomed everyone to the last Steering Committee Meeting of the year and thanked everyone for coming.
- Everyone introduced themselves.
- A review of the last LMS meeting held June 19, 2013 was conducted.
- Ken discussed the prior working group meeting, held June 19, 2013, and informed everyone that they had a summary available of the last meeting and gave everyone time to ask questions.
- Jeff Goldberg – PBC DEM - Emergency program Coordinator (Planning Section Chief) provided a brief on the Hazard Realignment for Hazard Specific Plans and how there would be no effect to the LMS and county. He discussed that our alignment is in line for the state and federal government and uses Comprehensive Planning Guidance 101 (CPG 101) and CPG 201 as our guides.

- Funding sources were discussed and it. Kelvin gave a presentation on potential new funding opportunity from the state's Residential Construction Mitigation Grant Program.
- Future committee meeting dates were presented
- LMS Update was discussed with a review of the time lines developed.
- The LMS Times newsletter is going to be restarted with a potential publishing date of late January 2014. There will be 4 annual issues: Winter, spring, summer, and fall. Cities were asked to provide any stories on mitigation success that should be included in the newsletter.
- It was announce that our LMS Evaluation sub-committee Chair, John Bonde was retiring at the end of December and that we would select a new chair for that position in the near future.
- A slide on future mitigation and incident management training was presented.
- LMS Steering committee members were informed that the slide presentation along with CPG 101, and CPG 201 would be sent out to them
- The meeting was adjourned at 12:17 p..m.

Summary:
Provided by Kelvin Bledsoe, LMS Coordinator
Approved by, Ken Roundtree, LMS Chairman

Palm Beach County

Local Mitigation Strategy (LMS) Steering Committee Meeting

AGENDA

June 19, 2013

11:00AM-1:00PM

Palm Beach County EOC

- Call to Order and Introductions
- Prior Working Group Meeting
- Current and Expected Funding Sources
- Recommendations from Evaluation Panel
- 2013 Project Prioritization List (PPL) Update
- State Response to LMS inquiries
- Future Steering committee Meeting Dates
- Future LMS Plan Updates
- LMS Work Group Meeting dates
- Meeting Host
- Member Transition
- New Community/Business Members
- Committees needed
- Questions/Comments
- Adjournment
- Reminder of Upcoming Training
  - CERT Training July and August
  - G-300 Intermediate Incident Command Systems and Control Sept 11-13
  - G-400 Advanced Incident Command Systems and Command & General Staff: Complex Incidents

PALM BEACH COUNTY FLORIDA

LMS Steering Committee

Meeting Summary

June 19, 2013

Attendees:

Debbie Manzo – Lantana
Ralph Wall - West Palm Beach
Carisse LaJeune - Boynton Beach
Ken Roundtree - Northern PBC Imp. Dist.
James Farrell – PBC Library
Richard Gathryht – PBC Building Division
Beverly Scott – Belle Glade
Paul Dorling – Delray Beach
Zoie Burgess – Highland Beach
Beth McElroy – SFWMD
Debra R. Buff – City of Belle Glade
David Rotar – Jupiter
Bill Johnson – PBC DEM
Ed Kerr - South Bay
Paul Blockson – PBC Fire Res
Jennifer Beckman - PBC DRC
John Bonde - Wellington
Larry Leskovjan- Palm Beach State College
Alvin Johnson – City of Pahohee
Chris Marsh – Village of Royal Palm Beach
Karla White – City Of Lake Worth
Kelvin Bledsoe – PBC DEM

Background:

The LMS Steering Committee serves as the Local Mitigation Strategy (LMS) program board of directors; therefore, serves as the primary decision and policy body for LMS sponsored mitigation activity. This committee meets on quarterly basis for the purpose of reviewing the plan and identifying update requirements.

Highlights:

- Ken Roundtree welcomed everyone to the 2nd quarterly Steering Committee Meeting of the year fiscal year.
- Ken introduced the new LMS coordinator, Kelvin Bledsoe, and then allowed everyone in the room to introduce themselves, including the City they were from.
- Ken discussed the prior working group meeting and informed everyone that they had a summary available of the last meeting and gave everyone time to review this notes and asked if there were any questions.
- Funding sources were discussed and it was determined that at the time there are no new funding sources available.

- John Bonde discussed the Evaluation Committee's last meeting and informed the LMS committee that the two projects evaluated had been integrated into the PPL list that will be sent forward if the LMS Steering Committee had no objections. Hearing none, the PPL list was approved and was forwarded to the State.
- Ken then discussed the State's response to questions the Evaluation Committee had concerning the current and future PPL list. The final result was that the county had the ability to submit the list in any form that they want the State to consider. The county sets the priorities.
- **The next date for the Steering committee was decided to be September 18, 2013 at 11:00 a.m. at the EOC.**
- LMS updates will be worked through the steering committee. The Plan will be broken down and sent to members for input and commendations and then discussed at the quarterly steering committee meetings. The LMS coordinator will begin to send out portions needed to be reviewed immediately.
- The LMS news letter will continue with support from the steering committee. It was determined that the Letter was a very useful tool for getting the work out on LMS issues.
- Ralph Wall from the City of West Palm Beach agreed to host the **working group meeting**. It was determined that the meeting would be either in July or August based on dates available for the venue. Ralph confirmed the date for **Wednesday July 31, 2013 at 10:00 am.** Parking will be in the City Center Parking Garage adjacent to City Hall at the corner of Banyan Boulevard and Dixie Highway. Ralph is working on having the parking validated. The address for City Hall is 401 Clematis Street, West Palm Beach, 33401. **This meet is a mandatory meeting for all municipalities.**
- The LMS newsletter will continue to be published with the help and input from the steering committee and the community.
- The Steering committee discusses group and committee transition. The Evaluation committee Chair will be retiring in December. The LMS chair asked that the group consider serving on or having a member of their city serving on the committee. The Chair stated that he would be contacting members to assess their interest.
- The Committee discussed adding members to the steering committee and at a minimum ensuring that based on the charter that the required members are on the committee. The list will be reviewed to ensure we are meeting minimum requirements and also ensure that those on the committee are regular attendees.

- The LMS Steering committee Chair stated that committees would be formed as needed to accomplish the goals of the LMS.
- After the meeting agenda was finished, there was helpful discussion by Carisse Lejeune (City of Boynton Beach) and Ralph Wall (City of West Palm Beach) concerning items critical to the municipalities in Palm Beach County. Ralph provided some hand-outs to the group and Carisse referenced the Biggert Waters ACT (Slides attached).
- The meeting was adjourned at 11:58 a.m.

Summary:
Provided by Kelvin Bledsoe, LMS Coordinator
Approved by, Ken Roundtree, LMS Chairman

Palm Beach County

Local Mitigation Strategy (LMS) Steering Committee Meeting

AGENDA

December 12, 2012

11:00AM-12:30PM

Palm Beach County EOC

- Call to Order and Introductions
- Prior Working Group Meeting
- Current and Expected Funding Sources
- Recommendations from Evaluation Panel
- 2012 Project Prioritization List (PPL) Update
- Future Meeting Dates & 2014 LMS Plan Update
- Questions/Comments
- Adjournment
- Reminder of Upcoming Training
  - *G-393 Mitigation for Emergency Managers*, December 10 – 11 and January 30 -31
  - *G-278 Benefit-Cost Analysis: Entry Level Training*, March 6 - 7
  - *BRO-001 Hurricane Resilient Community Planning and Design*, March 19 – March 20

Palm Beach County

Local Mitigation Strategy (LMS) Steering Committee Meeting

AGENDA

December 12, 2012

11:00AM-12:30PM

Palm Beach County EOC

- Call to Order and Introductions
- Prior Working Group Meeting
- Current and Expected Funding Sources
- Recommendations from Evaluation Panel
- 2012 Project Prioritization List (PPL) Update
- Future Meeting Dates & 2014 LMS Plan Update
- Questions/Comments
- Adjournment
- Reminder of Upcoming Training
  - *G-393 Mitigation for Emergency Managers*, December 10 – 11 and January 30 -31
  - *G-278 Benefit-Cost Analysis: Entry Level Training*, March 6 - 7
  - *BRO-001 Hurricane Resilient Community Planning and Design*, March 19 – March 20

PALM BEACH COUNTY FLORIDA

Palm Beach County Division of Emergency Management

LMS Steering Committee Meeting

Sign-In Sheet

Wednesday, September 10, 2014

NAME (PLEASE PRINT)	SIGNATURE	AGENCY/ORGANIZATION	EMAIL	TELEPHONE
Andrea Jamel		DMS Disaster Consultants	andreajamel@dmsrecovery.com	(561) 524-5707
Edgar Kerr		City of South Bay	kerre@southbaycity.com	561 561-6576
Ken Rumbfire		Northern Palm Beach County Improvement Dist	Ken@NPBCID.ORG	561-624-7830
Debbie Manzo		Lantana		
Jeff Goldberg		PBCDEM		
Dave Wise		PBC PZB	DWISE@PBCGOV.ORG	233 5192
Rebecca Creighton		Delray Medical Center/HBRC	rebecca.creighton@tenethealth.com	561-495-3339
Kelvin Bledsoe		EOC DEM	KBledsoe@pbcgov.org	561-712-6481
Carlos Cedeño		Greenacres	ccedeno@ci.greenacres.fl.us	561 642-2074
UYEN DANG		ROYAL PALM BEACH	UDANG@ROYALPALMBEACH.COM	561-790-5163
Karla White		City of Lake Worth	kwhite@lakeworth.org	561-586-1720
John James		PBC Medical Society	johnj@pbcms.org	561 433-3940

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Palm Beach County Division of Emergency Management
LMS Steering Committee Meeting
Sign-In Sheet
Wednesday, September 10, 2014

NAME (PLEASE PRINT)	SIGNATURE	AGENCY/ORGANIZATION	EMAIL	TELEPHONE
Jen Beckman	[signature]	DRC	beckmanj@pbc.org	561 310 2033
David Rotar	[signature]	Town of Jupiter	davidr@jupiter.fl.us	561-748-2705
Ralph Wall	[signature]	City of WPB	rwall@wpb.org	

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LMS Steering Committee
Sign-in Sheet

LMS Steering Committee

June 4, 2014
Emergency Management

Name.............................	Phone Num...........	Email Address...........................	City or organization..............
Ken Roundtree	561-624-7830	Ken@NPBCID.org	Northern Palm Beach County Imp. District
Edgar W. Kerr	561 261-6576	kerre@Southbaycity.com	City of South Bay
Andrea Jamel	(561) 529.5707	andrea.jamel@dmsrecovery.com	DMS Disaster Consultants
David Rotar	561 748-2705	davidr@jupiter.fl.us	Town of Jupiter
Allan Ortman	722-6736	AORTMAN@WPB.org	W. Palm Beh
Jeff Goldberg			
Debbie Manzo			
1. Nigel Baker	561 308-4102	NBaker@pbcgov.org	Palm Bch Cty
Ralph Wall	561-805-6661	rwall@wpb.org	City of West Palm Beach
3 Carlos Cedeno	642-2074	ccedeno@ci.greenacres.fl.us	Greenacres
Alvin Johnson	561-261 7693	ajohnson@cityofpahokee.com	City of Pahokee
Doug Wise	561 233 5101	DWISE@PBCGOV.ORG	PBC
LARRY LESKOVJAN	561-868-4015	LESKOVJL@PALMBEACHSTATE.EDU	PBSC

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Mike Resto mike.resto@em.myflorida.com

Kelvin Siedsel

LMS Steering Committee

Sign-in Sheet

LMS Steering Committee

March 5, 2014

Emergency Management

Name……………………..…….	Phone Numner…………	Email Address…………………………	City/ organization……….……
Carisse LeJeune	561-742-6012	LeJeuneC@BBFL.US	City of Boynton Bch
Doug Wise	561 233 5192	DWISE@PBCGOV.ORG	PBC Building Division
Alvin Johnson	561-924-5734	aJohnson@cityofpahokee.com	Pahokee
Ken Roundtree	561-624-7830	Ken@NPBCFD.ORG	Northern Palm Beach County Imp. District
Andrea Jewel	(561) 529-5707	andrea.jewel@dmsrecovery.com	DMS Disaster Consultants.
Jeff Goldberg		PBC DG	PBC DEM
Dan Beesley	712-6552	DBeesley@PBCGOV.org	PBCFR
UYEN DANG	790-6163	YDANG@ROYALPALMBEACH.COM	V.RPB
Carlos Cedeño	642-2074	ccedeno@ci.greenacres.fl.us	Greenacres

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LMS Steering Committee

Sign-in Sheet

LMS Steering Committee

March 5, 2014

Emergency Management

Name................................	Phone Numner...........	Email Address..........................	City/ organization..............
Marcos Montes De Oca	561 449-4448	mmontes@belleglade-fl.com	City of Belle Glade
Maeyl Bacallao	561 9931819	mBacallao@belleglade-fl.com	City of Belle Glade
Ken Todd	561 355-4600	ktodd@pbcgov.org	PBC
Dwayne Estelle	561 533 7382	destelle@lakeworth.org	Lake Worth
Ed Kerr	561-261-6576	Kerre@SouthBayCity.com	South
Vicky DelBosquez	561-261-6643	delbosquezv@Southbaycity.com	South Bay

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LMS Steering Committee

Sign-in Sheet

LMS Steering Committee

December 11, 2013

Emergency Management

Name............................	Phone Num......	Email Address.....................	City or organization......... .....
David Rotar	561-748-2705	davidr@jupiter.fl.us	Town of Jupiter
Ken Roundtree	561-718-2904	Ken@NPBCID.org	NPBCID
Karla White	561 586-1720	kwhite@lakeworth.org	City of Lake Worth
Dwayne Estelle	561 533 7382	dcastello@lakeworth.org	Lake Worth
LARRY LESKOVJAN	561-868-4015	LESKOVJL@PALMBEACHSTATE.EDU	PALM BEACH STATE COLLEGE
Ralph Wall	561-805-6661	rwall@wpb.org	City of West Palm Beach

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LMS STEERING COMMITTEE

PALM BEACH COUNTY UNIFIED LMS

Member sign-in sheet

(June 19, 2013)

**Debbie Manzo – Lantana	Deborah M[illegible]
Scott Pape – Delray Beach	Absent
Paul Dorling – Delray Beach	Paul Dorling
Allan Ortman - West Palm Beach	Absent
David Rotar – Jupiter	Absent
Ed Kerr - South Bay	[illegible]
John Bonde – Wellington	[illegible]
Carisse LeJuene - Boynton Beach	Carisse LeJeune
Beverly Scott – Belle Glade	Beverly J Scott
Ralph Wall – West Palm Beach	Ralph V Wall Jr
Allison Boyd/Hank Erikson – CSA	Absent
Link Walther – Continental Shelf	Absent
Kathie Kearney – NCCI Holding	Absent
Tom Serio – Verizon Wireless	Absent
Larry Leskovjan- Palm Beach State College	Larry L Leskovjan
Al Grasso – PBC Health Department	Absent
Peter Newman - PBC Health Department	Absent
Jennifer Beckman – Disaster Recovery Coalition	Absent
Tony Carper – Area 7 Regional Coordinator, Florida DEM	Absent

Ken Todd – Palm Beach County ______ Absent ______

Paul Blockson – Palm Beach County ______ Absent ______

*Ken Roundtree – Northern Palm Beach County Improvement District ______ Ken Rountree ______

Jim Shallman – Indian Trail Improvement District ______ Absent ______

Kelvin Bledsoe (none voting) DEM – Palm Beach County ______ Kelvin Bledsoe ______

* - Chairperson
**- Vice-Chair

Alvin Johnson - City of Pahokee

Richard Gathright PBC Building Division

Zoie Burgess - Highland Beach - Zoie Burgess

Chris Marsh – ~~V~~illage of Royal Palm Beach

Beth McElroy - SFWMD Beth McElroy

James Farrell - PBC Library

Karla White City of Lake Worth

Debra R. Buff - City of Belle Glade

Bill Johnson - PBCDEM

4-19-2009

LMS Evaluation Panel

Meeting Summary

May 22, 2014

Karen Temme- Palm Beach
Ed Kerr- South Bay - Absent
Carisse Lejeune – Boynton Beach
Kelvin Bledsoe – LMS Coordinator
Karla White – Lake Worth
Jennifer Beckman – PBC DRC
Ken Roundtree- NPCID
Carlos Cedeno – Green Acres - Chair

Background:

The LMS Evaluation Panel is designated to evaluate, review, score, and rank mitigation projects through established local, state and federal prioritization processes and criteria.

Highlights:

- The new LMS Chair opened the meeting and allowed everyone to introduce themselves. There were two new members to the evaluation committee: Karla White, and Carisse LeJeune,
- The Panel discussed the one project that was submitted for review from the Village of Royal Palm Beach. The project was scored and came in at number 31 of 71. The City of Green Acres removed two projects off the previous PPL list leaving 71 remaining.
- Scores were released for all members, once again demonstrating a clear pattern between reviewers and their scores. This demonstrates the Evaluation Panel's ability to score projects consistently over a continuum. The group was please that they were consistent across the board.
- It was still agreed that the committee would meet twice a year, once in May and once in November with the date to be set as the meeting approached and could be agreed upon.

- The next Evaluation committee meeting is scheduled for Thursday, November 6, 2014 at 2:00 p.m. at the EOC.
- All new projects be submitted 30 days before the next evaluation panel meeting, which would be October 7, 2014. This provides the panel to have suitable time to review new proposed projects.
- The LMS Steering Committee meeting is scheduled for June 4, 2014. Recommendations will be made to Steering Committee for final PPL approval.

Summary submitted by,

Kelvin Bledsoe, LMS Coordinator
Palm Beach County Division of Emergency Management

LMS Evaluation Panel

Meeting Summary

May 30, 2013

Karen Temme- Palm Beach
Ed Kerr- South Bay
Ken Roundtree- NPCID
Ron Guerrero – EM Program Coordinator
Absent – Paul Dorling, Delray Beach
Jennifer Beckman – PBC DRC
John Bonde- Wellington
Absent - Paul Blockson- PBC Fire Rescue
Kelvin Bledsoe – LMS Coordinator

Background:

The LMS Evaluation Panel is designated to evaluate, review, score, and rank mitigation projects through established local, state and federal prioritization processes and criteria.

Highlights:

- The new LMS coordinator and New Emergency program coordinator was introduced to the panel. .
- The Panel discussed the recent round of projects that were up for review (2). This number was a great relief from the last round of project that included 52 submissions. The new list was approved to be presented to the LMS steering committee with corrections.
- Scores were released for all members, once again demonstrating a clear pattern between reviewers and their scores. This demonstrates the Evaluation Panel's ability to score projects consistently over a continuum. The group was please that they were consistent across the board.
- The Panel discussed had a very long discussion on which the funds were awarded, to whom they were awarded to, and what the process was once the recommendations left our committee and were forwarded to the State. The committee wanted to know was

there a possibility of submitting lists by disaster event instead of simply adding to the list twice a year , thereby having projects changing priorities without reasonable justification.

- The LMS Coordinator stated that he would inquire from the state how this process is done to provide better guidance to the county, especially the LMS Steering committee.
- The community also discussed was there a possibility to have a procedure to protect smaller municipalities in the request for projects.
- The committee discussed member transition, the process of replacing members who maybe leaving the committee due to retirement or other reasons. The chair recommended that it be a subject at the LMS steering committee meeting.
- We will elect a new chair at the nest scheduled LMS Evaluation committee meeting.
- It was discussed and approved that the committee would meet twice a year, once in May and once in November with the date to be set as the meeting approached and could be agreed upon.
- The next Evaluation committee meeting is scheduled for Thursday, November 7, 2013 at 2:00 p.m. at the EOC.
- The committee recommended that all new projects be submitted 30 days before the next evaluation panel meeting. That date is 7 October 2013. This provides the panel to have suitable time to review new proposed projects.
- The LMS Steering Committee meeting is scheduled for June 19, 2013. Recommendations will be made to Steering Committee for final PPL approval.

Summary submitted by,

Kelvin Bledsoe, LMS Coordinator
Palm Beach County Division of Emergency Management

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Appendix H: Repetitive Loss Properties

In accordance with the following FEMA requirement, the PBC LMS includes repetitive flood loss properties in its risk assessments:

Requirement §201.6(c)(2)(ii): The risk assessment must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.

In addition, PBC's LMS and Community Rating System programs monitor the number and locations of flood prone properties countywide. At this writing, there were an estimated 285 FEMA-registered repetitive flood loss properties in the combined jurisdictions of incorporated and unincorporated PBC.

<u>Repetitive Loss Properties</u>

Repetitive loss properties are defined by the National Flood Insurance Program as: "properties with two or more NFIP claims of at least $1,000 in any rolling ten year period." Repetitive-loss properties constitute a significant drain on the resources of the NFIP, costing about 200,000,000 annually. Repetitive-loss properties comprise approximately 1 percent of currently insured properties but account for 25 to 30 percent of claims losses. They represent a key target of the NFIP for mitigation, including relocation, elevation and buyouts.

As of June 2014 PBC has a total of **66** repetitive loss properties with a total estimated cost of **$1,861,366**. A list of repetitive loss properties is available in this appendix

Repetitive Loss Properties in Palm Beach County

Municipality	Residential	Commercial
Palm Beach County	40	0
Lake Worth	7	0
Palm Beach Gardens	4	0
Delray Beach	4	0
West Palm Beach	3	0
Lake Park	3	0
Palm Beach	1	0
Ocean Ridge	1	0
Jupiter	1	0
Boynton Beach	1	0
Wellington	1	0
Total	**66**	**0**

Appendix H

Appendix I: Project Scoring Examples

Requirement: §201.6(c)(3)(iii): The mitigation strategy section shall include an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

This appendix supports the above FEMA requirement by providing a few examples of PBC's current project scoring process using the criteria established at the program's inception. This process is used as the basis for ranking (prioritizing) proposed projects. In order for a mitigation project to be eligible for federal monies there must be a Benefit Cost Analysis completed with results of a ratio greater than 1. This appendix illustrates the current scoring process through four examples:

- EXAMPLE 1: Community A - Library Wind Retrofit
- EXAMPLE 2: Community B - RV Park Flooding Prevention
- EXAMPLE 3: Community C - Hardening of an EOC; and
- EXAMPLE 4: Community D - Initiation of a Burn Program to Prevent Wildfire losses in the Urban Interface

<u>EXAMPLE 1: COMMUNITY A - LIBRARY RETROFIT</u>

Community A is a well-to-do community centered along the beach and on the Intracoastal Water. They have recently completed a large and very nice public library located on the Intracoastal Waterway. The library has many windows and a picturesque view of the waterway. The building itself is engineered to withstand category 5 hurricane force winds, but it is located in an area that can expect a 5 foot above mean high tide storm surge during storms rated at category 3 or higher. A storm surge of this magnitude will flood the bottom floor of this library to a depth of 2 feet. Equipment and books threatened by such an event are valued at an estimated $200,000. It will cost approximately $60,000 to raise the books and equipment in this library 3 ft above their current level. This would eliminate the $60,000 of exposure in all but the most catastrophic hurricanes of category 5 strength, achieving and an estimated 80% reduction in potential losses.

Applying the Benefit/Cost formula:

($200,000 - $40,000)) $ 60,000 = 2.67 Benefit/Cost Ratio therefore, this is a viable project.

Applying the Scoring Criteria (See Attached Score Sheet) this project would be scored as follows:

<u>COMMUNITY BENEFIT</u>

This is a Flood Damage Reduction activity and is awarded 10 points here;

Libraries are considered secondary critical facilities and 6 points are awarded here;

In terms of Community Exposure $200,000 is considered moderate and the frequency of the hazard this project mitigates for, Category 3 or higher storm surge, is low. Therefore Moderate (M) Exposure (E) + Low (L) Frequency (F) = 4 points under category; and

Cost Effectiveness in terms of the Benefit/Cost Ration is 2.67; therefore 12 points are awarded here.

This project's score under Community Benefit is 32.

<u>COMMUNITY COMMITMENT</u>

This project is not contained within a specific policy of Community A's Comprehensive Growth Management Plan, but this type of mitigation is addressed as a broad goal in the Coastal Management Element of that plan. Five points are awarded under this category;

Although libraries are considered secondary critical facilities this project is not part of any emergency management plan. It is, however, part of the Library Department's long -term strategic plan, which has been officially adopted by the City Council. Ten points are awarded here;

While there is considerable public support for the library in general, and there is every reason to believe there would be widespread public support for this mitigation project if it was presented to the public, this has not yet been done. Most of the citizens of Community A are not aware of the potential problem this mitigation project addresses. No points can be awarded here at this time. (Community A could change this score by holding public workshops on the problem and soliciting voter response questionnaires or other methods.)

This projects score under Community Commitment is 15 points.

<u>PROJECT IMPLEMENTATION</u>

There are no regulatory problems with this project and 5 points are awarded here;

Although the exposure is clearly visible, there has not been a severe hurricane since this library was constructed and therefore there is no history of loss or repetitive loss for this structure. Flood hazard mitigation money available now is directed toward structures suffering repetitive losses, and consequently no funds are immediately available. FEMA and other funding sources are being reviewed and it is believed that funds for this type of mitigation project will be available within the next 1 to 2 years. This project is awarded 6 points in this category;

Community A is an affluent community and despite the fact that the public is currently unaware of this problem, the City Council feels confident enough of public support to commit a 50% match, or $30,000 toward this mitigation effort. The project is awarded 5 points here; and if funding was to become available, this project could accomplish its objective of raising library books and equipment above the category 3 storm surge level in less than one year. The project is awarded 5 points here.

This project's score under Project Implementation is 21 points.

The Final Score for this proposed mitigation project is 68 points.

EXAMPLE 2: COMMUNITY B - RV PARK FLOODING PREVENTION

Community B has a large RV park with very poor drainage. Every time there is a minimal rain event this area floods, causing significant danger and health hazards to the residents in terms of flooded power outlets and sewage-contaminated standing water. These events also cause the town and county considerable expense and inconvenience such as traffic problems, emergency services disruption, and clean-up. This type of flooding happens approximately eight times per year with an estimated expense to the town and county of $3,000 per event. Correcting this problem will require a substantial reworking of the local drainage system. The estimated cost for this mitigation effort is $400,000.

If the flooding this project is designed to correct occurs eight times a year at a cost of $3,000 per event to the town and county in terms of police, fire/rescue, and utility worker time involvement, then Community B has a documented exposure of $24,000 per year to this hazard. If we assume the life expectancy of a drainage project to be 30 years, the potential savings to the town and county could be as high as $720,000. A reduction in the frequency of these flooding events by 90% would make the Benefit/Cost ratio on this project:

($720,000 - $72,000) $400,000 = 1.62 Benefit/Cost Ratio therefore, this is a viable project.

Applying the Scoring Criteria (See Attached Score Sheet) this project would be scored as follows:

COMMUNITY BENEFIT

This project is a Flood Damage reduction project and is awarded 10 points under the CRS Credit criterion.

This project addresses a problem within an RV park where there are no permanent residents. It does not address critical elements of the community infrastructure and must be considered as addressing only public convenience considerations. Award 4 points here.

Based on individual flooding events the community's exposure is low, but when considered over time this exposure becomes much higher. Points are awarded under this criterion based on a Medium Exposure and a High Frequency of occurrence. Nine points are awarded under this criterion.

The cost effectiveness based on the Benefit/Cost ratio for this project is 1.62; therefore 8 points are awarded here.

Total project score under Community Benefit is 31 points.

COMMUNITY COMMITMENT

This proposed project is contained within a broad mitigation goal under the Coastal Element of Community B's CGMP, but Community B has developed a proposed specific Policy amendment directed toward this type of drainage system retrofit. The project is awarded 8 points here.

This project is also contained within the Flood Plain Management Plan for Community B, which has been officially adopted. Award 10 points in this category.

This problem has been the subject of numerous letters and editorials in the local paper. It has also been the subject of one advertised public meeting. Award 5 points here.

Total project score under Community Commitment = 23 points

PROJECT IMPLEMENTATION

This project requires a considerable amount of construction work. While it is consistent within the local regulatory frame work there are regional and possibly national issues that will have to be addressed. Since the project will be discharging stormwater runoff into some body of water there will be water quality issues that must be dealt with. If Federal money is used, an NPDES review will be required. While all these issues can be addressed, they will delay implementation of the project and increase its cost. Award only 1 point under this criterion.

At the moment there are no identified sources for funding for this project. Once the LMS is adopted it is believed the Federal Government will make available, through the State DEM some funds to implement priority mitigation projects. These funds may be available within 1 to 2 years. Award 6 points under this criterion.

While Community B is relatively affluent they are not in a position to match more than 10% or $40,000 on a project of this magnitude. Award 1 point under this criterion.

If funding were immediately available for this project it would take approximately three years before this project could be permitted, bid, constructed, and operational. Award 3 points under this criterion.

Total project points under Project Implementation = 11

The Final Score for this proposed mitigation project is 65 points.

EXAMPLE 3: COMMUNITY C - DEVELOP A HARDENED EOC

Community C has no hardened Emergency Operations Center. They presently base their emergency management personnel in city office buildings that are highly vulnerable to both flooding and wind damage. They have an estimated $300,000 worth of computer, communications, and emergency response equipment housed within these vulnerable facilities. The county provides Community C with its Fire/Rescue services and is presently building a new, hardened fire station to serve this section of the county. County Fire/Rescue Services have offered to provide Community C space within their new building, but Community C will have to have this space fitted for Emergency Management Operations. Fitting this space and moving Community C's existing equipment into it will cost Community C an estimated $60,000. By undertaking this move Community C should reduce the exposure to its physical assets by 95% as well as position its Emergency Management Personnel in a much safer environment.

Applying the Benefit/Cost formula shows:

($300,000 - $15,000) $ 60,000 = 4.75 Benefit/Cost Ratio therefore, this is a viable project.

Applying the Scoring Criteria (See Attached Score Sheet) to this project would be scored as follows:

<u>COMMUNITY BENEFIT</u>

Although not its specific aim, this project may be classified as a Flood Damage Reduction activity. Award 10 points under this criterion.

This project addresses hardening of a Primary Critical Facility. Award 10 points here.

The currently utilized location of emergency management operations is highly vulnerable to sever tropical storms, hurricanes, or tornadoes and all these types of storms occur with medium frequency. Thus, we have a High Exposure = Medium Frequency = 8 points for this criterion.

The cost effectiveness for this proposed project expressed as the Benefit/Cost Ration is
4.75, thus 20 points are awarded in this criterion. Total Community Benefit Points = 48
COMMUNITY COMMITMENT

The concept of developing a hardened EOC for Community C is expressed in both a goal and a specific Policy of their CGMP. Award 10 points under this criterion.

Development of a permanent, protected EOC is also contained with Community C's Emergency Management Plan. Award 10 points under this criterion.

There is no real public support for, or opposition to, this project. Although it is believed the public would be highly supportive of this project if it were presented to them, they are at this time unaware of the problem. No points can be awarded in this criterion.
Total Community Commitment points = 20

<u>PROJECT IMPLEMENTATION</u>

There are no regulatory problems with this proposed project. Award 5 points here.

There is an identified funding source through the State Department of Emergency Management for the project at this time. Award 10 points here.

Community C will match with funds and in-kind services 20% of the cost of this project. Award 2 points for this criterion.

This project can be accomplished as soon as the new fire station is ready for occupancy in approximately six months. Award 5 points here.

Total Project Implementation Points = 22 points

The Final Score for this proposed mitigation project is 90 points.

EXAMPLE 4: COMMUNITY D - INITIATION OF A CONTROLLED BURNING PROGRAM TO PREVENT WILDFIRE LOSSES IN THE URBAN INTERFACE ZONE.

Community D has a large agricultural, ranching, and undeveloped land component within its jurisdiction. The community wishes to undertake a controlled burning program along the urban interface zone, but to do this it will have to upgrade its fire control equipment, pass a new controlled burning ordinance, and get the required permission from the forestry and environmental services. The cost of initiating this new program is estimated to be $200,000 including the necessary upgrading of fire control equipment. Community C has an exposure, based on tax role data, of $3 million within the area where wildfire is considered a threat. Controlled burning would reduce the potential risk of wildfire by 60%.

Applying the Benefit/Cost formula shows:

($3,000,000 - $1,200,000) $200,000 = 9.0 Benefit/Cost Ratio therefore, this is a viable project.

Applying the Scoring Criteria (See Attached Score Sheet) to this project would be scored as follows:

COMMUNITY BENEFIT

This is not a flood-related project so no points are awarded here.

There are primary critical facilities located in the area threatened by wildfire so this project does mitigate for threats to critical elements of the community’s infrastructure. Award 10 points here. The community has a high exposure to wildfire ($3 million) and wildfires have occurred with moderate frequency recently in south Florida. Award eight points for this criterion.

The project has a Benefit/Cost Ratio of 9.0. Award 20 points under this criterion.

Total Community Benefit Points = 38 points

COMMUNITY COMMITMENT

Controlled burning is currently expressed as a broad Goal under Community D's CGMP, but it is the subject of a specific Policy amendment which has been proposed. Award eight points here.

Controlled burning is not addressed in any existing emergency management plans, but following last summer's wildfire outbreaks, controlled burning plans have been developed and proposed. Award 6 points under this criterion.

The danger of wildfire and the desirability of a controlled burn program have been the subjects of two publicly advertised meetings and a considerable number of letters and written comments from the public at-large. Award 5 points for this criterion.

Total Community Commitment points = 19

PROJECT IMPLEMENTATION

The proposed controlled burn ordinance will have to be adopted by the City Council. Various permits will have to be obtained from the county and Division of Forestry when controlled burning is actually to take place, but these are not considered regulatory obstacles to the program itself. The only area of non-regulatory compliance is an issue in passing the ordinance creating the program itself. Award 4 points for this criterion.

The county and the City have agreed to put up the funding for this program so funds will be available as soon as the program has been legally adopted by Community D. Award 10 points here.

Community D will match 50% of the funds required for this program. Award 5 points here.

Once the program is in place it will begin to accomplish its stated goals immediately. Award 5 points here.

Total Project Implementation Points = 24 points

The Final Score for this proposed mitigation project is 81 points.

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Appendix J: NFIP and CRS Status and Activities

This appendix is intended to provide current data and information on NFIP and CRS status and activities countywide in fulfillment of the following FEMA requirement:

Requirement: §201.6(c)(3)(ii): The mitigation strategy must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

The tables on the following pages provide summaries of NFIP and CRS status and activities by jurisdiction. A variety of FEMA, ISO and local resources were used to prepare the summary tables.

Detailed summaries of CRS activities, class ratings and insurance savings are included. The number and value of NFIP insurance policies in effect, claims activity, and savings realized from CRS participation are also included on a jurisdiction be jurisdiction basis. Currently the CRS program is generating close to $5 million in insurance premium savings countywide.

At this writing, the County's CRS program has been evaluated June 2014. A final score is yet to be determined. This information is maintained at the EOC by the CRS Coordinator.

CID	Name	Policies in Force	Class Rating
120192	PALM BEACH COUNTY *	74,897	5
120193	ATLANTIS, CITY OF	439	7
120195	BOCA RATON, CITY OF	14,333	8
120196	BOYNTON BEACH, CITY OF	9,709	7
120198	CLOUD LAKE, TOWN OF	8	7
120207	HYPOLUXO, TOWN OF	1,163	8
120208	JUNO BEACH, TOWN OF	1,737	5
120211	LAKE CLARKE SHORES, TOWN OF	251	8
120212	LAKE PARK, TOWN OF	869	8
120213	LAKE WORTH, CITY OF	1,583	8
120214	LANTANA, TOWN OF	1,139	9
120215	MANALAPAN, TOWN OF	224	8
120216	MANGONIA PARK, TOWN OF	49	8
120217	NORTH PALM BEACH, VILLAGE OF	3,603	7
120220	PALM BEACH, TOWN OF	74,897	7
120221	PALM BEACH GARDENS, CITY OF	3,290	8
120223	PALM SPRINGS, VILLAGE OF	1,445	8
120227	SOUTH PALM BEACH, TOWN OF	1,601	8
120228	TEQUESTA, VILLAGE OF	1,362	8
120229	WEST PALM BEACH, CITY OF	6,823	6
125102	DELRAY BEACH, CITY OF	8,312	9
125109	GULF STREAM, TOWN OF	353	7
125111	HIGHLAND BEACH, TOWN OF	4,134	9
125119	JUPITER, TOWN OF	8,453	6
125134	OCEAN RIDGE, TOWN OF	1,316	7
125137	PALM BEACH SHORES, TOWN OF	989	8
125157	WELLINGTON, VILLAGE OF	676	7
	CRS Chart - Appendix J		

Palm Beach County and its municipalities will continue their commitment to NFIP by continuing to:

- Enforce the Floodplain Management Ordinance which regulates new development and substantial improvements in the special flood hazard areas.
    - Inform the community by news releases and open public meeting
    - Community Outreach
    - County Public TV

- Maintain elevation certificates on file for all new construction in the SFHAS or for substantial improvements to properties in the sfha.
    - "Doing Business with the County" seminars geared toward construction industry and builders

- Use best available (flood map) data for issuing construction permits.
    - Public Education Seminars
    - Updated mapping provided to each municipality
    - Mapping placed in all county libraries

- Maintain public records and make them available for review.
    - Community outreach
    - News releases and county public TV

- Maintain records pertaining to LOMAS, and LOMRS, etc.

- Provide information related to flood hazards, flood maps, etc., to the public upon request.

- Continue community outreach efforts for compliance with the community rating system program.
    - Integrate new NFIP information and mapping into already existing strong community presentations

- Continue to promote flood insurance to property owners.
    - Increase and continue outreach presentations to community and home owners associations

- Continue to update the public and enable their participation in the flood remapping project.
    - Community outreach
    - News releases and county public TV

- Maintain flood hazard publications at the main branch of the library.

- Where feasible, continue to identify/acquire land in the SFHA open space/preservation.

- Promote hazard flood mitigation to the public.
    - LMS posted on the County website
    - Grant information posted on County website
    - Integrate into outreach presentation

- Continue drainage maintenance and drainage system improvement projects.
    - Encourage more drainage projects through-out the county in all LMS meetings

- Continue floodplain management activities and target a Class 5 Rating.

- Adopt and enforce the floodplain management plan
    - Schedule quarterly meetings with CRS User Group and invite all 38 municipalities
    - Provide continued education and best practices to all municipalities

- Provide robust community assistance program
    - Community outreach presentations
    - Town hall meetings in different municipalities
    - Press releases and TV programs
    - Telephone information Hotline Floodplain and Mapping questions
    - New map pick up information

- Outreach to municipalities not participating in the CRS/NFIP
    - Provide continued outreach, best practices to municipalities that are not part of the CRS/NFIP
    - Document each municipality not a participant in the CRS/NFIP and continue providing them with best practices incentives to participate
    - Ensure that municipalities not participating in the CRS/NFIP are members of the LMS working group, allowing them still to receive mitigation information

Appendix K: Mitigation Assessment Teams (MATs)

Should PBC be impacted by a natural disaster deemed by FEMA to be of national significance, teams of technical specialists, referred to as Mitigation Assessment Teams (MATs), might be mobilized by FEMA, in conjunction with State and local officials, to conduct on-site qualitative engineering analyses to assess damage to government offices, homes, hospitals, schools businesses, critical facilities and other structures and infrastructure. The purpose of the assessment would be to determine the causes of structural failures (or successes) and to evaluate the adequacy of local building codes, practices and construction materials for the purpose of improving future performance. They also might use the opportunity to review the effectiveness of previous mitigation projects.

Most frequently MATs would be mobilized by FEMA's Directorate in response to joint federal, state and local requests for technical support.

The technical make-up of MATs will depend largely on the nature and extent of damage incurred. Disciplines most commonly represented are likely to include: civil and coastal engineering, hydraulics, architecture, construction, and building code development and enforcement. If the damage is severe enough, representatives from FEMA Headquarters, Regional Office engineers, representatives from other Federal agencies and academia, and experts from the design and construction industry may also participate. State representatives would be dispatched by the Mitigation Bureau. The County would be expected to provide local team members and support services as defined below.

At the county level, during activations, the Operations Section Chief will be responsible for coordinating with the Logistics Section to arrange for local personnel, equipment, vehicles, data, and other resources necessary to support MAT assessments. Once staffed and equipped, MAT activities will be closely supported by the Damage Assessment and Impact Assessment Units of the Operations Section under the direction of the Operations Section Chief. Most likely FEMA and State representatives will bring personal resources such as laptop computers, cell phones, GPS, etc. with them in their Go Bags, however, backup inventories and sources for local resources will be maintained.

According to NIMS/ICS task force guidelines, federal and state MATs may choose to coordinate their activities with local law enforcement homeland security units who commonly perform critical infrastructure and key resource (CI/KR) field assessments within the County. This temporary disaster response task force may also include special operations personal from the fire service as necessary. Non-sensitive information from local law enforcement's established database will be shared to the fullest extent possible with the MATs. Any exchange of information associated with this initiative will limited so as not to compromise local law enforcement's tactical or strategic capabilities or the region's efforts in CI/KR programs in support of the National Infrastructure Protection Plan (NIPP).

Lists of needed resources will be prepared by the Operations Manager and given to the Logistics Manager who will be responsible for maintaining the inventories at the EOC or other PBC facilities and ensuring equipment is secured, available and ready for deployment. Access to special or emergency resources beyond the working inventory, may be available through the Purchasing Unit, through the ESF18 (Business & Industry) functions at the regional and state levels, through WebEOC source lists or though private sector partners party to the Business Continuity Information Network (BCIN). The BCIN is a web-based service available to local businesses, county emergency management, and organizations that assist businesses to gather and share critical information that support continuity efforts before, during and after a disaster. Available year round as a public service, this trusted, business-to-business, community network provides participating companies a tool to track their key employees and supply chain status, and locate needed recovery goods and services.

The County will provide appropriate public sector and private sector technical, operational, logistical, administrative, and planning expertise necessary to support the mitigation assessment mission. Lists of emergency contacts will be maintained by the Logistics Section.

Depending on the geographic distribution and severity of damage throughout the PBC, the MAT might establish its base(s) of operation at the EOC or at sites near any or all of the six Emergency Operating Areas (EOAs).

The MATs may work in conjunction with Damage Assessment Teams or independently, based on need, time priorities and the availability of State and FEMA MAT personnel.

The mission of the MATs is to learn exactly what happened and why, and how to reduce disaster damage in the future. Key questions include: How did buildings perform? Did winds exceed building codes? Did flood damages go beyond special flood hazard areas? Were building codes followed and enforced? Were construction materials sufficient to withstand wind and water damages? Were protective measures such as shutters used? Were local, State and Federal building standards and ordinances sufficient?

Palm Beach County is the largest county by area in the U.S. east of the Mississippi River. Most of its population and development are heavily concentrated in the eastern corridor within 10 miles of the coastline. The County's emergency management planning is based on the assumption that the County may not be serviced effectively by a single EOC location. Consequently, the County has been divided into six Emergency Operations Areas, each of which is equipped to function on its own before, during and after a disaster. Pre -equipped field response trailers are available for deployment year round. Where lead times are sufficient, resources will be pre-staged. Mitigation assessment resources may not be available for all EOAs concurrently, in which case the Operations Section Chief will work with the MAT to identify priorities and will request additional resources through Logistics.

If available local personnel resources are insufficient, the County may be able to draw mutual aid support from neighboring counties on an as needed basis. The Logistics and Operations Sections may also coordinate with FDEM, as necessary and appropriate, to arrange for field support from organizations such as the International Code Council.

Based on a comprehensive analysis of assessment data compiled in the field, the teams will prepare recommendations regarding construction codes and standards, building design, and best practices that PBC, its municipalities and the construction industry can use to reduce future disaster damage. Throughout the process, the MAT will consult with partnering government agencies and supporting private sector organizations to ensure consensus on each phase of the investigation, including methodology, data collection, and analysis. This will help to ensure the MAT's final recommendations represent the most current and best available data and technical expertise. Once consensus is reached, FEMA will issue a series of "Recovery Advisories" that will provide initial guidance on building issues and best practices that can be used in the reconstruction process. FEMA will also publish a comprehensive report that provides local decision makers with information and detailed technical recommendations for improving building construction and design, building code policy and enforcement, and mitigation activities that can limit or eliminate damages in future disasters.

MAT observations and recommendations submitted to the LMS will provide a basis for future mitigation strategies, initiatives and projects and the optimum uses of mitigation assistance funds.

The DEM recovery section will provide oversight. The recovery and post-disaster coordinator from the recovery section along with the LMS Coordinator will facilitate and coordinate the application process and serve as a primary communication link with funding agencies.

Public information will be coordinated through the Joint Information Center (managed by ESF-14), based on cleared information provided by the MATs and Disaster Recovery Centers. Longer-term, information will be integrated into media releases, LMS and CRS outreach activities, public presentations, presentations at professional conferences, training curricula, etc.

At this writing, Standard Operating Guidelines for mitigation assessment activities are in the early planning stage. DEM will coordinate with the Inspections Section of the County's Building Department to lay a foundation for development of Standard Operating Guides. Many of the 38 municipalities of the County have their own building departments, officials, and procedures and will be an integral part of the procedure development process. Several of these departments can draw from their damage assessment experiences following Hurricane Andrew in 1992 and to a lesser extent their experiences following Hurricane Frances, Jeanne and Wilma which impacted PBC. Organizations such as the PBC Builder's Association and the Building Code Advisory Board of PBC will also need to be consulted.

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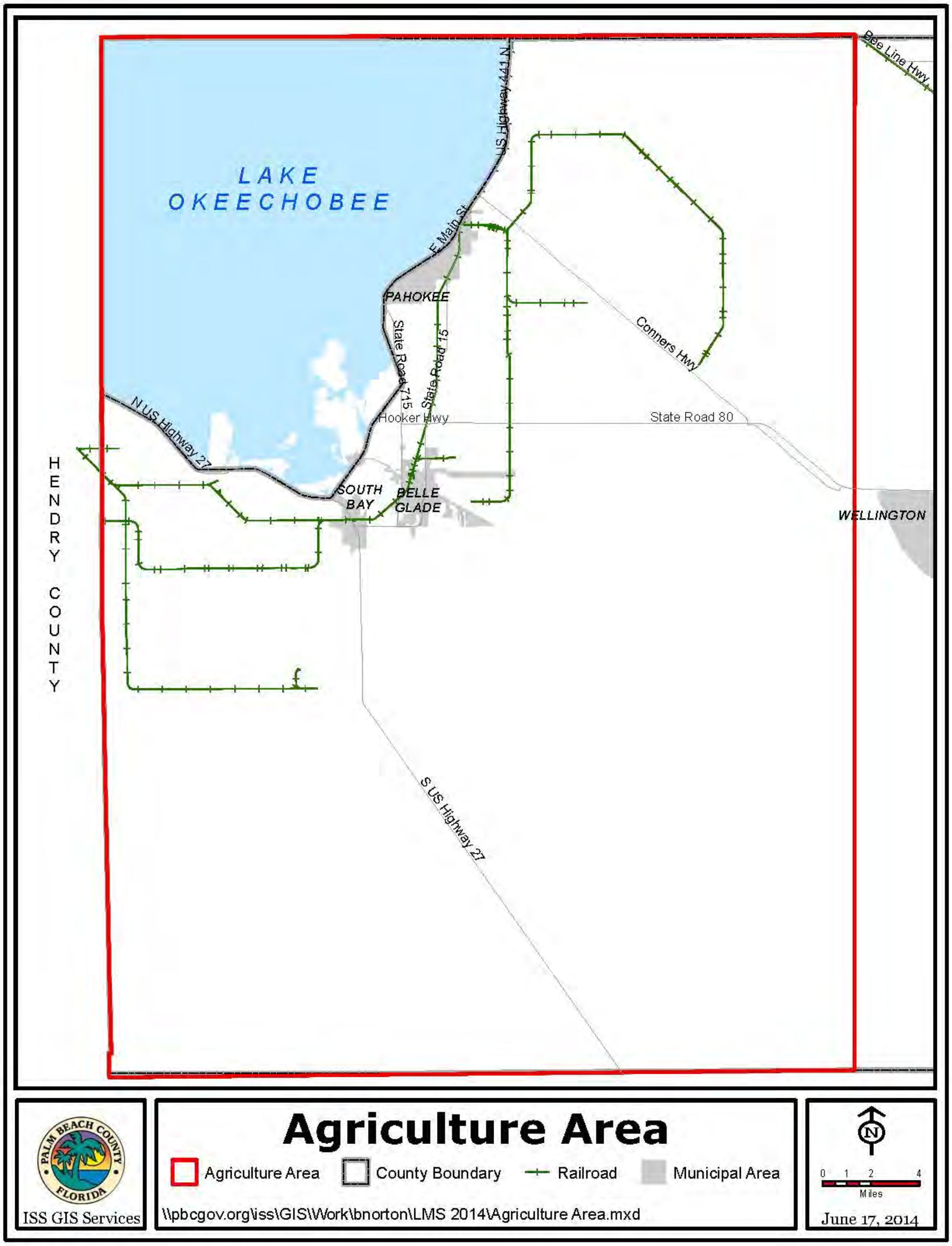
Appendix L: List of Acronyms

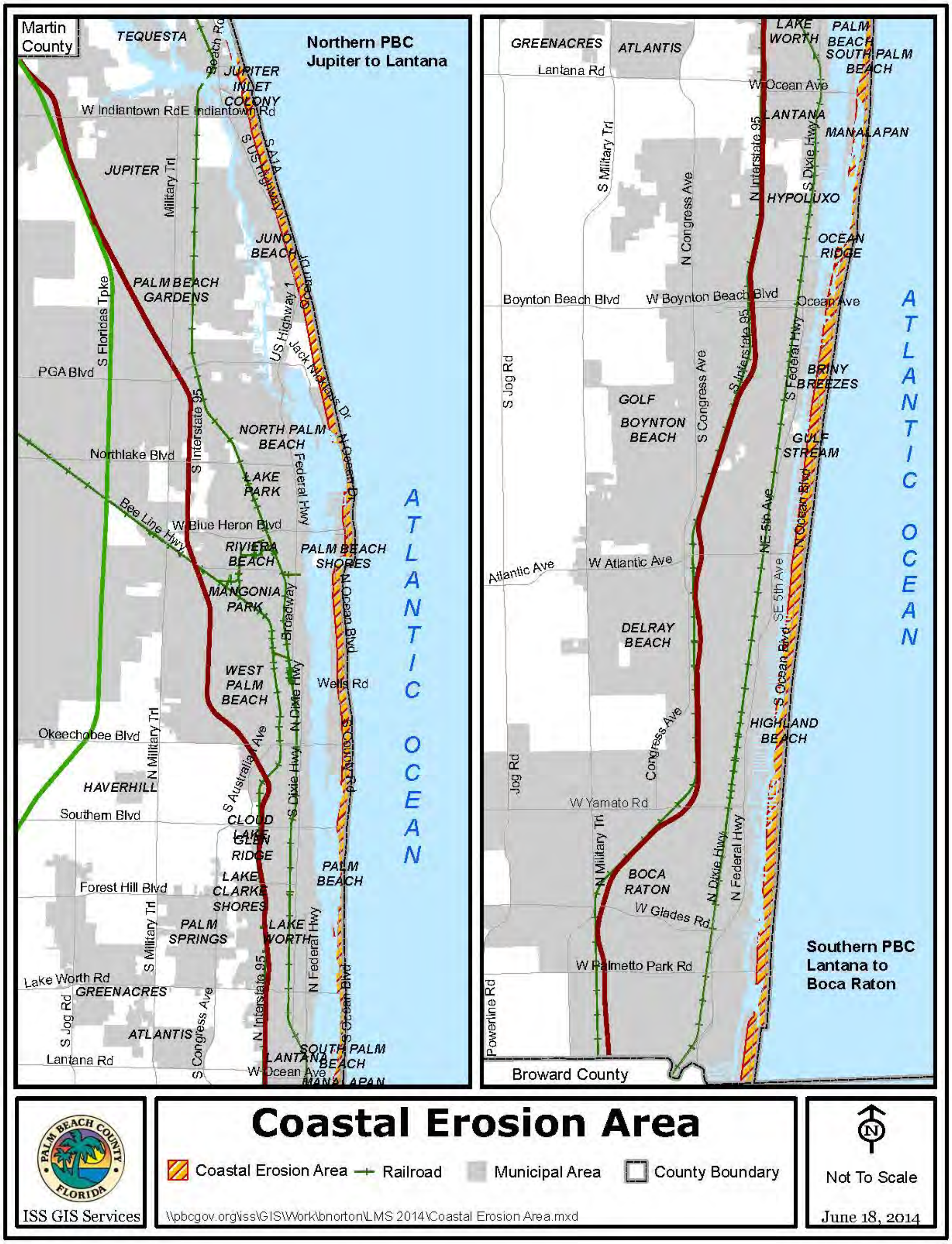
ALF	Assisted Living Facility
BCC	Palm Beach County Board of County Commissioners
CDC	Center for Disease Control
CEI	Climate Extremes Index
CEMP	Comprehensive Emergency Management Plan
CERT	Community Emergency Response Team
C-MAN	Coastal-Marine Automated Network
CRS	Community Rating System
DEM	Palm Beach County Division of Emergency Management
DOF	Florida Division of Forestry
EDMIS	Economic Disaster Management Information Systems
EM	Emergency Management
EMAP	Emergency Management Accreditation Program
EMPA	Emergency Management Preparedness & Assistance
EOA	Emergency Operations Area
EOC	Palm Beach County Emergency Operations Center
ERM	Environmental Resource Management
ESF	Emergency Support Function
FDACS	Florida Department of Agriculture and Consumer Services
FDEM	Florida Division of Emergency Management
FEMA	Federal Emergency Management Agency
FHMS	Florida Hazard Mitigation Strategy
FIRM	Flood Insurance Rate Maps
FMAP	Flood Mitigation Assistance Program
GCRI	Greenhouse Climate Response Index
GIS	Geographic Information System
HHD	Herbert Hoover Dike
HMGP	Hazard Mitigation Grants Program
ICS	Incident Command System
IPZ	Ingestion Pathway Zone
LMS	Local Mitigation Strategy
LDR	Local Development Regulations
LEPC	Local Emergency Planning Committee
LOD	Letter of Dispute
MAT	Mitigation Assessment Team
MLLW	Mean Lower Low Water
MOM	Maximum of Maximums
MPO	Metropolitan Planning Organization
NCDC	National Climactic Data Center
NFIP	National Flood Insurance Program
NGO	Non-Governmental Organization
NGVD	National Geodetic Vertical Datum
NHC	National Hurricane Center
NIMS	National Incident Management System

List of Acronyms Cont.

NIPP	National Infrastructure Protection Plan
NOAA	National Oceanic Atmospheric Administration
NWS	National Weather Service
OPS	Outreach Project Strategy
PAPA	Property Appraisers Database
PDM	Pre-Disaster Mitigation
PDRP	Post Disaster Redevelopment Plan
PPL	Project Prioritization List
PZB	Department of Planning, Zoning, & Building
SARS	Severe Acute Respiratory Syndrome
SFWMD	South Florida Water Management District
SLOSH	Sea, Lake and Overland Surges from Hurricanes
SWP	State Warning Point
TCRPC	Treasure Coast Regional Planning Council
TYLCV	Tomato yellow Leaf Curl Virus
WFO	National Weather Service Forecast Office
WHO	World Health Organization

Appendix M: Maps

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Jupiter to Lantana
Martin County
TEQUESTA
JUPITER INLET COLONY
JUPITER
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RIVIERA BEACH
PALM BEACH SHORES
MANGONIA PARK
WEST PALM BEACH
HAVERHILL
CLOUD LAKE
GLEN RIDGE
PALM BEACH
LAKE CLARKE SHORES
PALM SPRINGS
LAKE WORTH
GREENACRES
ATLANTIS
LANTANA
SOUTH PALM BEACH
MANALAPAN
W Indiantown Rd
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PGA Blvd
Northlake Blvd
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Bee Line Hwy
Okeechobee Blvd
Southern Blvd
Forest Hill Blvd
Lake Worth Rd
Lantana Rd
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Wells Rd
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Military Trl
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S Jog Rd
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Jack Nicklaus Dr
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N Ocean Blvd
S Ocean Blvd
Federal Hwy
N Federal Hwy
Broadway
N Dixie Hwy
S Dixie Hwy
S Australian Ave
ATLANTIC OCEAN
Southern PBC
Lantana to Boca Raton
GREENACRES
ATLANTIS
LAKE WORTH
PALM BEACH
SOUTH PALM BEACH
LANTANA
MANALAPAN
HYPOLUXO
OCEAN RIDGE
BRINY BREEZES
GOLF
BOYNTON BEACH
GULF STREAM
DELRAY BEACH
HIGHLAND BEACH
BOCA RATON
Lantana Rd
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Atlantic Ave
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W Glades Rd
W Palmetto Park Rd
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Broward County
Coastal Erosion Area
Coastal Erosion Area
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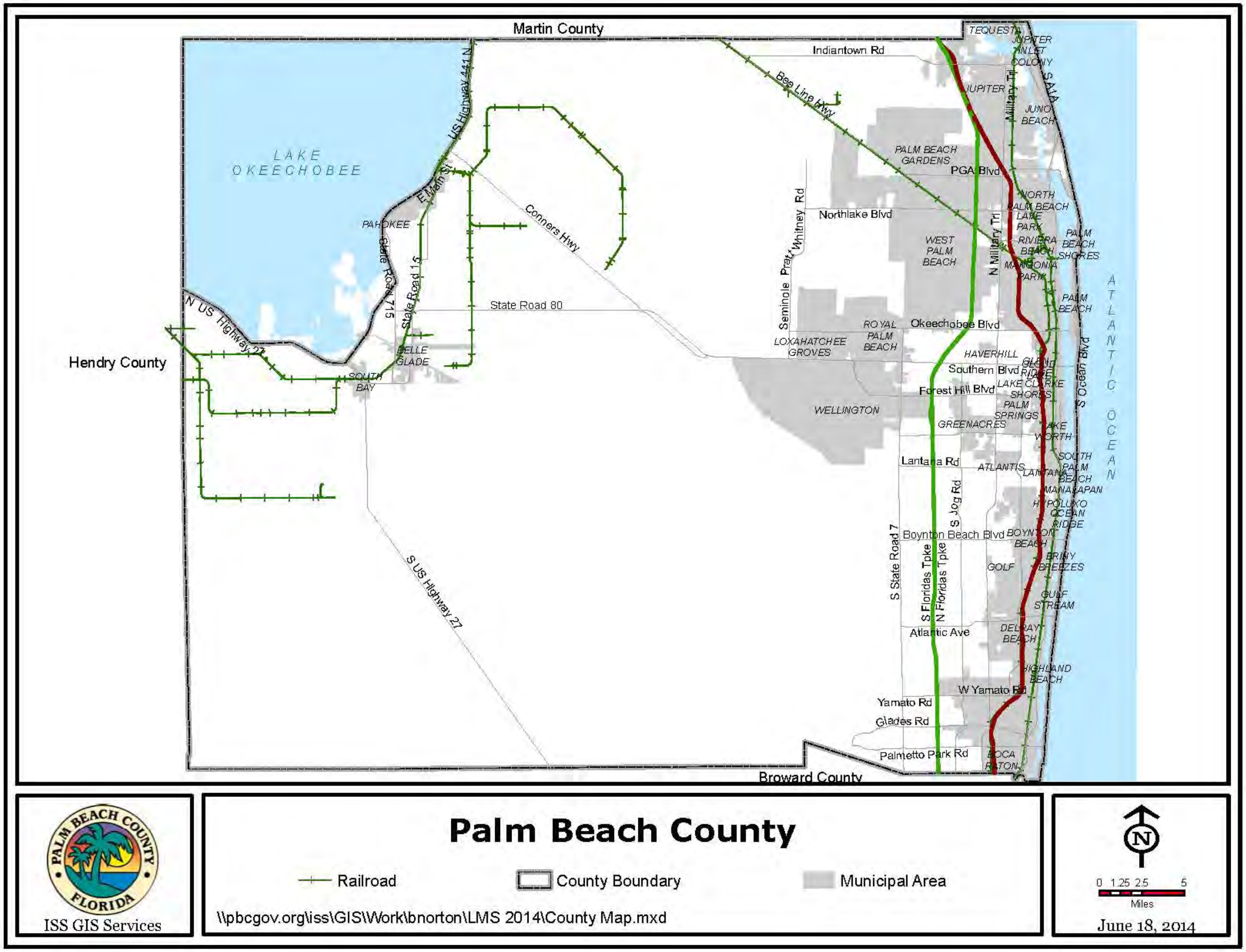
June 18, 2014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BOYNTON BEACH
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BRINY BREEZES
GULF STREAM
S State Road 7
S Floridas Tpke
N Floridas Tpke
Atlantic Ave
DELRAY BEACH
HIGHLAND BEACH
W Yamato Rd
Yamato Rd
Glades Rd
Palmetto Park Rd
BOCA RATON
Palm Beach County
Railroad
County Boundary
Municipal Area
PALM BEACH COUNTY FLORIDA
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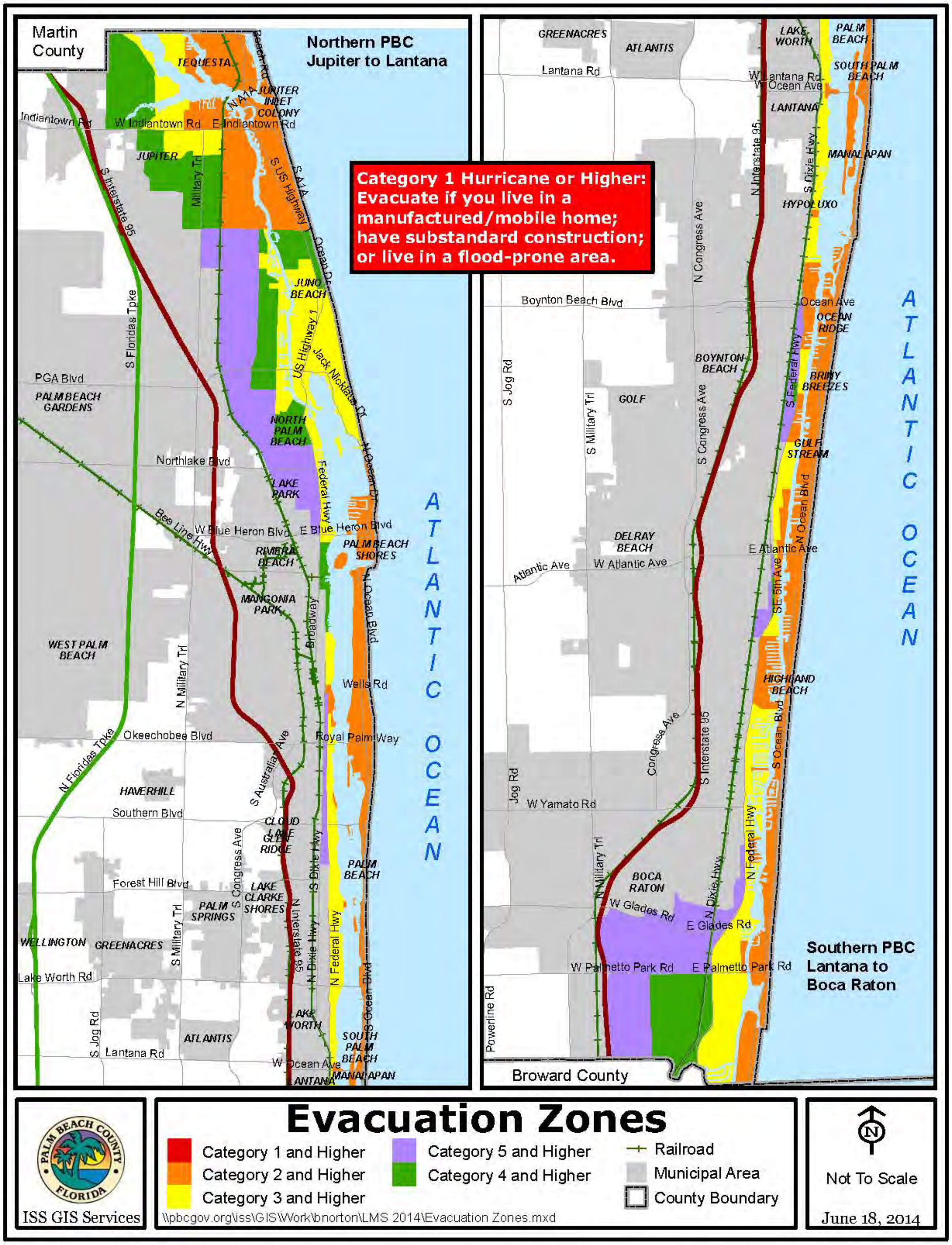
Northern PBC Jupiter to Lantana
Southern PBC Lantana to Boca Raton
Category 1 Hurricane or Higher: Evacuate if you live in a manufactured/mobile home; have substandard construction; or live in a flood-prone area.
Martin County
Broward County
ATLANTIC OCEAN
Evacuation Zones
Category 1 and Higher
Category 2 and Higher
Category 3 and Higher
Category 5 and Higher
Category 4 and Higher
Railroad
Municipal Area
County Boundary
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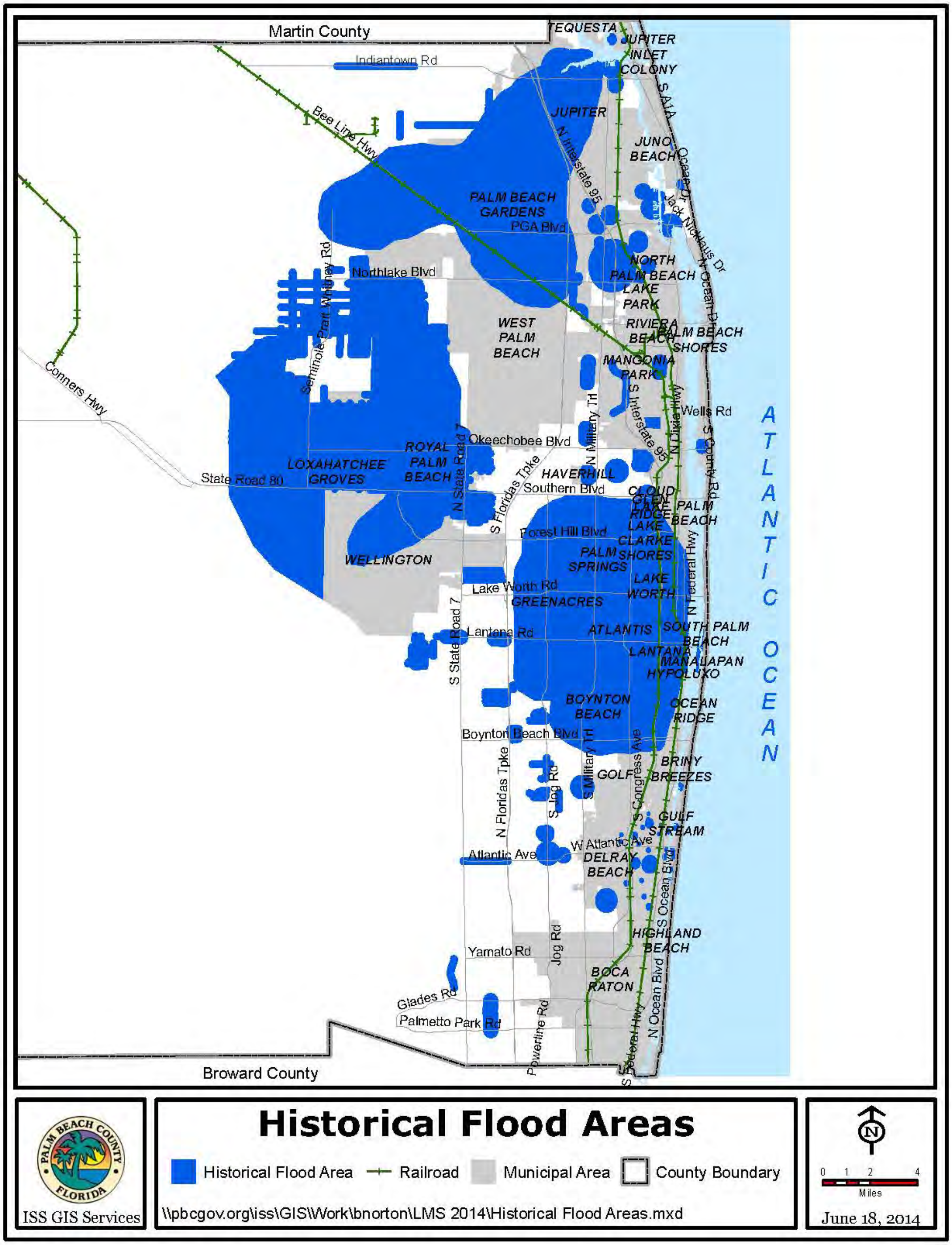
June 18, 2014


Historical Flood Areas
Historical Flood Area
Railroad
Municipal Area
County Boundary
Martin County
Broward County
ATLANTIC OCEAN
TEQUESTA
JUPITER INLET COLONY
JUPITER
JUNO BEACH
PALM BEACH GARDENS
NORTH PALM BEACH
LAKE PARK
RIVIERA BEACH
PALM BEACH SHORES
MANGONIA PARK
WEST PALM BEACH
ROYAL PALM BEACH
LOXAHATCHEE GROVES
WELLINGTON
HAVERHILL
CLOUD LAKE
GLEN RIDGE
PALM BEACH
LAKE CLARKE SHORES
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LAKE WORTH
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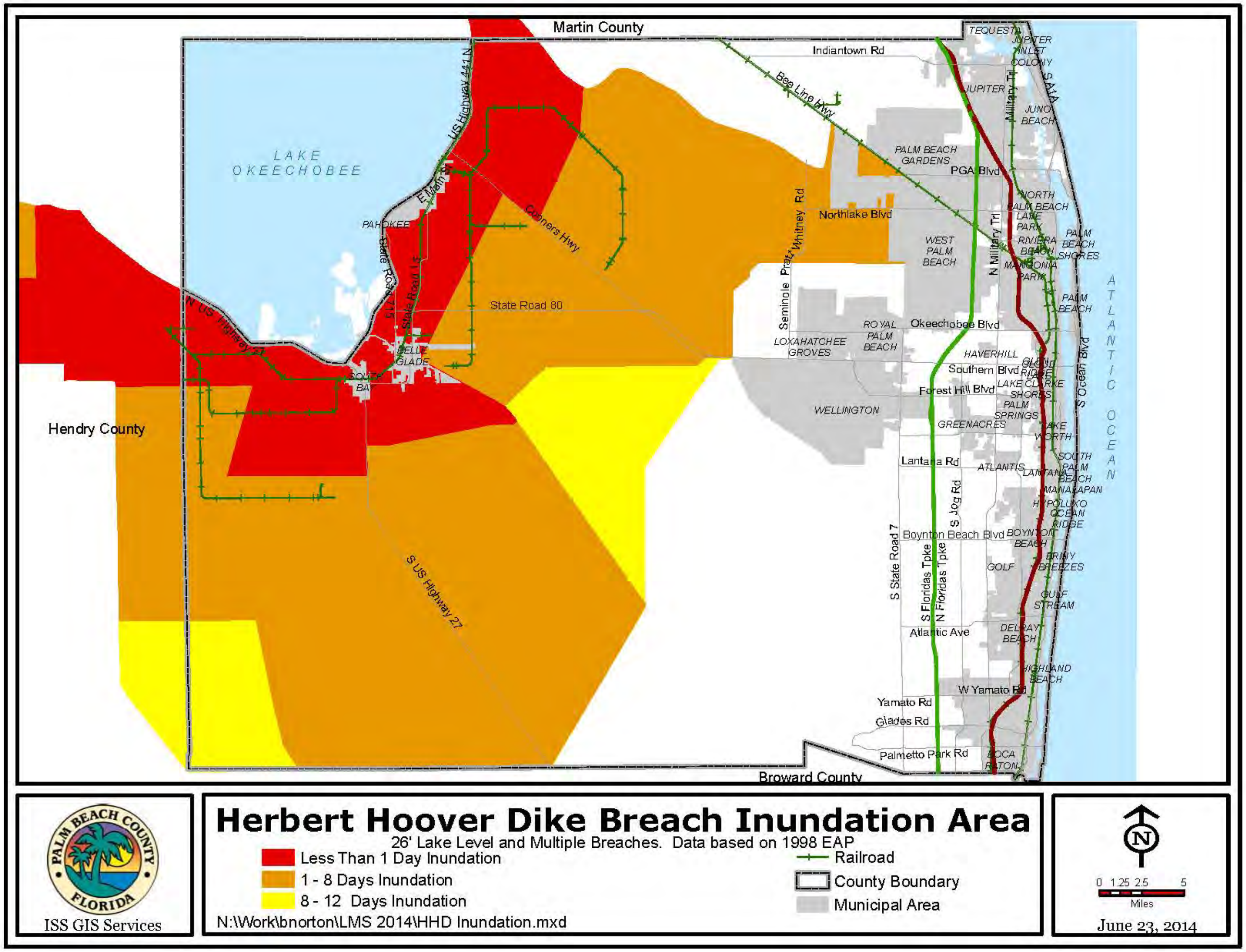
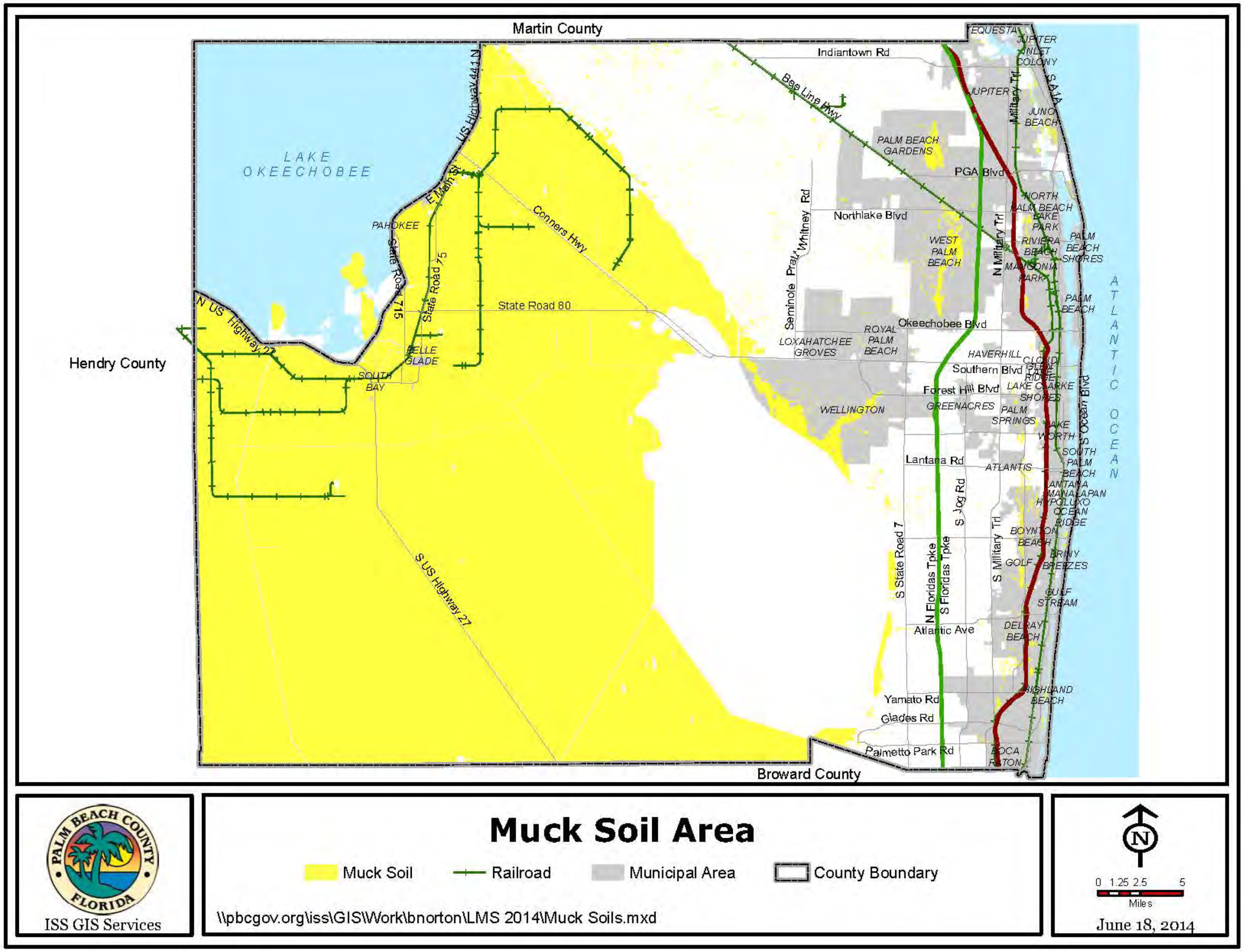
June 18, 2014


Herbert Hoover Dike Breach Inundation Area
26' Lake Level and Multiple Breaches. Data based on 1998 EAP
Less Than 1 Day Inundation
1 - 8 Days Inundation
8 - 12 Days Inundation
Railroad
County Boundary
Municipal Area
N:\Work\bnorton\LMS 2014\HHD Inundation.mxd
ISS GIS Services
June 23, 2014
Miles
Martin County
Broward County
Hendry County
LAKE OKEECHOBEE
ATLANTIC OCEAN
Indiantown Rd
Bee Line Hwy
PGA Blvd
Northlake Blvd
State Road 80
Okeechobee Blvd
Southern Blvd
Forest Hill Blvd
Lantana Rd
Boynton Beach Blvd
Atlantic Ave
W Yamato Rd
Yamato Rd
Glades Rd
Palmetto Park Rd
S US Highway 27
N US Highway 27
Conners Hwy
US Highway 441 N
Seminole Pratt Whitney Rd
S State Road 7
S Florida Tpke
N Florida Tpke
S Jog Rd
N Military Trl
S Ocean Blvd
WELLINGTON
ROYAL PALM BEACH
LOXAHATCHEE GROVES
WEST PALM BEACH
PALM BEACH GARDENS
JUPITER
TEQUESTA
JUNO BEACH
GREENACRES
ATLANTIS
GOLF
PAHOKEE
HAVERHILL
DELRAY BEACH
BOCA RATON
HIGHLAND BEACH
GULF STREAM
BRINY BREEZES
BOYNTON BEACH
PALM BEACH
LAKE WORTH


Muck Soil Area
Muck Soil
Railroad
Municipal Area
County Boundary
Martin County
Hendry County
Broward County
LAKE OKEECHOBEE
ATLANTIC OCEAN
PAHOKEE
BELLE GLADE
SOUTH BAY
ROYAL PALM BEACH
LOXAHATCHEE GROVES
WELLINGTON
WEST PALM BEACH
PALM BEACH GARDENS
JUPITER
JUNO BEACH
PALM BEACH
GREENACRES
LAKE WORTH
ATLANTIS
BOYNTON BEACH
DELRAY BEACH
HIGHLAND BEACH
BOCA RATON
State Road 80
Conners Hwy
Bee Line Hwy
Indiantown Rd
Northlake Blvd
PGA Blvd
Okeechobee Blvd
Southern Blvd
Forest Hill Blvd
Lantana Rd
Atlantic Ave
Yamato Rd
Glades Rd
Palmetto Park Rd
S US Highway 27
ISS GIS Services
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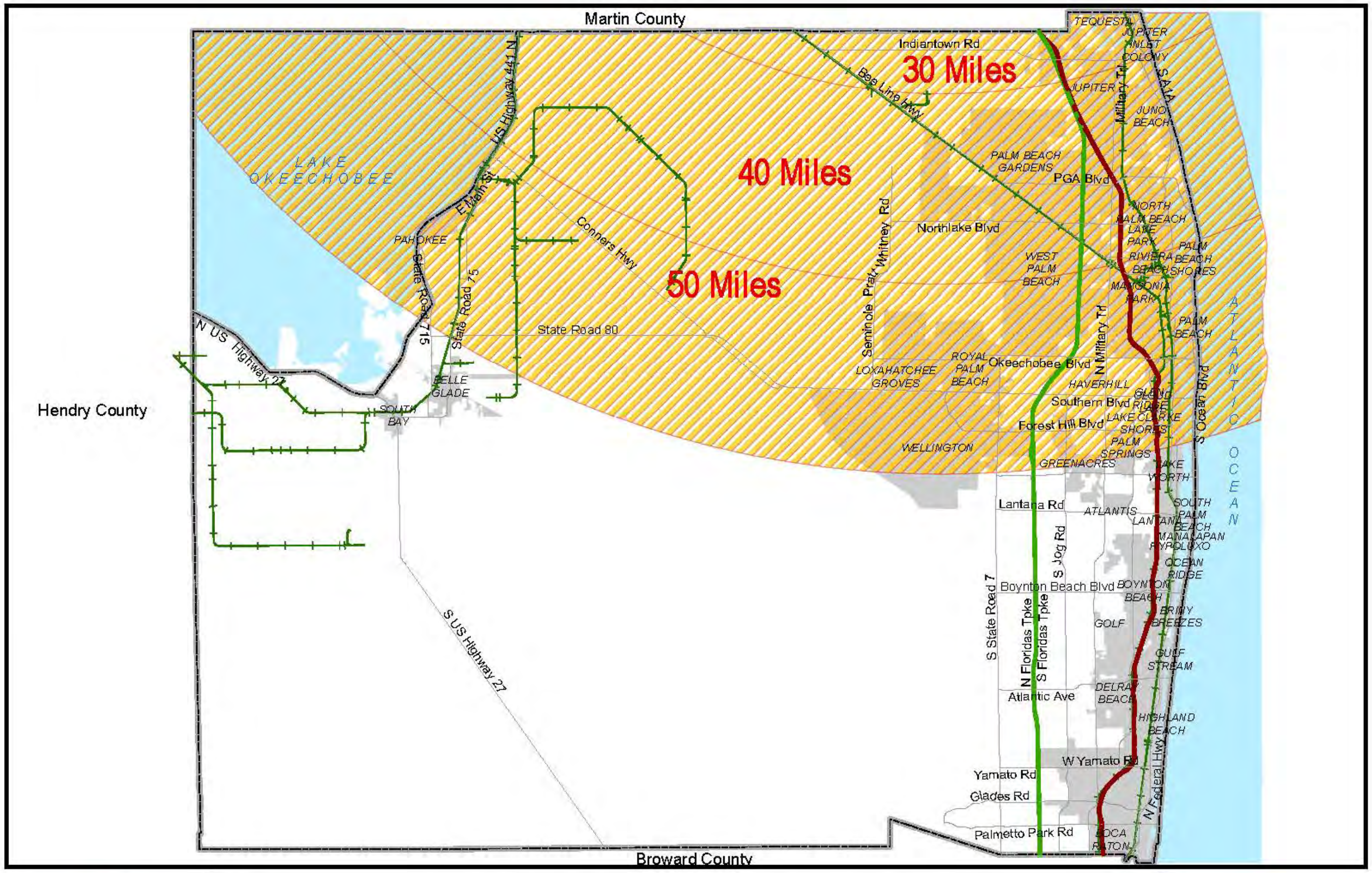
0 1.25 2.5 5
Miles
June 18, 2014



Radiological Hazard Area

St Lucie Nuclear Power Plant IPZ | Railroad | Municipal Area | County Boundary

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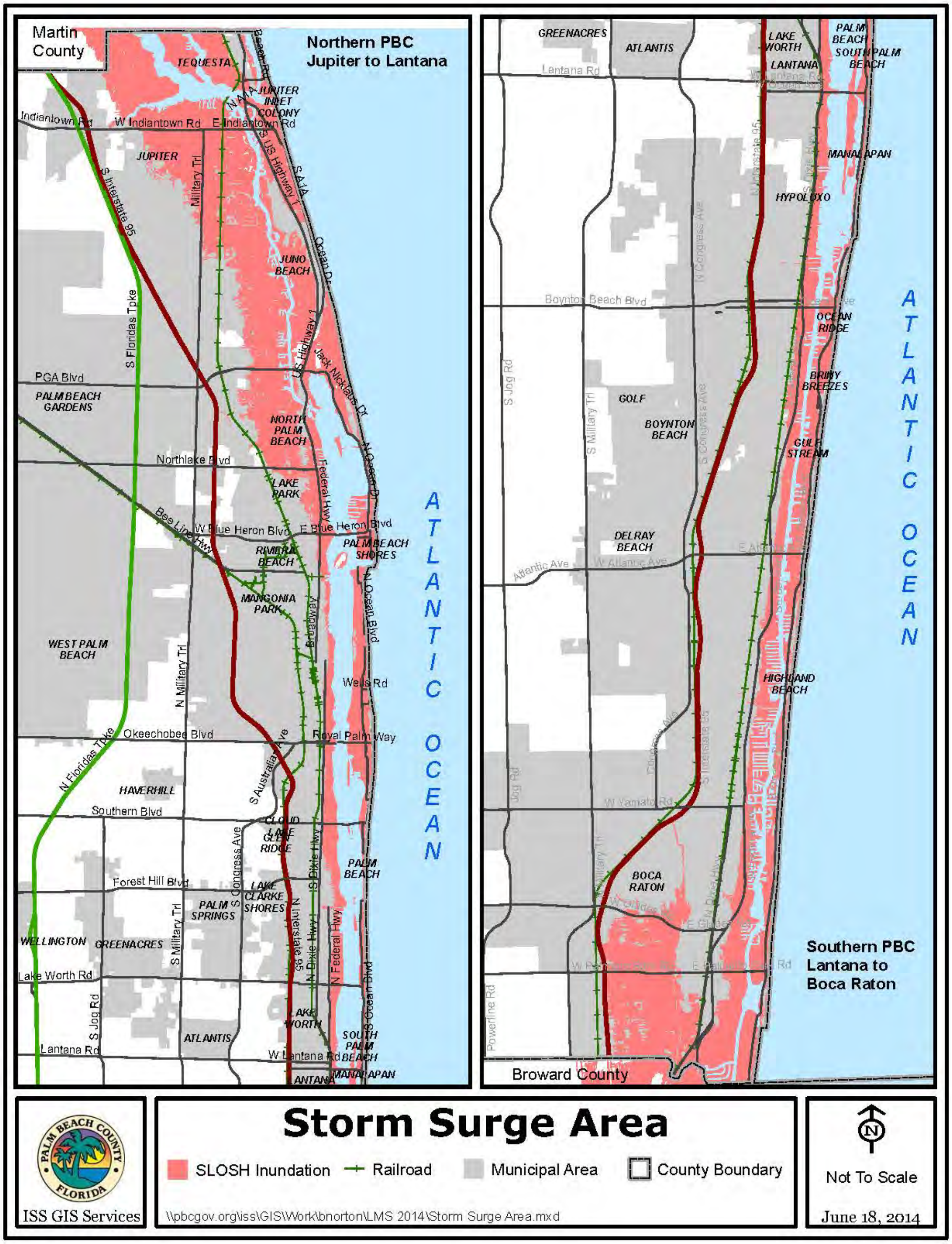
ISS GIS Services

0 1.25 2.5 5 Miles

June 18, 2014


Martin County
Northern PBC
Jupiter to Lantana
Southern PBC
Lantana to Boca Raton
Broward County
ATLANTIC OCEAN
Storm Surge Area
SLOSH Inundation
Railroad
Municipal Area
County Boundary
Not To Scale
ISS GIS Services
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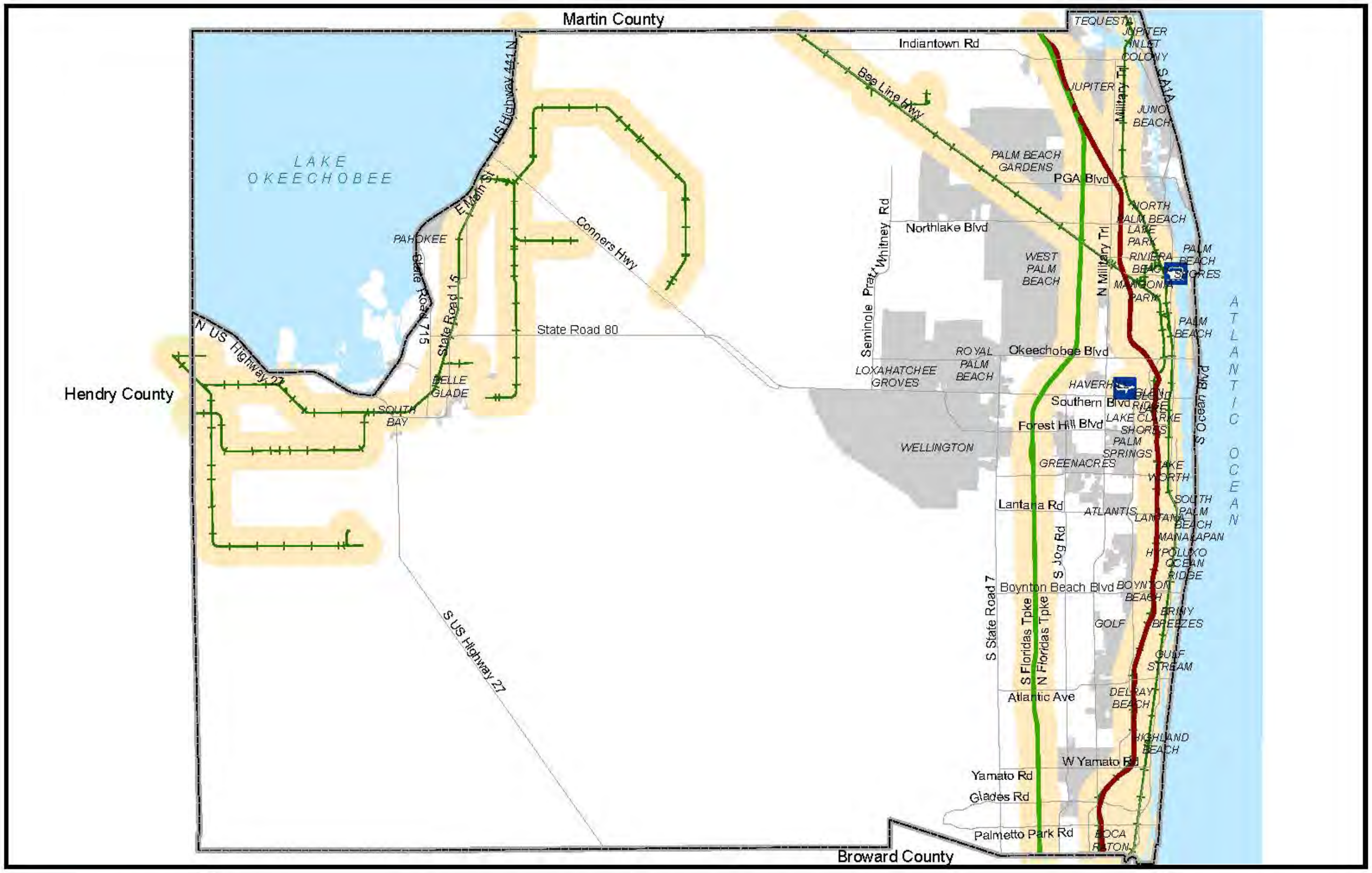
June 18, 2014



ISS GIS Services

Transportation Hazard Area

1 Mile Buffer of Transportation Mode
Airport
Port
Railroad
Municipal Area
County Boundary

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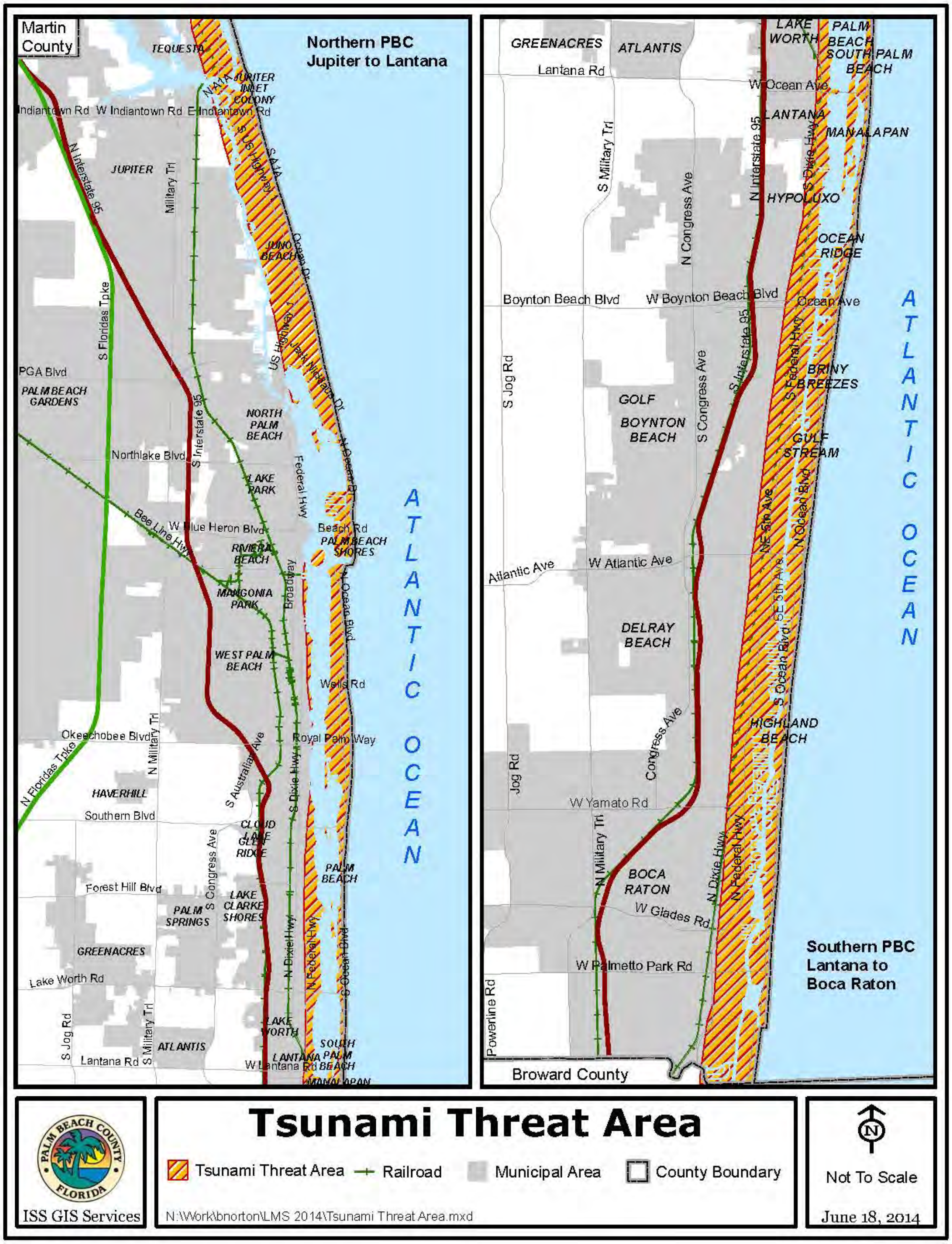
N
0 1.25 2.5 5
Miles

June 18, 2014


Northern PBC
Jupiter to Lantana
Martin County
TEQUESTA
JUPITER INLET COLONY
JUPITER
JUNO BEACH
PALM BEACH GARDENS
NORTH PALM BEACH
LAKE PARK
RIVIERA BEACH
PALM BEACH SHORES
MANGONIA PARK
WEST PALM BEACH
HAVERHILL
CLOUD LAKE
GLEN RIDGE
PALM BEACH
PALM SPRINGS
LAKE CLARKE SHORES
GREENACRES
LAKE WORTH
ATLANTIS
LANTANA
SOUTH PALM BEACH
MANALAPAN
Indiantown Rd
W Indiantown Rd
E Indiantown Rd
N Interstate 95
S Floridas Tpke
Military Trl
PGA Blvd
Northlake Blvd
S Interstate 95
Bee Line Hwy
W Blue Heron Blvd
Beach Rd
Broadway
Federal Hwy
US Highway 1
Ocean Dr
Okeechobee Blvd
N Military Trl
N Floridas Tpke
S Australian Ave
Royal Palm Way
Wells Rd
Southern Blvd
S Congress Ave
Forest Hill Blvd
Lake Worth Rd
S Jog Rd
S Military Trl
Lantana Rd
W Lantana Rd
N Dixie Hwy
N Federal Hwy
ATLANTIC OCEAN
GREENACRES
ATLANTIS
LAKE WORTH
PALM BEACH
SOUTH PALM BEACH
Lantana Rd
W Ocean Ave
LANTANA
MANALAPAN
S Military Trl
N Congress Ave
N Interstate 95
HYPOLUXO
OCEAN RIDGE
Boynton Beach Blvd
W Boynton Beach Blvd
Ocean Ave
S Jog Rd
S Congress Ave
S Interstate 95
S Federal Hwy
BRINY BREEZES
GOLF
BOYNTON BEACH
GULF STREAM
NE 5th Ave
N Ocean Blvd
Atlantic Ave
W Atlantic Ave
DELRAY BEACH
HIGHLAND BEACH
Congress Ave
Jog Rd
W Yamato Rd
N Military Trl
BOCA RATON
W Glades Rd
N Dixie Hwy
N Federal Hwy
W Palmetto Park Rd
Powerline Rd
Broward County
Southern PBC
Lantana to Boca Raton
ATLANTIC OCEAN
PALM BEACH COUNTY FLORIDA
ISS GIS Services
Tsunami Threat Area
Tsunami Threat Area
Railroad
Municipal Area
County Boundary
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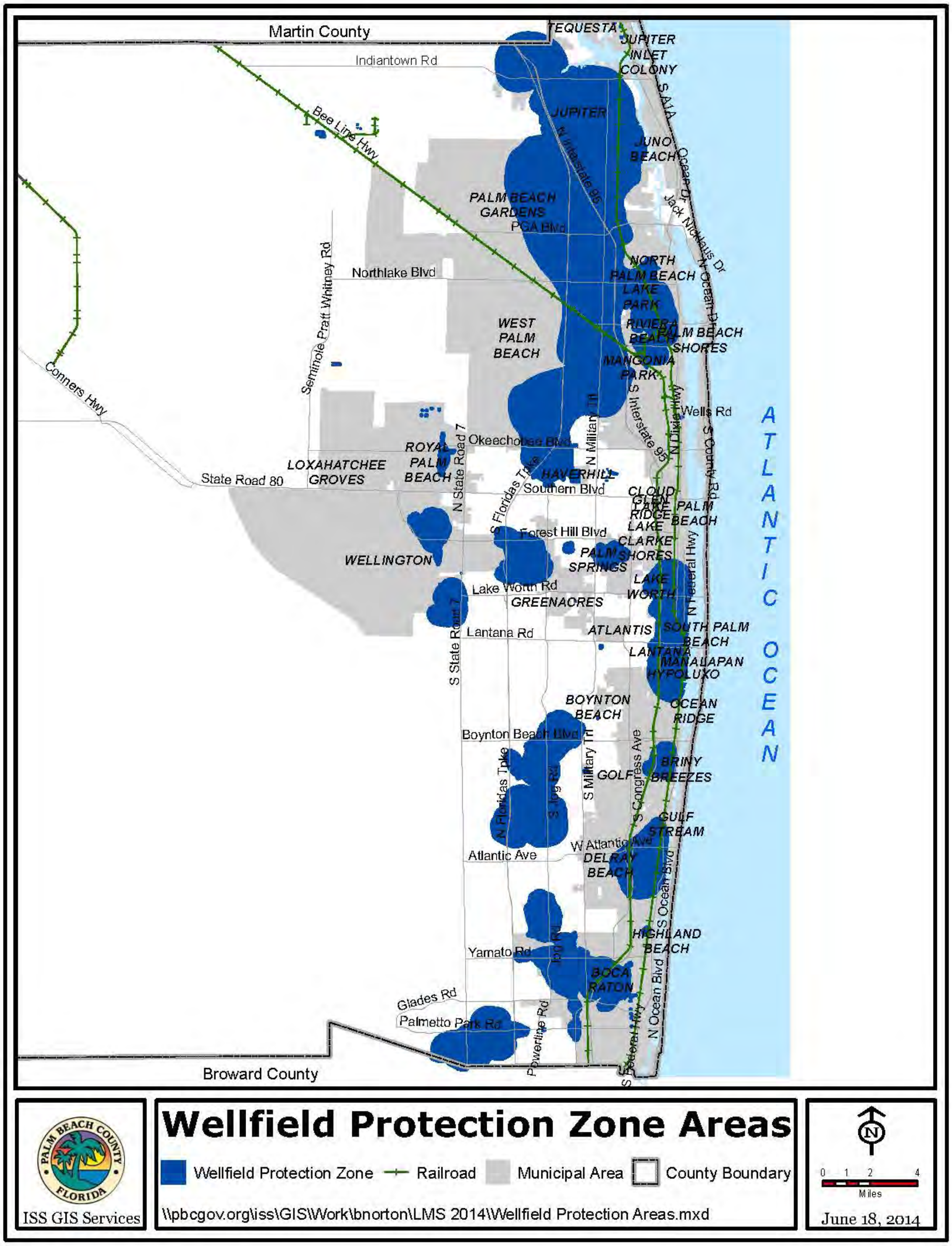
N
Not To Scale
June 18, 2014


Wellfield Protection Zone Areas
Wellfield Protection Zone
Railroad
Municipal Area
County Boundary
Martin County
Broward County
ATLANTIC OCEAN
JUPITER
PALM BEACH GARDENS
WEST PALM BEACH
WELLINGTON
ROYAL PALM BEACH
LOXAHATCHEE GROVES
BOYNTON BEACH
DELRAY BEACH
BOCA RATON
ISS GIS Services
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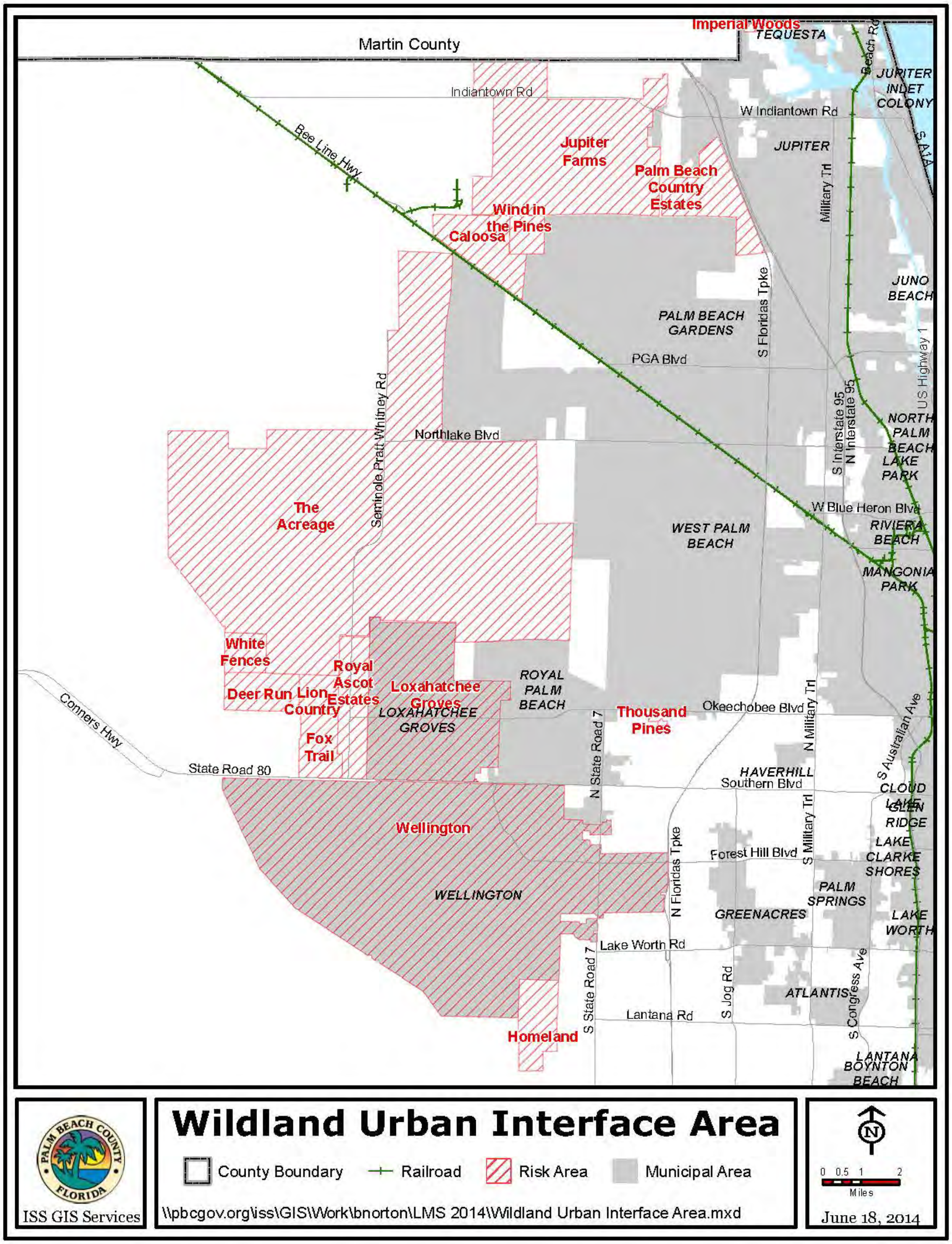
Miles
June 18, 2014


Martin County
Imperial Woods
TEQUESTA
JUPITER INLET COLONY
Indiantown Rd
W Indiantown Rd
Bee Line Hwy
Jupiter Farms
JUPITER
Palm Beach Country Estates
Wind in the Pines
Caloosa
JUNO BEACH
PALM BEACH GARDENS
S Floridas Tpke
PGA Blvd
Military Trl
US Highway 1
Seminole Pratt Whitney Rd
Northlake Blvd
S Interstate 95
N Interstate 95
NORTH PALM BEACH
LAKE PARK
W Blue Heron Blvd
RIVIERA BEACH
The Acreage
WEST PALM BEACH
MANGONIA PARK
White Fences
Royal Ascot Estates
Deer Run
Lion Country
Loxahatchee Groves
LOXAHATCHEE GROVES
ROYAL PALM BEACH
Thousand Pines
Okeechobee Blvd
Conners Hwy
Fox Trail
N State Road 7
N Military Trl
S Australian Ave
State Road 80
HAVERHILL
Southern Blvd
CLOUD LAKE
GLEN RIDGE
Wellington
Forest Hill Blvd
LAKE CLARKE SHORES
WELLINGTON
N Floridas Tpke
S Military Trl
PALM SPRINGS
GREENACRES
LAKE WORTH
Lake Worth Rd
S State Road 7
S Jog Rd
ATLANTIS
S Congress Ave
Lantana Rd
Homeland
LANTANA
BOYNTON BEACH
Wildland Urban Interface Area
County Boundary
Railroad
Risk Area
Municipal Area
ISS GIS Services
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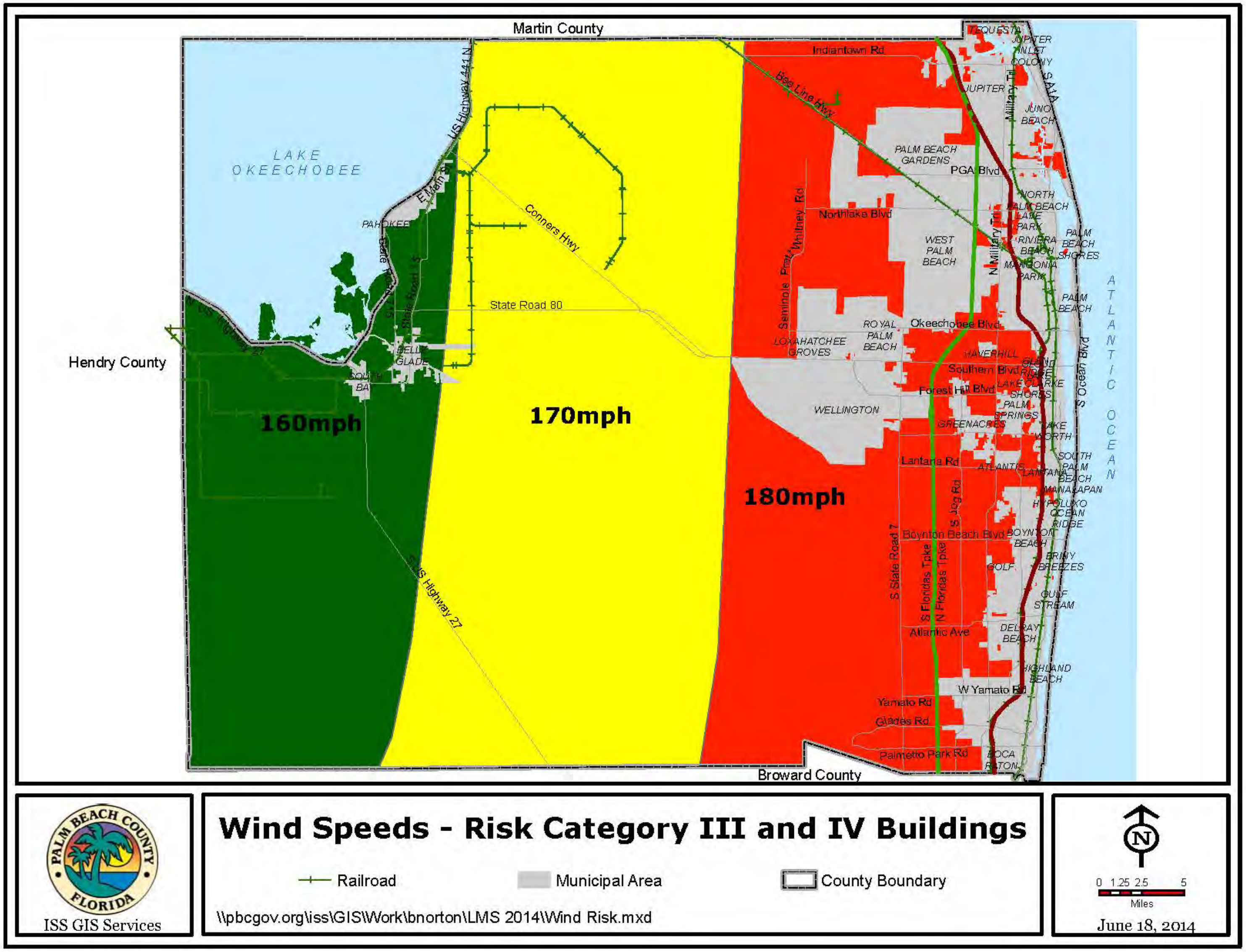
0 0.5 1 2
Miles
June 18, 2014


Wind Speeds - Risk Category III and IV Buildings
Railroad
Municipal Area
County Boundary
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ISS GIS Services
June 18, 2014
0 1.25 2.5 5
Miles
Martin County
Hendry County
Broward County
LAKE OKEECHOBEE
ATLANTIC OCEAN
160mph
170mph
180mph
Indiantown Rd
Bee Line Hwy
Conners Hwy
State Road 80
US Highway 441 N
US Highway 27
PGA Blvd
Northlake Blvd
Okeechobee Blvd
Southern Blvd
Forest Hill Blvd
Lantana Rd
Boynton Beach Blvd
Atlantic Ave
W Yamato Rd
Yamato Rd
Glades Rd
Palmetto Park Rd
S State Road 7
S Ocean Blvd
PAHOKEE
BELLE GLADE
JUPITER
PALM BEACH GARDENS
WEST PALM BEACH
ROYAL PALM BEACH
LOXAHATCHEE GROVES
WELLINGTON
GREENACRES
BOYNTON BEACH
DELRAY BEACH
BOCA RATON