COASTAL MAPPING
ADMINISTRATIVE PROCEDURES
MANUAL

Coastal High Hazard, Coastal Evacuation, and
Coastal Planning Areas

October 13, 2020

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INTRODUCTION

The Administrative Procedures Manual contains supplemental details used in the administration of Manatee County's Comprehensive Plan and Land Development Code (LDC) as it relates to mapping the boundaries of Manatee County's Coastal High Hazard Area (CHHA), Coastal Evacuation Area (CEA), and Coastal Planning Area (CPA).

The manual is organized to support and comply with the intent of Chapter 4 Zoning of the LDC, as well as implement the goals, policy and objectives of Elements 2 Future Land Use and 4 Coastal of the Comprehensive Plan. This manual does not repeat the text contained within with the LDC or Comprehensive Plan, so it is important to reference the current version of both, in addition to the current version of this manual.

LEGISLATIVE FINDINGS, RELIANCE ON STUDY(S) AND INTENT

The Board of County Commissioners approved this manual by Resolution 20-xx. The most recent Sea, Lake and Overland Surges from Hurricanes (SLOSH) model data is from May 2016. In Manatee County, the coastal areas are defined in Chapter 2 of the LDC, with regulations codified in Chapter 4 of the LDC. It is the intent of Manatee County to have administrative decisions governed by specific criteria, the findings and legislative intent to guide implementation and administration of coastal evacuation mapping.

MAP TYPES INCLUDED

The procedures contained in this document apply to the following maps:

- Coastal High Hazard Area (CHHA)
- Coastal Evacuation Area (CEA)
- Coastal Planning Area (CPA)

CONFLICTS

In the event of a conflict between the regulations in the Administrative Procedures Manual and the provisions in the Comprehensive Plan, in all instances the Comprehensive Plan shall supersede these regulations.

DEFINITIONS

In addition to the definitions contained in Chapter 2 of the Manatee County LDC, and Element 1 of the Manatee County Comprehensive Plan, the following definitions shall apply:

MEOW: The Maximum Envelope of Water (MEOW) provides a worst-case basin snapshot for a particular storm category, forward speed, trajectory, and initial tide level, incorporating uncertainty in forecast landfall location. These products are compiled when a SLOSH basin is developed or updated. MEOWs are not storm specific and are available to view in the SLOSH display program for all operational basins. No single hurricane will produce the regional flooding depicted in the MEOWs. Instead, the product is intended to capture the worst-case high-water value at a particular location for hurricane evacuation planning.

SLOSH: The Sea, Lake and Overland Surges from Hurricanes (SLOSH) model is a computerized numerical model developed by the National Weather Service (NWS) to estimate storm surge heights resulting from historical, hypothetical, or predicted hurricanes by taking into account the atmospheric pressure, size, forward speed, and track data.

LIDAR: Is a method for measuring distances (ranging) by illuminating the target with laser light and measuring the reflection with a sensor.

NAVD 88: Is the vertical datum for orthometric heights established for vertical control surveying in the United States of America based upon the General Adjustment of the North American Datum of 1988. It superseded the National Geodetic Vertical Datum of 1929 (NGVD 29), previously known as the Sea Level Datum of 1929.

ACRONYMS/ABBREVIATIONS

AMSL	Above Mean Sea Level
BFE	Base Flood Elevation
CEMP	Comprehensive Emergency Management Plan
CEA	Coastal Evacuation Area
CHHA	Coastal High Hazard Area
CPA	Coastal Planning Area
EHPA	Enhanced Hurricane Protection Area
FBC	Florida Building Code
FDEM	Florida Division of Emergency Management
FEMA	Federal Emergency Management Agency
LDC	Land Development Code
LIDAR:	Light Detection and Ranging (data)
LMS	Local Mitigation Strategy Plan
MEOW	Maximum Envelope of Water
NHC	National Hurricane Center
NAVD	North American Datum
NWS	National Weather Service
SESP	State Emergency Shelter Plan
SLOSH	Sea, Land and Overland Surges from Hurricanes
SRES	Statewide Regional Evacuation Study
TBRPC	Tampa Bay Regional Planning Council

POINT OF CONTACT

Questions regarding data, applicability, supporting documents and processes, should be directed to:

Manatee County Emergency Management
P.O. Box 1000
Bradenton, Florida 34206
Emergency.Management@mymanatee.org
(941) 749-3507

COASTAL MANAGEMENT ELEMENT OBLIGATION

As a coastal county, Manatee County is identified in Section 380.24, F.S. to be required to adopt a Coastal Management Element meeting the requirements of the applicable statutes. The Coastal Management Element is required to address certain objectives, including protecting human life against the effects of natural disasters and limiting public expenditures that subsidize development in coastal high hazard areas. (Section 163.3177(6)(g), F.S.)

The Florida Legislature has made legislative findings that in the event of natural disaster, the State may provide financial assistance to local governments for the reconstruction of roads, sewer systems, and other public facilities. However, one of the requirements to enable Manatee County to be eligible for such financial assistance is to have a Comprehensive Plan that restricts development activities where such activities would damage or destroy coastal resources and such plans must protect human life and limit public expenditures in areas that are subject to destruction by natural disaster. (Section 163.3178(1), F.S.)

Sea, Lake and Overland Surges from Hurricanes (SLOSH)

The NWS updates SLOSH models on a regular basis as an area experiences natural changes in the shoreline or new structures are built (such as levees). The NHC regards the Composite Approach – a method which predicts surge by running SLOSH several thousand times with hypothetical hurricanes under different storm conditions, as the best approach for determining storm surge vulnerability since it takes into account forecast uncertainty. This approach plays an integral role in emergency management as they form the basis for the development of the nation's evacuation zones/levels.

COASTAL MAPPING DETERMINATION

This section of the manual clarifies the manner in which those sections of the LDC are to be implemented to maintain consistency with Florida law and generally accepted mapping of the boundary areas.

Per Florida Statute, the Florida Division of Emergency Management (FDEM) shall manage the update of the regional hurricane evacuation studies, ensure such studies are done in a consistent manner, and ensure that the methodology used for modeling storm surge is that used by the NHC. Local governments have the following authorities and responsibilities:

a. Safeguarding the life and property of its citizens is an innate responsibility of the governing body of each political subdivision of the State,

b. Directing timely evacuation,

c. Determining how to safely evacuate the density of coastal population. (e.g. Evacuation Maps), and

d. Evacuate and shelter at-risk citizens during an emergency or disaster

Section 403.8 of the LDC describes the purpose, approximate boundaries, use limitations, prohibited activities, and other development restrictions for land located in the coastal overlay districts - the CHHA, CEA, and CPA.

Coastal High Hazard Area (CHHA)

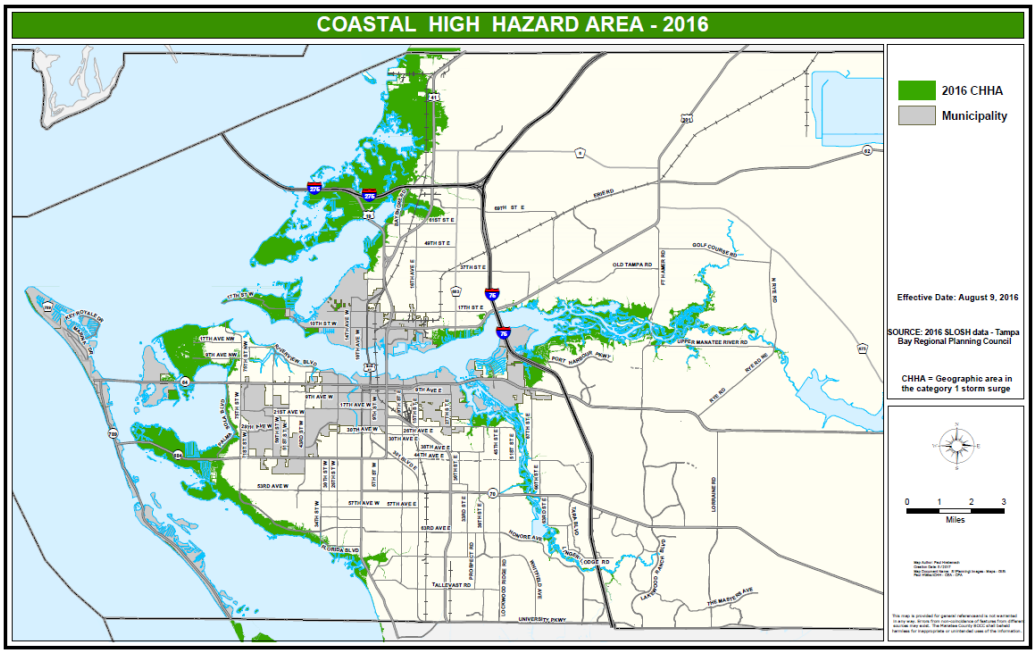
The designation of CHHA is defined by the Florida Statute as: "The area below the elevation of the Category 1 storm surge line as established by a SLOSH computerized storm surge model". (Section 163.3178(1)(h) F.S.)

The County is required to base the update of the boundaries of the CHHA Map upon the most relevant and appropriate data and analysis available at the time of adoption of the Map Amendment. The data must be taken from a professionally accepted source. (Section 163.3177(1)(f)1. and 2. F.S.)

The FDEM, Division of Community Planning (now Department of Economic Opportunity) and Department of Transportation in coordination with the Tampa Bay Regional Planning Council (TBRPC) published the *2010 Statewide Regional Evacuation Study for the Tampa Bay Region* on August 26, 2010. The computerized storm surge model known as the SLOSH model was calibrated based on the 2009 LIDAR data **– the latest information at that time**. The LIDAR has a vertical accuracy of the laser mapping that is within 15-centimeter tolerance.

The SLOSH model coverage is subdivided into 32 regions or basins and in 2016, the NHC added a new region or basin to the model. With the addition of a new basin along the west coast of Florida, the data produced more inundation than the 2009 model. As such, a new CHHA map was produced by TBRPC.

The result of the SLOSH model is the mapping of the CHHA Overlay Map - Category 1 storm surge. (Map included below is meant as a representation only. Official copy shall be as formally adopted in the Manatee County Comprehensive Plan.)

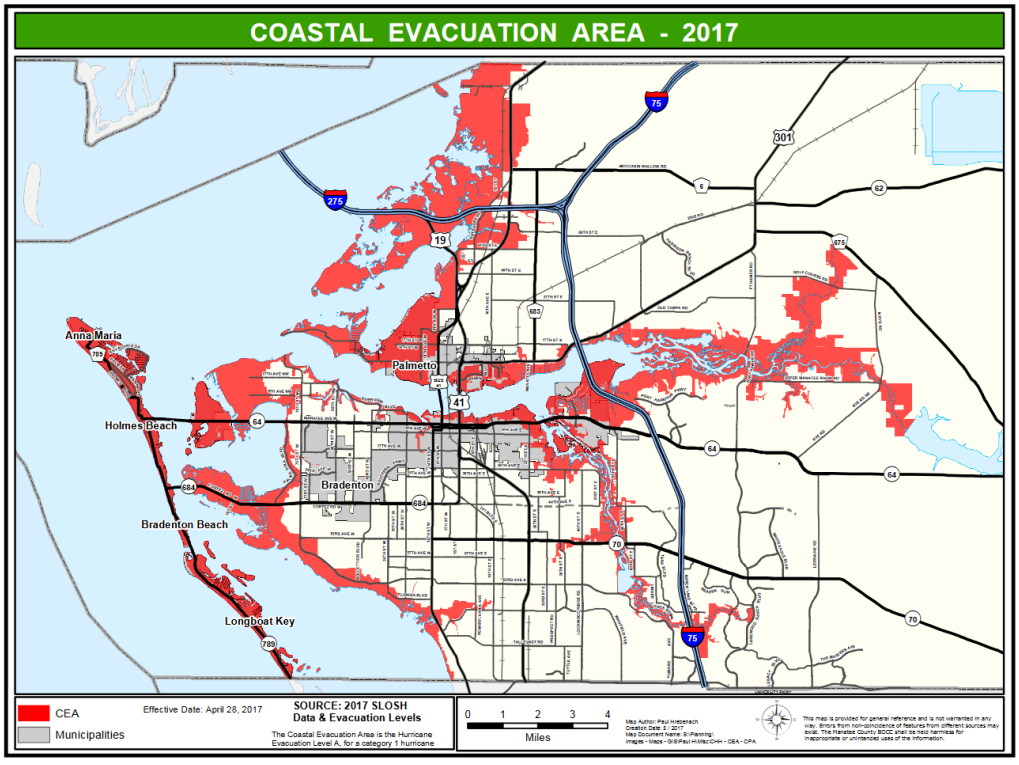


Coastal Evacuation Area (CEA)

The designation of the CEA is evacuation Level A, established based on the Category 1 storm surge, as established in the regional hurricane evacuation study applicable to Manatee County and as updated on a periodic basis.

The CEA map implements the purpose of the CEA Overlay District – Comprehensive Plan Policy 2.2.2.4.1 – to minimize the effect of development on the evacuation of population from Zone A during Category 1 hurricane, as well as implements Policy 2.2.2.4.2.a – limit population in the CEA Overlay District. (Map included below is meant as a representation only. Official copy shall be as formally adopted in the Manatee County Comprehensive Plan.)

The goal of an evacuation is to move as few people as needed the shortest distance to safety. Zone-based evacuation plans can be most effective in meeting this goal. They reduce resource burdens, facilitate re-entry, and accelerate the transition to recovery. A zone-based approach requires emergency managers and the whole community to work together to understand and coordinate evacuation and shelter-in-place actions, and make informed decisions based on the appropriate transportation models. These protective actions support all-hazards planning, whether for hurricanes, wildfires, floods, chemical spills, or civil unrest. Situational awareness and flexibility of plans, along with an educated public, allow each state, local, tribal, and territorial partner to customize its preparation and response efforts.

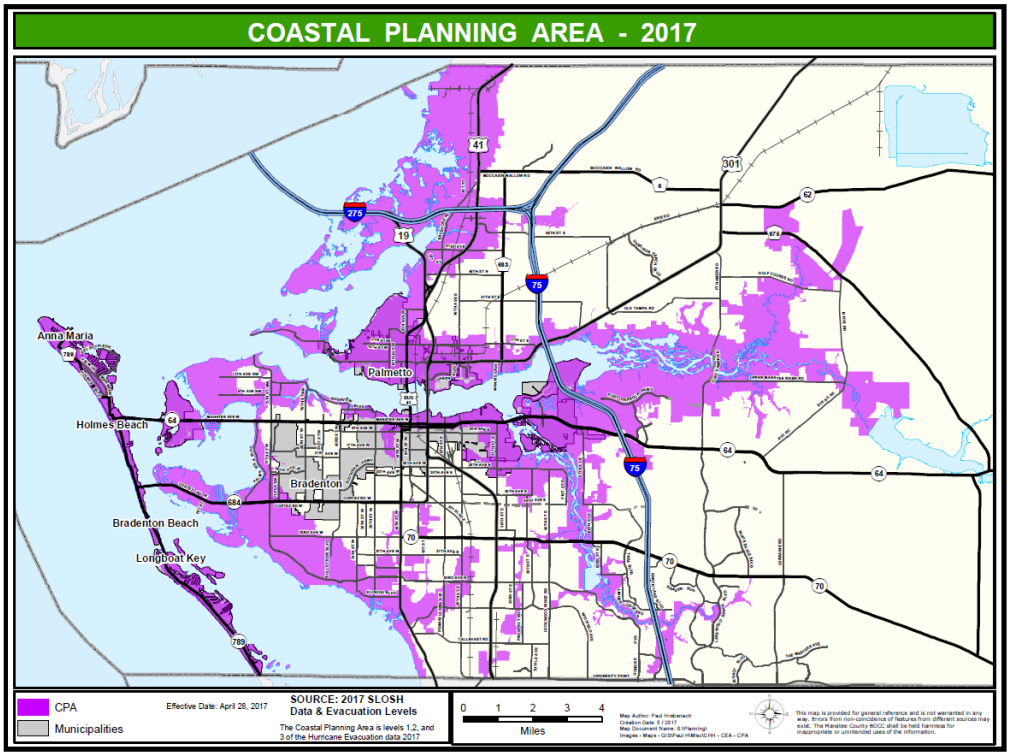


Coastal Planning Area (CPA)

The designation of the CPA is defined as the geographic area of the County which lie within the Hurricane Vulnerability Area (evacuations levels A, B and C), as updated on a periodic basis.

The CPA map implements the Comprehensive Plan Goal 4.3 – to protect the residents and property within the CPA from the physical and economic impact of natural disasters, as well as implements Policy 2.2.2.4.2.a – limit population in the CEA Overlay District and Policy 4.3.1.1 – direct population concentrations away from the CEA. (Map included below is meant as a representation only. Official copy shall be as formally adopted in the Manatee County Comprehensive Plan.)

While the primary reason for creating evacuation levels and/or maps is for hurricanes, residents, businesses, and visitors may also need to be evacuated in the event of freshwater flooding or other hazards. Manatee County's Department of Public Safety and the Division of Emergency Management encourages and facilitates planning processes that establish and emphasizes the importance of preparing a framework through which Manatee County prepares, responds, recovers, and mitigates the impacts of a wide variety of disasters that could adversely affect the health, safety and/or general welfare of residents, businesses, and visitors.



Evacuation Levels and Storm Surge

There are five (5) surge levels, ranked by the risk of storm surge impact. Evacuation levels are classified using letters A through E, with areas that are not located within a hurricane evacuation level being declared, "outside of the evacuation area," or N/A. Storm surge inundation heights range from ground level up to 33 feet. Evacuation Level A is considered to be "lower" than Evacuation Level E, and Level A will evacuate first.

Tropical storms and hurricanes produce strong winds that push seawater ashore, creating deadly storm surge. Storm surge inundation describes the height of water above ground level. In Manatee County, storm surge inundation is communicated through ranges of heights known as hurricane evacuation levels.

High tide, wave action, freshwater flooding, and rainfall will add additional flooding risks to saltwater storm surge issues as these threats are not captured with the categorized A through E levels.

Evacuation Levels	Instructions	Storm Surge Height NAVD 1988
Level A	Evacuate red areas and all manufactured homes	Up to 11 ft.
Level B	Evacuate red and orange areas and all manufactured homes	Up to 15 ft.
Level C	Evacuate red, orange and yellow areas and all manufactured homes	Up to 18 ft.
Level D	Evacuate red, orange, yellow and green areas and all manufactured homes	Up to 28 ft.
Level E	Evacuate red, orange, yellow, green and blue areas and all manufactured homes	Up to 34 ft.

COASTAL MAPPING

This section describes the responsibilities of the various individuals and groups involved in the review, methodology, and production of mapping the boundaries of the three coastal areas.

Responsibilities of Individuals

1. **The National Weather Service**
   NWS develops a computerized model known as the SLOSH model to estimate storm surge heights resulting from historical, hypothetical, or predicted hurricanes by considering the atmospheric pressure, size, forward speed, and track data. This data is provided to TBPRC for them to map data surge zones for each County in the region.

2. **Tampa Bay Regional Planning Council**
   TBPRC is responsible for producing Storm Tide Zones for each County in the region based on latest SLOSH model data. This data is provided to each County in the region for further jurisdiction-specific mapping efforts.

3. Manatee County

The Chief of the Emergency Management Division is responsible for assigning a Project Manager from the Emergency Management Division. The duties of the Project Manager are as follows:

a. The Project Manager is the first point of contact and is responsible for overseeing the coordination with the Geographic Information Systems (GIS) staff member(s) assigned to assist with mapping efforts, as well as responsible for coordinating reviews performed by other departments, and taking an application through the legislative public hearings for Comprehensive Plan Map Amendments.
b. The Project Manager is responsible for overseeing a county-wide advertisement campaign to ensure the public is informed of the updated maps.
c. The Project Manager is responsible for ensuring the maps are correctly displayed on the County website, which includes the Learn Your Level interactive map.
d. The Project Manager is responsible for seeing that the pertinent information from the coastal maps is correctly displayed on the All Hazards Disaster Planning Guide.

Standard Operating Procedures

The Emergency Management Division of the Public Safety Department compares the surge data on the SLOSH model maps to local county parcel maps to determine evacuation levels. While the SLOSH models provide a local assessment of storm surge risk, they do not provide complete certainty.

Upon receipt of updated SLOSH computerized storm surge model data, the following Manatee County Standard Operating Procedures shall be followed when mapping the boundaries of the CHHA, CEA and CPA:

1. The Project Manager shall provide the current/latest MEOW lines to the assigned Manatee County GIS employee, so additional data layers may be provided for consideration. Additional data layers include, but shall not be limited to, roads, buildings, and evacuation routes.
2. Once the GIS employee provides the data maps to the Project Manager as described above, the Project Manager shall follow the methods described below when determining the exact delineation of each Evacuation Level:

a. Coastal High Hazard Area

i. The Category 1 storm surge line, as established by the SLOSH computerized storm surge model, shall be mapped as the boundary of the CHHA. The County shall base the update of the boundaries of the CHHA Map upon the most relevant and appropriate data and analysis available at the time of adoption of the Comprehensive Plan Map Amendment.
ii. No other additional information shall be considered when mapping the CHHA other than what is required per Florida Statute.
iii. Once the new boundaries are established and the map is deemed finalized for implementation, the latest boundaries of the CHHA shall be formally adopted into the Comprehensive Plan per requirements set forth in Florida Statute, Manatee County Land Development Code and Comprehensive Plan.

b. Coastal Evacuation Area

i. Any property where the Category 1 storm surge crosses the property line, which results in storm surge inundation inward of the property lines, the entire property shall be mapped as Evacuation Level A.
ii. Any property where both the Category 1 and Category 2 storm surge crosses the property line, which results in inundation for both storm surges levels being inward of the property lines, the entire property shall be mapped as Evacuation Level A – the most conservative/earliest evacuation level.
iii. Any street, right-of-way, access lane, drive aisle or other form of vehicular travel area which results in Category 1 storm surge inundation being mapped into said area, the entire width of said area shall be mapped as Evacuation Level A.
iv. Any street, right-of-way, access lane, drive aisle or other form of vehicular travel area which results in both Category 1 and Category 2 storm surge inundation being mapped into said area, the entire width of said area shall be mapped as Evacuation Level A- the most conservative/earliest evacuation level.
v. If a more intense area of category storm surge inundation and/or evacuation level (e.g. Cat 1/Evac A) occur on the street, right-of-way, access lane, drive aisle or other form of vehicular travel area where a property gains access from, and the property itself contains no area of storm surge inundation at all, the property shall be mapped as Evacuation Level A.
vi. Any property that contained Category 1 storm surge inundation on a previous SLOSH storm surge model, that contains no inundation on the current/latest model, shall be removed from Evacuation Level A and mapped as No Evacuation Level or N/A.
vii. No exception shall be given to properties which contain structures built under newer building codes or include increased mitigation measures such as hurricane impact windows and elevated structures. Given the threat of surge and flooding affects associated with surge, properties determined to be mapped as Evacuation Level A according to the methodology defined above, shall remain mapped in the Evacuation Level A.
viii. Once the new boundaries are established and the map is deemed finalized for implementation, the latest boundaries of the CEA shall be formally adopted into the Comprehensive Plan per requirements set forth in Florida Statute, Manatee County Land Development Code and Comprehensive Plan.

c. Coastal Planning Area

i. Any property where the Category 1 storm surge crosses the property line, which results in storm surge inundation inward of the property lines, the entire property shall be mapped as Evacuation Level A.
ii. Any property where the Category 2 storm surge crosses the property line, which results in storm surge inundation inward of the property lines, the entire property shall be mapped as Evacuation Level B.
iii. Any property where the Category 3 storm surge crosses the property line, which results in storm surge inundation inward of the property lines, the entire property shall be mapped as Evacuation Level C.
iv. Any property that contains more than one category of storm surge inundation inward of the property lines, the entire property shall be mapped as the most conservative/earliest evacuation level. (e.g. Cat 2 & 3 storm surge inundation present on property = entire property mapped as Evacuation Level B.)

v. Any street, right-of-way, access lane, drive aisle or other form of vehicular travel area which results in Category 2 storm surge inundation being mapped into said area, the entire width of said area for the entire length of the inundation area shall be mapped as Evacuation Level B.

vi. Any street, right-of-way, access lane, drive aisle or other form of vehicular travel area which results in both Category 2 and Category 3 storm surge inundation being mapped into said area, the entire width of said area shall be mapped as Evacuation Level B- the most conservative/earliest evacuation level.

vii. If a more intense area of category storm surge inundation and/or evacuation level occur on the street, right-of-way, access lane, drive aisle or other form of vehicular travel area where a property gains access from, and the property itself contains a lesser/later category, or no area of storm surge inundation, the property shall be mapped equal to the evacuation level assigned to the street.

viii. Any property that contained a more intense storm surge inundation on a previous SLOSH storm surge model, that contains a lesser or no inundation on the current/latest model, shall be mapped with an evacuation level according to the current/latest model.

ix. No exception shall be given to properties which contain structures built under newer building codes or include increased mitigation measures such as hurricane impact windows and elevated structures. Given the threat of surge and flooding affects associated with surge, properties shall remain mapped per according to the methodology defined above.

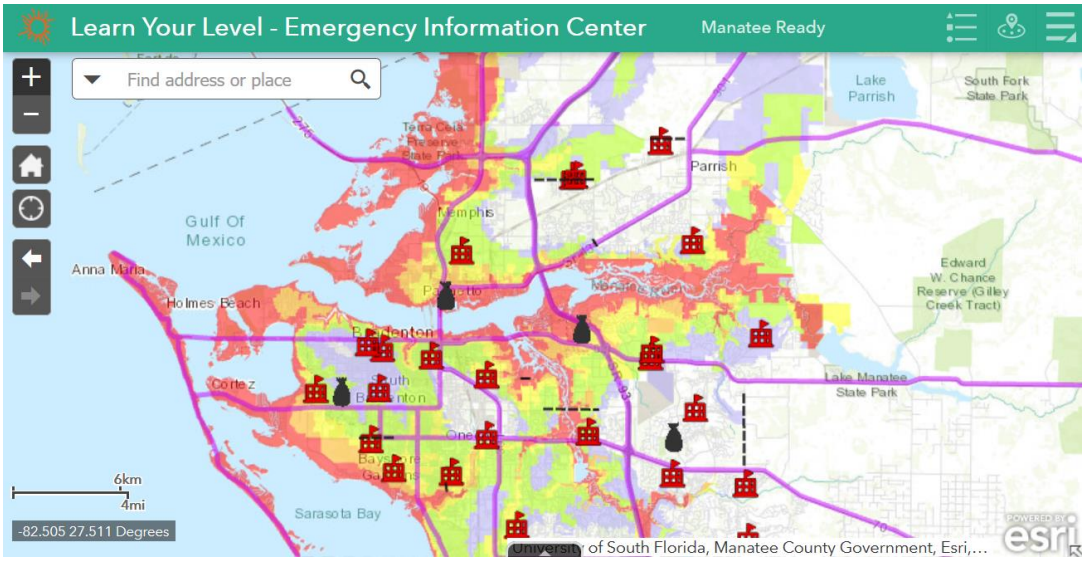
x. Once the new boundaries are established and the map is deemed finalized for implementation, the latest boundaries of the CPA shall be formally adopted into the Comprehensive Plan per requirements set forth in Florida Statute, Manatee County Land Development Code and Comprehensive Plan.

**Footnotes:*

Given new data and increased knowledge of threats, methods for mapping the evacuation levels has, and will continue to, evolve over the years. The determination of evacuation level is not based on a percentage of the overall property being located within a particular category of storm surge. Under no circumstances should the SLOSH storm surge interactive risk maps be compared with local evacuation levels. Evacuation levels consider other critical factors, which affect evacuation decision-making. The SLOSH storm surge maps are provided for informational and educational purposes only and do not supersede evacuation levels established on the coastal maps, which is set by local and state emergency management.

EVACUATION LEVEL MAP AVAILABILITY

Evacuation level maps are available on the Manatee County website (www.mymanatee.org) and through a variety of printed sources distributed to county and municipal facilities. Evacuation maps are updated when new information becomes available and in conjunction with the Tampa Bay Regional Planning Council hurricane evacuation study program. The digital version of the All Hazards Disaster Planning Guide is also available on the County website. Manatee County partners with local news media agencies to share the evacuation level map and typically the newspapers print a special edition paper annually with critical hurricane preparedness information, including the full-color hurricane evacuation level map.



SUPPORTING INFORAMTION RELATED TO MAPPING BOUNDARIES

Element 4 of the Comprehensive Plan – Coastal Element - is further implemented through both the Comprehensive Emergency Management Plan (CEMP), as well as the Local Mitigation Strategy Plan (LMS).

The CEMP standardizes documents that set forth the County's role in organizing and carrying out evacuations, sheltering operations, post-disaster response and recovery activities, deployment of resources, and emergency warning and communications coordination.

The LMS is a plan developed to promote hazard mitigation and to manage post-disaster recovery. The LMS deals not only with flooding and hurricanes, but with pre-disaster mitigation techniques to hazards which Manatee County might be vulnerable, including natural, technological, and societal hazards. Through the goals, objectives and initiatives, the focus of the LMS is to reduce vulnerability and enhance hazard mitigation. Additionally, as part of the Threats and Hazards analysis, the LMS evaluates coastal and riverine erosion stating that those areas identified at greater risk of erosion are those areas located in the CHHA, CPA, CEA; areas around the Manatee, Braden, and Little Manatee Rivers and associated tributaries; Bowless and Wares Creeks.

Hurricane Wind Scale Determination

Due to its subtropical location and long coastline, the entire county is particularly susceptible to hurricanes and tropical storms. Information located on the Atlantic Oceanographic and Meteorological Laboratory/National Oceanic and Atmospheric Administration website places the probability of a tropical storm/hurricane striking Manatee County at 36-42 percent annually. The probability of a major storm (Category 3+) is at 2 percent annually.

The greatest threat posed by hurricane or tropical storm to Manatee County is storm surge along the barrier islands, wind damage to homes, businesses, and coastal lands, and inland flooding. Depending on location within the County, storm surge could vary from 11 to 34 feet. The barrier islands of Longboat Key and Anna Maria Island are most susceptible to the effects of storm surge created by tropical systems and severe winter storms. The combination of high tides and wind action can create coastal flooding and saltwater inundation of the barrier islands and is considered a significant risk factor. Secondary

areas susceptible to these same impacts are the low-lying areas along the Manatee and Braden Rivers. Storm surge can range from 6 feet for a Category 1 storm to 28 feet for a Category 5 storm. Based on the study done by Tampa Bay Regional Planning County, storm surge could go as far inland as Lake Manatee, with a surge of almost 9 feet.

The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating based on a hurricane's sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous and require preventative measures. In the western North Pacific, the term "super typhoon" is used for tropical cyclones with sustained winds exceeding 150 mph.

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
Tropical Depression	<38 mph	Winds can produce some damage
Tropical Storm	39 to 73 mph <64 kt <119 km/h	Dangerous winds can produce some damage
1	74-95 mph 64-82 kt 119-153 km/h	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding, and gutters. Large tree branches will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last several days.
2	96-110 mph 83-95 kt 154-177 km/h	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	111-129 mph 96-112 kt 178-208 km/h	Devastating damage will occur: Well-constructed framed homes may incur major damage or removal of roof, decking, and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4	130-156 mph 113-136 kt	Catastrophic damage will occur: Well-constructed framed homes can sustain

	209-251 km/h	severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted, and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	157 mph or higher 137 kt or higher 252 km/h or higher	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
Source: *http//www.nhc.noaa.gov/climo*		

REFERENCE DOCUMENTS

1. Manatee County Comprehensive Emergency Management Plan
   (2020 Interim Update CEMP - 2018 ed. - or the latest plan as adopted by Manatee County Board of County Commissioners)

   Provided upon request. See point of contact on page 4 of this manual.

2. Manatee County Local Mitigation Strategy Plan
   (2019 Update or the latest plan as adopted by Manatee County Board of County Commissioners)
   Available online at:
   www.mymanatee.org/hazard

3. Statewide Emergency Shelter Plan
   (January 31, 2020 or the latest plan as adopted January of each even calendar year)

   Available online at:
   https://www.floridadisaster.org/dem/response/infrastructure/statewide-emergency-shelter-plan/

4. Statewide Regional Evacuation Study Program
   (August 26, 2010 and the latest supplemental data report to the plan)

   Available online at:
   http://www.tbrpc.org/regional-evacuation-study/