Section 4 – Hazard Risk and Vulnerability Assessment

Requirements:

§201.6 (c) (2) (i) - Does the Plan include a description of the type, 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 for each jurisdiction.

§201.6 (c) (2) (ii) – Is there 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. All plans must also address NFIP insured structures that have been repetitively damaged by floods.

aves crash on stilt houses along the shore due to Hurricane Michael at Alligator Point in Franklin County, Florida. October 10, 2018. REUTERS/Steve Nesius

This section of the Franklin County Local Mitigation Strategy summarizes the results of the hazard identification and vulnerability assessment processes undertaken by the LMS Working Group members.

The intent of this section is to provide a summary compilation of the information gathered and the judgments made about the hazards threatening Franklin County, and the potential vulnerability to those hazards. This assessment will allow County officials and residents to make fully informed decisions as to what types of natural hazards threatens them, how severe the threat is, and the priority to which they should mitigate those threats.

The risk and vulnerability assessment reflects an effort to analyze and record hazard occurrences that have occurred over the past five years. The Franklin County Emergency Management Department has carefully documented specifics on hazard events through the years through photos of the damages that occurred. As described in the last plan update, many of the hazards discussed in this section are relevant to Franklin County and the participating jurisdictions, however, selected natural hazards are not listed due to the geographic location, and characteristics of the planning area, (i.e. dam levee failure, landslides, sinkholes, earthquakes and tsunamis). These hazards are not included in the hazard risk and assessment section due to the very low probability and frequency of the selected hazards with no documented record of historical occurrence.

The risk and vulnerability assessment identifies the characteristics and potential consequences of hazards within the natural environment that may threaten life and property within the Franklin County. Through the information presented in the county profile in Section 3 and this evaluation section, the county will be able to determine mitigation strategies and prioritize mitigation projects.

The hazard analysis includes a profile of each hazard which identifies county assets vulnerable to each hazard and is a multijurisdictional assessment. This risk assessment for Franklin County meets all requirements of 44 CFR § 201, as follows: A community's vulnerability to a specific hazard must be coupled with critical factors to perform a risk

assessment. By understanding the risk and vulnerability related to a specific hazard, the community can effectively plan mitigation projects and allocate limited financial resources. Additionally, the community can identify the highest priority hazards and focus mitigation strategies to those hazards with the highest risk of occurrence.

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

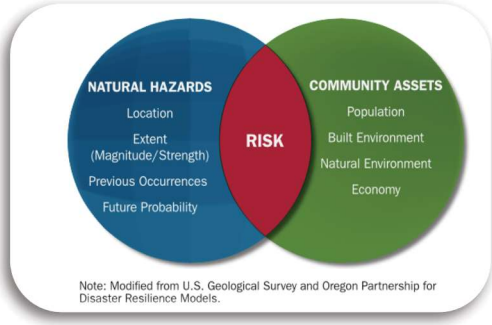
✓ Frequency – How frequent does a known hazard produce an impact within the community.
✓ Vulnerability – How vulnerable is a community to the impact produced by a known hazard.
✓ Exposure – What is the community's exposure in terms of life and property to the impact produced by a specific hazard.

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. In this approach, the three factors are characterized as the sides of a triangle, and the risk or probability of loss is represented by the triangle's area. If a community wishes to reduce the risk of a specific hazard any of the three factors may be addressed. Mitigation measures applied to any of the three factors can reduce the potential for loss or risk of impacts for any given hazard.

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

All municipalities in the county are susceptible to the hazards identified therefore the risk assessment was conducted on a countywide basis. Although all communities are susceptible to the identified hazards, the magnitude of those hazards and related disasters can differ.

Natural Hazard Risk and Vulnerability



The important goal for the Working Group members is to maintain a strong, ever-evolving county-wide, multi-hazard mitigation strategy and on a frequent bases evaluate the current and future hazards the county faces and assess the potential vulnerability from each of these hazards.

Periodically analysis occurs of any new information and reassessment the County's vulnerability to each of these threats. This assessment will allow county officials and residents to make fully informed decisions as to the scope of the natural hazards, how severe the threat can be, and the priority to which they should mitigate those threats.

The 2020 Hazard Identification and Vulnerability Assessment represents an effort to continually document hazard occurrences and incorporate relevant, new data. Each hazard addressed in this assessment presents Franklin County with different challenges and opportunities. Some disasters are more likely than others, and some will impact certain residents more than others.

Each natural hazard profile is summarized into the following sections:

1. Hazard Overview
2. Geographic Area
3. Historical Occurrences
4. Risk and Vulnerability Assessment
5. Probability
6. Extent, and
7. Impact

Disaster Declarations

When a disaster strikes that overwhelms the ability of local communities to respond, the President's action authorizes the Department of Homeland Security, Federal Emergency Management Agency (FEMA), to coordinate all disaster relief efforts which have the purpose of alleviating the hardship and suffering caused by the emergency on the local population, and to provide appropriate assistance for required emergency measures, authorized under Title V of the Stafford Act, to save lives and to protect property and public health and safety and to lessen or avert the threat of a catastrophe in the county.

One of the factors associated with risk is the frequency in which the hazard occurs. To understand the risk level and character associated with hazards, the number and type of presidentially declared disasters are recorded below. Franklin County has been impacted by a number of disasters, many of the most significant being hurricanes, tropical storms, and severe storms. Coastal Storms, flooding, fires and tornado events have also occurred. Many of these incidents have resulted in levels of damage that qualified for federal assistance as the county. Therefore, it is very beneficial to review past major disaster declarations that have impacted the County in preparation for analysis. Since 1953, Franklin County has received 33 presidential disaster declarations for hurricanes, floods, severe storms, wildfires, a freeze, a tornado and a biological. Less damaging events that do not call for a presidential declaration are sometimes issued federal, state, or local emergency declarations.

Figure 4.1 discloses that the County experienced over 20 hurricanes, 6 severe storms, 2 biological, 2 fires,1 coastal storm, 1 flood, and 1 tornado event that resulted in a disaster declarations.

Figure 4.1 – 33 Disasters Types in Franklin County

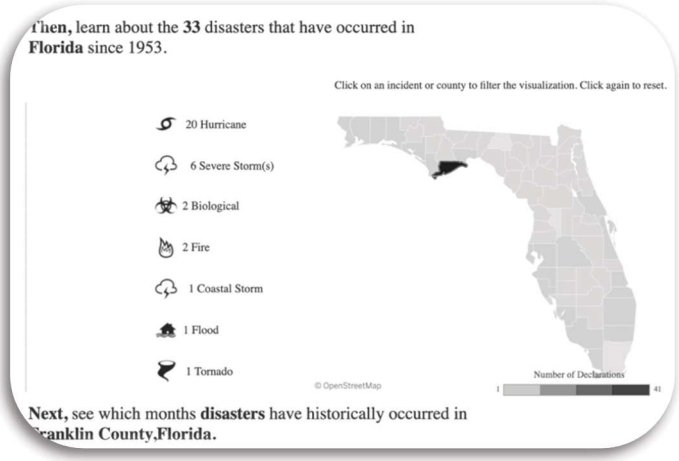
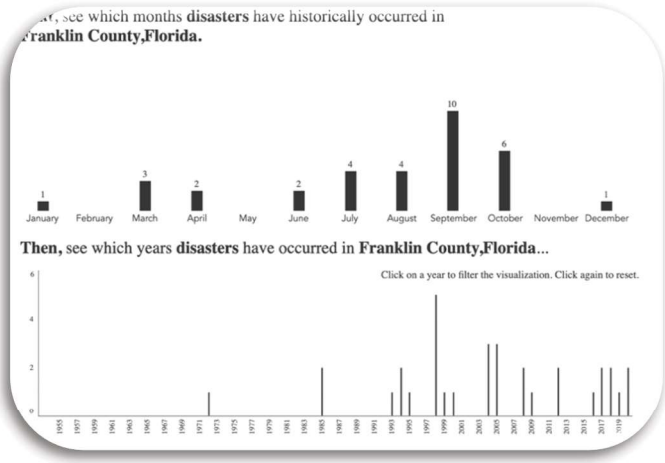


Figure 4.2 displays that the most disasters have occurred in the County in the month of September.

Figure 4.2 – 33 Disasters Month and Years in Franklin County



Based on the summary data in Figures 4.1 – 4.2, table 4.1 provides a list of disaster declarations for the County providing date of incident, disaster event, incident type, declaration # and what type of assistance the County required (i.e. Individual Assistance (IA) or Public Assistance (PA); or both) from 1/1/1985 – 7/20/20. The data reveals that there were 32 disaster declarations in the time period. Although noted in Figure 4.2 that there were 33 disasters, the details were from the time period in the 1950's.

Table 4.1 – Franklin County Disaster Declarations (1/1/1985 – 7/20/20)

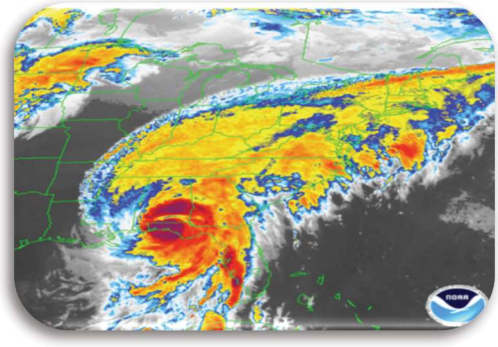


Photo – Hurricane Opal; NOAA

IA, PA or both	Date – Incident Period	Disaster Event	Incident Type	Declaration #
IA, PA	August 29 – September 2, 1985	Hurricane Elena	Hurricane	743
IA, PA	November 21 – 22, 1985	Hurricane Kate	Hurricane	756
IA,PA	March 12 - 16, 1993	Tornadoes, Flooding, High Winds & Tides, Freezing	Tornado	982
IA, PA	July 2 – 29, 1994	Severe Storms, Flooding, Tropical Storm Alberto	Flood	1035

PA	July 2 – 29, 1994	Tropical Storm Alberto	Tropical Storm	3114
IA, PA	October 4 – 11, 1995	Hurricane Opal	Hurricane	1069
IA, PA	December 25, 1997 – April 24, 1998	Severe Storms, High Winds, Tornadoes, And Flooding	Severe Storm(s)	1195
IA, PA	May 25 - July 22,1998	Fires	Fire	1223
IA	September 3 – 4, 1998	Hurricane Earl	Hurricane	1241
PA	September 25 – October 2, 1998	Hurricane George	Hurricane	3131
IA, PA	September 25 – October 7, 1998	Hurricane George	Hurricane	1249
PA	April 15 – May 25,1999	Fires	Fire	3139
PA	September 21 – October 4, 2000	Tropical Storm	Tropical Storm	1344
PA	August 11 - 30, 2004	Hurricane Charley and Tropical Storm Bonnie	Hurricane	1539
PA	September 3 – October 8, 2004	Hurricane Frances	Hurricane	1545
IA, PA	September 13 – November 17, 2004	Hurricane Ivan	Hurricane	1551
IA, PA	July 7 – 20, 2005	Hurricane Dennis	Hurricane	1595
PA	August 24 – September 6, 2005	Hurricane Katrina	Hurricane	1602
PA	August 29 – October 1, 2005	Hurricane Katrina Evacuation	Hurricane	3220
PA	August 18 – September 12, 2008	Tropical Storm Fay	Severe Storm(s)	3288
PA	August 31 – September 7, 2008	Hurricane Gustav	Hurricane	1806
PA	March 26 – May 5, 2009	Severe Storms, High Winds, and Tornadoes	Severe Storm(s)	1831
IA, PA	June 23 – July 26, 2012	Tropical Storm Debby	Severe Storm(s)	4068
PA	August 27 – 29, 2012	Hurricane Isaac	Hurricane	4084
PA	August 31 – September 11, 2016	Hurricane Hermine	Hurricane	4280
PA	September 4 – October 18, 2017	Hurricane Irma	Hurricane	4337
PA	September 4 – October 18, 2017	Hurricane Irma	Hurricane	3385
PA	October 7 – October 19, 2018	Hurricane Michael	Hurricane	3405
IA, PA	October 7 – October 19, 2018	Hurricane Michael	Hurricane	4399
PA	August 28 – September 9, 2019	Hurricane Dorian	Hurricane	3419
IA, PA	January 20, 2020 – Continuing	Florida Covid – 19	Pandemic	4486
PA	January 20, 2020 – Continuing	Florida Covid – 19	Pandemic	3432

Source: Federal Emergency Management Agency; https://www.fema.gov/disasters?field_dv2_state_territory_tribal_value_selective=FL&field_dv2_incident_type_tid=All&field_dv2_declaration_type_value=All&field_dv2_incident_begin_value%5Bvalue%5D%5Bmonth%5D=1&field_dv2_incident_begin_value%5Bvalue%5D%5Byear%5D=1985&field_dv2_incident_end_value%5Bvalue%5D%5Bmonth%5D=11&field_dv2_incident_end_value%5Bvalue%5D%5Byear%5D=201

The Natural Hazards profiled are as follows:

Table 4.2 – Natural Hazards Profiled for Franklin County

Natural Hazards – Franklin County
Flooding
Storm Surge
Hurricanes and Tropical Storms
Tornadoes and Waterspouts
Thunderstorms, Strong Winds, Hailstorms, and Lightning
Coastal and Riverine Erosion
Wildfires
Drought/Heat Wave
Winter Storms/Freezing Temperatures

Hazard Identification

The information contained in this assessment was identified by using both primary and secondary research materials which includes, but is not limited to, reports from local, state, and national agencies, state and local weather records, the LMS working group members, key local stakeholders, and discussion with residents in Franklin County.

Dataset information was obtained from the GIS Technical Department at Florida Division of Emergency Management (FDEM). Parcel data was compiled from the Florida Department of Revenue and building count and value data was from the Franklin County Property Appraiser's Office.

Each hazard analysis includes the possible severity and magnitude, as well as the potential impact of damage within the County from future hazards. After careful deliberation, the Local Mitigation Strategy Working Group developed (and subsequently assigned) the following 4 levels of measurement to determine the probability that future events will affect the incorporated and unincorporated areas of Franklin County. This method has been retained for the 2020 update, and the probability and magnitude of future hazard events has not changed.

Probability

The probability of a hazard's occurrence is rated minimum through high as outlined below. Each hazard's probability was determined and updated by the Working Group after careful analysis and evaluation. The probability or "chance of occurrence" is defined using an ordinal scale. The scale is as follows:

- ✓ Low: At least 1 occurrence every 10 years
- ✓ Medium: At least 1 occurrence every 3 years
- ✓ High: At least 1 occurrence every 10 years

Extent or Magnitude

The extent of a hazard's impact in a worst-case-scenario instance of the hazard is represented in summary sections after each natural hazard.

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

The statements are based on the range of magnitude or severity that the county could experience or has experienced using a scientific scale or a quantitative measurement.

Types of scientific scales:

- Saffir-Simpson Hurricane Wind Scale for hurricanes/tropical storms/winds
- Enhanced Fujita Scale for tornadoes
- Palmer Drought Severity Index (PDSI) and Keetch-Byram Drought Index for droughts
- Heat Index Chart for heat-related occurrences

Quantitative measurements

Quantitative measurements based on historical occurrences recorded from the following sources: Northwest Florida Water Management District (NWFWMD); the National Climatic Data Center (NCDC), National Oceanic and Atmospheric Administration (NOAA); the National Weather Service (NWS), the Franklin County and incorporated areas Flood Insurance Study (FIS); the Florida Climate Center, the Florida Forest Service, Federal Emergency Management Agency (FEMA), the US Department of Agriculture, and the Franklin County Emergency Management Department.

The measurements are:

- Flood depth for floods
- Length, width and height for sinkhole measurement (if available)
- Acres burned for wildfires
- High, medium or low based on the previous event occurrences

Vulnerability Assessment

Franklin County has many assets at risk from hazards. The most important risk are injuries to the people or the citizens within the County. Hazard events that could cause significant injuries should be highlighted to ensure that appropriate emergency plans with specific guidelines and response mechanisms are in place. Property includes buildings, critical facilities and infrastructure are other physical assets that could be at risk.

In conducting the risk assessment, evaluate the vulnerabilities that would make an asset more susceptible to damage from a hazard. Examples of types of vulnerabilities could include deficiencies in building construction, process systems, security, protection systems and loss prevention programs which could contribute to the severity of damage when an incident occurs.

An assessment of each of the jurisdictions risk is essential to determine where they vary from the risks facing the entire community. And, estimating potential dollar losses to vulnerable structures, if available. For future planning, Franklin County will continue to evaluate and update the vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas.

Frequency

This represents how often a hazard that will impact the county is likely to occur. Frequency is based on both how often a hazard has occurred in the past and factors that have been determined to contribute to a hazard's potential future occurrence.

Distribution

This represents the geographic area that would be impacted should a hazard occur. It refers to how wide-spread a disaster's effects will be felt in the county.

Impact

The impact is the consequence or effect of the hazard on the community and its assets. A hazard occurrence impact could have considerable results on your relationships with customers, the surrounding community and other stakeholders. Contemplate scenarios and situations that would cause the County citizens or customers to lose confidence in your organization and its products or services. The impacts from hazards can be reduced by investing in mitigation actions, projects or initiatives.

In evaluating the "impact" for Franklin County, historical detail impacts and/or an estimate of potential losses are noted within the hazards identified. If a momentous and devastating storm decimated the entire county, then potential dollar costs would probably be based on the "just value figure" which was discussed in Section 3: $78,330,283 - tangible personal property and $2,775,279,697 – real property; and if applicable $555,044 railroads and private carlines) = **$2,854,165,024**.

The hazards profiled within this section can bring different consequences for the Franklin County's structures, infrastructure, economy and environment. The impact specifics are profiled within each hazard identified. Table 4.3 examines what types of structures and infrastructure would be impacted from the identified natural hazards.

Table 4.3 – Impacts on Franklin County's Structures and Infrastructure

Impacts on Structures and Infrastructure from Identified Hazards	All Structures	Mobile Homes	Poorly Constructed Homes	Non-Elevated Homes	Telecommunications	Electrical Utilities	Water / Sewer Utilities	Roadways	Waterways	Agriculture	Economic Disruption	Environmental Damage
Flooding	X	X	X	X	X	X	X	X	X	X	X	X
Storm Surge	X	X	X	X		X	X	X	X	X	X	X
Hurricanes/Tropical Storms	X	X	X	X	X	X	X	X	X	X	X	X
Tornadoes	X	X	X	X	X	X	X	X		X	X	X
Thunderstorms/ Strong Winds		X	X		X	X				X		
Lightning		X	X		X	X				X		
Hailstorms		X	X		X	X				X		
Coastal Erosion			X	X								X
Riverine Erosion			X						X	X		X
Wildfires	X	X	X	X	X	X		X		X	X	X
Drought							X		X	X	X	X
Heat Wave										X		X
Winter Storms		X	X			X		X	X	X	X	X
Freezing Temperatures			X		X	X		X	X	X	X	

Natural Hazard Profiling

A critical component in the local mitigation plan is to analyze the natural hazards that face the community. Understanding the risk and consequences on the various hazards is the first part of mitigating the adverse effects of future events.

As stated earlier, profiling each natural hazard will include the following sections:

- ✓ **Hazard Overview** – synopsis of the hazard
- ✓ **Geographic Area** – area in the county with exposure to the hazard
- ✓ **Historical Occurrences** – previous occurrences in terms of frequency

- ✓ **Probability** - the chance of occurrence
- ✓ **Risk and Vulnerability Assessment –** process to identify potential hazards and analyze what could happen
- ✓ **Impact –** the consequences of effects of a hazard on the community and its assets
- ✓ **Extent** – the strength or magnitude

Flooding

A flood is an overflow of water onto normally dry land. The inundation of a normally dry area caused by rising water in an existing waterway, such as a river, stream, or drainage ditch, or the ponding of water at or near the point where the rain fell. Flooding is a longer-term event than flash flooding as it may last for days or even weeks. Several factors determine the severity of floods, including rainfall intensity, rainfall duration, topography, ground cover, and frequency of inundation. Floods are the most common hazard in the United States and the affects can be local, impacting a neighborhood or community, or entire river basins and multiple states.

Floods events most often occur during major storms that produce large amounts of rain over short periods of time. While hurricanes and tropical storms are Florida's most obvious flood producers, it is important to recognize that heavy rains from severe thunderstorms can cause flooding in Franklin County at any time of the year.

With large volumes of water over an extended period of time flooding will occur over the duration of the storm, and the flooding may continue long after the storm passes. There will oftentimes be a lag between the event and the flooding as water moves through the hydrologic system. It may even be an event that did not generate heavy rain in your location, but areas upstream experienced significant rainfall. Flash flooding can take place when there are large amounts of rain over a short period of time and storm water drainage is insufficient. Water rise may be sudden and with little warning. And a storm surge flood develops from hurricanes and tropical storms winds and waves resulting in the accumulation of excessive amounts of water along the coast. It is a combination of the low pressure of the storm allowing water to rise and the relentless surf pushing water inland faster than it can escape against the same waves back to deeper water.

Riverine flooding is not only a threat due to tropical storms and hurricanes but can also occur from the severe and numerous thunderstorms from the spring to the fall months each year. In the spring, thunderstorms occur when warm troughs push back the cold weather to the north and gathering fuel from the moisture of the gulf. In the summer, short, but severe rains are generated from the heat of the summer day evaporating moisture into the air. In the fall, the cooler weather from the north pushes back the warmer weather and again, gathers fuel from the gulf, creating isolated thunderstorms.

In an undeveloped area, the water runoff system is provided by nature. In ever increasing urban areas flooding has necessitated the need for new and upgrades of existing drainage systems. Stormwater management systems have two purposes: the control of stormwater runoff to prevent or minimize damage to property and physical injury and loss of life which may occur during or after a very infrequent or unusual storm; and the control of stormwater to

eliminate or minimize inconvenience or disruption of activity as a result of runoff from more frequently occurring, less significant storms.

The following are several terms that are relevant to flooding and important for citizens to know:

Flood Watch: Flooding is possible. Tune in to NOAA Weather Radio, commercial radio, or television for information.

Flash Flood Watch: Flash flooding is possible. Be prepared to move to higher ground; listen to NOAA Weather Radio, commercial radio, or television for information.

Flood Warning: Flooding is occurring or will occur soon; if advised to evacuate.

Details from the FEMA revised Flood Insurance Study (FIS) *(Effective date, sometime during 2021)*

This Flood Insurance Study covers the geographic area of Franklin County, Florida located on the Gulf of Mexico in northwest Florida. The following streams were studied by detailed methods: the Carrabelle River, the Ochlockonee River, and the Apalachicola River.

For the February 5, 2014 revision to the countywide FIS, all coastal hazards affecting the county have been revised. The existing detailed study for the Ochlockonee River has been superseded with the revised coastal study. Additionally, the floodplain for the Apalachicola River has been redelineated using updated topographic data. Existing data for St. James Bay and the area in the vicinity of Eastpoint has also been incorporated.

For the (*effective date, sometime in 2021*) revision to the countywide FIS, three unnamed flooding areas along the Gulf of Mexico were studied by limited detailed methods. Limits of detailed study for riverine flooding sources are indicated on the Flood Profiles and on the FIRM. The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction.

The revision to the Franklin FIS incorporated new analysis and mapping information for Flood Insurance Rate Maps (FIRM) panels revised on June 11, 2018.

The FIRM's were reviewed from the FEMA Flood Map Service Center. The flood zones identified in the County based on the results of the engineering analyses are the following zones:

Table 4.4 – Flood Insurance Zone Designations for Franklin County

Zone A	Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.
Zone AE	Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.
Zone AH	Zone AH is the flood insurance rate zone that corresponds to the areas of 1-percent annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO	Zone AO is the flood insurance rate zone that corresponds to the areas of 1-percent annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.
Zone AR	Area of special flood hazard formerly protected from the 1-percent annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1-percent annual chance or greater flood event.
Zone A99	Zone A99 is the flood insurance rate zone that corresponds to areas of the 1-percent annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.
Zone V	Zone V is the flood insurance rate zone that corresponds to the 1-percent annual chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.
Zone VE	Zone VE is the flood insurance rate zone that corresponds to the 1-percent annual chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.
Zone X	Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2- percent annual chance floodplain, areas within the 0.2-percent annual chance floodplain, and to areas of 1-percent annual chance flooding where average depths are less than 1 foot, areas of 1-percent annual chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent annual chance flood by levees. No base flood elevations or depths are shown within this zone.
Zone D	Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

Figure 4.3 is the hydrography map, a type of topographic map, of Franklin County to reveal the slopes and contours of land. Hydrographic maps are specially made to survey underwater land terrain.

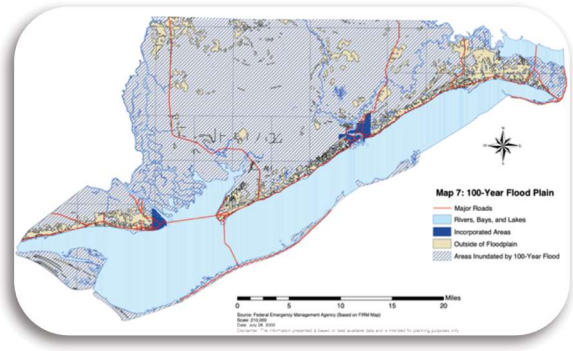
Figure 4.3 – Hydrography Map of Franklin County, Drainage Patterns

Principal Flood Problems from the FIS

General flooding in Franklin County stems from two sources: periods of intense rainfall causing ponding and sheet runoff in the low, poorly-drained areas and coastal flooding associated with hurricanes and tropical storms. The floodplains of the Apalachicola River, the New River, the Crooked River, the Carrabelle River, and the Ochlockonee River are also subject to flooding during high river stages.

Source: http://fcit.usf.edu/florida/maps/pages/11200/f11231/f11231.htm

Figure 4.4 – 100-Year Flood Plain Map



The floodplains of the Apalachicola River are subject to riverine flooding during periods of heavy rainfall. The Apalachicola River is part of an extensive river system whose drainage area extends northward about five hundred miles to a point near the northern Georgia border, and encompasses an area over 19,000 square miles.

Source: Franklin County Comprehensive Plan

Other rivers in Franklin County have smaller drainage areas and are therefore less significant sources of flooding. These include the New and Crooked Rivers, which flow through the central portion of the county and join to form the Carrabelle River, which then discharges into St. George Sound at Carrabelle.

The Ochlockonee River forms a portion of the northeast county boundary and empties into the Gulf of Mexico through Ochlockonee Bay. Low-lying, poorly drained areas of the county are also subject to rainfall ponding.

Franklin County is subject to coastal flooding caused by extra tropical cyclones and hurricanes. Extra tropical cyclones can occur at any time of the year but are more prevalent in the winter. The prime hurricane season is from August to October during which time 80 percent of all hurricanes occur. September is the worst month for hurricanes during which 32 percent of the total occur. Hurricanes are of shorter duration than northeasters and generally last through only one tidal cycle.

Flood Occurrence Data from the FIS

Significant Flood Events

Historical data indicates that several hurricanes have had significant impact on Franklin County, since 1972 - on June 19, 1972 (Agnes), on August 31, 1985 (Elena), on November 21, 1985 (Kate), on September 3, 1998 (Earl), and on July 10, 2005 (Dennis). Data provided by the Florida Department of Environmental Protection, regarding these storms, is summarized below:

Hurricane Agnes, in 1972, made landfall west of Cape San Blas, in Gulf County, with peak winds reaching 55 mph at Apalachicola. Despite being a Category One hurricane, the **storm surge** affecting Franklin County is estimated to have been approximately **8 feet** at St. Marks. Beach and dune erosion was significant along the entire open coast of Jefferson County, with breaches occurring on the Marsh Islands.

Hurricane Elena, in 1985, made two passes offshore of Jefferson County before making landfall in Mississippi. Wind damage associated with Hurricane Elena was limited to shoreline areas of Jefferson County; however, the accompanying **storm surge**, of approximately **8 to 9 feet** at St. Marks, resulted in damage to shorefront protection structures and buildings.

Hurricane Kate, in 1985, made landfall at Mexico Beach, in Gulf County, with peak winds reaching 85 mph at Apalachicola, just 2 months after Hurricane Elena. The **storm surge** affecting Jefferson County is estimated to have

been approximately **8.4 feet** at Shell Point. Land falling wind and waves, associated with Hurricane Kate, resulted in the destruction of 46 buildings and damage to 15 more.

Hurricane Earl, in 1998, made landfall in Panama City Beach in Bay County. In Jefferson County, the **storm surge** was approximately **8 feet** at St. Marks. Shorefront erosion resulted in damage to the Marsh Islands.

Hurricane Dennis, in 2005, made landfall on Santa Rosa Island, between Navarre Beach and Pensacola Beach, in Escambia County. Although well westward of Jefferson County, this hurricane produced a **storm surge** of **6 to 9 feet** in Apalachee Bay and 7.5 feet at the mouth of the Aucilla River. High waves, associated with Hurricane Dennis resulted in beach erosion to open coast areas of both Franklin County and Jefferson County, with approximately 37 buildings sustaining damage in Jefferson County.

Coastal flooding is not limited to hurricane activity; in fact, extra tropical cyclones, have resulted in significant tidal flooding along the Florida panhandle. Extra tropical cyclones can develop in the Gulf of Mexico and along strong frontal boundaries and can potentially occur at any time of year, but most frequently in the winter and spring months. Typically, these storms have centers that are colder than the surrounding air, with strongest winds in the upper atmosphere, and lower wind velocities and higher central pressures than a major hurricane; however, wind velocities associated with an extra tropical cyclone can easily reach tropical storm and Category 1 hurricane levels. In addition, the high winds of an extra tropical cyclone can last for several days, causing repeated flooding and excessive coastal erosion. The long exposure of property to high water, high winds, and pounding wave action can result severe property damage.

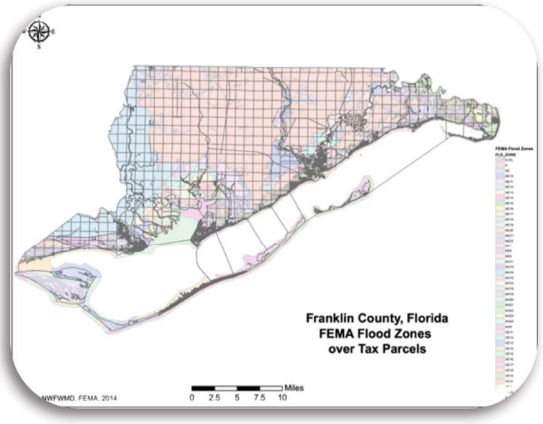
Flood Protection Measures

There are no existing or proposed flood protection projects located in Franklin County. The coastal areas of Franklin County are, for the most part, surrounded by barrier islands. St. George Island and Little St. George Island, for example, offer some protection to the coastal area along St. George Sound and Apalachicola Bay from wave action. It is expected, however, that portions of the barrier islands would be overtopped during the larger storm events. In 1973, the state of Florida established a Coastal Construction Control Line that now includes the coastal beaches of St. George Island, Dog Island, and Alligator Point. The purpose of this line is to control coastal land use and building construction methodology for areas susceptible to direct storm surge, erosion and wave runup.

Special Flood Hazard Areas (SFHA) for Franklin County

Figure 4.5 – Franklin County FEMA Flood Zones over Tax Parcels

According to the NWFMD, map details are derived directly from a variety of sources including the FEMA's FIRM's, the District digital elevation model, the county's digital parcel maps and data from other government sources. The SFHA is the land area covered by the floodwaters of the base flood on the NFIP map. The SFHA is the area where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The SFHA's in Franklin County are the land areas that are at high risk for flooding: Zones A, AE, AH, and VE.



Source: https://www.franklincountyflorida.com/documents/planning_building/Maps/

Historical Data from the National Weather Service on Gulf of Mexico Tide Gauge at Apalachicola

Figure 4.6 - Gauge at Apalachicola

Historic Crests

(1) 7.72 ft on 10/10/2018
(2) 6.50 ft on 07/10/2005
(3) 4.69 ft on 06/19/1972
(4) 4.29 ft on 09/03/1998
(5) 3.62 ft on 09/16/2004
(6) 3.21 ft on 08/28/2012
(7) 3.06 ft on 06/11/2005
(8) 3.04 ft on 09/01/2016
(9) 3.03 ft on 10/08/2017
(10) 3.01 ft on 06/24/2012
(11) 3.00 ft on 05/28/2018
(12) 2.92 ft on 09/26/2002
(13) 2.84 ft on 08/28/2005
(14) 2.80 ft on 11/10/2009
(15) 2.44 ft on 10/27/2015
(16) 2.42 ft on 01/15/2016
(17) 2.40 ft on 06/06/2016
(18) 2.36 ft on 09/22/2005
(19) 2.19 ft on 10/24/2008
(20) 2.07 ft on 12/14/2018
(21) 2.02 ft on 12/20/2018
(22) 1.74 ft on 02/24/2016
(23) 1.71 ft on 01/22/2017
(24) 1.48 ft on 06/21/2017
(25) 1.41 ft on 06/07/2016

Flood Categories (in feet)

Major Flood Stage:	6
Moderate Flood Stage:	4
Flood Stage:	2.2
Action Stage:	0.9
Low Stage (in feet):	-2.4

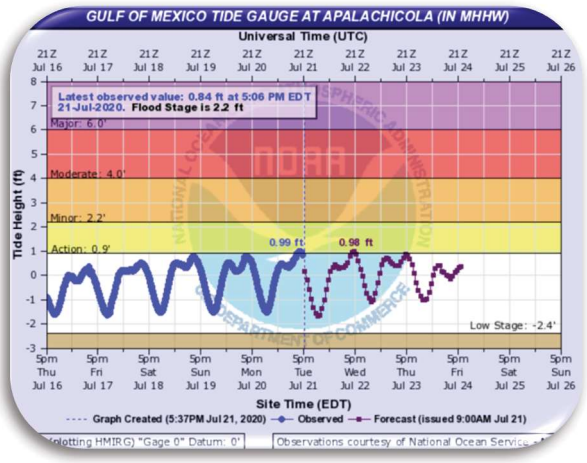
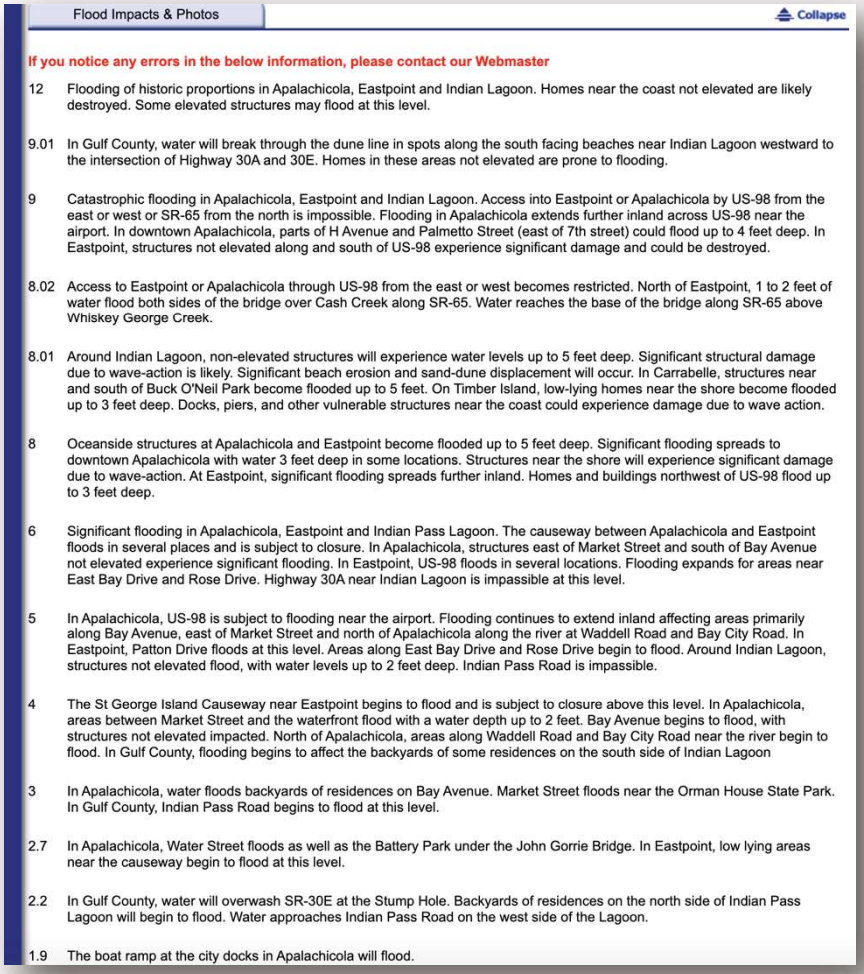


Figure 4.7 – Flood Impacts - Gulf of Mexico Tide Gauge at Apalachicola



Flood Impacts & Photos

Collapse

If you notice any errors in the below information, please contact our Webmaster

12	Flooding of historic proportions in Apalachicola, Eastpoint and Indian Lagoon. Homes near the coast not elevated are likely destroyed. Some elevated structures may flood at this level.
9.01	In Gulf County, water will break through the dune line in spots along the south facing beaches near Indian Lagoon westward to the intersection of Highway 30A and 30E. Homes in these areas not elevated are prone to flooding.
9	Catastrophic flooding in Apalachicola, Eastpoint and Indian Lagoon. Access into Eastpoint or Apalachicola by US-98 from the east or west or SR-65 from the north is impossible. Flooding in Apalachicola extends further inland across US-98 near the airport. In downtown Apalachicola, parts of H Avenue and Palmetto Street (east of 7th street) could flood up to 4 feet deep. In Eastpoint, structures not elevated along and south of US-98 experience significant damage and could be destroyed.
8.02	Access to Eastpoint or Apalachicola through US-98 from the east or west becomes restricted. North of Eastpoint, 1 to 2 feet of water flood both sides of the bridge over Cash Creek along SR-65. Water reaches the base of the bridge along SR-65 above Whiskey George Creek.
8.01	Around Indian Lagoon, non-elevated structures will experience water levels up to 5 feet deep. Significant structural damage due to wave-action is likely. Significant beach erosion and sand-dune displacement will occur. In Carrabelle, structures near and south of Buck O'Neil Park become flooded up to 5 feet. On Timber Island, low-lying homes near the shore become flooded up to 3 feet deep. Docks, piers, and other vulnerable structures near the coast could experience damage due to wave action.
8	Oceanside structures at Apalachicola and Eastpoint become flooded up to 5 feet deep. Significant flooding spreads to downtown Apalachicola with water 3 feet deep in some locations. Structures near the shore will experience significant damage due to wave-action. At Eastpoint, significant flooding spreads further inland. Homes and buildings northwest of US-98 flood up to 3 feet deep.
6	Significant flooding in Apalachicola, Eastpoint and Indian Pass Lagoon. The causeway between Apalachicola and Eastpoint floods in several places and is subject to closure. In Apalachicola, structures east of Market Street and south of Bay Avenue not elevated experience significant flooding. In Eastpoint, US-98 floods in several locations. Flooding expands for areas near East Bay Drive and Rose Drive. Highway 30A near Indian Lagoon is impassible at this level.
5	In Apalachicola, US-98 is subject to flooding near the airport. Flooding continues to extend inland affecting areas primarily along Bay Avenue, east of Market Street and north of Apalachicola along the river at Waddell Road and Bay City Road. In Eastpoint, Patton Drive floods at this level. Areas along East Bay Drive and Rose Drive begin to flood. Around Indian Lagoon, structures not elevated flood, with water levels up to 2 feet deep. Indian Pass Road is impassible.
4	The St George Island Causeway near Eastpoint begins to flood and is subject to closure above this level. In Apalachicola, areas between Market Street and the waterfront flood with a water depth up to 2 feet. Bay Avenue begins to flood, with structures not elevated impacted. North of Apalachicola, areas along Waddell Road and Bay City Road near the river begin to flood. In Gulf County, flooding begins to affect the backyards of some residences on the south side of Indian Lagoon
3	In Apalachicola, water floods backyards of residences on Bay Avenue. Market Street floods near the Orman House State Park. In Gulf County, Indian Pass Road begins to flood at this level.
2.7	In Apalachicola, Water Street floods as well as the Battery Park under the John Gorrie Bridge. In Eastpoint, low lying areas near the causeway begin to flood at this level.
2.2	In Gulf County, water will overwash SR-30E at the Stump Hole. Backyards of residences on the north side of Indian Pass Lagoon will begin to flood. Water approaches Indian Pass Road on the west side of the Lagoon.
1.9	The boat ramp at the city docks in Apalachicola will flood.

Source: https://water.weather.gov/ahps2/hydrograph.php?wfo=tae&gage=apcf1

Historical Data from the National Weather Service on the Crooked River at Carrabelle

Figure 4.8 – Crooked River at Carrabelle

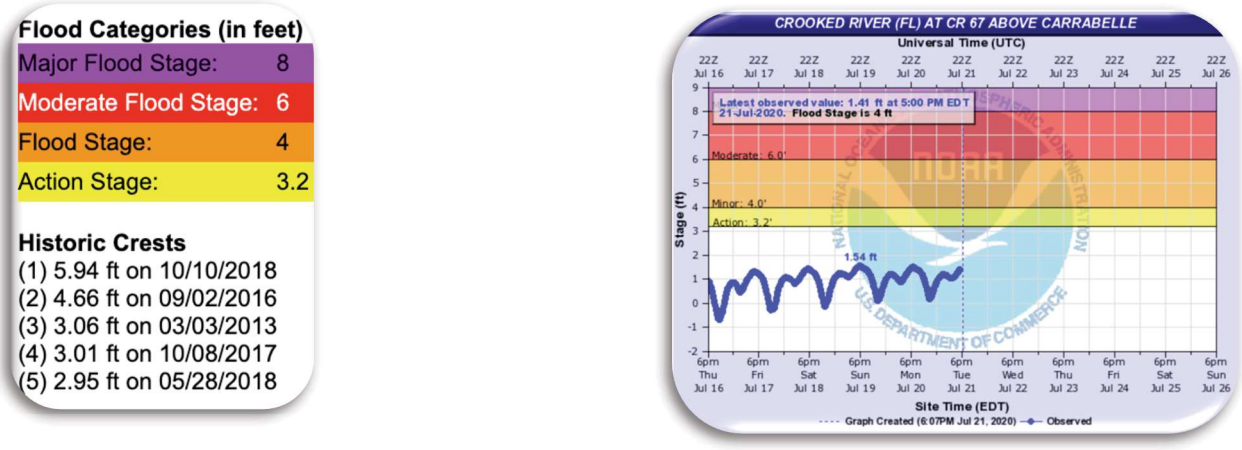
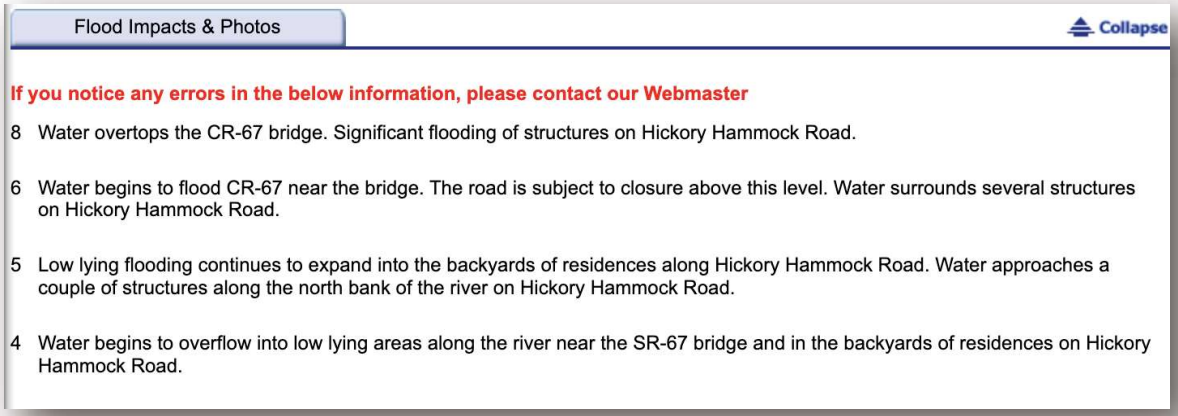


Figure 4.9 – Flood Impacts – Crooked River at Carrabelle

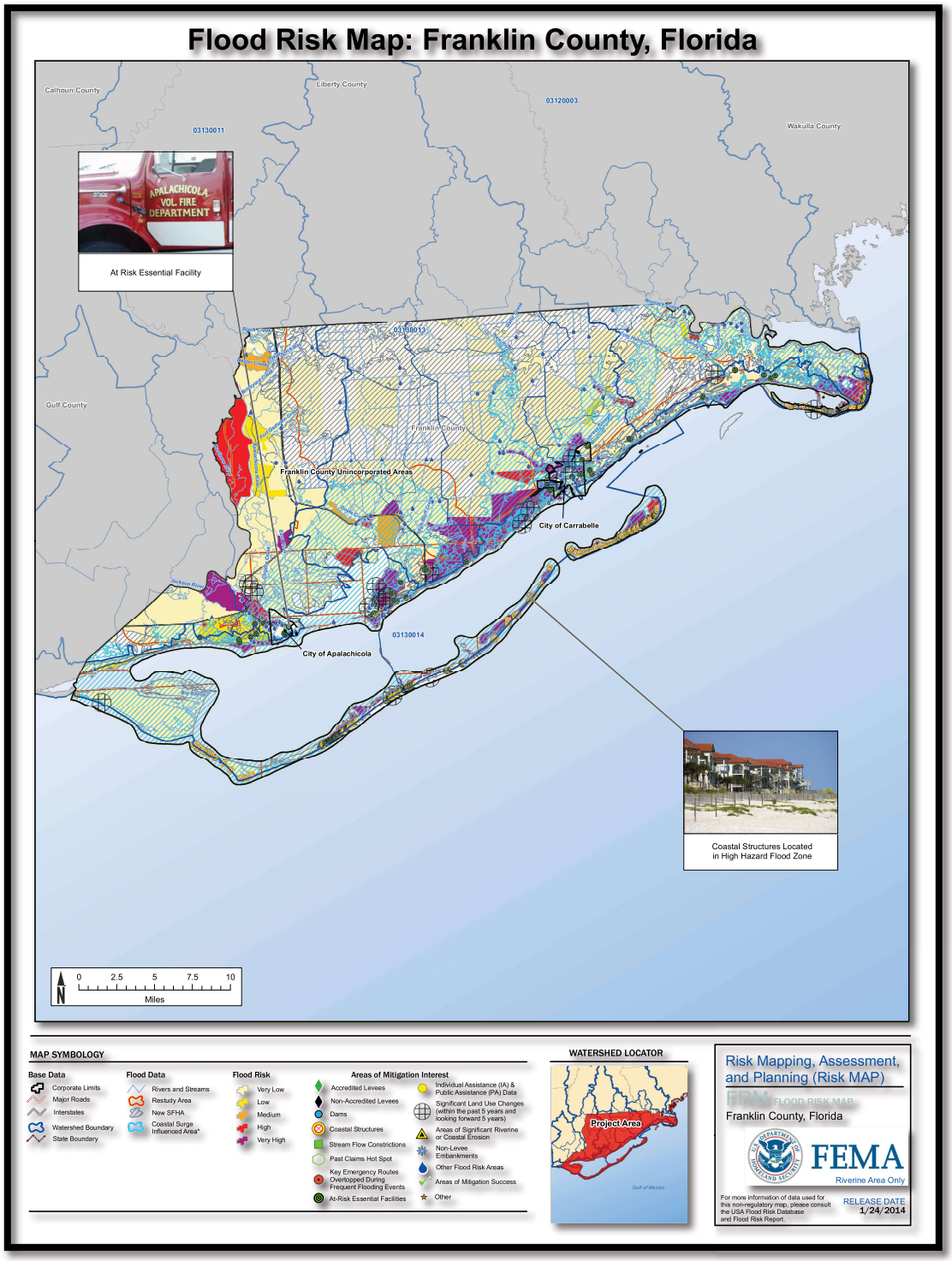


Source: https://water.weather.gov/ahps2/hydrograph.php?wfo=tae&gage=crdf1

Flood Risk Products

Specific information from the FEMA Flood Map Service Center identify that Flood Risk Products (FRP) were prepared and completed 1/24/2014 for Franklin County. FRP's have purposes that are different from regulatory flood hazard products (i.e. FIRM, FIS, and the FIRM database). The FRP's are supplementary resources for communicating flood risk to communities and may not entirely align with the regulatory flood maps. Figure 4.10 is the FEMA Flood Risk Map for Franklin County. The Flood Risk Report (FRR) is located in Appendix E. Specific highlights from the report will follow the map.

Figure 4.10 – FEMA Flood Risk Map for Franklin County



Source: https://map1.msc.fema.gov/data/FRP/FRM_12037C_20150312.pdf?LOC=0001377bf1bd4a41bdce67f83e0bf5bf

Flood Risk Report Summary Highlights

Flood hazard identification uses FIRMs, and FIS Reports to identify where flooding can occur along with the probability and depth of that flooding. Flood risk assessment is the systematic approach to identifying how flooding impacts the environment. In hazard mitigation planning, flood risk assessments serve as the basis for mitigation strategies and actions by defining the hazard and enabling informed decision making. Fully assessing flood risk requires the following:

- Identifying the flooding source and determining the flood hazard occurrence probability
- Developing a complete profile of the flood hazard including historical occurrence and previous impacts
- Inventorying assets located in the identified flood hazard area
- Estimating potential future flood losses caused by exposure to the flood hazard area

Analysis of Risk - For Franklin County, this information includes the following elements:

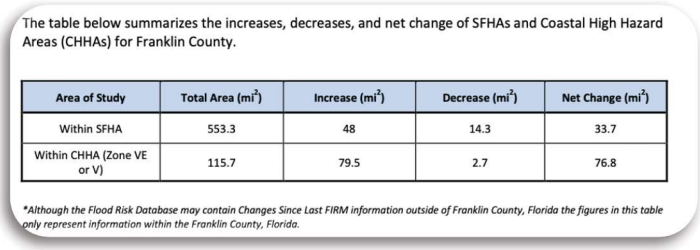
- Changes Since Last FIRM
- Areas of Mitigation Interest
- Analysis Grids -Coastal Depth and Wave Height Grids
- Coastal Flood Risk Assessments
- Coastal Increased Inundation Areas
- Coastal Wave Hazard Severity Areas
- Primary Frontal dune (PFD) Erosion Areas

Estimating Flood Loss - Flood loss estimates provided in the FRR were developed using a FEMA flood loss estimation tool, Hazus. Flood loss estimates are being provided at the project and community levels for multiple flood frequencies including: Residential Asset Loss; Commercial Asset Loss; Other Asset Loss; Business Disruption; Annualized Losses; Loss Ratio; and Hazus Flood Risk Value.

Areas of mitigation interest for Franklin County are identified:

- Coastal Structures
- At-Risk Facilities
- Areas of Significant Land Use Change
- Areas of Mitigation Success
- Areas at risk of Flooding from Larger Floods
- Areas of Significant Coastal Erosion
- Other Flood Risk Areas

Changes since last FIRM – Special Flood Hazard Area (SFHA) boundaries and flood risk zones within Franklin County were updated to new engineering analysis performed.



The table below summarizes the increases, decreases, and net change of SFHAs and Coastal High Hazard Areas (CHHAs) for Franklin County.

Area of Study	Total Area (mi^2)	Increase (mi^2)	Decrease (mi^2)	Net Change (mi^2)
Within SFHA	553.3	48	14.3	33.7
Within CHHA (Zone VE or V)	115.7	79.5	2.7	76.8

**Although the Flood Risk Database may contain Changes Since Last FIRM information outside of Franklin County, Florida the figures in this table only represent information within the Franklin County, Florida.*

SFHA - Apalachicola

The table below summarizes the increases, decreases, and net change of SFHAs and Coastal High Hazard Areas (CHHAs) for the City of Apalachicola.

Area of Study	Total Area (mi^2)	Increase (mi^2)	Decrease (mi^2)	Net Change (mi^2)
Within SFHA	1.4	0.1	0	0.1
Within CHHA (Zone VE or V)	0.8	0.7	0.01	0.69

**Although the Flood Risk Database may contain Changes Since Last FIRM information outside of Franklin County, Florida the figures in this table only represent information within the City of Apalachicola.*

SFHA - Carrabelle

The table below summarizes the increases, decreases, and net change of SFHAs and Coastal High Hazard Areas (CHHAs) for the City of Carrabelle.

Area of Study	Total Area (mi^2)	Increase (mi^2)	Decrease (mi^2)	Net Change (mi^2)
Within SFHA	4.8	0.4	0.1	0.3
Within CHHA (Zone VE or V)	1.2	0.4	0.1	0.3

**Although the Flood Risk Database may contain Changes Since Last FIRM information outside of the City of Carrabelle the figures in this table only represent information within the City of Carrabelle.*

Coastal Depth and Wave Height Grids - The data provided within the FRD should be used to further isolate areas where flood mitigation potential is high and may be helpful in planning and implementing mitigation strategies.

Coastal Wave Hazard Severity	*Total Area (mi^2)*
High	100.6
Moderate	60
Minimal	186.9

Wave Height Grids – Apalachicola

Coastal Wave Hazard Severity	Total Area (mi^2)
High	0.8
Moderate	0.3
Minimal	0.6

Wave Height Grids – Carrabelle

Coastal Wave Hazard Severity	Total Area (mi^2)
High	1.2
Moderate	1
Minimal	3.1

Coastal Increased Inundations Areas - The polygons encompass areas that would be flooded by an additional 1, 2, or 3 feet of flooding above the total water level elevation (stillwater plus waves) for the specified flood frequency. The table below summarizes the additional areas that would be inundated and added to the floodplain for each of these scenarios.

	Area of Additional Inundation (mi^2)				
Flood Event Frequency	1-ft Increase	2-ft Increase		3-ft Increase	
		Newly Inundated	Total	Newly Inundated	Total
1%-annual-chance	17.10	24.40	41.5	24.58	66.08

- Franklin County's approximately 40 - 50% of major highways within the county are anticipated to experience moderate to severe inundation if an event were to exceed the regulatory special flood hazard area designations. Even if the event does not exceed the regulatory special flood hazard area designations the inundation along roadways is expected to be significant enough to cause road closures or strand motorists. Alternate routes will probably be inundated during these events as well.
- Critical Facilities: Franklin County has thirty - nine identified critical facilities within the jurisdiction. Fourteen of those facilities are anticipated to be inundated if an event were to exceed the regulatory special flood hazard area designation by one to three feet. These facilities are critical to the economic viability and safety of the residents in the area.

Coastal Increased Inundation – Apalachicola

	Area of Additional Inundation (mi^2)				
Flood Event Frequency	1-ft Increase	2-ft Increase		3-ft Increase	
		Newly Inundated	Total	Newly Inundated	Total
1%-annual-chance	.05	0.06	.11	0.11	.22

Coastal Increased Inundation – Carrabelle

	Area of Additional Inundation (mi^2)				
Flood Event Frequency	1-ft Increase	2-ft Increase		3-ft Increase	
		Newly Inundated	Total	Newly Inundated	Total
1%-annual-chance	.42	.35	.77	.32	1.09

Flood Risk Results

	Total Inventory		Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[1]	Loss Ratio[2,6]	Dollar Losses[1]	Loss Ratio[2,6]	Dollar Losses[1]	Loss Ratio[2,6]	Dollar Losses[1]	Loss Ratio[2,6]	Dollar Losses[1]	Loss Ratio[2,6]
Residential Building and Contents Losses	$976,900,000	71%	$29,900,000	4%	$103,200,000	11%	$143,300,000	15%	$251,100,000	26%	$7,700,000	1%
Commercial Building and Contents Losses	$251,000,000	18%	$5,200,000	2%	$29,700,000	12%	$41,800,000	17%	$75,600,000	30%	$1,800,000	1%
Other Building and Contents Losses	$140,500,000	10%	$6,700,000	6%	$21,800,000	16%	$27,500,000	20%	$42,600,000	30%	$1,400,000	1%
Total Building and Contents Losses[3]	$1,368,400,000	100%	$41,800,000	3%	$154,700,000	11%	$212,600,000	16%	$369,300,000	27%	$10,900,000	1%
Business Disruption[4]	N/A	N/A	$1,600,000	N/A	$5,200,000	N/A	$6,600,000	N/A	$10,200,000	N/A	$300,000	N/A
TOTAL[5]	$1,368,400,000	100%	$43,400,000	3%	$159,900,000	12%	$219,200,000	16%	$379,500,000	28%	$11,200,000	1%

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
[3]Total Building and Contents Losses = Residential Building and Contents Losses + Commercial Building and Contents Losses + Other Building and Contents Losses.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total Loss = Total Building and Contents Losses + Business Disruption
[6]Loss Ratio is the weighted average of the Coastal and Riverine Loss Ratios

Flood Risk Results - Apalachicola

	Total Inventory		Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[1]	Loss Ratio[2,6]	Dollar Losses[1]	Loss Ratio[2,6]	Dollar Losses[1]	Loss Ratio[2,6]	Dollar Losses[1]	Loss Ratio[2,6]	Dollar Losses[1]	Loss Ratio[2,6]
Residential Building and Contents Losses	$160,300,000	54%	$1,300,000	1%	$4,400,000	3%	$6,000,000	4%	$13,500,000	8%	$300,000	0.2%
Commercial Building and Contents Losses	$77,200,000	26%	$1,300,000	2%	$5,300,000	7%	$7,300,000	9%	$13,800,000	18%	$400,000	1%
Other Building and Contents Losses	$58,200,000	20%	$4,500,000	8%	$10,900,000	19%	$12,400,000	21%	$17,200,000	30%	$800,000	1%
Total Building and Contents Losses[3]	$295,700,000	100%	$7,100,000	2%	$20,600,000	7%	$25,700,000	9%	$44,500,000	15%	$1,500,000	1%
Business Disruption[4]	N/A	N/A	$1,000,000	N/A	$2,100,000	N/A	$2,300,000	N/A	$3,600,000	N/A	$200,000	N/A
TOTAL[5]	$295,700,000	100%	$8,100,000	3%	$22,700,000	8%	$28,000,000	9%	$48,100,000	16%	$1,700,000	1%

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
[3]Total Building and Contents Losses = Residential Building and Contents Losses + Commercial Building and Contents Losses + Other Building and Contents Losses.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total Loss = Total Building and Contents Losses + Business Disruption
[6]Loss Ratio is the weighted average of the Coastal and Riverine Loss Ratios

Flood Risk Results – Carrabelle

	Total Inventory		Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[1]	Loss Ratio[2,6]	Dollar Losses[1]	Loss Ratio[2,6]	Dollar Losses[1]	Loss Ratio[2,6]	Dollar Losses[1]	Loss Ratio[2,6]	Dollar Losses[1]	Loss Ratio[2,6]
Residential Building and Contents Losses	$89,600,000	68%	$1,500,000	2%	$4,900,000	5%	$7,700,000	9%	$16,600,000	19%	$400,000	0%
Commercial Building and Contents Losses	$25,900,000	20%	$900,000	3%	$3,500,000	14%	$5,000,000	19%	$8,700,000	34%	$200,000	1%
Other Building and Contents Losses	$16,500,000	12%	$200,000	1%	$900,000	5%	$1,600,000	10%	$2,800,000	17%	$50,000	0%
Total Building and Contents Losses[3]	$131,900,000	100%	$2,600,000	2%	$9,300,000	7%	$14,300,000	11%	$28,100,000	21%	$700,000	1%
Business Disruption[4]	N/A	N/A	$50,000	N/A	$200,000	N/A	$400,000	N/A	$700,000	N/A	$10,000	N/A
TOTAL[5]	$131,900,000	100%	$2,700,000	2%	$9,500,000	7%	$14,700,000	11%	$28,800,000	22%	$700,000	1%

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
[3]Total Building and Contents Losses = Residential Building and Contents Losses + Commercial Building and Contents Losses + Other Building and Contents Losses.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total Loss = Total Building and Contents Losses + Business Disruption
[6]Loss Ratio is the weighted average of the Coastal and Riverine Loss Ratios

Areas of Mitigation Interest

Type of Mitigation Interest	Number of Areas	Data Source
Coastal Structures	3,032	FL DEP
Significant Land Use Changes	17	FL DEP
Areas of Significant Erosion	17	FEMA
At Risk Essential Facilities	71	FL DEM
Other Flood Risk Areas	1,316	FL DEP, FDOT
Area of Mitigation Success	1	FL DEP

- Within the Unincorporated Areas of Franklin County 3,032 coastal structures were identified. Of those, 142 were located within the Special Flood Hazard Area. Seventeen areas of significant land use change were identified. Of those, five were located within a Special Flood Hazard Area. Seventy-one essential facilities were identified within the County limits. Of those, more than twenty were located within a Special Flood Hazard Area. 1,316 other flood risk areas were identified. Of those, 216 were located within a Special Flood Hazard Area. These areas of mitigation interest are at the highest risk within the community. Within the City of Apalachicola three essential facilities were identified of which one was located within a Special Flood Hazard Area. Eight other flood risk areas were identified, of which three were located within a Special Flood Hazard Area. These areas of mitigation interest are at the highest risk within the community. Within the City of Carrabelle there is one area of significant land use change which is not located within a Special Flood Hazard Area. Nine at risk essential facilities were identified of which seven were located within a Special Flood Hazard Area. Nine other flood risk areas were identified within the city limit of which four were located within a Special Flood Hazard Area. These areas of mitigation interest are at the highest risk within the community.

Areas of Mitigation Interest - Apalachicola

Type of Mitigation Interest	Number of Areas	Data Source
At Risk Essential Facilities	3	FDEM
Other Flood Risk Areas	8	FDEP

- Within the City of Apalachicola three essential facilities were identified of which one was located within a Special Flood Hazard Area. Eight other flood risk areas were identified, of which three were located within a Special Flood Hazard Area. These areas of mitigation interest are at the highest risk within the community. The City would benefit from updating the local mitigation strategy with data from this report.

Areas of Mitigation Interest – Carrabelle

Type of Mitigation Interest	Number of Areas	Data Source
Significant Land Use Changes	1	FDEP
At Risk Essential Facilities	9	FDEP; FDEM
Other Flood Risk Areas	9	FDEP; FDOT

- Within the City of Carrabelle there is one area of significant land use change which is not located within a Special Flood Hazard Area. Nine at risk essential facilities were identified of which seven were located within a Special Flood Hazard Area. Nine other flood risk areas were identified within the city limit of which four were located within a Special Flood Hazard Area. These areas of mitigation interest are at the highest risk within the community. The City would benefit from updating the local mitigation strategy with data from this report.

The comprehensive Flood Risk Report summarizes the entire study to develop the flood risk products which is located in Appendix E.

Historical Flood Occurrences

According to the NCDC, (1/1/1950 – 7/20/20), there were 3 flood, 2 flash flood, 3 coastal flood and 8 heavy rain occurrences reported in Franklin County over the last 70 years with location, date, time, the type of event, if there were any deaths or injuries, and the property and crop damage estimates.

It is important to note that Franklin County experienced several hurricane, tropical storms and storm surge events that included extreme flooding. Additional flood details will be discussed in the storm surge and hurricane and tropical storm occurrence hazard event narrative, extent and impact sections.

Table 4.5 – Flood Occurrences in Franklin County – (1/1/1950 – 7/20/2020)

Location or County	Date	Time	Type	Death	Injuries	Property Damage	Crop Damage
Franklin (Zone)	3/10/1998	00:00	Flood	0	0	650K	0.00K
Countywide	9/22/2000	07:00	Flash Flood	0	0	200K	0.00K
Franklin (Zone)	3/7/2003	06:00	Flood	0	0	50K	0.00K
Franklin (Zone)	9/11/2008	02:00	Coastal Flood	0	0	0.00K	0.00K
Franklin (Zone)	10/24/2008	09:15	Coastal Flood	0	0	0.00K	0.00K
Franklin	9/18/2009	07:00	Flood	0	0	0.00K	0.00K
Franklin (Zone)	11/10/2009	06:00	Coastal Flood	0	0	50K	0.00K
Apalachicola Arpt	7/17/2011	11:00	Heavy Rain	0	0	0.00K	0.00K
Apalachicola Arpt	9/3/2011	07:00	Heavy Rain	0	0	0.00K	0.00K
Bay City	9/3/2011	07:00	Heavy Rain	0	0	0.00K	0.00K
Carrabelle	10/17/2011	07:00	Heavy Rain	0	0	0.00K	0.00K
Apalachicola Arpt	10/18/2011	00:00	Heavy Rain	0	0	0.00K	0.00K
Apalachicola	7/17/2011	03:00	Heavy Rain	0	0	0.00K	0.00K
Apalachicola Arpt	6/23/2012	19:00	Heavy Rain	0	0	0.00K	0.00K
Apalachicola	9/19/2012	17:23	Heavy Rain	0	0	0.00K	0.00K
Apalachicola Arpt	11/8/2015	12:05	Flash Flood	0	0	0.00K	0.00K
Totals:						**Property Damage: $ 950,000**	

Source: http://www.ncdc.noaa.gov/stormevents/listevents

Hazard Event Narrative – Extent and Impact

1. 3/10/1998, Franklin Zone – Several counties in Florida (Franklin, Calhoun, Gadsden, Gulf, Holmes, and Jackson) are included in this total property damage figure of $367 million. In Franklin County, rising waters along the Apalachicola River flooded 40 to 50 homes near Fort Gadsden and Bay City. The estimated property damage was $650,000.

2. 9/22/2000 – Countywide – Between six and ten inches of rain from Tropical Storm Helene inundated the county. Several homes were flooded in Apalachicola, including Bluff Road near the Apalachicola River, and on 17th Street and Brownsville Road just west to the municipal airport. A portion of US Hwy 98 five miles west

of Carrabelle was flooded. Highway 67 from CR 13 to the Franklin and Liberty county lines were flooded. Property damage estimates were $200,000.

Additional Significant Flood Occurrence

Hurricane Michael- October 2018

The storm tides of Hurricane Michael in Franklin County ranged from 8 to 12 feet above sea level. At Apalachicola on the mainland shore of Apalachicola Bay, storm tides were experienced of 8 to 9 feet above sea level. At the bay entrance of the Apalachicola River, a NOAA tide gauge measured a peak tide level from Hurricane Michael of 8.6 feet. At East Point on the mainland shore of St. George Sound behind St. George Island, the USGS measured high water marks ranging between 8.6 to 10.6 feet. At the eastern end of St. George Island, a debris line was measured at 9.7 feet, and along the mainland beach adjacent to East Pass, a high-water mark was measured inside a storage shed to be 11.8 feet. No high-water marks have yet been measured on Dog Island, but storm tides of 9 to 10 feet above sea level were measured along the shoreline at Carrabelle fronting on St. George Sound. Likewise, storm tides of 9 to 11 feet above sea level were measured along the gulf fronting shoreline of St. James Island. The USGS measured high water marks along Alligator Peninsula, including the Southwest Cape and Lighthouse Point, ranging between 8.8 to 10.7 feet. While preliminary peak storm surge inundation was slightly less east of Indian Pass, values were still life-threatening and caused significant damage. Along the coast, portions of US 98 and Alligator Drive were washed out and had to be patched and repaved. In Carrabelle, water was high enough to enter a restaurant, resulting in damage to furniture. In addition, numerous homes along the coast were destroyed and damaged as water slammed against the structures. **Flooding occurred throughout the County with the storm surge waters and powerful winds.**

Risk and Vulnerability Assessment

The Flood Risk Report, Appendix E, provides an excellent assessment and analysis on flood risk for Franklin County. Prepared by the Department of Homeland Security, FEMA's risk Mapping, Assessment, and the Planning Risk MAP program, the report informs the communities to take action to reduce flood risk.

Flooding events either from a hurricane, tropical storm, or a heavy rain event, poses a major hazard from the Gulf coast throughout the county and it is not necessary for development to be in the 100-year floodplain to be at risk. The entire coastal area (the unincorporated and incorporated regions) of the county are subject to flooding from a powerful hurricane or tropical storm event that can produce significant storm surges resulting in flood occurrences. Figure 4.5 – Franklin County FEMA Flood Zones over Tax Parcels identifies that a large portion of the county is located in Zone A with other areas in the following zones: AE, AH, and VE. These zones are prone to flooding events. In addition, substantial flooding can and has occurred in the City of Apalachicola, the City of Carrabelle, the Town of Alligator Point, the Town of Eastpoint, Lanark Village, Bay City and St. George Island as noted from previous flooding events.

Vulnerability for the Franklin County's Population

The most vulnerable populated area in the county are the citizens who are close proximity to the Gulf of Mexico and the Apalachicola River in several locations, especially those within the special flood hazard areas.

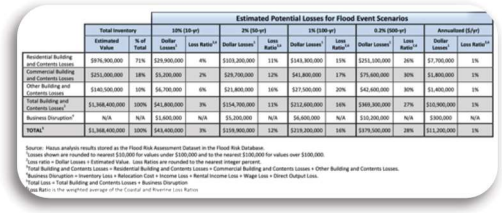
Table 4.6 – Population in 100 and 500 - Year Flood Return Period

Population in 100 and 500 - Year Flood Return Period (2015 population estimates)		
County	**100-Year Flood**	**500-Year Flood**
Franklin	200	223

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

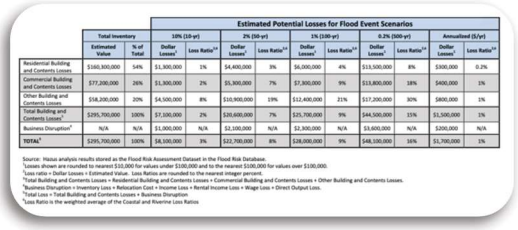
Vulnerability for Franklin County's Structures, Facilities and Infrastructure

Franklin County's buildings, infrastructure and critical facilities are considered vulnerable to damage caused by flooding events. Specific's from the Flood Risk Report, Flood Risk Results, estimated potential losses for flood event scenarios are summarized for the County, the City of Apalachicola, and the City of Carrabelle:



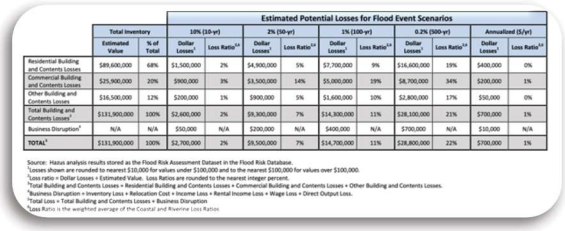
	Total Inventory		Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[1]	Loss Ratio[1,2]	Dollar Losses[1]	Loss Ratio[1,2]	Dollar Losses[1]	Loss Ratio[1,2]	Dollar Losses[1]	Loss Ratio[1,2]	Dollar Losses[1]	Loss Ratio[1,2]
Residential Building and Contents Losses	$976,900,000	71%	$29,900,000	4%	$103,200,000	11%	$143,300,000	15%	$251,100,000	26%	$7,700,000	1%
Commercial Building and Contents Losses	$251,000,000	18%	$5,200,000	2%	$29,700,000	12%	$41,800,000	17%	$75,600,000	30%	$1,800,000	1%
Other Building and Contents Losses	$140,500,000	10%	$6,700,000	6%	$21,800,000	16%	$27,500,000	20%	$42,600,000	30%	$1,400,000	1%
Total Building and Contents Losses[3]	$1,368,400,000	100%	$41,800,000	3%	$154,700,000	11%	$212,600,000	16%	$369,300,000	27%	$10,900,000	1%
Business Disruption[4]	N/A	N/A	$1,600,000	N/A	$5,200,000	N/A	$6,600,000	N/A	$10,200,000	N/A	$300,000	N/A
TOTAL[5]	$1,368,400,000	100%	$43,400,000	3%	$159,900,000	12%	$219,200,000	16%	$379,500,000	28%	$11,200,000	1%

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
[3]Total Building and Contents Losses = Residential Building and Contents Losses + Commercial Building and Contents Losses + Other Building and Contents Losses.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total Loss = Total Building and Contents Losses + Business Disruption
[2]Loss Ratio is the weighted average of the Coastal and Riverine Loss Ratios



	Total Inventory		Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[1]	Loss Ratio[1,2]	Dollar Losses[1]	Loss Ratio[1,2]	Dollar Losses[1]	Loss Ratio[1,2]	Dollar Losses[1]	Loss Ratio[1,2]	Dollar Losses[1]	Loss Ratio[1,2]
Residential Building and Contents Losses	$160,300,000	54%	$1,300,000	1%	$4,400,000	3%	$6,000,000	4%	$13,500,000	8%	$300,000	0.2%
Commercial Building and Contents Losses	$77,200,000	26%	$1,300,000	2%	$5,300,000	7%	$7,300,000	9%	$13,800,000	18%	$400,000	1%
Other Building and Contents Losses	$58,200,000	20%	$4,500,000	8%	$10,900,000	19%	$12,400,000	21%	$17,200,000	30%	$800,000	1%
Total Building and Contents Losses[3]	$295,700,000	100%	$7,100,000	2%	$20,600,000	7%	$25,700,000	9%	$44,500,000	15%	$1,500,000	1%
Business Disruption[4]	N/A	N/A	$1,000,000	N/A	$2,100,000	N/A	$2,300,000	N/A	$3,600,000	N/A	$200,000	N/A
TOTAL[5]	$295,700,000	100%	$8,100,000	3%	$22,700,000	8%	$28,000,000	9%	$48,100,000	16%	$1,700,000	1%

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
[3]Total Building and Contents Losses = Residential Building and Contents Losses + Commercial Building and Contents Losses + Other Building and Contents Losses.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total Loss = Total Building and Contents Losses + Business Disruption
[2]Loss Ratio is the weighted average of the Coastal and Riverine Loss Ratios



	Total Inventory		Estimated Potential Losses for Flood Event Scenarios									
			10% (10-yr)		2% (50-yr)		1% (100-yr)		0.2% (500-yr)		Annualized ($/yr)	
	Estimated Value	% of Total	Dollar Losses[1]	Loss Ratio[1,2]	Dollar Losses[1]	Loss Ratio[1,2]	Dollar Losses[1]	Loss Ratio[1,2]	Dollar Losses[1]	Loss Ratio[1,2]	Dollar Losses[1]	Loss Ratio[1,2]
Residential Building and Contents Losses	$89,600,000	68%	$1,500,000	2%	$4,900,000	5%	$7,700,000	9%	$16,600,000	19%	$400,000	0%
Commercial Building and Contents Losses	$25,900,000	20%	$900,000	3%	$3,500,000	14%	$5,000,000	19%	$8,700,000	34%	$200,000	1%
Other Building and Contents Losses	$16,500,000	12%	$200,000	1%	$900,000	5%	$1,600,000	10%	$2,800,000	17%	$50,000	0%
Total Building and Contents Losses[3]	$131,900,000	100%	$2,600,000	2%	$9,300,000	7%	$14,300,000	11%	$28,100,000	21%	$700,000	1%
Business Disruption[4]	N/A	N/A	$50,000	N/A	$200,000	N/A	$400,000	N/A	$700,000	N/A	$10,000	N/A
TOTAL[5]	$131,900,000	100%	$2,700,000	2%	$9,500,000	7%	$14,700,000	11%	$28,800,000	22%	$700,000	1%

Source: Hazus analysis results stored as the Flood Risk Assessment Dataset in the Flood Risk Database.
[1]Losses shown are rounded to nearest $10,000 for values under $100,000 and to the nearest $100,000 for values over $100,000.
[2]Loss ratio = Dollar Losses ÷ Estimated Value. Loss Ratios are rounded to the nearest integer percent.
[3]Total Building and Contents Losses = Residential Building and Contents Losses + Commercial Building and Contents Losses + Other Building and Contents Losses.
[4]Business Disruption = Inventory Loss + Relocation Cost + Income Loss + Rental Income Loss + Wage Loss + Direct Output Loss.
[5]Total Loss = Total Building and Contents Losses + Business Disruption
[2]Loss Ratio is the weighted average of the Coastal and Riverine Loss Ratios

View the potential loss figures from the Flood Risk Report and Appendix E for the full FEMA report.

Table 4.7 – Economic Loss for Buildings by Return Period

Direct Economic Loss for Buildings for Franklin County by Return Period (in dollars)		
County	**100-Year Flood**	**500-Year Flood**
Franklin	$3,224,000	$3,324,000

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.8 – Inland Flood Hazard Sum of County Facilities

Inland Flood Hazard Sum of Franklin County Facilities						
Floodplain	**Hospitals**	**Fire Stations**	**Police Stations**	**Schools**	**Other**	**Totals**

100	0	7	2	2	54	**65**
500	0	8	3	4	78	**93**

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.9 – Inland Flood Hazard Value of County Facilities

Inland Flood Hazard Value of Franklin County Facilities (in dollars)						
Floodplain	**Hospitals**	**Fire Stations**	**Police Stations**	**Schools**	**Other**	**Totals**
100	0	800,761	958,157	1,832,861	10,161,825	**$13,753,604**
500	0	810,761	1,821,078	1,832,861	18,619,884	**$23,084,584**

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.10– Inland Flood Hazard Building Economic Count

Inland Flood Hazard Building Economic Count 100-year and 500-year Floodplain for Franklin County								
Floodplain	**Residential**	**Commercial**	**Medical**	**Industrial**	**Agriculture**	**Education**	**Government**	**Totals**
100	5,418	259	2	125	16	3	53	**5876**
500	1,889	101	0	24	10	4	28	**2056**

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Table 4.11 – Inland Flood Hazard Building Economic Values

Inland Flood Hazard Building Economic Values 100-year and 500-year Floodplain for Franklin County								
Floodplain	**Residential**	**Commercial**	**Medical**	**Industrial**	**Agriculture**	**Education**	**Government**	**Totals**
100	1,660,972,273	60,874,269	346,174	13,587,934	68,089,061	1,868,661	634,874,712	**2,440,613,084**
500	258,678,816	21,877,589	0	1,700,770	44,958,788	2,015,996	48,496,519	**377,728,478**

Source: Florida Division of Emergency Management, GIS Department,
Data for the State of Florida Enhanced Hazard Mitigation Program, 2018

Summary details for flooding events:

Probability of Future Occurrences	There is a high probability (at least 1 occurrence every year) that Franklin County will continue to experience flooding associated with large tropical storms, powerful hurricanes, and heavy rainfall that generally occur between late August through October.
Geographic Area	The entire planning area (the City of Apalachicola, the City of Carrabelle and the unincorporated areas of Franklin County, especially the coast line, i.e. the Town of Alligator Point, the Town of Eastpoint, and St. George Island) is at high risk to flooding events especially the cities and towns that are considered high to very high flood risk as identified by Figure 4.10 FEMA Flood Risk Map for Franklin County.

	In addition, the floodplains of the Apalachicola River, the New River, the Crooked River, the Carrabelle River, and the Ochlockonee River are also subject to flooding during high river stages.
Extent	The have been a couple of worse-case scenarios for Franklin County from significant hurricane events including extensive storm surges that resulted in considerable flooding and extensive property damage. Hurricane Michael- October 2018 The storm tides of Hurricane Michael in Franklin County ranged from 8 to 12 feet above sea level. At Apalachicola on the mainland shore of Apalachicola Bay, storm tides were experienced of 8 to 9 feet above sea level. At the bay entrance of the Apalachicola River, a NOAA tide gauge measured a peak tide level from Hurricane Michael of 8.6 feet. At East Point on the mainland shore of St. George Sound behind St. George Island, the USGS measured high water marks ranging between 8.6 to 10.6 feet. At the eastern end of St. George Island, a debris line was measured at 9.7 feet, and along the mainland beach adjacent to East Pass, a high-water mark was measured inside a storage shed to be 11.8 feet. No high-water marks have yet been measured on Dog Island, but storm tides of 9 to 10 feet above sea level were measured along the shoreline at Carrabelle fronting on St. George Sound. Likewise, storm tides of 9 to 11 feet above sea level were measured along the gulf fronting shoreline of St. James Island. The USGS measured high water marks along Alligator Peninsula, including the Southwest Cape and Lighthouse Point, ranging between 8.8 to 10.7 feet. While preliminary peak storm surge inundation was slightly less east of Indian Pass, values were still life-threatening and caused significant damage. Along the coast, portions of US 98 and Alligator Drive were washed out and had to be patched and repaved. In Carrabelle, water was high enough to enter a restaurant, resulting in damage to furniture. In addition, numerous homes along the coast were destroyed and damaged as water slammed against the structures. Flooding occurred throughout the County with the storm surge waters and powerful winds. Hurricane Dennis – July 2005 Hurricane Dennis, a category 3 hurricane moved inland just east of Gulf Breeze on July 10. Rainfall totals ranged from 3 to 4 inches in the eastern Florida Panhandle to 6 to 10 inches in the Florida Big Bend. Maximum coastal storm surge heights ranged from 8 to 12 feet in Franklin County. Moderate to severe beach erosion was observed in several counties including Franklin. At St. George Island, five miles of road and numerous structures were damaged or destroyed by Dennis' storm surge. Dennis's deluge caused several rivers and creeks in the FL Panhandle and Big Bend to exceed their flood stages.
Impact	The Franklin County community, the residents, the structures and the infrastructure have been impacted from coastal flooding events from powerful hurricanes, tropical storms, along with astronomical storm surges, and heavy rains. Exposure of property to high water, high winds, and pounding wave action resulting in hundreds of millions of dollars in property damage. The flooding events impacting Franklin County, and the damages they have caused suggest that the future impacts would include: ✓ Substantial flooding in the City of Apalachicola, the City of Carrabelle, the Town of Alligator Point, the Town of Eastpoint, and St. George Island; ✓ Increase in repetitive loss properties; ✓ Road closures along the coast line and in the unincorporated areas of the County; ✓ Environmental impact; ✓ Power lines and trees downed;

	✓ Infrastructure damages; ✓ Extensive beach erosion on St. George Island, St. Vincent Island, Dog Island, and Alligator Point Beach; and ✓ Damage to mobile homes, poorly constructed and non-elevated homes along the coastline. Also, Figures 4.7 and 4.9, Flood Impacts from the tide gauge at Apalachicola and Crooked River at Carrabelle summarizes the impacts from water crest levels. Considerable and significant damage could occur from . The most severe consequence of flooding events is the impact on the local economy with businesses closed and all economic processes are interrupted.

Additional Flood Mitigation Efforts

Flood Mitigation Assistance Plan

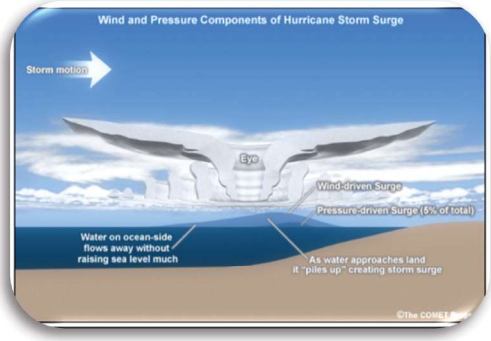
In 2016, Franklin County prepared a Flood Mitigation Plan. As stated in the plan, the general purpose of the plan is to protect people and property from potential flood damages while maintaining good standing with FEMA's NFIP and CRS programs.

The plan also serves as a guide to the community to reduce the number repetitive loss properties through acquisitions, as well as by improving the County's canal and storm drainage system. The County plans to accomplish these goals by continuing to be aggressive with mitigation and structural projects, coupled with governmental ordinances and regulations designed to provide planning guidance for future development and construction. In addition, the County also intends to expand current outreach programs, to maintain the flood mitigation program via assistance through federal grant programs, and to continue with capital improvement drainage projects to alleviate structural flooding within the County's flood-prone communities. The plan is designed to educate the residents of Franklin County about the hazards of flooding, to suggest loss reduction measures, and to raise awareness of the beneficial functions of the floodplain.

The document was prepared to satisfy the certification requirements of the National Flood Insurance Program Community Rating System Coordinator's Manual. A flood mitigation plan is required by all CRS communities that have ten or more repetitive loss properties that have not received mitigation. Unincorporated Franklin County has a total of 91 repetitive loss properties on record with FEMA. The entire plan is available in Appendix F.

Storm Surge

According to the NWS, the storm surge causes are a result of strong hurricane winds that blow along the ocean surface and cause water to pile up as it approaches the shoreline. The low pressure at the storm's center causes water to bulge upward. The surge effect from wind is much higher than that caused by low pressure.



The storm's intensity, forward speed, size, central pressure, shape, and angle of approach to the coast all determine how strong the surge will be. In addition, the shape of bays and estuaries and slope of the ocean bottom also play a large role. The coastal areas adjacent to a steeply sloping ocean bottom will experience less surge than areas adjacent to shallow slopes, given the same storm.

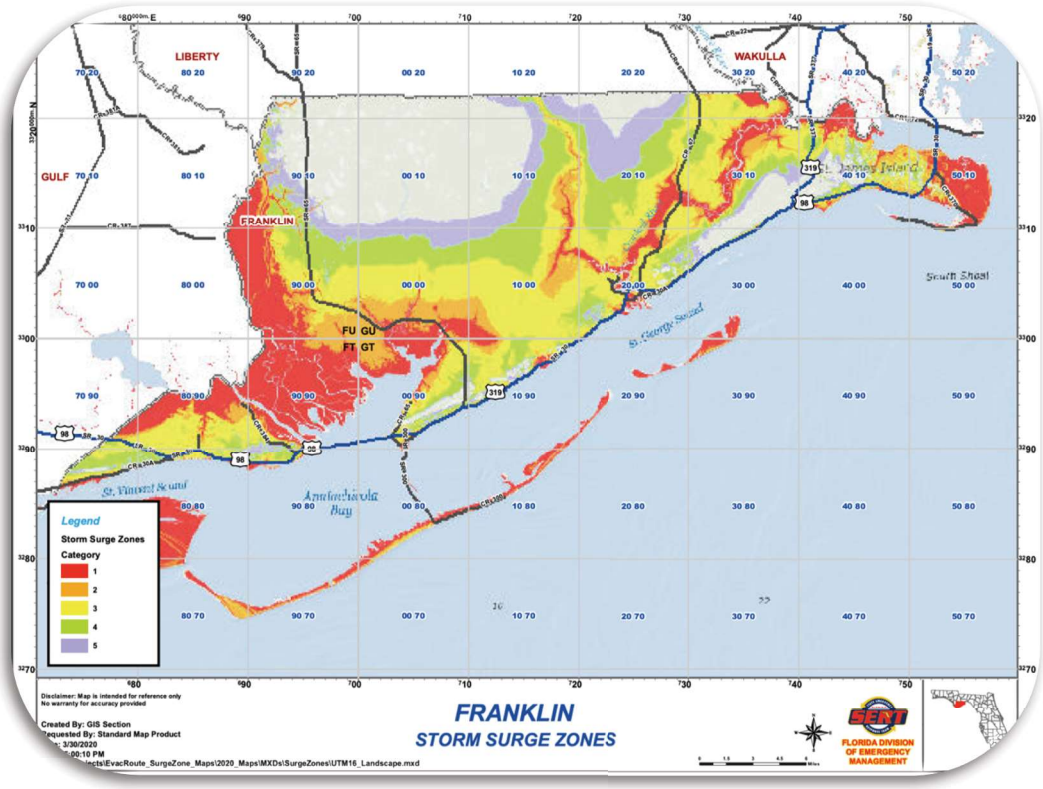
Source: https://www.weather.gov/mdl/stormsurge_about

The waves move on top of the surge and cause even more damage by acting as battering rams to flooded structures. And water weighs about 1700 pounds per cubic yard, so it can easily demolish buildings. Surge undermines roads and foundations when it erodes material out from underneath them. It can also send salt water into the fresh drinking supply and drives potentially dangerous creatures inland to higher ground.

Storm surge is purely water level rise caused by hurricane winds and low pressure. However, when surge levels are combined with the already-present tide, "storm surge" becomes "storm tide". If storm surge hits a coastal area during its high tide, it can cause even more damage. That phenomenon motivates research into improving surge predictions by accurately modeling the timing of peak surge in relation to astronomical tides.

Figure 4.11 is the storm surge zone map for Franklin County, categories 1-5, created by the GIS department at FDEM.

Figure 4.11 – Storm Surge Zones for Franklin County



Source:https://maps.floridadisaster.org/county/SURGE_FRANKLIN.pdf

Historical Storm Surge Occurrences

There were 16 storm surge/tide events reported in Franklin County per the NCDC (1/1/1950 – 7/20/2020) over the last 70 years.

Table 4.12 –Storm Surge Occurrences inFranklin County (1/1/1950 – 7/20/2020)

Location or County	Date	Time	Type	Death	Injuries	Property Damage	Crop Damage
Carrabelle Beach	9/25/2002	18:00	Storm Surge/Tide	0	0	500K	0.00K