## Section 4 - Hazard Risk and Vulnerability Assessment

Requirements:

§201.6 (c) (2) (i) - 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.

§201.6 (c) (2) (ii) - 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.

Section 4 of the Franklin County Local Mitigation Strategy summarizes the results of the hazard identification and vulnerability assessment processes undertaken by the LMS Committee/Workgroup 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 the scope of the natural hazards, how severe the threat can be, and the priority to which they should mitigate those threats.

While many of the hazards discussed in this section are relevant to Franklin County and the participating jurisdictions, 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).

Summary: In reference to sinkholes – Franklin County did experience a sinkhole on Alligator Road in 2005 after Hurricane Dennis. However, this natural hazard will not be profiled as the county is located in a region of deeply buried carbonate rocks. Overburden sediments are primarily cohesive clayey sands and interbedded carbonates in excess of 200 feet thick. Sinkholes are uncommon, but rare deep collapse types and small subsidence sinkholes formed in shallow shell beds or carbonate lenses are possible. This could have been the case for the sinkhole that occurred in

2005. According to the Florida Department of Environmental Protection, there was no sinkhole data for Franklin County from 1950's to the 2010's.

The Natural Hazards profiled in Section 4 for Franklin County are as follows:

**Table 4.1 – Natural Hazards Profiled for Franklin County**

| Natural Hazards |
|---|
| Flooding |
| Storm Surge |
| Hurricanes/Tropical Storms |
| Tornadoes |
| Thunderstorms/High Winds/ Lightning and Hailstorms |
| Coastal and Riverine Erosion |
| Wildfires |
| Drought/Heat Wave |
| Winter Storms/Freezing Temperatures |

*Vulnerability Assessments*

The LMS plan assesses the community's vulnerability of the hazard's impact on the community and its vulnerable structures on the following:

- ✓ Description of all types of natural hazards that can affect the community.
- ✓ Description of the probability, location, vulnerability, extent and impact of each identified hazard that can affect the jurisdiction.
- ✓ An assessment of each jurisdictions risk where they vary from the risks facing the entire community for each identified hazard.
- ✓ An estimate of the potential dollar losses to vulnerable structures, if available.
- ✓ POLICY: As additional data becomes available, Franklin County will update the vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas.
- ✓ There are some changes to the identified natural hazards that were profiled in the previous LMS plan. These hazards were removed for this updated plan:
  Dam/Levee Failure; Earthquake; Volcanic Activity; Subsidence/Expansive Soils, Tsunami, and Landslide

- ✓ Modifications were made to these profiled natural hazards:
  Hurricanes and Coastal Storms was changed to Hurricanes/Tropical Storms; Flooding includes Flash Floods and Coastal Floods; Thunderstorms was changed to Thunderstorms including High Winds, Lightning and Hailstorms; Winter Storms includes Freezing Temperatures; Landslide/Erosion was changed to Coastal and Riverine Erosion. The other natural hazards will remain the same in this updated LMS plan as they have a consequence and impact on the county.

*Probability Assessments*

Throughout the hazard section, the probability of future events will be determined for the natural hazards. 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 year

*Extent Assessment*

Throughout the hazard section the extent statements will be determined for the hazards. The statements will be based on the range of magnitude or severity that the county could experience using a scientific scale or a quantitative measurement

Types of scientific scales:
- Enhanced Fujita Scale for tornadoes
- Saffir-Simpson Hurricane Wind Scale for hurricanes/tropical storms/winds

Quantitative measurements were based on historical occurrences recorded:
- Flood depth for floods
- Acres burned for wildfires
- Wave height for storm surge
- Heat index for heat wave
- High, medium or low based on the previous event occurrence

And from the following sources:
- ✓ Franklin County Emergency Management Department Office;
- ✓ *National Oceanic and Atmospheric Administration* (*NOAA*);
- ✓ National Climatic Data Center (NCDC);
- ✓ National Weather Service (NWS);
- ✓ Florida Forest Service;
- ✓ United States Geological Survey (USGS);
- ✓ Florida Department of Environmental Protection (DEP); and
- ✓ The Northwest Florida Water Management District (NWFWMD).

*Impact Assessment*

The impact is the consequence or effect of the hazard on the community and its assets. In evaluating the "impact" for Franklin County, historical detail impacts and/or an estimate of potential losses were 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: $2,559,370,577.

The natural hazards that are profiled are based on previous occurrence data. The aftermath from a storm event can bring different results to Franklin County, its structures, infrastructure and utilities, transportation networks, its economy, and its environment. Details are analyzed and reported as to the "impact" for each hazard identified. See Table 4.2 for the impact summary on the various structures and infrastructure for the county.

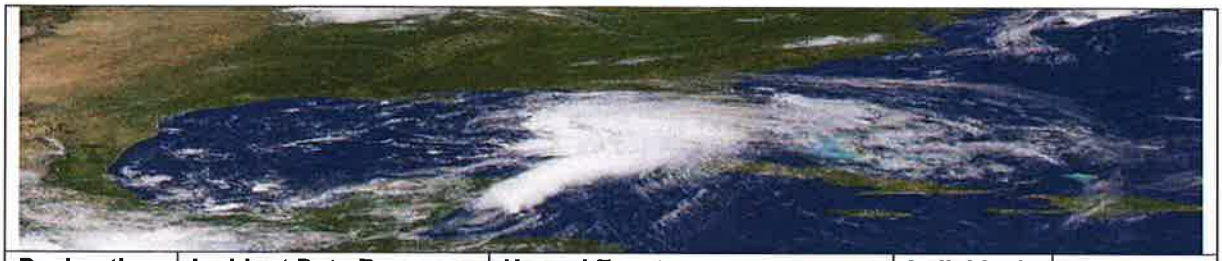
**Table 4.2- Impacts on Structures and Infrastructure from the Identified Hazards in Franklin County**

| 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 | Seafood Industry | 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 | 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 |
| Thunderstorm/ Wind | | X | X | | X | X | | X | | X | | |
| Lightning | | X | X | | | | | | | | | X |
| Hailstorms | | X | X | | | | | | | | | |
| Coastal Erosion | X | | | X | | | | X | | | X | X |
| Riverine Erosion | | X | X | X | | | | | | | | X |
| Wildfires | X | X | X | X | X | X | | X | | | X | X |
| Drought | | | | | | | X | | X | X | X | X |
| Heat Wave | | | | | | | X | | | | | X |
| Winter Storm | | X | X | | | | | X | | X | X | X |
| Freeze | | X | X | | X | X | | X | | X | X | X |

## Disaster Declarations History

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. Table 4.3 lists the disaster declarations from September 2004 – October 2015 that have occurred in Franklin County.

**Table 4.3 - Disasters Declarations for Franklin County (September 2004 – October 2015)**



| Declaration #/ Date | Incident Date Range | Hazard Event | Individual Assistance | Public Assistance |
|---|---|---|---|---|
| #1545 / 9/4/2004 | 9/3/2004 – 10/8/2004 | Hurricane Frances | | X |
| #1551/ 9/16/2004 | 9/13/2004 – 11/17/2004 | Hurricane Ivan | X | X |
| #1595/ 7/10/2005 | 7/7/2005 – 7/20/2005 | Hurricane Dennis | X | X |
| #1602/ 8/28/2005 | 8/24/2005 – 9/6/2005 | Hurricane Katrina | | X |
| #3220/ 9/5/2005 | 8/29/2005 – 10/1/2005 | Hurricane Katrina Evacuation | | X |
| #3288/ 8/21/2008 | 8/18/2008 – 9/12/2008 | Tropical Storm Fay | | X |
| #1806/ 10/27/2008 | 8/31/2008 – 9/7/2008 | Hurricane Gustav | | |
| #1831/ 4/21/2009 | 3/26/2009 – 5/5/2009 | Severe Storms, Flooding, Tornadoes, and Straight-line Winds | | X |
| #4068/ 7/3/2012 | 6/23/2012 - 7/26/2012 | Tropical Storm Debby | X | X |
| #4084/ 10/18/2002 | 8/27/2012 – 8/29/2012 | Hurricane Isaac | | X |

Source: FEMA - www.fema.gov/disaster

## Natural Hazards

### 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. Some of the most significant flood losses are due to the failure of dams and levees.

Some areas of Franklin County are more flood-prone than others. Floodplain maps show those areas of Franklin County and both its municipalities, which are within the 100-year and 500-year floodplain as delineated by the FEMA as part of the National Flood Insurance Program (NFIP). These are areas that have a probability of flooding once every 100-years or 500-years respectively during any given year. The classification of floodplains is due in part to the probability or return rate of a level of water; for instance, 100-year floods are calculated to be the level of flood water expected to be equal or exceeded every 100 years on average. This means that a flood has a 1% chance of being equaled or exceeded in magnitude in any single year; a 500-year floodplain has a 0.2% chance.

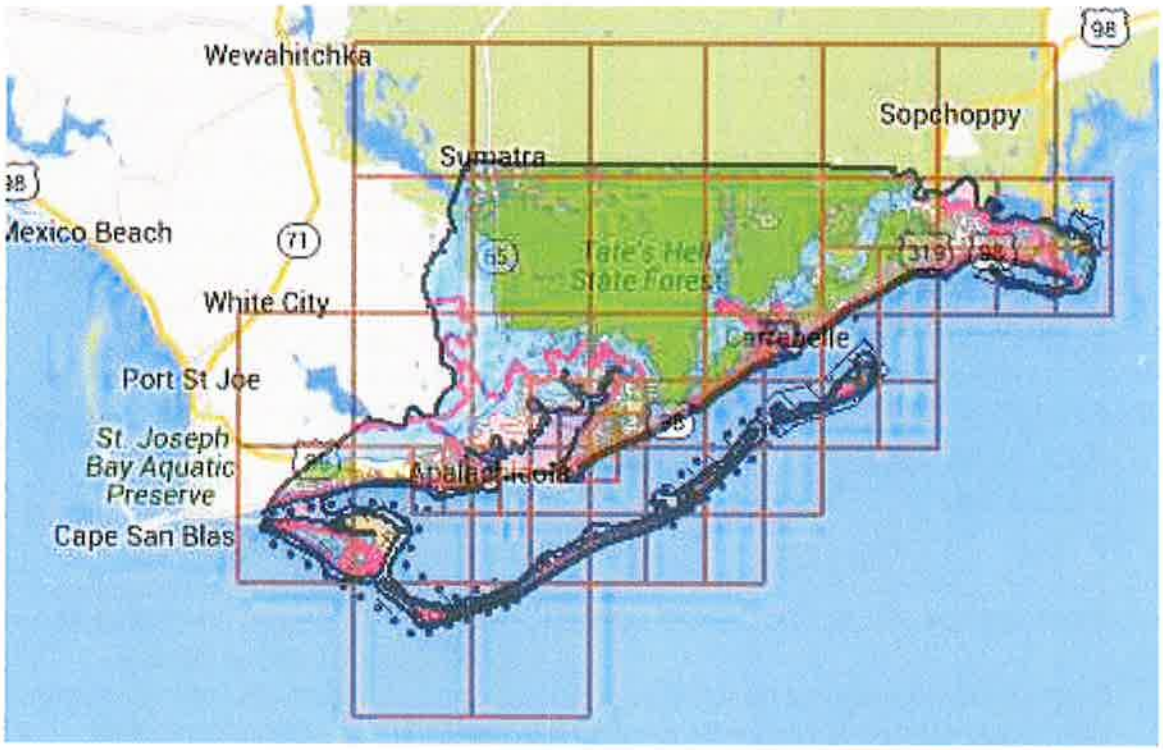
*Special Flood Hazard Areas (SFHA) for Franklin County*

According to the NWFWMD, map details are derived directly from a variety of sources including the FEMA's Flood Insurance Rate Maps (FIRMs), the District's digital elevation model, the counties' digital parcel maps and data from other governmental 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 land areas that are at high risk for flooding and can be identified by A, AE and VE zones along the coastal line and in areas within the county.

**Figure D – Map Classification For Flood Zone Areas**


**Figure E – Franklin County Flood Zone Area Map**




Source: http://portal.nwfwmdfloodmaps.com/map.aspx?cty=franklin

Details from the FEMA Flood Insurance Study (FIS)

## Principal Flood Problems

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.

**Figure F – Hydrography Map of Franklin County**


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. 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. Other rivers in the county have smaller drainage areas and are therefore less significant sources of flooding. Other rivers in the 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 the Ochlockonee Bay. Low-lying, poorly drained areas of the county are also subject to rainfall ponding.

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

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.

In meteorological terms, a hurricane is defined as a tropical cyclone, which has a central

barometric pressure of 29 inches or less of mercury, and wind velocities of 75-miles per hour or more. The low barometric pressures and high winds combine to produce abnormally high tides and accompanying tidal flooding. The high winds can generate large waves, provided there are no obstructions or barrier beaches to dissipate wave momentum. The winds of a hurricane in the Northern Hemisphere spiral inward in a counter clockwise direction towards the "eye" or center of low pressure. The eye of the hurricane where winds are subdued can vary in diameter. Normally, the "eye" can extend for 15 miles, although the eye of a mature hurricane can reach diameters of 20 to 30 miles or even greater.

A hurricane develops as a tropical storm either near the Cape Verde Islands off the African coast or in the western Caribbean Sea. Most hurricanes, which reach northwestern Florida approach from a southerly direction after crossing the Florida peninsula, the island of Cuba, or the western Gulf of Mexico. These hurricanes start their journey northward with a forward speed of about 10 miles per hour. The most destructive winds in a hurricane occur east of the eye, where the spiral wind movement and forward motion of the storm combine. Several past hurricanes have tracked over the Florida Panhandle; therefore, Franklin County is prone to experience the full intensity of a major hurricane. In order for Franklin County to experience the highest winds and accompanying highest tides of a hurricane, the storm would need to track west of the county.

### Historical Data

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 details are for the following counties: Wakulla, Jefferson, Gulf, Bay, Escambia, and Franklin County.

- ✓ 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 measures designed and constructed specifically for flood protection. The U.S. Army Corps of Engineers (USACE) designed and built the Jim Woodruff Lock and Dam, which is located north of Franklin County on the Apalachicola River at the Florida/Georgia state line and approximately 108 miles north of the mouth. Construction of this dam was initiated in September 1947, and the impounding of water occurred in May 1954. Although the Jim Woodruff Dam was primarily designed for navigation purposes, it does offer a limited amount of flood regulation of the Apalachicola River. Because of the dam's geographical location, it provides minimal flood protection for Franklin County. The Jackson Bluff Dam on Lake Talquin (this dam is not located within Franklin County) is a hydroelectric installation operated by the Florida Power Corporation. This project was completed in 1930, and offers no appreciable flood control for properties located downstream.

The coastal areas of Franklin County are, for the most part, surrounded by barrier islands. St. George Island and Little St. George Island 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.

Flood Occurrences

According to the NCDC (7/1/1950 – 7/31/2015), there were flood, flash flood and coastal flood occurrences reported in Franklin County over the last 65 years.

**Table 4.4 – Flood and Coastal Flood Occurrences in Franklin County – (7/1/1950 – 7/31/2015)**

| Location or County | Date | Time | Type | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|
| 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) | 7/10/2005 | 20:00 | Storm Surge/Tide (Coastal Flooding) | 0 | 0 | 9.5M | 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 |
| **Totals:** | **(This figure includes coastal flooding from a significant storm surge) Property Damage: $10,450,000** | | | | | | |

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

**Key Code**: Dth: Deaths; Inj: Injuries; PdD: Property Damage; CrD: Crop Damage

Hazard Event Narrative

1. 3/10/1998 – Franklin (Zone) – There were several counties effected by the flooding event in 1998 (Franklin, Calhoun, Gadsden, Gulf, Holmes, and Jackson were declared federal disaster area. The Apalachicola River at Blountstown crested near 27.2 feet (third highest) on March 13. In Franklin County, rising water along the Apalachicola River flooded 40 to 50 homes near Fort Gadsden and Bay City.

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.

Note: The 7/10/2005 event will be profiled in the flood, storm surge and erosion areas.

3. 7/10/2005 – Franklin (Zone) – A 8 to 12 foot storm surge caused significant coastal flooding and moderate to severe beach erosion. Highway 98 from Lanark Village to Carrabelle and Carrabelle to Eastpoint was washed out. CR 370 (Alligator Point Road) and SR 300 (the bridge entrance to St. George Island State Park) were closed. Five miles of the road into St. George Island Park was damaged. The surge damaged 80% of the park's dunes, boardwalks, and beachfront restrooms. Oyster houses, boats and equipment were damaged. Septic tanks and wells

on St. George and Dog Islands were contaminated. A total of 28 homes were destroyed, 141 were damaged, and numerous businesses were damaged or destroyed. The property damage estimations were over $9.5 - $10+ million.

4. 11/10/2009 - Franklin (Zone) – Storm tides associated with Tropical Storm Ida ranged from 3 to 5 feet along the Florida Panhandle coast. In Franklin, flooding and debris closed Alligator Point Road and Water Road in Apalachicola. Minor beach erosion was reported in Franklin.

## Vulnerability

Vulnerability to flooding events can be defined as to the extent to which people will experience harm and property will be damaged from the natural hazard. Franklin County is located on the coast of the Gulf of Mexico, therefore, damage from natural hazard events like flooding (especially coastal floods) is highly likely to occur and affect most of the residents that live in the county and cause property damage from storm surge events.

The tax collector's office reports that there are 1,251 property records identified as mobile homes, which accounts for approximately 25 - 29% of the total residential structures living in the county. In addition, due to the number of mobile homes, the older homes, the poorly constructed homes, the non-elevated structures located along the coastline, and the infrastructure could experience extensive property damage.

**Table 4.5 – Vulnerability Areas in Franklin County**

| **Areas of Vulnerability<br>Reference details from the NWFWMD<br>Flood Information Portal** | |
|---|---|
| Flood Zone definitions: www.fema.gov | Map area details: Figure D |
| **Zone A –** Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management | A large portion of the county is located in Zone A, the northern, the central and western areas as identified in Lime Green. See Figure D. |

| | |
|---|---|
| standards apply. | |
| **Zone AE –** Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. BFEs are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply. | Specific areas within the county along the western, eastern and central areas as identified in Light Blue. See Figure D. |
| **Zone VE -** Areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. Base Flood Elevations (BFEs) derived from detailed hydraulic analyses are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply. | The entire coastal line of the county and areas on the northeast and west as identified in Light Pink. See Figure D. |

*(A) Vulnerability for the Franklin County's Population (Inland Flooding)*

Franklin County had a 2.6% growth rate from 2010 to 2015 from 11,549 residents in 2010 to a projected 11,844 residents in 2015. The flooding vulnerability for the Franklin County's population exposure based on 2010 Census population data's potentially at risk for riverine flooding is noted in Table 4.6.

**Table 4.6 – Inland Flood Vulnerability for Franklin County's Population**

| County | 100-Year | 500-Year |
|---|---|---|
| Franklin Population | 9,070 | 4,371 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page 3.53

*Vulnerability for Franklin County's Structures and Facilities (Inland Flooding)*

Tables 4.7 – 4.10 summarize the following details for the Floodplain Area (100-year and 500-year) in Franklin County on:

- the types of structures located by occupancy type in the floodplain area;
- the value of the structures;
- the county facilities within the floodplain area (100-year only); and
- the value of the county facilities (100-year only).

**Table 4.7 – Structures Located in the Floodplain Area in Franklin County**

| Floodplain | Residential | Commercial | Medical | Industrial | Agriculture | Education | Government |
|---|---|---|---|---|---|---|---|
| 100-year | 3,346 | 75 | 8 | 43 | 2 | 0 | 8 |
| 500-year | 179 | 6 | 1 | 6 | 0 | 0 | 5 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.11

**Table 4.8 – Values of Structures in the Floodplain Area in Franklin County** *(in millions)*

| Floodplain | Resid. ($ million) | Comm. ($ million) | Med. ($ million) | Indus. ($ million) | Agric. ($ million) | Educ. ($ million) | Govt. ($ million) |
|---|---|---|---|---|---|---|---|
| 100-year | 726,961.70 | 57,307.69 | 3,907.70 | 7,386.74 | 470.57 | 0.00 | 15,185.67 |
| 500-year | 33,181.26 | 4,977.20 | 301.62 | 662.09 | 0.00 | 0.00 | 1,795.22 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.15

**Table 4.9 – Franklin County Facilities in the Floodplain Area**

| Floodplain | Hospitals | Fire Stations | Police Stations | Schools | Other | Total Facilities |
|---|---|---|---|---|---|---|
| 100-year | 0 | 1 | 3 | 0 | 70 | 74 |
| 500-year | 0 | 0 | 1 | 0 | 6 | 7 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.19

**Table 4.10 – Value of Franklin County Facilities in the Floodplain Area** *(in millions)*

| Floodplain | Hospitals ($million) | Fire Stations ($million) | Police Stations ($million) | Schools ($million) | Other ($million) | Total Facilities ($million) |
|---|---|---|---|---|---|---|
| 100-year | 0 | 0 | 3.78 | 0 | 3.46 | 7.24 |
| 500-year | 0 | 0 | 1.26 | 0 | 0.86 | 2.12 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.23

*(B) Vulnerability for the Franklin County's Population (Coastal Flooding)*

Franklin County had a 2.6% growth rate from 2010 to 2015 from 11,549 residents in 2010 to a projected 11,844 residents in 2015. The flooding vulnerability for the Franklin County's population exposure based on 2010 Census population data's potentially at risk for coastal flooding from Hurricane Categories 2 and 5 are noted in Table's 4.11 - 4.12.

**Table 4.11 – Coastal Flood Vulnerability for Franklin County's Population, Category 2**

| County | 1-3 feet | 4-6 feet | 7-10 feet |
|---|---|---|---|
| Franklin Population | 11,652 | 10,757 | 5,318 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page 3.55

**Table 4.12 – Coastal Flood Vulnerability for Franklin County's Population, Category 5**

| County | 1-3 feet | 4-6 feet | 7-10 feet | 11-13 feet | 14-16 feet | 17-20 feet | 21-23 feet | 24- 26 feet | 27-30 feet |
|---|---|---|---|---|---|---|---|---|---|
| Franklin Population | 237 | 519 | 796 | 725 | 778 | 654 | 264 | 159 | 33 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page 3.57

*Vulnerability for Franklin County's Structures and Facilities*

*Coastal Flooding Vulnerability*

Tables 4.13– 4.16 summarize the following details of the vulnerability to flooding depth associated with categories 2 and 5 hurricanes in Franklin County on:

- the number of structures by occupancy type to flooding associated with Category 2 hurricanes;
- the replacement value of the structures by occupancy type to flooding associated with Category 2 hurricanes;
- the number of structures located by occupancy type to flooding associated with Category 5 hurricanes;
- the replacement value of the structures by occupancy type to flooding associated with Category 5 hurricanes.

**Table 4.13 – Structures Located in the Coastal Flood Hazard Area in Franklin County, Category 2**

| Coastal Flood | Residential | Commercial | Medical | Industrial | Agriculture | Education | Government |
|---|---|---|---|---|---|---|---|
| Depth Range (1- 5 feet) | 888 | 34 | 3 | 12 | 0 | 0 | 2 |
| Depth Range (6 – 10 feet) | 967 | 17 | 3 | 11 | 0 | 0 | 0 |
| Depth Range (11 – 15 feet) | 86 | 2 | 0 | 1 | 0 | 0 | 1 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.27

**Table 4.14 – Values of Structures in the Coastal Flood Hazard Area in Franklin County, Category 2** *(in millions)*

| Coastal Flood | Resid. ($ million) | Comm. ($ million) | Med. ($ million) | Indus. ($ million) | Agric. ($ million) | Educ. ($ million) | Govt. ($ million) |
|---|---|---|---|---|---|---|---|
| Depth Range (1- 5 feet) | 9,199.89 | 1,617.71 | 156.45 | 305.72 | 1.37 | 267.24 | 329.57 |
| Depth Range (6 – 10 feet) | 5,866.45 | 775.71 | 239.33 | 440.57 | 26.31 | 166.18 | 1,683.31 |
| Depth Range (11 – 15 feet) | 823.98 | 31.82 | 0.86 | 0.84 | 0.79 | 3.41 | 27.01 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.30

**Table 4.15 – Structures Located in the Coastal Flood Hazard Area in Franklin County, Category 5**

| Coastal Flood | Residential | Commercial | Medical | Industrial | Agriculture | Education | Government |
|---|---|---|---|---|---|---|---|
| Depth Range (1- 5 feet) | 594 | 23 | 5 | 11 | 0 | 0 | 3 |
| Depth Range (6 – 10 feet) | 1,460 | 57 | 15 | 7 | 0 | 6 | 9 |
| Depth Range (11 – 15 feet) | 1,354 | 34 | 5 | 21 | 1 | 0 | 4 |
| Depth Range (16 – 20 feet) | 951 | 23 | 4 | 12 | 0 | 0 | 1 |
| Depth Range (20+ feet) | 195 | 2 | 0 | 1 | 0 | 0 | 1 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C33

**Table 4.16 – Values of Structures in the Coastal Flood Hazard Area in Franklin County, Category 5** *(in millions)*

| Floodplain | Resid. ($ million) | Comm. ($ million) | Med. ($ million) | Indus. ($ million) | Agric. ($ million) | Educ. ($ million) | Govt. ($ million) |
|---|---|---|---|---|---|---|---|
| Depth Range (1- 5 feet) | 76.11 | 14.76 | 2.25 | 0.97 | 0.00 | 0.00 | 5.90 |
| Depth Range (6 – 10 feet) | 250.41 | 24.87 | 11.13 | 2.52 | 0.00 | 17.30 | 13.65 |
| Depth Range (11 – 15 feet) | 296.84 | 16.23 | 1.80 | 1.99 | 0.26 | 0.00 | 0.67 |
| Depth Range (16 – 20 feet) | 206.11 | 31.28 | 2.54 | 1.05 | 0.00 | 0.00 | 0.37 |
| Depth Range (20+ feet) | 46.41 | 2.92 | 0.00 | 1.49 | 0.00 | 0.00 | 0.06 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.38

## *Problem Areas for Franklin County*

The entire coastal area (the unincorporated and incorporated sections) of the county are subject to flooding from a powerful hurricane or topical storm event that can produce significant storm surges resulting in flood occurrences. Figure E, Franklin County Flood Zone Area Map, identifies that a large portion of the county is located in Zone A, with specific areas in Zone AE, and entire coastline of the county and portions of the northeast is Zone VE (all zones that are prone to flooding events).

- Substantial flooding can and has occurred in the City of Apalachicola, the City of Carrabelle, the Town of Alligator Point, Lanark Village, the Town of Eastpoint and St. George Island as noted from previous flooding events.

| **Probability** |
|---|
| The probability for flooding is high for the entire county (at least one occurrence every year). |
| **Location** |
| The floodplains of the Apalachicola River, the New River, the Crooked River, the Carrabelle River, and the Ochlocknee River are subject to flooding during high river stages. The low-lying, poorly drained areas of the county are also subject to rainfall ponding. |

The entire coastal area of the county is subject to coastal flooding caused by tropical cyclones, storms and hurricanes. See Figure E to identify the unincorporated and incorporated areas that would be affected by flood events.

## Extent

The worse case scenario for coastal flooding in Franklin County resulted from a 8 to 12 foot storm surge in July of 2005. Highway 98 from Lanark Village to Carrabelle and Carrabelle to Eastpoint was washed out. CR 370 (Alligator Point Road) and SR 300 (the bridge entrance to St. George Island State Park) were closed. Five miles of the road into St. George Island Park was damaged. The surge damaged 80% of the park's dunes, boardwalks, and beachfront restrooms. Oyster houses, boats and equipment were damaged. Septic tanks and wells on St. George and Dog Islands were contaminated. A total of 28 homes were destroyed, 141 were damaged, and numerous businesses were damaged or destroyed.

## Impact

The Franklin County community, the residents, the structures, and the infrastructure suffered from the July 10, 2005 coastal flooding event. Details from the NCDC narratives state that Franklin County has been impacted from flood events:

- ✓ 3/10/1998 – Franklin (Zone) – The Apalachicola River at Blountstown crested near 27.2 feet. Rising water along the Apalachicola River flooded 40 to 50 homes near Fort Gadsden.

- ✓ 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 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.

- ✓ 7/10/2005 – Franklin (Zone) – A 8 to 12 foot storm surge caused significant coastal flooding. Highway 98 from Lanark Village to Carrabelle and Carrabelle to Eastpoint was washed out. CR 370 (Alligator Point Road) and SR 300 (the bridge entrance to St. George Island State Park) were closed. Five miles of the road into St. George Island Park was damaged. The surge damaged 80% of the park's dunes, boardwalks, and beachfront restrooms. Oyster houses, boats and equipment were damaged. Septic tanks and wells on St. George and Dog Islands were contaminated. A total of 28 homes were destroyed, 141 were damaged, and numerous businesses were damaged or

destroyed. The property damage estimations were over $9.5 - $10 + million.

- ✓ 11/10/2009 - Franklin (Zone) – Storm tides associated with Tropical Storm Ida ranged from 3 to 5 feet along the Florida Panhandle coast. In Franklin, flooding and debris closed Alligator Point Road and Water Road in Apalachicola.

The flooding events impacting Franklin County, and the damages they have caused suggest that the future impacts could 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;
- road closures along the coast line and in the unincorporated areas of the county;
- power lines, downed trees and infrastructure damages;
- destruction to the county's seafood industry (Franklin County's seafood harvest some of the finest seafood in the country, including more than 90% of Florida's oysters and approximately 10% of the nation's oyster supply with over 2.6 million pounds of oyster meat harvested annually).
- extensive beach erosion on St. George Island, St. Vincent Island, Dog Island and Alligator Point beach; and
- damage to the mobile homes, poorly constructed and non-elevated homes along the coastline.

In addition, there could be an economic or financial impact with results that would be devastating from a large-scale flood event not only during the crisis phase, which immediately follows the event, yet through the recovery and rebuilding stages.

## Storm Surge

Storm surge is an abnormal rise of water generated by a storm, over and above the predicted astronomical tide. It's the change in the water level that is due to the presence of the storm. Since storm surge is a difference between water levels, it does not have a reference level. Storm tide is the water level rise during a storm due to the combination of storm surge and the astronomical tide. Since storm tide is the combination of surge and tide, it does require a reference level. A 15 ft. storm surge on top of a high tide that is 2 ft. above mean sea level produces a 17 ft. storm tide.

Source: http://www.nws.noaa.gov/om/hurricane/resources/surge

The causes of a storm surge are primarily from the strong winds from a tropical storm or hurricane. The wind circulation around the eye of the hurricane blows on the ocean surface and produces a vertical circulation in the ocean. If the water is deep then there is nothing to disturb the circulation resulting in a non-storm surge event. However, if the hurricane reaches shallow waters near the coast, the vertical circulation in the ocean becomes disrupted by the ocean floor, and the water can no longer go downward, so the results are up and inland causing a storm surge occurrence. A storm surge occurs when winds are blowing towards the shore and the highest surge occurs where

the strongest winds of the hurricane occur.

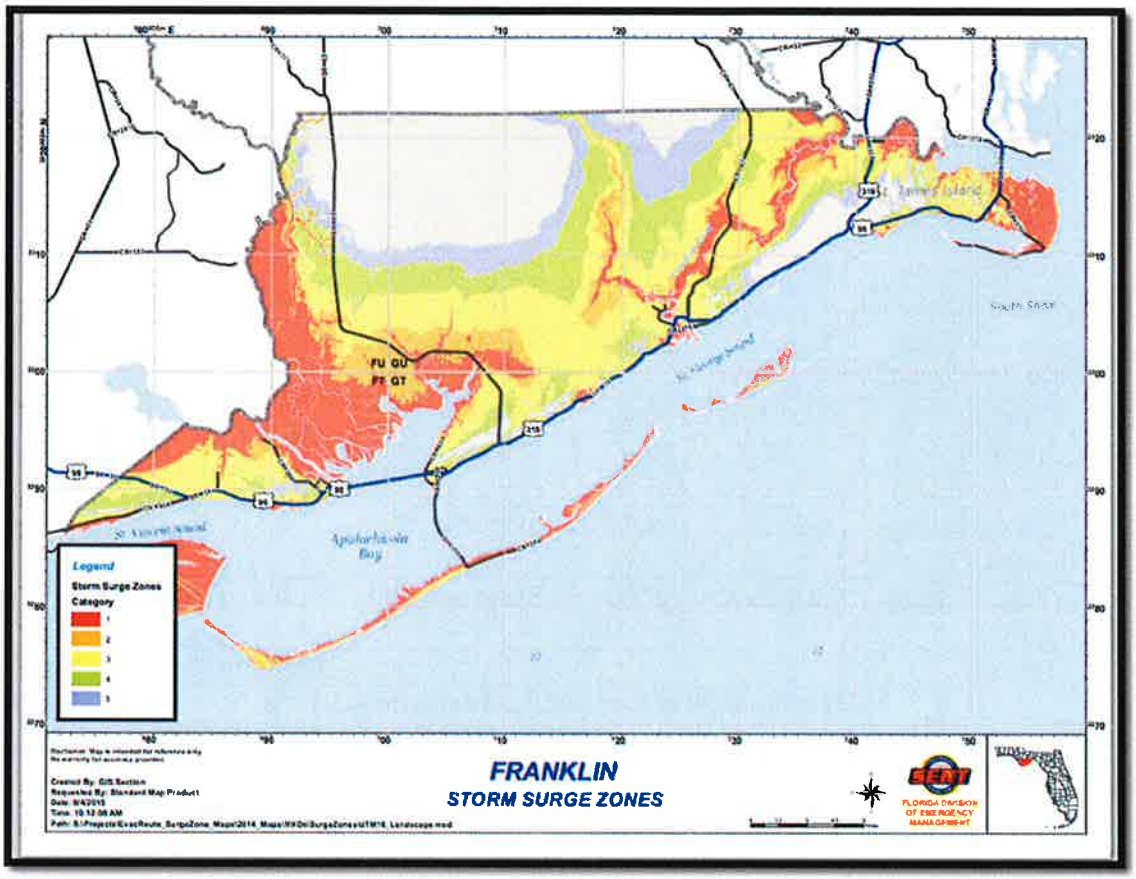
Influences of a Storm Surge – *what will produce a higher storm surge* –

- Central Pressure – a lower pressure
- Storm Intensity – stronger winds
- Size – a larger storm
- Storm Speed – a faster storm, however a higher surge is produced in bays, sounds and other enclosed bodies of water with a slower storm
- Angle of Approach to a Coastline – perpendicular to the coast produces a higher storm surge
- Shape of the Coastline – a concave coastline (curved inward, like Apalachee Bay)
- Width and Slope of the Ocean Flood – wide, gently sloping continental shelves
- Local Features – no barriers that will affect the flow of the water (i.e. barrier islands, inlets, sounds, bays and rivers)

Along the coast, storm surge is considered the greatest threat to life and property from a hurricane event. Historical data reveal that death tolls have resulted from the rise of the ocean associated with many of the hurricanes that have made landfall. The map (Figure H) reveals the affects of storm surge from the different hurricane categories on Franklin County.

**Figure G – Map Legend for Storm Surge Zones**

**Figure H – Storm Surge Zones (Categories 1 – 5) for Franklin County**




Source: http://www.floridadisaster.org/publicmapping/SURGE/SURGE_FRANKLIN.pdf

*Notable Surge Event that Occurred in Franklin County*

Hurricane Dennis 2005

A 8 to 12 foot storm surge caused significant coastal flooding and moderate to severe beach erosion. Highway 98 from Lanark Village to Carrabelle and Carrabelle to Eastpoint was washed out. CR 370 (Alligator Point Road) and SR 300 (the bridge entrance to St. George Island State Park) were closed. Five miles of the road into St. George Island Park was damaged. The surge damaged 80% of the park's dunes, boardwalks, and beachfront restrooms. The hurricane caused considerable damage in the western Florida Panhandle, including widespread utility and communications outages. Oyster houses, boats and equipment were damaged. Septic tanks and wells on St. George and Dog Islands were contaminated. A total of 28 homes were destroyed, 141 were damaged, and numerous businesses were damaged or destroyed. The property damage estimations were over $9.5 to $10 million.

Storm Surge Occurrences

**Table 4.17 – Storm Surge Occurrences in Franklin County – (7/1/1950 – 7/31/2015)**

| Location or County | Date | Time | Type | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|
| Carrabelle Beach | 9/5/2002 | 18:00 | Storm Surge/tide | 0 | 0 | 500K | 0.00K |
| Franklin (Zone) | 8/12/2004 | 08:00 | Storm Surge/tide | 0 | 0 | 15K | 0.00K |
| Franklin (Zone) | 6/11/2005 | 12:00 | Storm Surge/tide | 0 | 0 | 25K | 0.00K |
| Franklin (Zone) | 7/10/2005 | 06:00 | Storm Surge/tide | 0 | 0 | 9.5M | 0.00k |
| Franklin (Zone) | 8/28/2005 | 20:00 | Storm Surge/tide | 0 | 0 | 200K | 0.00K |
| Franklin (Zone) | 6/12/2006 | 12:00 | Storm Surge/tide | 0 | 0 | 5K | 0.00K |
| Franklin (Zone) | 8/24/2008 | 06:00 | Storm Surge/tide | 0 | 0 | 0.00K | 0.00K |
| Franklin (Zone) | 9/1/2008 | 02:00 | Storm Surge/tide | 0 | 0 | 100K | 0.00K |
| Franklin (Zone) | 8/16/2009 | 17:00 | Storm Surge/tide | 0 | 0 | 0.00K | 0.00K |
| Coastal Franklin (Zone) | 6/25/2012 | 14:24 | Storm Surge/tide | 0 | 0 | 25K | 0.00K |
| Coastal Franklin (Zone) | 8/28/2012 | 07:00 | Storm Surge/tide | 0 | 0 | 500K | 0.00K |
| **Totals:** | | | | | | **Property Damage: $10,870,000** | |

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

**Key Code**: Dth: Deaths; Inj: Injuries; PdD: Property Damage; CrD: Crop Damage

Hazard Event Narrative

1. 9/5/2002 – Carrabelle Beach - Storm surge heights of 4 feet combined with large battering waves eroded sand up to 5 feet at Dog Island. Two homes partially collapsed. At St. George Island, moderate beach erosion occurred. Overwash undermined a portion of Highway 98 near Carrabelle Beach.

2. 7/10/2005 – Franklin (Zone) – see summary above under Hurricane Dennis 2005.

3. 8/28/12 – Coastal Franklin (Zone) – The outer remnants of Hurricane Isaac spawned a couple of funnel clouds and tornadoes, and some coastal flooding did occur across Franklin County with the storm surge. Significant erosion occurred across the county with estimates of around $500,000 in damage. The storm surge was measured at 3.45 feet at Apalachicola at 1200 UTC on the 28th with a total storm tide of 3.92 inches. Water Street in Apalachicola flooded with over 1 foot of water in some places. Some flooding occurred in St. George Island State Park with water passing the dune line and flooding parking areas.

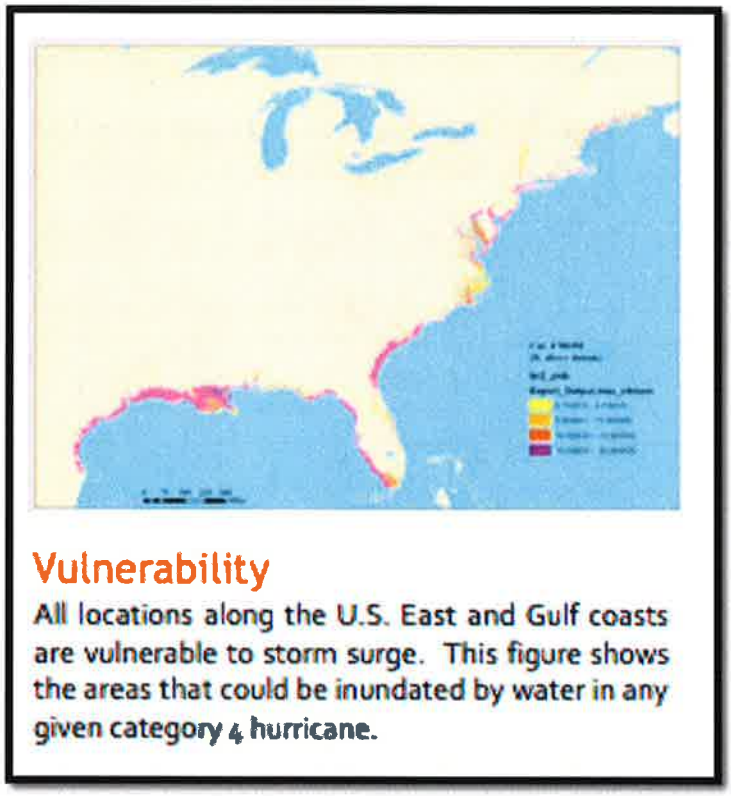
**Vulnerability**

Vulnerability to storm surge events can be defined as to the extent to which people will experience harm and property will be damaged from the natural hazard. Franklin County is located on the

coast of the Gulf of Mexico, therefore, damage from natural hazard events like storm surge is highly likely to occur causing significant coastal flooding and affecting most of the residents that live in the county resulting in property damage.

*The historical data reveals that the county has experienced storm surge events of up to 12 feet high.*

**Figure I – Map of US East and Gulf Coasts Vulnerable to Storm Surge**




*Vulnerability for Franklin County's Structures and Facilities*

**Table 4.18 – Number of County Facilities Located within Storm Surge, Category 2 Hurricane**

| Facility Type | 1-5 feet | 6-10 feet | 11-15 feet | 16-20 feet | Total by Facility Type |
|---|---|---|---|---|---|
| Police Stations | 2 | 0 | 0 | 0 | 2 |
| Schools | 1 | 0 | 0 | 0 | 1 |
| Other Facilities | 46 | 42 | 0 | 0 | 88 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C43

**Table 4.19 – Value of County Facilities Located within Storm Surge, Category 2 Hurricane** *(in millions)*

| Facility Type | 1-5 feet ($million) | 6-10 feet ($million) | 11-15 feet ($million) | 16-20 feet ($million) | Total by Facility Type ($million) |
|---|---|---|---|---|---|
| Police Stations | 9.84 | 2.95 | 0 | 0 | 12.79 |
| Schools | 2.52 | 0 | 0 | 0 | 2.52 |
| Other Facilities | 0.19 | 0 | 0 | 0 | 0.19 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C46

**Table 4.20 – Number of County Facilities Located within Storm Surge, Category 5 Hurricane**

| Facility Type | 1-5 feet | 6-10 feet | 11-15 feet | 16-20 feet | 20+ feet | Total by Facility Type |
|---|---|---|---|---|---|---|
| Hospitals | 0 | 1 | 0 | 0 | 0 | 1 |
| Police Stations | 0 | 0 | 3 | 0 | 0 | 3 |
| Schools | 1 | 6 | 1 | 0 | 0 | 8 |
| Other Facilities | 2 | 16 | 36 | 53 | 1 | 108 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C50

**Table 4.21 – Value of County Facilities Located within Storm Surge, Category 5 Hurricane** *(in millions)*

| Facility Type | 1-5 feet ($million) | 6-10 feet ($million) | 11-15 feet ($million) | 16-20 feet ($million) | 20+ feet ($million) | Total by Facility Type ($million) |
|---|---|---|---|---|---|---|
| Hospitals | 0.00 | 6.04 | 0.00 | 0.00 | 0.00 | 6.04 |
| Police Stations | 0.00 | 0.00 | 3.78 | 0.00 | 0.00 | 3.78 |
| Schools | 2.29 | 10.27 | 0.19 | 0.00 | 0.00 | 12.75 |
| Other Facilities | 0.00 | 1.20 | 9.56 | 3.69 | 0.00 | 14.45. |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C54

***Problem Areas for Franklin County***

The entire county is subject to storm surge caused by powerful hurricane occurrence, however, this would depend on the category level for the hurricane, see Figure H – Storm Surge Zones (Categories 1 – 5) for Franklin County. Most of the entire coastal area (the unincorporated and incorporated sections) of the county are subject to flooding from a momentous hurricane that can produce significant storm surges resulting in flood occurrences. Consequential storm surge events

have occurred causing destructive flooding in the Cities of Apalachicola and Carrabelle, the Town of Alligator Point, Lanark Village, the Town of Eastpoint and St. George Island as noted from previous flooding events.

**Probability**

The probability for storm surge is medium to high for the entire county (at least one occurrence every 3 years to possibly every year).

**Location**

The entire county is subject to storm surge caused by tropical cyclones, storms and hurricanes, however, this would depend on the category level for the hurricane. The map in Figure H reveals the effects of storm surge from the different hurricane categories on Franklin County for the incorporated and unincorporated areas.

**Extent**

The worse case scenario for storm surge was the 8 to 12 foot storm surge in July of 2005 from Hurricane Dennis. Highway 98 from Lanark Village to Carrabelle and Carrabelle to Eastpoint was washed out. CR 370 (Alligator Point Road) and SR 300 (the bridge entrance to St. George Island State Park) were closed. Five miles of the road into St. George Island Park was damaged. The surge damaged 80% of the park's dunes, boardwalks, and beachfront restrooms. Oyster houses, boats and equipment were damaged. Septic tanks and wells on St. George and Dog Islands were contaminated. A total of 28 homes were destroyed, 141 were damaged, and numerous businesses were damaged or destroyed.

**Impact**

The Franklin County community, the residents, the structures, and the infrastructure experienced storm surge heights of up to 12 feet. Details from the NCDC narratives state that Franklin County has been impacted from storm surge events:

- ✓ 9/5/2002 – Carrabelle Beach - Storm surge heights of 4 feet combined with large battering waves eroded sand up to 5 feet at Dog Island. Two homes

partially collapsed. At St. George Island, moderate beach erosion occurred. Overwash undermined a portion of Highway 98 near Carrabelle Beach.

- ✓ 7/10/2005 – Franklin (Zone) – A 8 to 12 foot storm surge caused significant coastal flooding. Highway 98 from Lanark Village to Carrabelle and Carrabelle to Eastpoint was washed out. CR 370 (Alligator Point Road) and SR 300 (the bridge entrance to St. George Island State Park) were closed. Five miles of the road into St. George Island Park was damaged. The surge damaged 80% of the park's dunes, boardwalks, and beachfront restrooms. Oyster houses, boats and equipment were damaged. Septic tanks and wells on St. George and Dog Islands were contaminated. A total of 28 homes were destroyed, 141 were damaged, and numerous businesses were damaged or destroyed. The property damage estimations were over $9.5 - $10 + million.

- ✓ 8/28/12 – Coastal Franklin (Zone) – The outer remnants of Hurricane Isaac spawned a couple of funnel clouds and tornadoes, and some coastal flooding did occur across Franklin County with the storm surge. Significant erosion occurred across the county with estimates of around $500,000 in damage. The storm surge was measured at 3.45 feet at Apalachicola at 1200 UTC on the 28th with a total storm tide of 3.92 inches. Water Street in Apalachicola flooded with over 1 foot of water in some places. Some flooding occurred in St. George Island State Park with water passing the dune line and flooding parking areas.

The storm surge events impacting Franklin County, and the damages they have caused suggest that the future impacts could include:

- substantial flooding from the storm surge in the City of Apalachicola, the City of Carrabelle, the Town of Alligator Point, the Town of Eastpoint and St. George Island;
- road closures and infrastructure damage along the coast line and in the unincorporated areas of the county;
- destruction to the county's seafood industry (Franklin County's seafood harvest some of the finest seafood in the country, including more than 90% of Florida's oysters and approximately 10% of the nation's oyster supply with over 2.6 million pounds of oyster meat harvested annually).
- extensive beach erosion on St. George Island, St. Vincent Island, Dog Island and Alligator Point beach; and
- damage to the mobile homes, poorly constructed, non-elevated homes, businesses and other structures along the coastline.

In addition, there could be an economic or financial impact with results that would be devastating from a large-scale storm surge event (resulting in coastal and inland flooding) not only during the crisis phase, which immediately follows the event, yet through the recovery and rebuilding stages.

## Hurricane/Tropical Storms


Tropical storms and tropical cyclones will be profiled within this section. A tropical storm is a tropical cyclone with maximum sustained winds of at least 39 mph. Tropical storms are given official names once they reach these wind speeds. When the wind speeds reach 74 mph or greater, a tropical storm is called a hurricane, typhoon, or cyclone based on the storm location.

A hurricane is a category of tropical cyclone characterized by thunderstorms and defined surface wind circulation. Hurricanes develop over warm waters and are caused by the atmospheric instability created by the collision of warm air with cooler air. Hurricane winds blow in a large spiral around a calm center, which can be 20-30 miles wide. When a hurricane nears land, it may cause torrential rain, high wind, storm surge, coastal flooding, inland flooding, and sometimes tornadoes. A tropical storm is classified as a hurricane once winds goes up to 74 miles per hour or higher.

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, however, and require preventative measures. See Figure J, the Saffir-Simpson Hurricane Wind Scale for specifics on a hurricane's sustained wind speed.

## Figure J: Saffir-Simpson Hurricane Wind Scale

| Category | Sustained Winds | Types of Damage Due to Hurricane Winds |
|---|---|---|
| 1 | 74-95 mph<br>64-82 kt<br>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 branches of trees 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 a few to several days. |
| 2 | 96-110 mph<br>83-95 kt<br>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 (major) | 111-129 mph<br>96-112 kt<br>178-208 km/h | **Devastating damage will occur:** Well-built 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 (major) | 130-156 mph<br>113-136 kt<br>209-251 km/h | **Catastrophic damage will occur:** Well-built framed homes can sustain 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 (major) | 157 mph or higher<br>137 kt or higher<br>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. |

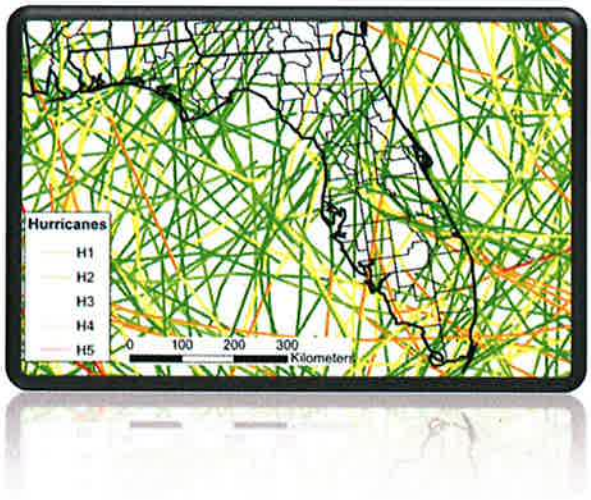
Source: http://www.nhc.noaa.gov/aboutsshws.php

Hurricanes are a seasonal occurrence, with the Atlantic Coast/Gulf of Mexico hurricane season ranging from June 1 to November 30. Hurricanes pose a significant threat to Florida, particularly those residents living along the coast. Franklin County is not a coastal county, but is still subject to the wind and water damage that hurricanes can bring, although to a lesser extent than a coastal Florida county. Details in Figure K show that a H3 or Category 3 hurricane passed and made landfall in Franklin County.

*What Makes a Hurricane Season Active*

According to NOAA, Science fact sheet... "Atlantic hurricanes, also called Atlantic tropical cyclones, are intense storms that occur over the North Atlantic Ocean, Caribbean Sea and Gulf of Mexico. Whether an Atlantic hurricane season is active or quiet generally depends upon the large-scale atmospheric and oceanic environment within the main development region, which spans the tropical North Atlantic Ocean and Caribbean Sea."

**Figure K – Tracks of hurricanes passing near to and making landfall over Florida 1851- 2006**




The conditions, which typically are associated with an active Atlantic hurricane season - and can also produce a more intense hurricane include:

- ✓ warmer tropical North Atlantic sea surface temperatures (SSTs);
- ✓ increased thunderstorm activity; and
- ✓ reduced vertical wind shear (changes of wind direction and/or speed with height) within the main development region, among other features.

Source: http://fcit.usf.edu/florida/teacher/science/mod2/tropical.cyclone

**Figure L – Tracks of tropical depressions and tropical storms passing near to and making landfall over Florida 1851- 2006**


*Tropical Depression to a Tropical Storm*

After a group of thunderstorms for a period of time have come together under the right atmospheric conditions, they organize into a tropical depression. The wind speed near the center are between 20 -34 knots (23 to 39 mph).

After a tropical depression has intensified to the point where its maximum sustained winds are between 35-64 knots (39-73 mph), it then becomes a tropical storm. It is at this time that it is assigned a name. During this time, the storm itself becomes more organized and begins to become more circular in shape -- resembling a hurricane. Figure L identifies numerous tropical storms that made landfall in Franklin County.

Source: http://fcit.usf.edu/florida/teacher/science/mod2/tropical.cyclone.html

*Hurricane and Tropical Storm Occurrences*

There have been several recorded hurricane and tropical storm events reported in Franklin County per the NCDC. Some of the tropical storms were the result of a hurricane event heading inward onto land.

**Table 4.22 – Hurricane and Tropical Storm Occurrences in Franklin County (7/1/1950 –7/31/2015)**

| Location or County | Date | Time | Type | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|
| Franklin (Zone) | 10/7/1996 | 12:00 | Tropical Storm | 0 | 0 | 0.00K | 0.00K |
| Franklin (Zone) | 9/2/1998 | 12:00 | Hurricane | 0 | 0 | 750K | 0.00K |
| Franklin (Zone) | 9/28/1998 | 00:00 | Hurricane | 0 | 0 | 275K | 0.00K |
| Franklin (Zone) | 9/17/2000 | 08:00 | Hurricane | 0 | 0 | 0.00K | 0.00K |
| Franklin (Zone) | 9/21/2000 | 18:00 | Tropical Storm | 0 | 0 | 0.00K | 0.00K |
| Franklin (Zone) | 8/4/2001 | 15:00 | Tropical Storm | 0 | 0 | 0.00K | 0.00K |
| Franklin (Zone) | 9/25/2002 | 18:00 | Tropical Storm | 0 | 0 | 500K | 0.00K |
| Franklin (Zone) | 8/12/2004 | 00:00 | Tropical Storm | 0 | 0 | 0.00K | 0.00K |
| Franklin (Zone) | 9/5/2004 | 14:00 | Tropical Storm | 0 | 0 | 10K | 0.00K |
| Franklin (Zone) | 9/15/2004 | 00:00 | Hurricane | 0 | 0 | 150K | 0.00K |
| Franklin (Zone) | 9/26/2004 | 15:00 | Tropical Storm | 0 | 0 | 0.00K | 0.00K |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Franklin (Zone) | 6/10/2005 | 18:00 | Tropical Storm | 0 | 0 | 25K | 0.00K |
| Franklin (Zone) | 7/9/2005 | 18:00 | Hurricane | 0 | 0 | 10M | 0.00K |
| Franklin (Zone) | 8/28/2005 | 18:00 | Hurricane | 0 | 0 | 200K | 0.00K |
| Franklin (Zone) | 6/12/2006 | 12:00 | Tropical Storm | 0 | 0 | 5K | 0.00K |
| Franklin (Zone) | 6/1/2007 | 07:00 | Tropical Storm | 0 | 0 | 0.00K | 0.00K |
| Franklin (Zone) | 8/22/2008 | 12:00 | Tropical Storm | 0 | 0 | 25K | 0.00K |
| Franklin (Zone) | 8/16/2009 | 03:00 | Tropical Storm | 0 | 0 | 25K | 0.00K |
| Franklin (Zone) | 11/9/2009 | 06:00 | Tropical Storm | 0 | 0 | 75K | 0.00K |
| Franklin (Zone) | 6/24/2012 | 07:00 | Tropical Storm | 0 | 0 | 5K | 0.00K |
| Coastal Franklin (Zone) | 6/24/2012 | 07:00 | Tropical Storm | 0 | 0 | 10K | 0.00K |
| **Totals:** | | | | | | **Property Damage: $12,055,000** | |

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

**Key Code**: Dth: Deaths; Inj: Injuries; PdD: Property Damage; CrD: Crop Damage

Hazard Event Narrative

1. 9/2/1998 – Franklin (Zone) – Hurricane Earl, a category 1 storm came ashore on 9/3/1998. The storm surge along the Florida Big Bed coast ranged from 6 to 12 feet above normal tide levels. The storm surge affected 136 homes and 15 businesses. CR 65, SR 300, US 98 and the St. George Causeway were closed due to high water. Significant beach erosion occurred on Carrabelle Beach and Alligator Point, and Alligator Point Road washed out stranding 50 people. Franklin County was declared a disaster area.

2. 9/27/2002 – Franklin (Zone) – Tropical Storm Isidore came ashore during the early morning hours of 9/26/2002. Storm rainfall totals were from 2 – 6 inches. The main impact from Isidore was storm surge flooding, beach erosion and tornadoes. The maximum storm surge ranged from 4 to 7 feet along the Panhandle coast.

3. 7/9/2005 – Franklin (Zone) – Hurricane Dennis, a category 3 hurricane, moved inland early on July 10, 2005. A 8 to 12 foot storm surge caused significant coastal flooding and moderate to severe beach erosion. Highway 98 from Lanark Village to Carrabelle and Carrabelle to Eastpoint was washed out. CR 370 (Alligator Point Road) and SR 300 (the bridge entrance to St. George Island State Park) were closed. Five miles of the road into St. George Island Park was damaged. There were numerous reports of downed trees and power lines across the county. The storm surge damaged 80% of the park's dunes, boardwalks, and beachfront restrooms. Oyster houses, boats and equipment were damaged. Septic tanks and wells on St. George and Dog Islands were contaminated. A total of 28 homes were destroyed, 141 were damaged, and numerous businesses were damaged or destroyed. The property damage estimations were $9.5 million to over $10 + million. Franklin County was declared a disaster area.

## Vulnerability

Vulnerability to hurricane and tropical storm events can be defined as to the extent to which people will experience harm and property will be damaged from the natural hazard. The county is very vulnerable to hurricane and tropical storm force winds and heavy rains are compounded by the high concentration of mobile home residents.

The tax collector's office reports that there are 1,251 property records identified as mobile homes, which accounts for approximately 25 - 29% of the total residential structures in the county. In addition, due to the number of mobile homes, the older homes, the poorly constructed homes, the non-elevated structures located along the coastline, and the infrastructure could experience extensive property damage.

Since September 2004, Franklin County has had 10 disaster declarations that have required individual assistance, or public assistance or both. Of which 9 of them were from hurricane and tropical storm events.

*Vulnerability for the Franklin County's Population*

Franklin County had a 2.6% growth rate from 2010 to 2015 from 11,549 residents in 2010 to a projected 11,844 residents in 2015. A hurricane or tropical storm could affect the entire population especially the mobile home residents, which consist of 25 - 29%, the poorly constructed home residents, the non-elevated structures and those living along the gulf coastline are considered very vulnerable to this natural hazard.

*Vulnerability for Franklin County's Structures and Facilities*

Tables 4.23 – 4.26 summarize the following details for Franklin County on hurricane winds for:

- the number of structures by occupancy type that would be affected by a Category 2 hurricane based on return period indicated and probability of occurrence;
- the value of the structures by occupancy type that would be affected by a Category 2 hurricane based on return period indicated and probability of occurrence;
- the county facilities by type that are located in the geographic areas expected to be affected every 20, 50, 100, 200 or 500 years by a Category 2 hurricane return periods, and
- the value of the county facilities by type that are located in the geographic areas expected to be effected every 20, 50, 100, 200 or 500 years by a Category 2 hurricane return periods.

### Table 4.23 – Number of Structures Affected by a Category 2 Hurricane Winds, Return Period

| Return Period (years) | Resident. | Comm. | Medical | Industrial | Agriculture | Education | Govt. |
|---|---|---|---|---|---|---|---|
| 50-year | 2,817 | 96 | 17 | 29 | 0 | 5 | 18 |
| 100-year | 6,092 | 170 | 39 | 71 | 2 | 6 | 29 |
| 200-year | 2,096 | 20 | 12 | 11 | 1 | 0 | 6 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.58

### Table 4.24 – Values of Structures Affected by a Category 2 Hurricane Winds, Return Period *(in millions)*

| Return Period (years) | Resid. ($ million) | Comm. ($ million) | Med. ($ million) | Indus. ($ million) | Agric. ($ million) | Educ. ($ million) | Govt. ($ million) |
|---|---|---|---|---|---|---|---|
| 50-year | 615.36 | 58.32 | 10.13 | 5.74 | 0.00 | 12.46 | 15.19 |
| 100-year | 1,106.73 | 109.99 | 22.94 | 11.54 | 0.47 | 17.30 | 33.52 |
| 200-year | 307.91 | 12.25 | 6.17 | 1.25 | 0.21 | 0.00 | 4.05 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.63

### Table 4.25 – Number of County Facilities Affected by a Category 2 Hurricane Winds, Return Period

| Facility Type | 20-Year | 50-Year | 100-Year | 200-Year | 500-Year |
|---|---|---|---|---|---|
| Fire Stations | 0 | 0 | 2 | 2 | 0 |
| Hospitals | 0 | 1 | 1 | 0 | 0 |
| Other Facilities | 0 | 145 | 177 | 103 | 0 |
| Police Stations | 0 | 2 | 4 | 1 | 0 |
| Schools | 0 | 6 | 9 | 1 | 0 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.71

### Table 4.26 – Values of County Facilities Affected by a Category 2 Hurricane Winds, Return Period *(in thousands)*

| Facility Type | 20-Year ($Thousand) | 50-Year ($Thousand) | 100-Year ($Thousand) | 200-Year ($Thousand) | 500-Year ($Thousand) |
|---|---|---|---|---|---|
| Fire Stations | 0 | 0 | 0 | 0 | 0 |
| Hospitals | 0 | 6,042 | 6,042 | 0 | 0 |
| Other Facilities | 0 | 9 | 16 | 0 | 0 |
| Police Stations | 0 | 2,520 | 5,040 | 1,260 | 0 |
| Schools | 0 | 10,274 | 19,722 | 6,964 | 0 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.79

### *Problem Area for Franklin County*

The entire county, the incorporated and unincorporated areas, are at high risk and very vulnerable to hurricane and/or tropical storm events. Franklin County is **located on the gulf coast** and is subject to storm surge, violent winds, heavy and widespread torrential rains, flooding, tornadoes, and lightning strikes, which can come from hurricanes and tropical storm events.

Extensive problems can occur to the mobile homes, which accounts for approximately 25 - 29% of the total residential structures in the county, and the poorly constructed houses, as this group of homes vulnerability are considered very high. Franklin County is in a location that has been previously impacted by many tropical storms and hurricanes as noted by the number of occurrences and property damage the county has sustained.

| **Probability** |
| --- |
| The probability of hurricane and tropical storms are considered high (at least 1 occurrence every year). |
| **Location** |
| The entire planning area (the incorporated and unincorporated areas of Franklin County) is at high risk and very vulnerable to hurricane and/or tropical storm events. Franklin County is located on the gulf coast and is subject to storm surge, violent winds, heavy and widespread torrential rains, flooding, tornadoes, and lightning strikes, which can come from hurricanes and tropical storm events. Franklin County is in a location that has been previously impacted by many tropical storms and hurricanes as noted by the number of occurrences in Table 4.22. |
| **Extent** |
| The worse case scenario from a hurricane or tropical storm event would be a category 5 hurricane with winds of over 157 mph or higher, which could potentially cause catastrophic damage throughout the entire county. Mobile homes and 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.<br><br>Franklin County experienced a very destructive and powerful hurricane in July of 2005 from Hurricane Dennis. When this hurricane reached the eastern area of the Gulf of Mexico it re-intensified into a category 4 hurricane, however, it weakened into a category 3 hurricane before making landfall over the western Florida Panhandle. There was a 8 to 12 foot storm surge damaging the infrastructure, homes, and several businesses.<br><br>Therefore, a category 5 hurricane could prove to be even more devastating to the county |

residents, structures and infrastructure.

## Impact

The Franklin County community, the residents, the structures, the infrastructure can be severely impacted from hurricane or tropical storm event that can bring high winds, heavy rains, destructive flood levels and possibly a tornado. Details from the NCDC narratives state that Franklin County has been impacted from the storm events:

- ✓ Hurricane Earl – 9/2/1998, the storm surge ranged from 6 to 12 feet above normal tide levels. There were 136 homes and 15 businesses affected, and CR 65, SR 300, US 98 and the St. George Causeway closed due to high water. There was significant beach erosion on Carrabelle Beach and Alligator Point, and Alligator Point Road washed out stranding 50 people. The property damage was estimated at $750,000.
- ✓ Tropical Storm Isidore – 9/27/2002, the storm surge ranged from 4 to 7 feet causing flooding, beach erosion and spawning tornado events. The property damage was estimated at $500,000.

- ✓ Hurricane Dennis – 7/9/2005, a Category 3 Hurricane, moved inland early on July 10, 2005. A 8 to 12 foot storm surge caused significant coastal flooding in downtown Apalachicola and part of the highway around Carrabelle, and moderate to severe beach erosion. Highway 98 from Lanark Village to Carrabelle and Carrabelle to Eastpoint was washed out. CR 370 (Alligator Point Road) and SR 300 (the bridge entrance to St. George Island State Park) were closed. Five miles of the road into St. George Island Park was damaged. There were numerous reports of downed trees and power lines across the county. The storm surge damaged 80% of the park's dunes, boardwalks, and beachfront restrooms. Oyster houses, boats and equipment were damaged. Septic tanks and wells on St. George and Dog Islands were contaminated. A total of 28 homes were destroyed, 141 were damaged, and numerous businesses were damaged or destroyed. Details reveal - approximately 17 businesses sustained structural damage, 5 of which are substantial; 6 residences damaged and 1 totally destroyed; on the north side, 10 residences and 1 commercial property sustained flood damage; east of Bryant Patton Bridge (Patton Dr.) 6-10 small commercial structures sustained significant damage. The property damage estimations were $9.5 to $10 + million.

The hurricane and storm events impacting Franklin County, and the damages they have caused

suggest that the future impacts could include:

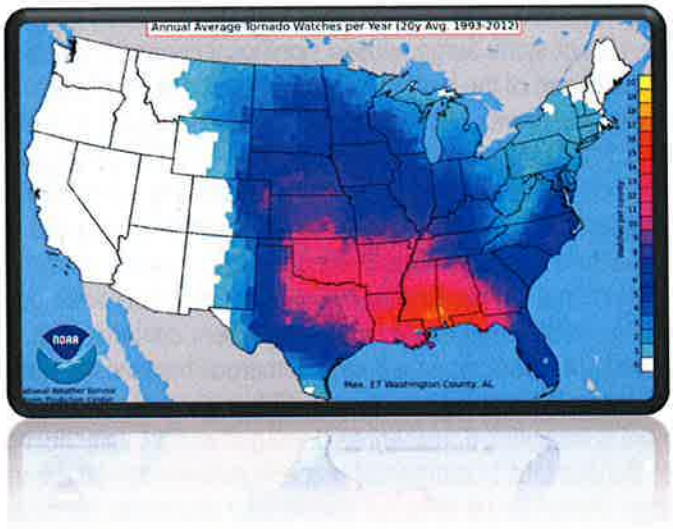
- substantial flooding in the City of Apalachicola, the City of Carrabelle, the Town of Alligator Point, the Town of Eastpoint and St. George Island;
- road closures along the coast line and in the unincorporated areas of the county;
- power lines, downed trees and infrastructure damages;
- destruction to the county's seafood industry (Franklin County's seafood harvest some of the finest seafood in the country, including more than 90% of Florida's oysters and approximately 10% of the nation's oyster supply with over 2.6 million pounds of oyster meat harvested annually).
- extensive beach erosion on St. George Island, St. Vincent Island, Dog Island and Alligator Point beach; and
- damage to the mobile homes, poorly constructed and non-elevated homes along the coastline.

In addition, there could be an economic or financial impact with results that would be devastating from a large-scale hurricane event not only during the crisis phase, which immediately follows the event, yet through the recovery and rebuilding stages.

## Tornado

Tornadoes are nature's most violent storms. Spawned from powerful thunderstorms, tornadoes can cause fatalities and devastate a neighborhood in seconds. A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long. Every state is at some risk from this hazard.

**Figure M – Tornado Map of the US (20-year Average, 1993 – 2012)**




Source: http://www.spc.noaa.gov/wcm/20ytora.png

Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others. Some tornadoes develop rapidly with little advance warning and then may dissipate just as quickly. Most tornadoes are on the ground for less than 15 minutes. Before a tornado hits, the wind may die down and the air may become very still. A cloud of debris can mark the location of a tornado even if a funnel is not visible. It is not uncommon to see clear, sunlit skies behind a tornado.

Facts about tornadoes:

- They may strike quickly, with little or no warning.
- They may appear nearly transparent until dust and debris are picked up or a cloud forms in the funnel.
- The average tornado moves southwest to Northeast, but tornadoes have been known to move in any direction.
- The average forward speed of a tornado is 30 MPH, but may vary from stationary to 70 MPH.
- Tornadoes can accompany tropical storms and hurricanes as they move onto land.
- Waterspouts are tornadoes that form over water.
- Tornadoes are most frequently reported east of the Rocky Mountains during spring and summer months.
- Peak tornado season in the southern states is March through May; in the northern states, it is late spring through early summer.
- Tornadoes are most likely to occur between 3 p.m. and 9 p.m., but can occur at any time.

Source: FEMA http://www.fema.gov/hazard/tornado/index.shtm

The most common, least destructive tornadoes are warm weather tornadoes that occur between May and August. Cool season tornadoes are the most destructive, occurring between December and April. Franklin County is vulnerable to these wind disasters due to a high concentration of the population residing in manufactured or mobile homes, approximately 25 – 29% of the residential structures. A tornado or a series of tornadoes could effect the population if it should occur in a highly populated area. Damage has occurred from tornadoes in the county.

The possible consequences of tornadoes include: power outages, infrastructure damage (road/culvert washout), erosion, property damage/loss from wind, water and fires, fresh water flooding, evacuations (day/night, road congestion), agricultural damage/loss, economic loss, and debris.

Definition for Funnel Cloud

A condensation funnel extending from the base of a towering cumulus or Cb, associated with a rotating column of air that is not in contact with the ground (and hence different from a tornado). A condensation funnel is a tornado, not a funnel cloud, if either a) it is in contact with the ground or b) a debris cloud or dust whirl is visible beneath it.

Source: http://www.crh.noaa.gov/glossary.php?word=FUNNEL%20CLOUD

Definition of Waterspouts

Waterspouts fall into two categories: fair weather waterspouts and tornadic waterspouts.

Tornadic waterspouts are tornadoes that form over water, or move from land to water. They have the same characteristics as a land tornado. They are associated with severe thunderstorms, and are often accompanied by high winds and seas, large hail, and frequent dangerous lightning.

Fair weather waterspouts usually form along the dark flat base of a line of developing cumulus clouds. This type of waterspout is generally not associated with thunderstorms. While tornadic waterspouts develop downward in a thunderstorm, a fair weather waterspout develops on the surface of the water and works its way upward. By the time the funnel is visible, a fair weather waterspout is near maturity. Fair weather waterspouts form in light wind conditions so they normally move very little.

If a waterspout moves onshore, the National Weather Service issues a tornado warning, as some of them can cause significant damage and injuries to people. Typically, fair weather waterspouts dissipate rapidly when they make landfall, and rarely penetrate far inland.

Source: http://oceanservice.noaa.gov/facts/waterspout.html

Enhanced Fujita Scale

According to NOAA's National Weather Service, Storm Prediction Center, the Enhanced Fujita Scale was implemented February 2007. The storm events database documentation notes that the Tornado EF Scale was based on the enhanced F-Scale. Details from NOAA's National Weather Service Storm Prediction Center on the Enhanced Fujita scale states it must continue to support and maintain the original tornado database and there must be some conformity to that of the F-Scale that is listed in the database. When using the EF-Scale to determine the tornado's EF-rating, begin with the 28 Damage Indicators.

- ✓ Each one of these indicators has a description of the typical construction for that category of indicator.
- ✓ Then the next step is to find the Degree of Damage (DOD).
- ✓ Each DOD in each category is given and expected estimate of wind speed, a lower bound of wind speed and an upper bound of wind speed.

The Enhanced Fujita (EF) Scale is a set of wind estimates (not measurements) based on damage. Its uses three-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators listed below. These estimates vary with height and exposure. The 3 -second gusts is not the same wind as in standard surface observations. Standard measurements are taken by weather stations in open exposures, using a directly measured, and "one minute mile" speed. See Figure N, the Enhanced F-Scale for specifics on tornado damage.

## Figure N – Enhanced Fujita Scale

| Fujita Scale | | | Derived EF Scale | | Operational EF Scale | |
|---|---|---|---|---|---|---|
| F Number | Fastest 1/4-mile (mph) | 3 Second Gust (mph) | EF Number | 3 Second Gust (mph) | **EF Number** | **3 Second Gust (mph)** |
| 0 | 40-72 | 45-78 | 0 | 65-85 | **0** | **65-85** |
| 1 | 73-112 | 79-117 | 1 | 86-109 | **1** | **86-110** |
| 2 | 113-157 | 118-161 | 2 | 110-137 | **2** | **111-135** |
| 3 | 158-207 | 162-209 | 3 | 138-167 | **3** | **136-165** |
| 4 | 208-260 | 210-261 | 4 | 168-199 | **4** | **166-200** |
| 5 | 261-318 | 262-317 | 5 | 200-234 | **5** | **Over 200** |

### Enhanced F Scale Damage Indicators

| | | |
|---|---|---|
| 1 | Small barns, farm outbuildings | SBO |
| 2 | One- or two-family residences | FR12 |
| 3 | Single-wide mobile home (MHSW) | MHSW |
| 4 | Double-wide mobile home | MHDW |
| 5 | Apt, condo, townhouse (3 stories or less) | ACT |
| 6 | Motel | M |
| 7 | Masonry apt. or motel | MAM |
| 8 | Small retail bldg. (fast food) | SRB |
| 9 | Small professional (doctor office, branch bank) | SPB |
| 10 | Strip mall | SM |
| 11 | Large shopping mall | LSM |
| 12 | Large, isolated ("big box") retail bldg. | LIRB |

| | | |
|---|---|---|
| 13 | Automobile showroom | ASR |
| 14 | Automotive service building | ASB |
| 15 | School - 1-story elementary (interior or exterior halls) | ES |
| 16 | School - jr. or sr. high school | JHSH |
| 17 | Low-rise (1-4 story) bldg. | LRB |
| 18 | Mid-rise (5-20 story) bldg. | MRB |
| 19 | High-rise (over 20 stories) | HRB |
| 20 | Industrial bldg. (hospital, govt. or university) | IB |
| 21 | Metal building system | MBS |
| 22 | Service station canopy | SSC |
| 23 | Warehouse (tilt-up walls or heavy timber) | WHB |
| 24 | Transmission line tower | TLT |
| 25 | Free-standing tower | FST |
| 26 | Free standing pole (light, flag, luminary) | FSP |
| 27 | Tree – hardwood | TH |
| 28 | Tree - softwood | TS |

Details from the NCDC reveal there have been numerous tornadoes and waterspouts occurrences over the last 65 years in Franklin County.

**Table 4.27 – Tornado or Funnel Cloud Occurrences, Franklin County (7/1/1950 – 7/31/2015)**

| Location or County | Date | Time | Type | Mag | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|---|
| Franklin County | 8/30/1950 | 16:00 | Tornado | F1 | 0 | 0 | 25K | 0.00K |
| Franklin County | 5/26/1951 | 09:30 | Tornado | F1 | 3 | 0 | 250K | 0.00K |
| Franklin County | 11/23/1961 | 02:50 | Tornado | F2 | 0 | 1 | 25K | 0.00K |
| Franklin County | 6/23/1963 | 05:00 | Tornado | | 0 | 0 | 25K | 0.00K |
| Franklin County | 9/20/1969 | 21:20 | Tornado | F1 | 0 | 0 | 2.5K | 0.00K |
| Franklin County | 9/20/1969 | 21:45 | Tornado | F2 | 0 | 3 | 2.50K | 0.00K |
| Franklin County | 10/1/1969 | 04:10 | Tornado | | 0 | 0 | 0.03K | 0.00K |
| Franklin County | 12/21/1969 | 15:45 | Tornado | F1 | 0 | 0 | 2.50K | 0.00K |
| Franklin County | 10/27/1972 | 08:005 | Tornado | F0 | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 10/27/1972 | 12:10 | Tornado | F2 | 0 | 0 | 250K | 0.00K |
| Franklin County | 2/19/1974 | 08:30 | Tornado | F0 | 0 | 0 | 2.50K | 0.00K |
| Franklin County | 5/11/1974 | 16:20 | Tornado | F1 | 0 | 0 | 25K | 0.00K |
| Franklin County | 5/11/1974 | 19:00 | Tornado | F1 | 0 | 0 | 25K | 0.00K |
| Franklin County | 3/9/1976 | 04:30 | Tornado | F0 | 0 | 0 | 25K | 0.00K |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Franklin County | 4/23/1983 | 02:30 | Tornado | F1 | 0 | 0 | 25K | 0.00K |
| Franklin County | 11/3/1984 | 20:00 | Tornado | F1 | 0 | 0 | 2.50K | 0.00K |
| Franklin County | 4/3/1987 | 08:30 | Tornado | F0 | 0 | 0 | 2.50K | 0.00K |
| Franklin County | 6/8/1989 | 15:30 | Tornado | F0 | 0 | 0 | 0.00K | 0.00K |
| Eastpoint | 6/8/1989 | 17:00 | Tornado | F2 | 3 | 4 | 4.5M | 0.00K |
| Franklin County | 6/8/1989 | 16:05 | Tornado | F0 | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 6/10/1989 | 08:55 | Tornado | F0 | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 11/2/1992 | 04:00 | Tornado | F0 | 0 | 0 | 25K | 0.00K |
| Franklin County | 8/16/1994 | 00:00 | Tornado | F0 | 0 | 0 | 0.00K | 0.00K |
| St. George Island | 10/2/1994 | 13:45 | Tornado | | 0 | 0 | 0.00K | 0.00K |
| Lanark Village | 11/11/1995 | 11:50 | Tornado | F0 | 0 | 0 | 0.50K | 0.00K |
| Apalachicola | 10/1/1996 | 13:55 | Tornado | F1 | 0 | 1 | 10K | 0.00K |
| Eastpoint | 9/2/1998 | 21:30 | Tornado | F1 | 0 | 0 | 150K | 0.00K |
| St. Teresa | 6/23/2000 | 19:25 | Tornado | F0 | 0 | 0 | 0.00K | 0.00K |
| Carrabelle Beach | 6/24/2000 | 08:10 | Tornado | F0 | 0 | 0 | 0.00K | 0.00K |
| Carrabelle Beach | 7/31/2000 | 07:53 | Tornado | F0 | 0 | 0 | 0.00K | 0.00K |
| St. Teresa | 9/22/2000 | 07:05 | Tornado | F0 | 0 | 0 | 25K | 0.00K |
| Eastpoint | 9/22/2000 | 07:15 | Tornado | F1 | 0 | 0 | 10K | 0.00K |
| Carrabelle | 8/5/2001 | 18:43 | Tornado | F0 | 0 | 0 | 5K | 0.00K |
| Apalachicola | 10/14/2001 | 00:30 | Tornado | F1 | 0 | 0 | 325K | 0.00K |
| Eastpoint | 11/10/2002 | 18:15 | Tornado | F0 | 0 | 0 | 15K | 0.00K |
| Carrabelle | 9/15/2004 | 20:15 | Tornado | F0 | 0 | 0 | 10K | 0.00K |
| Apalachicola | 10/27/2006 | 18:10 | Tornado | F1 | 0 | 0 | 1M | 0.00K |
| Royal Bluff | 6/23/2009 | 16:15 | Tornado | EF0 | 0 | 0 | 5K | 0.00K |
| Royal Bluff | 4/21/2012 | 09:16 | Tornado | EF0 | 0 | 0 | 0.00K | 0.00K |
| Eastpoint | 2/25/2013 | 13:22 | Tornado | EF0 | 0 | 0 | 0.00K | 0.00K |
| Eastpoint | 4/14/2013 | 14:30 | Tornado | EF0 | 0 | 0 | 20K | 0.00K |
| Buck Siding | 10/13/2014 | 19:29 | Tornado | EF0 | 0 | 0 | 0.00K | 0.00K |
| **Totals:** | | | | | | | **$6,813,004; 6 deaths; 9 injured** | |

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

**Table 4.28 Waterspout Occurrences, Franklin County (7/1/1950 – 7/31/2015)**

| Location or County | Date | Time | Type | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|
| Eastpoint | 4/28/1997 | 05:56 | Waterspout | 0 | 0 | 0.00K | 0.00K |
| Carrabelle Beach | 11/30/1998 | 15:05 | Waterspout | 0 | 0 | 0.00K | 0.00K |
| Carrabelle Beach | 6/23/2000 | 11:24 | Waterspout | 0 | 0 | 0.00K | 0.00K |
| St. Teresa | 6/23/2000 | 19:20 | Waterspout | 0 | 0 | 0.00K | 0.00K |
| Green Point | 6/24/2000 | 07:15 | Waterspout | 0 | 0 | 0.00K | 0.00K |
| Carrabelle | 6/25/2000 | 07:55 | Waterspout | 0 | 0 | 0.00K | 0.00K |
| Apalachicola | 7/20/2000 | 14:50 | Waterspout | 0 | 0 | 0.00K | 0.00K |
| Carrabelle Beach | 7/31/2000 | 07:45 | Waterspout | 0 | 0 | 0.00K | 0.00K |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Eastpoint | 9/6/2000 | 19:45 | Waterspout | 0 | 0 | 0.00K | 0.00K |
| Apalachicola | 6/11/2001 | 14:11 | Waterspout | 0 | 0 | 0.00K | 0.00K |
| St. Teresa | 9/01/2001 | 09:40 | Waterspout | 0 | 0 | 0.00K | 0.00K |
| **Totals:** | | | | | | | **N/A** |

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

**Key Code**: Mag: Magnitude; Dth: Deaths; Inj: Injuries; PdD: Property Damage; CrD: Crop Damage

Hazard Event Narrative


1. 5/26/1951 – Franklin County, an F1 tornado - there were 3 deaths and property damage of $250,000, however, specific narrative of the event was not available.

2. 6/8/1989 – Eastpoint, an F2 tornado - a waterspout moved NE onto the shore from Apalachicola Bay and as a tornado, crossed Magnolia Bluff and then passed through Eastpoint before dissipating. Three people, two of who had taken refuge from a nearby mobile home, were killed when thrown 500 feet from the frame house there were in which was completely demolished. The total damage done by the tornado was valued at $4.5 million. The tornado damaged or destroyed 27 house, mobile homes and businesses, and a dozen vehicles and boats. In addition, 60 acres of trees were destroyed as well.

3. 10/27/2006, Apalachicola, an F1 tornado - a waterspout came ashore near US 98 and 26th Street. The tornado then tracked NE through Apalachicola, and lifted near Water Street and Avenue G. A few boats were capsized. Four homes were destroyed and 48 others were damaged. Hundreds of trees were either knocked down or had their tops sheared off, and numerous utility poles were down. The main electrical power substation was damaged, causing citywide power outage. All telephone and TV cable lines were down. A restaurant along US 98 sustained heavy damage to the roof and outbuildings. An elementary school received minor roof damage. The city's hospital suffered heavy damage with a portion of the roof collapsed, numerous windows were blown out, and two air-handling units were torn from the roof. The property damage estimates were $1 million.

**Vulnerability**

The vulnerability to tornado events can be defined as to the extent to which people will experience harm and property will be damaged from the natural hazard. Franklin County is vulnerable to these wind disasters due to a high concentration of the population residing in mobile homes, approximately (25 – 29%).

Out of the 67 Counties in Florida, Franklin County is ranked 25 by from tornado occurrences over

the last 63 years (1950 -2013).

*Vulnerability for the Franklin County's Population*

Franklin County had a 2.6% growth rate from 2010 to 2015 from 11,549 residents in 2010 to a projected 11,844 residents in 2015. Depending on the path of the tornado it could affect the entire residential area especially the mobile home residents, which consist of approximately 25 - 29% and the poorly constructed homes, which are considered very vulnerable to this natural hazard.

*Over the last 65 years, Franklin County has had 6 deaths and 9 injuries due to tornado events.*

*Vulnerability for Franklin County's Structures and Facilities*

In the event of a tornado, the potential for damage to mobile homes is significant. This potential increases with various factors, such as the proximity of the storm event to the structure, the age, and the construction quality.

The NCDC details reveal that Franklin County has been vulnerable to property damage from 1950 to 2015 with over $6.8 million. This figure consists of all types of property including homes, mobile homes, structures, buildings, boats, vehicles, the infrastructure and other structures. Details were limited as to exactly what property was damaged through the years.

The two most damaging tornadoes that affected the population and structures in Franklin were the following:

1) On 6/8/1989 in Eastpoint, an F2 tornado – (3 people died, 27 residential and businesses were destroyed, 12 vehicles and boats were damaged, with an estimated property damage figure of $4.5 million.
2) On 10/27/2006 in Apalachicola, an F1 tornado – (4 homes were destroyed, boats were capsized, electrical power substation was damaged, and several businesses, schools and hospital had roof damage, with an estimated property damage figure of $1 million.

Table's 4.29 – 4.30 identify the structures by occupancy type and value of the structures that are vulnerable to severe thunderstorm (tornado events).

**Table 4.29 – Structures by Occupancy Type that Vulnerable to a Thunderstorm (including Tornado) Hazard per Year in Franklin County by the Number of Thunderstorms that Effect that Area on an Average**

| Thunderstorms Tornadoes | Residential | Commercial | Medical | Industrial | Agriculture | Education | Government |
|---|---|---|---|---|---|---|---|
| 2 – 3.5 | 5,478 | 169 | 37 | 71 | 2 | 6 | 29 |
| 3.5 – 9.5 | 614 | 1 | 2 | 0 | 0 | 0 | 0 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.93

**Table 4.30 – Value of Structures by Occupancy Type that Vulnerable to Severe Thunderstorms (including Tornadoes) per Year in Franklin County**

| Thunderstorms Tornadoes | Resid. ($million) | Comm. ($million) | Med. ($million) | Indus. ($million) | Agric. ($million) | Educ. ($million) | Govern. ($million) |
|---|---|---|---|---|---|---|---|
| 2 – 3.5 | 985.87 | 107.55 | 22.39 | 11.54 | 0.47 | 17.30 | 33.52 |
| 3.5 – 9.5 | 120.86 | 2.44 | 0.55 | 0 | 0 | 0 | 0 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.97

***Problem Area for Franklin County***

The entire county is very vulnerable to tornadoes with a high concentration of mobile home residents, which accounts for approximately 25 - 29% of the residential structures.

| **Probability** |
|---|
| The probability for a tornado high for the entire county (at least one occurrence every year). |
| **Location** |
| The NCDC data reveals that the tornado events that have occurred in the unincorporated and incorporated areas within the county, and several have started from waterspouts that turn into tornadoes. |
| **Extent** |
| The worse case scenario would be an F5 tornado that could be spawned from a waterspout with destructive winds of 261 – 318 miles per hour, complete devastation of homes leveled off foundations and swept away, businesses, churches, schools, and government buildings and other structures demolished, trees and power lines downed, the infrastructure destroyed resulting in a catastrophic storm event.<br><br>Although the county experienced 6 deaths, and over $6.8+ million in property damage, the NCDC data reveals that the highest magnitude in the last 65 years was the F2 tornado. |
| **Impact** |

The Franklin County community, the residents, the structures, the infrastructure can be severely impacted tornado events that can bring powerful and destructive winds. Details from the NCDC narratives state that Franklin County has been impacted from the storm events (including 6 deaths and 9 injured):

- ✓ 5/26/1951 – Franklin County, an F1 tornado - there were 3 deaths and property damage of $250,000, however, specific narrative of the event was not available.

- ✓ 6/8/1989 – Eastpoint, an F2 tornado - a waterspout moved NE onto the shore from Apalachicola Bay and as a tornado, crossed Magnolia Bluff and then passed through Eastpoint before dissipating. Three people, two of who had taken refuge from a nearby mobile home, were killed when thrown 500 feet from the frame house there were in which was completely demolished. The total damage done by the tornado was valued at $4.5 million. The tornado damaged or destroyed 27 house, mobile homes and businesses, and a dozen vehicles and boats. In addition, 60 acres of trees were destroyed as well.

- ✓ 10/27/2006, Apalachicola, an F1 tornado - a waterspout came ashore near US 98 and 26th Street. The tornado then tracked NE through Apalachicola, and lifted near Water Street and Avenue G. A few boats were capsized. Four homes were destroyed and 48 others were damaged. Hundreds of trees were either knocked down or had their tops sheared off, and numerous utility poles were down. The main electrical power substation was damaged, causing citywide power outage. All telephone and TV cable lines were down. A restaurant along US 98 sustained heavy damage to the roof and outbuildings. An elementary school received minor roof damage. The city's hospital suffered heavy damage with a portion of the roof collapsed, numerous windows were blown out, and two air-handling units were torn from the roof. The property damage estimates were $1 million.

The tornado events impacting Franklin County, and the damages they have caused suggest that the future impacts could include:

- ➢ destruction and or damage to the residential inventory, businesses, schools, hospitals, churches;
- ➢ power lines, downed trees and infrastructure damages;
- ➢ waterspouts could destroy the county's seafood industry (Franklin County's seafood harvest some of the finest seafood in the country, including more than 90% of Florida's

oysters and approximately 10% of the nation's oyster supply with over 2.6 million pounds of oyster meat harvested annually).

The impacts associated with tornadoes can be very destructive or catastrophic on the county residential (especially the mobile homes which account for 25 - 29% of the residential structures), commercial, and public buildings, as well as the critical infrastructure such as transportation, water, energy, and communication systems. In addition, the economic effect or financial impact could be devastating from a strong tornado event not only during the crisis phase, which immediately follows the event, through the recovery and rebuilding stages.

## Thunderstorms - *(includes High Winds, Lightning and Hailstorms)*

### Thunderstorms/Wind Events

A thunderstorm is a rain shower during which you hear thunder, and since thunder comes from lightning, all thunderstorms have lightning. A thunderstorm is the result of convection which is created by surface heating and is an upward atmospheric motion that transports whatever is in the air especially moisture.

A thunderstorm that produces a tornado, winds of at least 58 mph or 50 knots, and/or hail of at least 1 inch in diameter. Structural wind damage may imply the occurrence of a severe thunderstorm.

The storms have the potential of causing power outages and destruction or damage to buildings and can result in loss of life. Flash flooding from rainfall, fires from lightning, strong straight-line winds can knock down trees, mobile homes and tornadoes can be very destructive.

Thunderstorms facts:

- They may occur singly, in clusters, or in lines.
- Some of the most severe occur when a single thunderstorm effects one location for an extended time.
- Thunderstorms typically produce heavy rain for a brief period, anywhere from 30 minutes to an hour.
- Warm, humid conditions are highly favorable for thunderstorm development.
- About 10 percent of thunderstorms are classified as severe—one that produces hail at least one inch in diameter, has winds of 58 miles per hour or higher, or produces a tornado.

Source: http://www.spc.noaa.gov/wcm/2013/WIND.png

*High Winds*

High winds are very strong winds with air moving from an area of high pressure to an area of low pressure. A high wind warning is defined as 1-minute average surface winds of 35 kt (40 mph or 64 km/hr) or greater lasting for 1 hour or longer, or winds gusting to 50 kt (58 mph or 93 km/hr) or greater regardless of duration that are either expected or observed over land.

*Thunderstorm Occurrences*

According to the NCDC, there have been 49 thunderstorms/wind events with a total property damage figure of $264,750 over the last 65 years documented in Franklin County.

**Table 4.31 – Thunderstorm/Wind Occurrences, Franklin County (7/1/1950 – 7/31/2015)**

| Location or County | Date | Time | Type | Mag | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|---|
| Franklin County | 2/8/1971 | 04:30 | Thunderstorm Wind | | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 8/26/1977 | 09:20 | Thunderstorm Wind | 56 kts. | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 8/26/1977 | 10:20 | Thunderstorm Wind | 56 kts. | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 7/15/1979 | 14:47 | Thunderstorm Wind | 56 kts. | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 3/29/1980 | 00:30 | Thunderstorm Wind | | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 3/29/1980 | 01:00 | Thunderstorm Wind | | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 3/29/1980 | 03:00 | Thunderstorm Wind | 51 kts. | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 4/23/1983 | 05:30 | Thunderstorm Wind | 61 kts. | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 2/6/1986 | 07:15 | Thunderstorm Wind | | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 3/2/1991 | 06:55 | Thunderstorm Wind | | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 3/3/1991 | 00:00 | Thunderstorm Wind | 61 kts. | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 3/3/1991 | 02:30 | Thunderstorm Wind | | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 7/9/1991 | 14:20 | Thunderstorm Wind | | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 7/11/1991 | 12:40 | Thunderstorm Wind | | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 11/21/1991 | 18:45 | Thunderstorm Wind | | 0 | 0 | 0.00K | 0.00K |
| Franklin | 6/14/1992 | 08:10 | Thunderstorm | | 0 | 0 | 0.00K | 0.00K |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| County | | | Wind | | | | | |
| Franklin County | 6/21/1992 | 11:35 | Thunderstorm Wind | | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 11/2/1992 | 04:20 | Thunderstorm Wind | | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 11/4/1992 | 16:35 | Thunderstorm Wind | | 0 | 0 | 0.00K | 0.00K |
| Apalachicola | 3/31/1993 | 11:10 | Thunderstorm Wind | | 0 | 0 | 0.50K | 0.00K |
| Dog Island | 4/15/1993 | 10:50 | Thunderstorm Wind | 54 kts. | 0 | 0 | 0.00K | 0.00K |
| St. Vincent Island | 8/14/1993 | 10:30 | Thunderstorm Wind | 50 kts. | 0 | 0 | 0.00K | 0.00K |
| Carrabelle | 8/19/1993 | 13:50 | Thunderstorm Wind | | 0 | 0 | 5K | 0.00K |
| Franklin County | 10/2/1994 | 14:00 | Thunderstorm Wind | 51 kts. | 0 | 0 | 0.00K | 0.00K |
| Apalachicola | 1/15/1998 | 14:45 | Thunderstorm Wind | 50 kts. | 0 | 0 | 15K | 0.00K |
| Eastpoint | 2/22/1998 | 09:29 | Thunderstorm Wind | 64 kts. | 0 | 0 | 0.00K | 0.00K |
| Apalachicola | 2/22/1998 | 09:35 | Thunderstorm Wind | | 0 | 0 | 5K | 0.00K |
| Countywide | 6/4/1999 | 22:10 | Thunderstorm Wind | | 0 | 0 | 25K | 0.00K |
| Countywide | 8/9/2000 | 21:15 | Thunderstorm Wind | | 0 | 0 | 0.75K | 0.00K |
| Countywide | 3/12/2002 | 17:30 | Thunderstorm Wind | | 0 | 0 | 15K | 0.00K |
| Apalachicola | 6/20/2002 | 22:57 | Thunderstorm Wind | | 0 | 0 | 1K | 0.00K |
| Carrabelle | 7/3/2002 | 15:40 | Thunderstorm Wind | | 0 | 0 | 3K | 0.00K |
| Lanark Village | 2/1/2007 | 17:30 | Thunderstorm Wind | 55 kts. | 0 | 0 | 3K | 0.00K |
| Apalachicola Arpt | 4/15/2007 | 01:45 | Thunderstorm Wind | 60 kts. | 0 | 0 | 100K | 0.00K |
| Apalachicola Arpt | 3/7/2008 | 06:20 | Thunderstorm Wind | 55 kts. | 0 | 0 | 10K | 0.00K |
| Apalachicola | 4/5/2008 | 13:25 | Thunderstorm Wind | 55 kts. | 0 | 0 | 0.00K | 0.00K |
| St. Teresa | 4/5/2008 | 14:30 | Thunderstorm Wind | 63 kts. | 0 | 0 | 0.00K | 0.00K |
| Eastpoint | 3/27/2009 | 10:10 | Thunderstorm Wind | 50 kts. | 0 | 0 | 0.00K | 0.00K |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Eastpoint | 4/2/2009 | 12:17 | Thunderstorm Wind | 55 kts. | 0 | 0 | 25K | 0.00K |
| Apalachicola Arpt | 6/4/2010 | 20:11 | Thunderstorm Wind | 56 kts. | 0 | 0 | 0.00K | 0.00K |
| Bay City | 4/5/2011 | 02:25 | Thunderstorm Wind | 55 kts. | 0 | 0 | 20K | 0.00K |
| St. Teresa | 4/5/2011 | 02:50 | Thunderstorm Wind | 50 kts. | 0 | 0 | 3K | 0.00K |
| St. Teresa | 4/5/2011 | 02:50 | Thunderstorm Wind | 50 kts. | 0 | 0 | 3K | 0.00K |
| Turkey Point | 3/31/2012 | 13:30 | Thunderstorm Wind | 50 kts. | 0 | 0 | 3K | 0.00K |
| Bay City | 1/30/2013 | 18:20 | Thunderstorm Wind | 45 kts. | 0 | 0 | 0.50K | 0.00K |
| Bay City | 2/26/2013 | 04:24 | Thunderstorm Wind | 65 kts. | 0 | 0 | 25K | 0.00K |
| Apalachicola Arpt | 2/26/2013 | 04:24 | Thunderstorm Wind | 67 kts. | 0 | 0 | 0.00K | 0.00K |
| St. Teresa | 7/3/2014 | 00:58 | Thunderstorm Wind | 50 kts. | 0 | 0 | 2K | 0.00K |
| Fort Gadsden | 6/23/2015 | 13:35 | Thunderstorm Wind | 50 kts. | 0 | 0 | 0.00K | 0.00K |
| **Total** | | | | | | | | **Property Damage: $264,750** |

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

**Key Code**: Mag: Magnitude; Dth: Deaths; Inj: Injuries; PdD: Property Damage; CrD: Crop Damage

Hazard Event Narrative

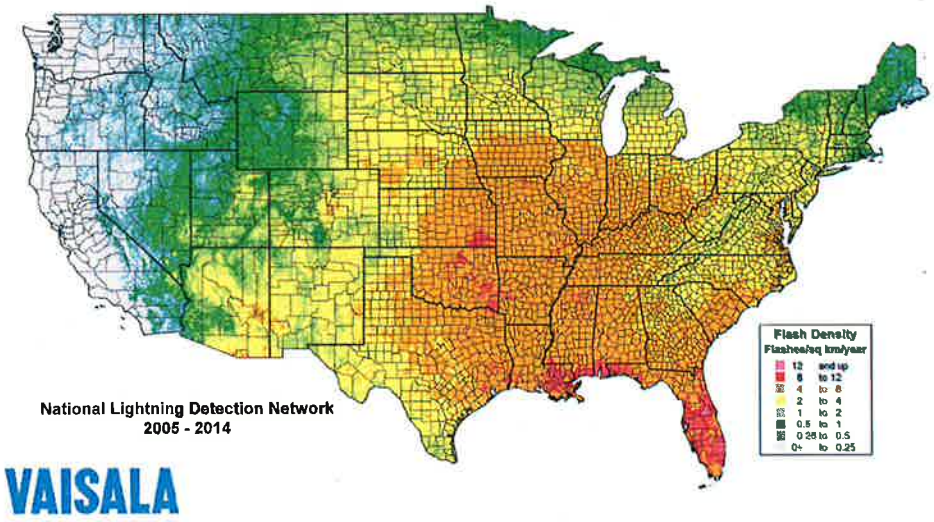
- ✓ The magnitude extent was 67 kts (approximately 77 miles per hour), which occurred on 2/26/2013.The narrative reveals a series of upper level disturbance rotating around a mean long wave trough west of the area brought copious amounts of moisture into the area. Rainfall amounts generally between 9 and 14 inches were observed during the 5-day period 2/22 – 2/26 across the Tallahassee area with similar amounts across the remainder of the FL Panhandle which led to areas of flooding.

- ✓ The highest property damage figures were $100,000 on one recorded event in the City of Apalachicola on 4/15/2007. Straight-line winds downed numerous trees throughout the county. There was damage to several boats and businesses. The metal roof was peeled off a seafood house and piled along US Hwy 98. The winds capsized a shrimp boat at the Apalachicola City Dock. Windows were blown out of several homes.

- ✓ The magnitude was not identified on approximately 44% of the thunderstorm/wind events, however, the events that did have the magnitude, over 54 % were 50 kts magnitude or more, which would categorize them as severe thunderstorms

*Lightning*

**Figure O – Lightning Map (2005 – 2014)**




Source: http://www.vaisala.com/VaisalaImages/Lightning/avg_fd_2005-2014_CONUS_2km_grid.png

Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt." This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches a temperature approaching 50,000 degrees Fahrenheit in a split second.

Lightning is the second most common storm-related killer in the United States. It causes several billion dollars in property damage each year and kills several dozen people. It is a frequent cause of wildfires and costs airlines billions of dollars per year in extra operating expenses. The State of Florida has the highest number of deaths from lightning strikes, and the highest frequency of lightning in the United States.

The following are facts about lightning:

- Lightning's unpredictability increases the risk to individuals and property.
- Lightning often strikes outside of heavy rain and may occur as far as 10 miles away from any rainfall.
- "Heat lightning" is actually lightning from a thunderstorm too far away for thunder to be heard, however, the storm may be moving in your direction.
- Most lightning deaths and injuries occur when people are caught outdoors in the summer months during the afternoon and evening.
- Your chances of being struck by lightning are estimated to be 1 in 600,000, but could be reduced even further by following safety precautions.
- Lightning strike victims carry no electrical charge and should be attended to immediately.

*Lightning Occurrences*

As recorded by the NCDC, there was ***one*** lightning event in Franklin over the last 65 years. Lightning struck the Franklin County Jail, a critical facility for the county, and disabled the 911-dispatch telephone system for several hours. The Franklin County EOC was activated and utilized as a back-up dispatch center until the communication system was repaired. One employee, a 911 dispatcher, suffered minor injuries.

**Fires caused by Lightning**

The data from the Florida Forest Service on fire causes, Table 4.35 states that 71 **fires have been a direct result from lightning events burning 839.3 acres** of the last 14 ½ years.

*Hailstorms*

Hail is precipitation in the form of lumps of ice produced by convective clouds and typically accompanies thunderstorms. They can grow by colliding with supercooled water drops, which will freeze on contact with ice crystals, frozen raindrops, dust or some other nuclei. Thunderstorms that have a strong updraft keep lifting the hailstones up to the top of the cloud where they encounter more supercooled water and continue to grow. The hail falls when the thunderstorm's updraft can't support the weight of the ice or the updraft weakens and the stronger the updraft the larger the hailstone can grow. Hail can damage aircraft, homes and cars, and can be deadly to livestock and people.

*Hailstorm Occurrences*

According to the NCDC, from 7/1/1950 to 7/31/2015, there have been 11 hailstorm events documented in the county.

**Table 4.32– Hailstorm Occurrences in Franklin County (7/1/1950 –7/31/2015)**

| Location or County | Date | Time | Type | Mag | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|---|
| Franklin County | 6/16/1989 | 16:45 | Hail | .75 in. | 0 | 0 | 0.00K | 0.00K |
| Franklin County | 7/9/1991 | 13:45 | Hail | .75 in. | 0 | 0 | 0.00K | 0.00K |
| St. George Island | 3/31/1993 | 10:50 | Hail | 1.00 in. | 0 | 0 | 0.00K | 0.00K |
| St. Teresa | 2/16/1998 | 19:05 | Hail | .88 in. | 0 | 0 | 0.00K | 0.00K |
| Carrabelle | 5/4/1998 | 07:50 | Hail | 1.75 in. | 0 | 0 | 0.00K | 0.00K |
| Eastpoint | 2/3/2006 | 18:05 | Hail | 1.75 in. | 0 | 0 | 0.00K | 0.00K |
| Carrabelle | 4/22/2006 | 09:35 | Hail | 1 in. | 0 | 0 | 0.00K | 0.00K |
| Apalachicola | 5/9/2006 | 01:30 | Hail | .88 in. | 0 | 0 | 0.00K | 0.00K |
| Eastpoint | 1/22/2008 | 15:05 | Hail | 1.00 in. | 0 | 0 | 0.00K | 0.00K |
| Eastpoint | 4/14/2013 | 14:43 | Hail | 1.00 in. | 0 | 0 | 0.00K | 0.00K |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Apalachicola | 2/23/2014 | 06:15 | Hail | 1.50 in. | 0 | 0 | 0.00K | 0.00K |
| **Total** | | | | | | | | **Property Damage: N/A** |

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

**Key Code**: Mag: Magnitude; Dth: Deaths; Inj: Injuries; PdD: Property Damage; CrD: Crop Damage

Hazard Event Narrative

- ✓ The magnitude extent was 1.75 inches (the size of a golf ball), which occurred on 5/4/1998 and 2/3/2006 in Carrabelle and Eastpoint. Carrabelle – there was dime to golf ball sized hail in Carrabelle, Dog Island, and Lanark Village. In the 2006 hailstorm event, the Sheriff's office and the public reported the golf ball size hail.
- ✓ Quarter size hail, 1.0 inches +, occurred 7 times throughout the entire county.

## Vulnerability

The vulnerability to thunderstorm, lightning and hailstorm events can be defined as to the extent to which people will experience harm and property will be damaged from the natural hazard. Franklin County is vulnerable to these wind disasters due to a high concentration of the population residing in mobile homes.

*Vulnerability for the Franklin County's Population*

Franklin County had a 2.6% growth rate from 2010 to 2015 from 11,549 residents in 2010 to a projected 11,844 residents in 2015. The entire unincorporated and incorporated area of Franklin County especially the mobile home residents, which consist of 25 - 29% of the residential structures and the poorly constructed homes, have been affected by thunderstorms and hailstorms.

*Vulnerability for Franklin County's Structures and Facilities*

In the event of a strong wind and rain event, the potential for damage to mobile homes is significant. This potential increases with various factors, such as the proximity of the storm event to the structure, the age, and the construction quality.

The NCDC details reveal that Franklin County has had vulnerability to property damage with over $264,750. This figure consists of all types of property including homes, mobile homes, structures, buildings, boats, trees, and other structures. Details were limited as to exactly what property was damaged through the years.

The most damaging thunderstorms that affected the population and structures in Franklin were the following:

- ✓ The magnitude extent was 67 kts (approximately 77 miles per hour), which occurred on 2/26/2013. Rainfall amounts generally between 9 and 14 inches were observed during the 5-day period 2/22 – 2/26 across the Tallahassee area with similar amounts across the remainder of the FL Panhandle which led to areas of flooding.

- ✓ The highest property damage figures were $100,000 on one recorded event in the City of Apalachicola on 4/15/2007. Straight-line winds downed numerous trees throughout the county. There was damage to several boats and businesses. The metal roof was peeled off a seafood house and piled along US Hwy 98. The winds capsized a shrimp boat at the Apalachicola City Dock. Windows were blown out of several homes.

Table's 4.33 – 4.34 identify the structures by occupancy type and value of the structures that are vulnerable to severe thunderstorm hail and wind events.

**Table 4.33 – Structures by Occupancy Type that Vulnerable to a Thunderstorm (including Hail and Wind) Hazard per Year in Franklin County by the Number of Thunderstorms that Effect that Area on an Average**

| Thunderstorms Hail and Wind | Residential | Commercial | Medical | Industrial | Agriculture | Education | Government |
|---|---|---|---|---|---|---|---|
| 2 – 3.5 | 5,478 | 169 | 37 | 71 | 2 | 6 | 29 |
| 3.5 – 9.5 | 614 | 1 | 2 | 0 | 0 | 0 | 0 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.93

**Table 4.34 – Value of Structures by Occupancy Type that Vulnerable to Severe Thunderstorms (including Hail and Wind) per Year in Franklin County**

| Thunderstorms Hail and Wind | Resid. ($million) | Comm. ($million) | Med. ($million) | Indus. ($million) | Agric. ($million) | Educ. ($million) | Govern. ($million) |
|---|---|---|---|---|---|---|---|
| 2 – 3.5 | 985.87 | 107.55 | 22.39 | 11.54 | 0.47 | 17.30 | 33.52 |
| 3.5 – 9.5 | 120.86 | 2.44 | 0.55 | 0 | 0 | 0 | 0 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.97

### *Problem Area for Franklin County*

The entire county is very vulnerable to thunderstorm wind events with a high concentration of mobile home residents, which accounts for approximately 25 - 29% of the residential structures. The unincorporated areas of the county is susceptible to lightning due to the data revealed that 20% of the wildfires in the past 14 1/2 years were caused by lightning.

| **Probability** |
|---|
| The probability for thunderstorm/wind events is high for the entire county (at least one occurrence every year). The probability for hailstorms is considered medium (at least one occurrence every 3 years), and the probability for lightning is low (at least one occurrence every 10 years). |
| **Location** |

The NCDC data reveals that the thunderstorm/wind and hailstorm events that have occurred in the unincorporated and incorporated areas within the county, and the county only has one lightning occurrence recorded, and the fires that have started from a lightning event that have happened in the unincorporated areas of the county.

**Extent**

The worst-case scenario for the following storm events:

- ✓ Thunderstorm/wind is 67 kts, approximately 77 miles per hour, a severe thunderstorm occurred on 2/26/ 2913 in Apalachicola.
- ✓ According to the light density map, see Figure O, the extent would be 4 to 8 flashes/sq km/year for Franklin County. Also, lightning has contributed to damage to the acreage in the unincorporated area of the county noting 71 fires due to lightning and 839.3 acres have burned.
- ✓ Hailstorms would be 1.75 inches, approximately the size of a golf ball, which occurred on 5/4/1998 in Carrabelle and on 2/3/2006 in Eastpoint.

**Impact**

The Franklin County community, the residents, the structures, the infrastructure can be impacted by thunderstorm/wind, lightning or hailstorm events.

The NCDC details reveal:

Thunderstorm/Wind

- ✓ The magnitude extent was 67 kts (approximately 77 miles per hour), which occurred on 2/26/2013. Rainfall amounts generally between 9 and 14 inches were observed which led to areas of flooding. Specific property damage was not available.

- ✓ The highest property damage figures were $100,000 on one recorded event in the City of Apalachicola on 4/15/2007. Straight-line winds downed numerous trees throughout the county. There was damage to several boats and businesses. The metal roof was peeled off a seafood house and piled along US Hwy 98. The winds capsized a shrimp boat at the Apalachicola City Dock. Windows were blown out of several homes.

Lightning

- ✓ Lightning struck the Franklin County Jail, a critical facility for the county, and disabled the 911-dispatch telephone system for several hours. One employee, a 911 dispatcher, suffered minor injuries. The property damage was approximately $5,000.

- ✓ 71 fires have been a direct result from lightning events that burned over 839.3 acres of the last 14 ½ years.

Hailstorms

- ✓ The magnitude extent was 1.75 inches (the size of a golf ball), which occurred on 5/4/1998 and 2/3/2006 in Carrabelle and Eastpoint. Carrabelle – there was dime to golf ball sized hail in Carrabelle, Dog Island, and Lanark Village. Specific property damage was not available.

The thunderstorm/wind, lightning or hailstorm events impacting Franklin County, and the damages they have caused suggest that the future impacts could include:

- ➢ damage to the residential inventory, businesses, boats, structures, the trees, and the infrastructure.

The impacts associated with strong thunderstorm/winds can be very destructive on the county residential (especially the mobile homes which account for 25 - 29% of the residential structures), buildings, as well as the critical infrastructure such as transportation, water, energy, and communication systems.

## Coastal and Riverine Erosion

*Coastal Erosion*

Coastal erosion is the landward displacement of the shoreline caused by the forces of waves and currents. The affects of coastal erosion can be from natural causes and causes related to human activities. The gradual process of coastal erosion results naturally from the very slow rise of the sea level. Severe coastal erosion can occur over a very short period of time the county's coast is impacted by hurricanes, tropical storms and other weather systems. Also, some coastal erosion may be caused by poorly thought-out coastal development.

A critical coastal erosion area is a segment of the shoreline where natural processes or human activity have caused or contributed to erosion and recession of the beach or dune system to such a degree that upland development, recreational interests, wildlife habitat, or important cultural resources are threatened or lost.

Critical erosion areas may also include peripheral segments or gaps between identified critical erosion areas which although they may be stable or slightly erosional now, their inclusion is necessary for continuity of management of the coastal system or for the design integrity of adjacent beach management projects.

Specifics on Franklin County's critical coastal erosion are noted in a report from the Division of Water Resource Management, Florida Department of Environmental Protection, *Critically Eroded Beaches in Florida*, June 2015, see details below.

Coastal Erosion Occurrences

There are six critically eroded beach areas (11.1 miles), nine non-critically eroded beach areas (19.7 miles), and one non-critically eroded inlet shoreline area (0.5 mile) in Franklin County, see Figure P.

St. Vincent Island has a 3.2-mile long non-critically eroded area along its most gulf ward protruding midsection (V17-V34). Resources on the St. Vincent National Wildlife Refuge do not currently appear threatened by this ongoing erosion condition. To the east, a 0.9-mile segment of St. Vincent Island (V34-V39) is critically eroded into the maritime forest resulting in the loss of beach wildlife habitat.

Severe erosion exists at Cape St. George on Little St. George Island resulting in the loss of the historic pre-Civil War lighthouse. Also, sea turtle nesting habitat to the west of the lighthouse has been lost as the shoreline has eroded into the maritime forest and the beach has virtually disappeared. This critically eroded area (R18.5-R22.5) extends along a 0.6-mile length of shoreline and is adjoined at both ends by a 0.7-mile non-critically eroded segment to the west (R15-R18.5) and a 0.3-mile non-critically eroded segment to the east (R22.5-R24).

The west end of the historical length of St. George Island west of Sike's Cut (R34-R51) is non-critically eroded for 3.3 miles. Both interior shorelines of Sike's Cut also have non-critical erosion for 0.5 mile. East of Sikes Cut, the St. George Island Plantation (R53-R69) also is non- critically eroded for 3.3 miles. Some inlet sand transfer of Sike's Cut dredge material has taken place west of the inlet and some material has been placed along the inlet shorelines.

Hurricane Dennis (2005) severely impacted St. George Island State Park. The entire developed stretch of the park (R106-R128.5) is now designated critically eroded for 4.5 miles due to the impact to recreational interests and park infrastructure. The undeveloped eastern 3.8 miles (R128.5-R147) is considered non-critically eroded.

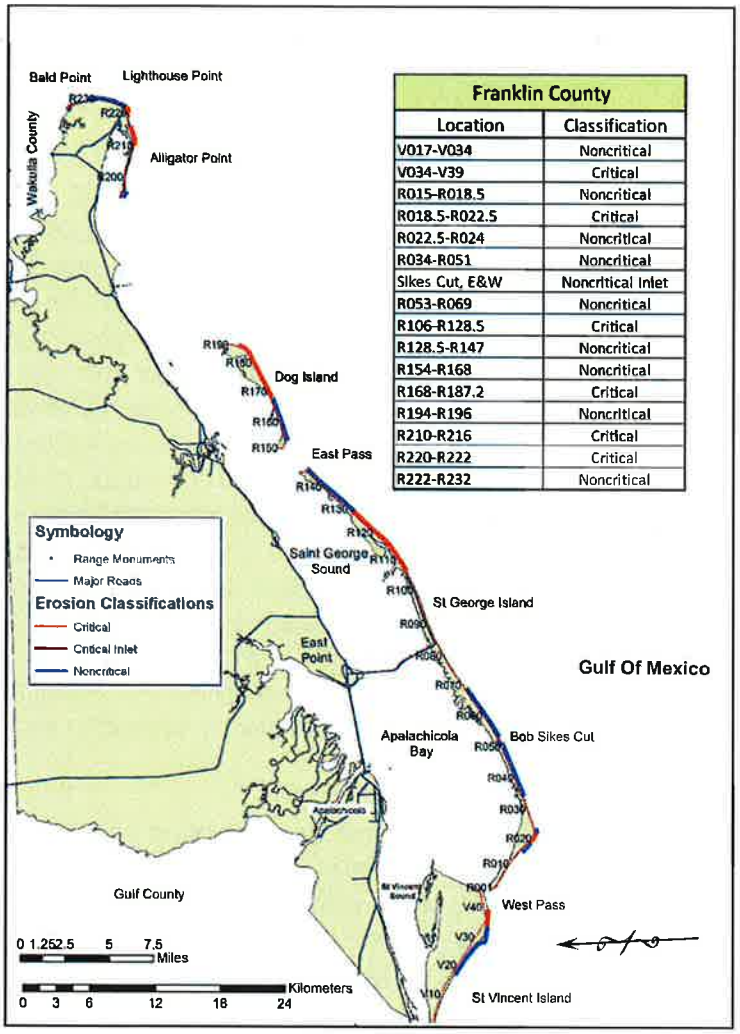
Most of Dog Island is eroded, including the western 2.6 miles (R154-R168) which is non-critically eroded. To the east, a 3.6-mile segment (R168-R187.2) is critically eroded where private development has been destroyed and continues to be threatened following Hurricane Dennis (2005).

The historic west end of Alligator Point (R194-R196) is severely eroded for 0.4-mile; however, this erosion into Phipps Preserve is not considered a threat to any interests at this time. The east end of Alligator Point (R210-R216) between the Southwest Cape and Lighthouse Point is critically eroded for 1.1 miles. Erosion at the Southwest Cape has destroyed and continues to threaten private development and a Franklin County road.

The southeast end of St. James Island is critically eroded extending north from Lighthouse Point (R220-R222) for 0.4 mile threatening residential development. Further north from Lighthouse Point

(R222-R232), a non-critically eroded area extends for 2.1 miles.

**Figure P - Critically Eroded Shoreline within Franklin County**




| Franklin County | |
|---|---|
| Location | Classification |
| V017-V034 | Noncritical |
| V034-V39 | Critical |
| R015-R018.5 | Noncritical |
| R018.5-R022.5 | Critical |
| R022.5-R024 | Noncritical |
| R034-R051 | Noncritical |
| Sikes Cut, E&W | Noncritical Inlet |
| R053-R069 | Noncritical |
| R106-R128.5 | Critical |
| R128.5-R147 | Noncritical |
| R154-R168 | Noncritical |
| R168-R187.2 | Critical |
| R194-R196 | Noncritical |
| R210-R216 | Critical |
| R220-R222 | Critical |
| R222-R232 | Noncritical |

Source: http://www.dep.state.fl.us/beaches/publications/pdf/CriticalErosionReport.pdf

*Riverine Erosion*

Riverine erosion is the long-term process whereby riverbanks and riverbeds are worn away. This process is best described as a river's tendency for constant course alteration, shape and depth change, and the balance between the water sediment transport capacity and the sediment supply. Riverine erosion has many consequences including land and development loss. When stormwater flows exceed channel capacity, water will overtop channel banks and spread out as floods. The loss of soils due to riverine erosion under paved roads, bridge abutments and approaches, bridge pilings and other structural pilings, can cause structural failures that endanger public safety. Washouts of boat ramps can restrict access for emergency personnel. Riverine erosion can

increase the debris flow of trees and structures like docks that can pile up against structures in the floodway, increasing stresses on the pilings and possibly contributing to failures.

The main river in Franklin County is the Apalachicola River, and the smaller rivers include the New River or the Carrabelle River, and the Crooked River.

**Figure Q – Apalachicola River** *(identified by the green dots in western portion of the county to the Apalachicola Bay)*


The Apalachicola River, an alluvial river, characteristically has a variable seasonal flow with substantial annual flooding, and a heavy sediment load. The continuing erosion and depositional processes acting within the Apalachicola River causes the river channel to be in a constant state of change, even during low flow. The deposition and erosion of material in the river eventually creates meanders, which widen the river valley, decrease slope, slowing down the water velocity, allowing more sediments to be deposited, thereby continuing the movement of the river channel laterally. During high flow, the river not only erodes and deposits sediments on the floodplain, but is capable of creating new channels by cutting off meanders or blocking the mouths of tributaries forcing them to create new channels. As the river adjusts and stabilizes, floodplain features are formed which can be discerned by topography and soil characteristic.

The New River flows through Tates Hell Swamp, a vast, forested plain in Franklin County. The river is very darkly stained, making it one of the darkest and blackest of the blackwater streams. After its confluence with Crooked River, the stream becomes wider and estuarine in character and is called the Carrabelle River. The Crooked River is a waterway that connects the tidal estuary of the Ochlockonee River to a junction with the tidal Carrabelle River.

Apalachicola Riverine Erosion

There has been documented riverine erosion on the Apalachicola River confirmed by the Corps of Engineers along the *Liberty County side of the river*. One property owner noted that he has lost up to 20 feet off the riverbank from riverine erosion on his property. The cause of the erosion is due to the natural meander of the river, however, it was exacerbated when the Corps began placing dredged material on the opposite side of the river. The disposal of the dredged material on the opposite side of the river pushed the current against the Estiffnugla Park side and increased the velocity, so the force of the bank is more erosive. In addition, high and low water conditions will also affect the erosion rate. Although as of this time, there have been no documented recorded riverine erosion occurrences in Franklin County.

*Riverine Erosion Occurrences*

There is *no history of significant riverine erosion events* along the rivers in the unincorporated areas within the county to any structures due to the setback requirements in the land use element in the COMP.

## Vulnerability

The vulnerability to coastal and riverine erosion events can be defined as to the extent to which people will experience harm and property will be damaged from the natural hazard.

Franklin County's coastline is very vulnerable to coastal erosion as there are six critically eroded beach areas (11.1 miles), nine non-critically eroded beach areas (19.7 miles), and one non-critically eroded inlet shoreline area (0.5 mile) in the county. Sections of Franklin County have average erosion rates of up to 9 ft/year.

The vulnerability of riverine erosion along the Apalachicola River does occur with continuing erosion and depositional processes acting within the river causing the river channel to be in a constant state of change, even during low flow.

### *Vulnerability for the Franklin County's Population and Wildlife*

Franklin County had a 2.6% growth rate from 2010 to 2015 from 11,549 residents in 2010 to a projected 11,844 residents in 2015. The county population that lives along the coastal areas (i.e. Carrabelle, Eastpoint, Lanark Village, St. Teresa, Alligator Point, Apalachicola, and especially the residents on St. George Island, and a few residents from Dog Island can have some type of vulnerability to coastal erosion. The residents in the unincorporated areas that live near the Apalachicola River are vulnerable to riverine erosion.

*Wildlife*
The sea turtle nesting habitat to the west of the lighthouse on St. George has been lost as the shoreline has eroded into the maritime forest and the beach has virtually disappeared due to coastal erosion.

### *Vulnerability for Franklin County's Structures, Buildings, Facilities, and the Infrastructure*

*Coastal Erosion*
There are sections in Franklin County along the coastal beach areas that are considered critically eroded. See details for the specific locations below in the problem areas for the county. Any structure, building, facility, home, mobile home, or residential complex that resides in a critically eroded area would be considered very vulnerable to a coastal erosion event.

*Impact on Structures, Homes, and the Infrastructure*
Hurricane Dennis, July 10, 2005, caused moderate to severe beach erosion especially on St. George Island with over 80% of the dunes, boardwalks, and beachfront restrooms were damaged. Septic tanks and wells on St. George and Dog Islands were contaminated. Homes were destroyed or damaged and destruction occurred to the infrastructure (road into St. George Island).

*Riverine Erosion*
The vulnerability for riverine erosion events would be homeowners that have property and structures located on or near the riverbeds and suffer from a historical river flooding elevation event that wash outs the structures. Riverine erosion can increase the debris flow of trees and structures like docks that can pile up against structures in the floodway, increasing stresses on the pilings and possibly contributing to failures.

***Problem Areas for Franklin County***

*(A) Coastal Erosion*

There are six critically eroded beach areas (11.1 miles):

- ✓ To the east, a 0.9-mile segment of St. Vincent Island is critically eroded into the maritime forest resulting in the loss of beach wildlife habitat.

- ✓ Severe erosion exists at Cape St. George on Little St. George Island resulting in the loss of the historic pre-Civil War lighthouse. Also, sea turtle nesting habitat to the west of the lighthouse has been lost as the shoreline has eroded into the maritime forest and the beach has virtually disappeared. This critically eroded area extends along a 0.6-mile length of shoreline.

- ✓ Hurricane Dennis, July 2005, severely impacted St. George Island State Park. The entire developed stretch of the park is now designated critically eroded for 4.5 miles due to the impact to recreational interests and park infrastructure.

- ✓ Most of Dog Island is eroded and to the east, a 3.6-mile segment is critically eroded where private development has been destroyed and continues to be threatened following Hurricane Dennis.

- ✓ The historic west end of Alligator Point is severely eroded for 0.4-mile. The east end of Alligator Point between the Southwest Cape and Lighthouse Point is critically eroded for 1.1 miles. Erosion at the Southwest Cape has destroyed and continues to threaten private development and a Franklin County road.

- ✓ The southeast end of St. James Island is critically eroded extending north from Lighthouse Point for 0.4 mile threatening residential development.

*(B) Riverine Erosion*

As noted earlier, riverine erosion along the Apalachicola Rivers does occur in (Liberty County) and there could be erosion occurring from this river in the unincorporated area of Franklin County. Tree limbs, logs, a dock, a deck, a structure, vegetation, or obstruction washes could occur into the river possibly causing a bridge (Apalachicola River Bridge) or road to erode and wash out.

## Probability

The probability for coastal erosion events is high for the entire county (at least one occurrence every year). The probability for riverine erosion is low (at least one occurrence every 10 years).

## Location

*Coastal Erosion*
Franklin County's coastline is very vulnerable to coastal erosion as there are six critically eroded beach areas (11.1 miles), nine non-critically eroded beach areas (19.7 miles), and one non-critically eroded inlet shoreline area (0.5 mile) in the county on St. George Island, St. Vincent Island and Dog Island.

*Riverine Erosion*
The unincorporated area of Franklin County that is located near the Apalachicola River.

## Extent

The worst-case scenario for the following storm events:

*Coastal Erosion*
Hurricane Dennis – 7/9/2005, a Category 3 Hurricane with a 8 to 12 foot storm surge caused significant coastal flooding in downtown Apalachicola and part of the highway around Carrabelle, and **moderate to severe beach erosion.** Highway 98 from Lanark Village to Carrabelle and Carrabelle to Eastpoint was washed out. CR 370 (Alligator Point Road) and SR 300 (the bridge entrance to St. George Island State Park) were closed. Five miles of the road into St. George Island Park was damaged. There were numerous reports of downed trees and power lines across the county. The storm surge **damaged 80% of the park's dunes**, boardwalks, and beachfront restrooms. **The dunes vanished on St. George Island and the foundations of homes and condominiums were left hanging over the edge of a cliff 20 feet above the beach.**

*Riverine Erosion*
An elevation in the river level and the velocity compounded with heavy flooding from a hurricane or tropical storm event could cause tree limbs, logs, a dock, a deck, a structure, vegetation, or obstruction to wash into the river possibly causing a bridge or road to erode and wash out.

## Impact

The Franklin County community, the residents, the structures, the infrastructure can be impacted by coastal erosion or riverine erosion events.

Photo: Beach Erosion on St. Vincent Island

*Coastal Erosion*

Details from the NCDC narratives state that Franklin County has been impacted from the storm events to the coastline. Specific erosion data is highlighted:

- ✓ Hurricane Earl – 9/2/1998, the storm surge ranged from 6 to 12 feet above normal tide levels. There were 136 homes and 15 businesses affected, and CR 65, SR 300, US 98 and the St. George Causeway closed due to high water. **There was significant beach erosion on Carrabelle Beach and Alligator Point**, and Alligator Point Road washed out stranding 50 people. The property damage was estimated at $750,000.
- ✓ Tropical Storm Isidore – 9/27/2002, the storm surge ranged from 4 to 7 feet causing flooding, **beach erosion** and spawning tornado events. The property damage was estimated at $500,000.
- ✓ Hurricane Dennis – 7/9/2005, a Category 3 Hurricane, moved inland early on July 10, 2005. A 8 to 12 foot storm surge caused significant coastal flooding in downtown Apalachicola and part of the highway around Carrabelle, and **moderate to severe beach erosion.** Highway 98 from Lanark Village to Carrabelle and Carrabelle to Eastpoint was washed out. CR 370 (Alligator Point Road) and SR 300 (the bridge entrance to St. George Island State Park) were closed. Five miles of the road into St. George Island Park was damaged. There were numerous reports of downed trees and power lines across the county. The storm surge severely impacted St. George Island and **damaged 80% of the park's dunes**, boardwalks, and beachfront restrooms. **The dunes vanished on St. George Island and the foundations of homes and condominiums were left hanging over the edge of a cliff 20 feet above the beach.** Oyster houses, boats and equipment were damaged. Septic tanks and wells on St. George and Dog Islands were contaminated. A total of 28 homes were destroyed, 141 were damaged, and numerous businesses were damaged or destroyed. The details reveal that approximately 17 businesses sustained structural damage, 5 of which are substantial; 6 residences damaged and 1 totally destroyed; on the north side,10 residences and 1 commercial property sustained flood damage; east of Bryant Patton Bridge (Patton Dr.) 6-10 small commercial structures sustained significant damage. The property damage estimations were $9.5 to $10 + million.

*Riverine Erosion*

The Franklin County communities that live near the Apalachicola River could be impacted if a bridge collapsed and residents were unable to use the bridge or roads for transportation.

## Wildfire

A wildfire is any uncontrolled fire in combustible vegetation that occurs in the countryside or a wilderness area. Other names such as brush fire, bushfire, forest fire, grass fire, hill fire, peat fire, vegetation fire, veldfire and wildland fire may be used to describe the same phenomenon depending on the
type of vegetation being burned.

Wildfires differ from other fires by its extensive size, the speed at which it can spread out from its original source, its potential to change direction unexpectedly, and its ability to jump gaps such as roads, rivers and firebreaks. Wildfires are characterized in terms of the cause of ignition, their physical properties such as speed of propagation, the combustible material present, and the effect of weather on the fire.

Florida's ecosystems are dependent on natural fire. These low intensity fires re-nourish soil, thin abundant vegetation, and provide proper conditions for reproduction and forage. However, since the early 1950's when Floridians actively began to suppress all fires to protect newly planted forest areas and keep newly built dwellings safe, vegetative fuel has become dense and thick. Natural fires have given way to dangerous wildfires, which often damage rather than benefit natural surroundings.

The growing number of people relocating to Florida adds to the wildfire problem as nearly 1,000 people move to Florida each day. Additionally, Floridians who are tired of big-city life are moving to rural areas to "get back to nature". Many of them choose to live in areas where natural vegetation meets homes and communities. These areas are called the Wildland-Urban Interface, and many of these new residents are unaware of the natural role of fire in Florida and therefore are unprepared.

Wildland-Urban Interface fires are fast moving fires that often require many pieces of fire fighting equipment, and suppression is a difficult and time-consuming operation. Wildfire suppression must also take on the challenge of home protection during almost every fire that is detected. The cost of these operations grows proportionally with their complexity.

*Historical Data of All types of Fires*

Table 4.35 reports statistics from the Florida Forest Service, Fires by Causes, over the last 14 ½ years reveals that 352 fires occurred burning over 16,190.6 acres In Franklin County.

**Table 4.35 – Fires by Causes**
**Franklin County (1/1/2000 – 5/23/2015)**

| Cause | Fires | Percent | Acres | Percent |
|---|---|---|---|---|
| Campfire | 15 | 4.26 | 122.6 | 0.76 |
| Children | 21 | 5.97 | 20.9 | 0.13 |
| Debris Burn * | 28 | 7.95 | 6,198.4 | 38.28 |
| Debris Burn – Authorized Broadcast/Acreage | 20 | 5.68 | 2,183.7 | 13.49 |
| Debris Burn – Authorized – Piles | 4 | 1.14 | 0.6 | 0 |
| Debris Burn – Authorized – Yard Trash | 2 | 0.57 | 0.2 | 0 |
| Debris Burn – NonAuthorized Broadcast/Acreage | 4 | 1.14 | 2.7 | 0.02 |
| Debris Burn – NonAuthorized – Piles | 9 | 2.56 | 7.7 | 0.05 |
| Debris Burn – NonAuthorized – Yard Trash | 10 | 2.84 | 6.4 | 0.04 |
| Equipment Use * | 9 | 2.56 | 171.6 | 1.06 |
| Equipment – Agriculture | 1 | 0.28 | 0.1 | 0 |
| Equipment – Logging | 4 | 1.14 | 0.6 | 0 |
| Equipment – Recreation | 2 | 0.57 | 18.1 | 0.11 |
| Equipment – Transportation | 3 | 0.85 | 24.6 | 0.15 |
| Incendiary | 60 | 17.05 | 2,851.8 | 17.61 |
| Lightning | 71 | 20.17 | 839.3 | 5.18 |
| Misc. – Breakout | 2 | 0.57 | 95 | 0.59 |
| Misc. – Electric Fence | 0 | 0 | 0 | 0 |
| Misc. – Fireworks | 3 | 0.85 | 4 | 0.02 |
| Misc. - Power Lines | 14 | 3.98 | 25.6 | 0.16 |
| Misc. – Structure | 2 | 0.57 | 0.1 | 0 |
| Misc. – Other | 17 | 4.83 | 635.2 | 3.92 |
| Railroad | 0 | 0 | 0 | 0 |
| Smoking | 5 | 1.42 | 20.7 | 0.13 |
| Unknown | 46 | 13.07 | 2,960.7 | 18.29 |
| **Total** | **352** | | **16,190.6** | |

Source Florida Forest Service: http://tlhforweb03.doacs.state.fl.us/PublicReports/FiresByCause.aspx

* Fire cause no longer used

*Additional data on Wildfire Occurrences*

According to the NCDC there were three wildfire occurrences reported in Franklin County.

**Table 4.36 – Wildfire Occurrences in Franklin County (7/1/1950 – 7/31/2015)**

| Location or County | Date | Time | Type | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|
| Apalachicola Arpt. | 6/20/1998 | 11:30 | Wildfire | 0 | 0 | 0.00K | 0.00K |
| Carrabelle | 7/1/1998 | 14:00 | Wildfire | 0 | 0 | 0.00K | 0.00K |
| Ft. Gadsden | 3/3/2000 | 05:00 | Wildfire | 0 | 0 | 0.00K | 0.00K |
| Total | | | | | | **Property Damage: N/A** | |

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

**Key Code**: Dth: Deaths; Inj: Injuries; PdD: Property Damage; CrD: Crop Damage

Hazard Event Narrative

1. Apalachicola Arpt. – 6/20/1998 – A 60+ acre wildfire erupted at the intersection of Gibson and Airport road near the Apalachicola Airport. The fire was contained with a few hot spots remaining. No homes were threatened.

2. Carrabelle – 7/1/1998 – A 100+ acre wildfire erupted on the Franklin Liberty County line 12 miles north of Carrabelle off SR 67. Two homes were protected. The DOF, Carrabelle FD, and the Florida National Guard supported the firefighting efforts.

Note: Throughout the State of Florida, 1998 was a significant year for wildfires due to severe drought conditions. The first wildfire to break out was on May 25, 1998 in the Apalachicola National Forest in Liberty County, a neighboring county for Franklin. Although specific details on wildfires for Franklin County seemed relatively low, the county did experience some wildfire events as noted in above in Table 4.36.

3. Ft. Gadsden – 3/3/2000 – A controlled burn in Tates Hell Forest spread out of control and consumed approximately 2,500 acres. No structures were threatened.

*Consequences of a Wildfire*

A noted earlier, in table 4.35, there are many types of causes that can start a wildfire, from lightning, to incendiary, to smoking in forested areas or improperly extinguishing campfires, etc. Prevention efforts include educating people on forested areas, and working with the Florida Forest Service to become a firewise community for preventative measures in protection from a wildfire. Consequences for a wildfire can be the following, see Table 4.37.

**Table 4.27 - Consequences of Wildfire**

| Infrastructure | Environmental | Human | Vegetative | Economic |
|---|---|---|---|---|
| power outages | Erosion | smoke inhalation | crop damage | business disruption |
| water/gas/ communication lines disrupted | wildlife destruction | personal injury | timber damage | property loss |
| road closures | habitat loss | human evacuation | species endangered | economic loss |
| roadway destruction | species endangered | animal evacuation | invasive species increased | suppression cost |

Prevention

The Florida Forest Service continues to promote and conduct community educational programs and presentations frequently to schools, at workshops, and many county resident functions or meetings throughout the year on Firewise Building and Landscape design principles.

Franklin County is currently working on the County Community Wildfire Protection Plan (CWPP), see the LMS project list in Attachment I as well as Fire Prevention Awareness programs. Materials are distributed on fire prevention to the Franklin County residents.

## Vulnerability

### *Vulnerability for the Franklin County's Population*

Franklin County had a 2.6% growth rate from 2010 to 2015 from 11,549 residents in 2010 to a projected 11,844 residents in 2015. The population at risk and vulnerable to wildfires is noted in Table 4.38.

**Table 4.38 – Wildfire Population by Level of Concern Category**

| County | LOC 1 | LOC 2 | LOC 3 | LOC 4 | LOC 5 | LOC 6 | LOC 7 | LOC 8 | LOC 9 |
|---|---|---|---|---|---|---|---|---|---|
| Franklin | 338 | 333 | 2,742 | 465 | 321 | 308 | 381 | 143 | 25 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C 3.110

From the details above, the highest vulnerability for the population would be the level of concern: 3 with 2,742 residents at risk within the population. The topmost risk areas for the population are in the unincorporated areas of the County due to the concentration of residents in rural wooded areas, additional threats to life and property exist, therefore, requiring increased mitigation efforts. This segment of the population could include the mobile home residents, which accounts for 25 - 29% of the residential structures, the poor, the sick, the elderly, and the children.

### *Vulnerability for Franklin County's Structures and Facilities*

The Florida Forest Service GIS mapping Fire Risk Assessment System determines high-risk areas using wildfire fuel types and densities, environmental conditions, and fire history to produce a Level of Concern (LOC), which is a number on a scale that runs from 1 (low concern) to 9 (high concern).

Tables 4.39 – 4.42 summarize the following details for Wildfires in Franklin County on:

- the number of structures by occupancy type within each level of concern;
- the value of structures by occupancy type within each level of concern;
- the number of county facilities by their wildfire level of concern; and
- the value of county facilities within wildfire level of concern.

**Table 4.39 – Structures Level of Concern for Wildfires in Franklin County**

| Level of Concern | Single Family Res. | Multi-Family Res. | Mobile Home | Vacant Res. | Agric. | Comm. | Instit./ Gov. | Indust. | Vacant Comm./ Indust./Inst | Misc./ Undef. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 139 | 2 | 9 | 0 | 0 | 3 | 4 | 4 | 0 | 0 |
| 2 | 133 | 0 | 14 | 0 | 1 | 2 | 0 | 1 | 0 | 0 |
| 3 | 1,038 | 11 | 167 | 0 | 1 | 13 | 9 | 6 | 0 | 0 |
| 4 | 116 | 5 | 81 | 0 | 0 | 11 | 3 | 4 | 0 | 0 |
| 5 | 89 | 0 | 48 | 0 | 0 | 5 | 1 | 2 | 0 | 0 |
| 6 | 87 | 0 | 41 | 0 | 0 | 3 | 3 | 2 | 0 | 0 |
| 7 | 111 | 0 | 45 | 0 | 0 | 7 | 2 | 6 | 0 | 0 |
| 8 | 36 | 0 | 21 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 9 | 5 | 0 | 4 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.105

**Table 4.40 – Value of Structures Level of Concern for Wildfires in Franklin County (*in millions*)**

| Level of Concern | Single Family Res. - $million | Multi-Family Res. - $million | Mobile Home - $million | Vacant Res. - $million | Agric. - $million | Comm. - $million | Instit./ Gov. $million | Indust. $million | Vacant Comm./ Indust./Inst - $million | Misc./ Undef. - $million |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 41.45 | 0.91 | 0.97 | 22.44 | 18.61 | 0.93 | 169.53 | 0.79 | 0.41 | 0.49 |
| 2 | 41.59 | 0.57 | 1.02 | 23.48 | 7.52 | 0.26 | 55.05 | 0.09 | 0.00 | 0.77 |
| 3 | 343.81 | 4.98 | 9.57 | 139.06 | 16.47 | 4.47 | 53.36 | 0.72 | 4.02 | 2.54 |
| 4 | 21.37 | 0.50 | 3.28 | 15.33 | 0.57 | 3.34 | 2.64 | 0.51 | 0.29 | 0.01 |
| 5 | 13.68 | 0.33 | 2.30 | 10.72 | 0.06 | 0.96 | 1.54 | 0.17 | 0.10 | 0.01 |
| 6 | 14.88 | 0.45 | 2.42 | 10.99 | 0.04 | 0.47 | 1.52 | 0.25 | 0.00 | 0.00 |
| 7 | 12.74 | 0.38 | 2.07 | 14.11 | 0.03 | 1.12 | 0.69 | 0.55 | 0.00 | 0.00 |
| 8 | 3.83 | 0.00 | 0.83 | 1.10 | 0.00 | 0.04 | 0.22 | 0.12 | 0.00 | 0.12 |
| 9 | 0.41 | 0.00 | 0.14 | 0.19 | 0.00 | 0.00 | 0.16 | 0.08 | 0.00 | 0.01 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.127

**Table 4.41 – County Facilities by Level of Concern for Wildfires in Franklin County**

| Facility | LOC 1 | LOC 2 | LOC 3 | LOC 4 | LOC 5 | LOC 6 | LOC 7 | LOC 8 | LOC 9 | Total by Type |
|---|---|---|---|---|---|---|---|---|---|---|
| Fire Stations | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Police Stations | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Schools | | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Other Facilities | 46 | 36 | 57 | 0 | 11 | 0 | 0 | 5 | 2 | 157 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.144

**Table 4.42 – Value of County Facilities by Level of Concern for Wildfires in Franklin County** *(in thousands)*

| Facility Type | LOC 1 $ thou. | LOC 2 $ thou. | LOC 3 $ thou. | LOC 4 $ thou. | LOC 5 $ thou. | LOC 6 $ thou. | LOC 7 $ thou. | LOC 8 $ thou. | LOC 9 $ thou. | Total Value of Facilities within Areas of Concern ($million) |
|---|---|---|---|---|---|---|---|---|---|---|
| Fire Stations | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Police Stations | 480 | 0 | 228 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 |
| Schools | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Other Facilities | 4,844 | 2,274 | 34,305 | 0 | 918 | 0 | 0 | 44 | 28 | 42.4 |

Source: State of Florida Enhanced Hazard Mitigation Plan, Page C.152

### *Problem Area for Franklin County*

Although wildfire incidents have occurred in the incorporated areas within Franklin County (i.e. City of Apalachicola and the City of Carrabelle), the unincorporated heavily forested area is more vulnerable to wildfires (i.e. Tate's Hell Forest which is over 202,300+ acres and located in Franklin and Liberty Counties).

| **Probability** |
|---|
| The probability for wildfire occurrences is medium to high for the entire county (at least one occurrence every 3 years or possibly every year). |
| **Location** |
| The entire planning area (the City of Apalachicola, the City of Carrabelle, and the unincorporated area of Franklin County) could be risk to wildfire events, especially during drought cycle events, however, the unincorporated heavily forested area is more vulnerable to wildfires (i.e. the Tate's Hell Forest). |

| Extent |
| --- |
| Based on the quantitative measurements for wildfires, the worse case scenario from the recorded data is the controlled burned in the Tates Hell Forest in March 2000. The wildfire spread out of control and burned over 2,500 acres in Franklin County.<br><br>However, it is important to evaluate the 1998 wildfire event that burned thousands of acres throughout the State of Florida was due to a significant drought event. The Cities of Apalachicola and Carrabelle both had documented wildfires and the initial outbreak of the 1998 State's wildfires that year broke out in the neighboring county, Liberty County, which shares part of the acreage of Tates Hell Forest. Therefore due to the amount of forested area, the extent could be greater in projecting future wildfires. Note: Drought has been an issue for Franklin County. |
| **Impact** |
| The Franklin County community, the residents, the structures, and the infrastructure could suffer from a wildfire event. Although the county is located on the gulf coast of Florida, there is considerable forestry land in the county and could present some impact to road closures due to smoke and visibility and evacuations for some of the unincorporated county residents.<br><br>Also, a Level of Concern 3 would present the greatest impact especially to the single-family, multi-family and mobile home residents and other facilities in the county resulting in millions of dollars in structural damage. |

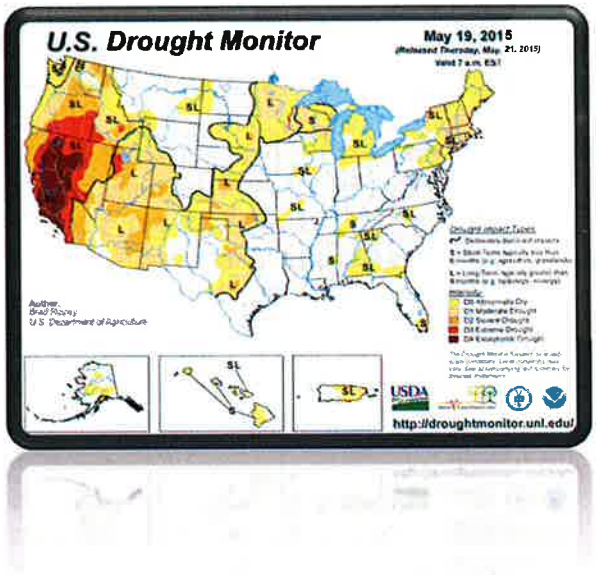
## Drought and Heat Wave

### Drought

Drought can be defined based on rainfall amount over some period of time, vegetation conditions, agricultural productivity, soil moisture, levels in reservoirs and stream flow, or economic impacts. In basic terms, a drought is a significant deficit in moisture availability due to lower than normal rainfall. This deficiency results in a water shortage for some activity, group or environmental sector. Excessively dry and hot conditions can provoke dust storms and low visibility. Droughts occur when a long period passes without substantial rainfall. A heat wave combined with a drought is a very dangerous situation.

**Figure R – US Drought Monitor Map**

The drought data was derived from the Palmer Drought Severity Index from the National Weather Service, Climate Prediction Center. The Palmer Drought Severity Index (PDSI) is an indicator of the relative dryness or wetness effecting water sensitive economies. The PDSI indicates the prolonged and abnormal moisture deficiency or excess. This indicator is of general conditions and not local variations caused by isolated rain. Calculation of the PDSI is made for 350 climatic divisions in the United States and Puerto Rico. The data collected for the calculations include the weekly precipitation total and average temperature, division constants (water capacity of the soil, etc.) and previous history of the indices.




The PDSI is an important climatological tool for evaluating the scope, severity, and frequency of prolonged periods of abnormally dry or wet weather. It can be used to help delineate disaster areas and indicate the availability of irrigation water supplies, reservoir levels, range conditions, amount of stock water, and potential intensity of forest fires.

Data on drought occurrences will also come from the PSDI data and will be used to analyze and report statistical moderate, severe and extreme drought data for Franklin County.

*The PDSI data for Franklin County on years (2011 – May 2015) are as follows:*

- ✓ (2011) - There was a recorded period of time in the months of January, April, May, June, July, August, September, October, November and December that had periods of moderate, severe and extreme drought. Franklin County experienced a period of extreme drought in 2011 from May until November 2011.

- ✓ (2012) -There was a recorded period of time in the months of January, February, March, April, May, and the 1st and 2nd weeks of June that had periods of moderate, severe and extreme drought. Franklin County experienced a period of extreme drought in June 2012.

- ✓ (2013 – May 2015) - There was no drought data recorded in fiscal years 2013, and in January – May 23, 2015. However, in September and October 2014, Franklin County experienced moderate drought conditions.

Source: http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer/

*Additional Drought Occurrences*

According to the NCDC there were 18 drought occurrences reported in Franklin County with no narrative data on property damage.

**Table 4.43 – Drought Occurrences in Franklin County (7/1/1950 – 7/31/2015)**

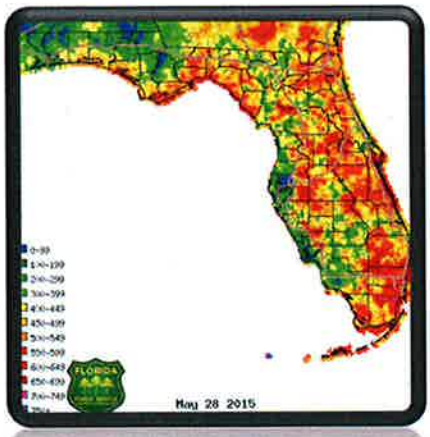
| Location or County | Date | Time | Type | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|
| Inland Franklin | 5/24/2011 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Coastal Franklin | 5/24/2011 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Coastal Franklin | 6/1/2011 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Inland Franklin | 6/1/2011 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Inland Franklin | 7/1/2011 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Coastal Franklin | 7/1/2011 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Franklin | 8/1/2011 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Coastal Franklin | 8/1/2011 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Franklin | 9/1/2011 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Coastal Franklin | 9/1/2011 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Inland Franklin | 10/4/2011 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Coastal Franklin | 10/4/2011 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Inland Franklin | 4/1/2012 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Coastal Franklin | 4/1/2012 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Franklin | 5/1/2012 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Coastal Franklin | 5/1/2012 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Coastal Franklin | 6/1/2012 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Franklin | 6/1/2012 | 00:00 | Drought | 0 | 0 | 0.00K | 0.00K |
| Total | | | | | | **Property Damage: N/A** | |

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

**Key Code**: Dth: Deaths; Inj: Injuries; PdD: Property Damage; CrD: Crop Damage

*As stated earlier, throughout the State of Florida, 1998 was a significant year for wildfires due to severe drought conditions.*

**Figure S - Keetch Byram Drought Index (KBDI)**




Also another mechanism to the drought monitor, the county utilizes the Keetch-Byram Drought Index (KBDI), which is updated each day by the Florida Forest Service. KBDI is a good indicator of the drought/moisture conditions for agricultural purposes, and it also provides a planning tool for the risks of wildfire. This index provides a numerical scale of 1 through 800, with 800 being the driest and 1 being wettest.

The direct physical effects of drought in Franklin County can have a significant impact on the seafood industry, which is very important for the economy in Franklin County. As noted earlier, the county's seafood harvest some of the finest seafood in the country, including more than 90% of Florida's oysters and approximately 10% of the nation's oyster supply. Over 2.6 million pounds of oyster meat is harvested annually.

Source: http://flame.fl-dof.com/fire_weather/KBDI/4km_main.html

UF report: Collapse of Oyster Industry Due to Drought, Salinity
By Virginia Hamrick and Donna Green-Townsend on April 26th, 2013

Drought, insufficient rainfall and salinity in the Apalachicola Bay helped cause a dramatic fall in oyster populations, according to a report by the University of Florida (UF). UF's Oyster Recovery Team said there is no evidence that pollutants from the 2010 oil spill in the Gulf of Mexico contributed to the decline. Still, seafood fishermen and sellers are suffering from the dip in oysters. Andrew Kane, leader of the contaminants and pathogens division of the recovery team, said he sees the report as something positive, because recovery can now begin.

A combination of reduced water flow and a nationwide drought has contributed to the lack of water flow, which elevated the salinity of the bay, making an environment that is not optimal for oysters but better for predators, said Kane, an associate professor of environmental and global health at UF. The team looked at a variety of factors for the report, including management factors, diseases and parasites that all affect the community, he said.

What's tricky about the report is there is not a lot of past history to compare it to, he said, so the team is focusing on the future. "The idea now is to take this data and move forward and ask the question: 'Where do we go from here?'" Kane said. The data found is critical to future plans, he said." We can predict that this drought is likely to continue in the coming year," he said. "And that's why we need to provide insights relative to the management of the fishery."

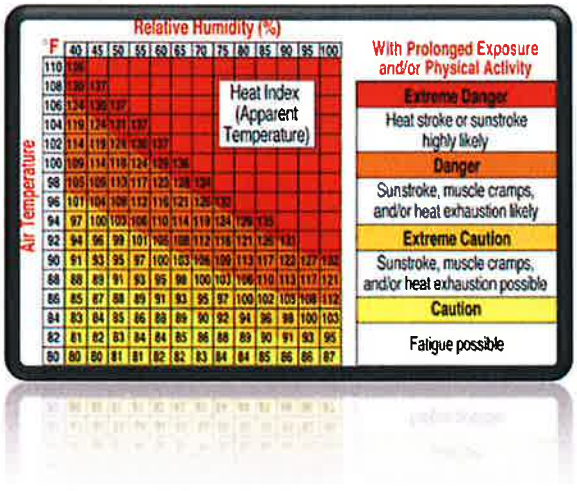
This problem has caused a lot of groups – from state universities to seafood workers to the Florida Fish and Wildlife Conservation Commission – to come together for a joint cause, Kane said. The

researchers are doing whatever they can to partner with other agencies.

The next step is to work on a restoration proposal, he said. The crabbers and harvesters and hurting the most are losing fishing time to become educated about this environmental problem. The report also recommends more research in the future, but funding could be an issue. This past study was funded by UF/IFAS. "The good thing is all of this concern with this decline is that it's brought a lot of partners to the table," he said.

**Heat Wave**

**Figure T - Heat Index Chart –**
Air Temperature and Relative Humidity versus Apparent Temperature




Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat, or those prolonged excessive heat/humidity episodes. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air nears the ground.

The heat can kill by taxing the human body beyond its abilities. In a normal year, about 175 Americans die to the demands of summer heat. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the disastrous heat wave of 1980, more than 1,250 people died. Elderly persons, small children, chronic invalids, and those on certain medications or drugs, are particularly susceptible to heat reactions, especially during heat waves in areas where a moderate climate usually prevails.

Small children are incredibly susceptible to heat, especially in a vehicle as it only takes approximately 10 minutes to heat up 19 degrees, so that it can reach lethal temperatures quickly. A child is more susceptible than adults to heat as their bodies heat up 3 to 5 times quicker and can suffer a heat stroke.

According to the NWS, the "Heat Index" (HI), is sometimes referred to as the "apparent temperature". The HI, given in degrees F, is an accurate measure of how hot it really feels when relative humidity (RH) is added to the actual air temperature.

To find the HI, look at the Heat Index Chart, Figure T. As an example, if the air temperature is 96°F (found on the left side of the table) and the RH is 60% (found at the top of the table), the HI-or how hot it really feels-is 116°F.

IMPORTANT: Since HI values were devised for shady, light wind conditions, exposure to full

sunshine can increase HI values by up to 15°F. Also, strong winds, particularly with very hot, dry air, can be extremely hazardous. Note on the HI chart the shaded zone above 105°F. This corresponds to a level of HI that may cause increasingly severe heat disorders with continued exposure and/or physical activity.

Franklin County's hot season are the months of June to September with and average high temperature of 88.9°F in June, 90°F in July, 90°F in August, and 87.7°F in September. Heat wave events occurring in the hot season would be in the 100°F plus temperature range.

*According to the Southeast Regional Climate Center data, the recorded high temperature for Carrabelle Florida was 104°F on September 26, 1899.* Although the relative humidity data was not available, the county is located in a humid subtropical climate zone and at the time, the humidity was probably high. An example of what the Heat Index might have been for this record temperature of 104°F, if the RH was only 50%, the Heat Index would have been 131°F based on the Heat Index Chart.

*Heat Wave Occurrences*

According to the NCDC there was 1 heat wave occurrence reported in Franklin County.

**Table 4.44 – Heat Wave Occurrence in Franklin County (7/1/1950 – 7/31/2015)**

| Location or County | Date | Time | Type | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|
| Coastal Franklin | 7/31/2010 | 12:00 | Heat | 0 | 0 | 0.00K | 0.00K |
| Total | | | | | | **Property Damage: N/A** | |

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

**Key Code**: Dth: Deaths; Inj: Injuries; PdD: Property Damage; CrD: Crop Damage

Hazard Event Narrative

1. 7/31/2010 – Coastal Franklin, Above normal temperatures combined with high humidity produced heat index values about 100 degrees across parts of the Florida panhandle at the end of the month. Heat index values even exceeded 115 degrees in a few locations on occasion. Dewpoint values in the 80s combined with temperatures in the 90s produced a long stretch of heat index values frequently above 100 degrees from 10 am EDT to 8 pm EDT at the Apalachicola airport. The heat index exceeded 115 degrees from 1 pm EDT until 3 pm EDT with a peak value of 124 degrees at 2:38 pm EDT. The temperature at that time was 95 degrees and the dewpoint was 84.2 degrees.

2. 8/22 – 23/2014 – Franklin County – Record high temperatures occurred in the unincorporated and incorporated areas of the county. The record for Apalachicola was 97 degrees with a 70% humidity level. According to the NWS, the heat index was about 130 degrees. Read details in the article below from the Apalachicola Times.

# HOT ENOUGH FOR YOU?

## Record temperatures set for Apalachicola

LOIS SWOBODA | The Times

Many downtown businesses, including these situated along Avenue D, were without power for about an hour Saturday afternoon.

Temperatures soar 7 degrees above average high

# Temperatures soar 7 degrees above average high

By LOIS SWOBODA
653-0619 | @ApalachTimes
lswoboda@starfl.com

Franklin County experienced record high temperatures on Friday and Saturday of last week.

According to the National Weather Service office in Tallahassee, "A heat wave began building across the Southeast on Thursday, Aug. 21. In our local area, widespread heat index values of 105 degrees or more were observed, with quite a few stations in the 108-112 degree range. Some locations closer to the coast in the Florida Panhandle and Big Bend, as well as some spots closer to larger bodies of water in the interior Florida Panhandle, observed heat index values between 113 and 117 degrees, illustrating the influence warm water can have on surface dewpoints, and therefore heat index. Multiple locations in Gulf County observed heat index values peaking in the 120 to 123 degree range."

The heat index estimates the temperature perceived by persons working or playing outside.

According to the U.S. Department of Labor, "The heat index is a single value that takes both temperature and humidity into account. The higher the heat index, the hotter the weather feels, since sweat does not readily evaporate and cool the skin," when humidity is high.

The actual temperatures observed at Apalachicola Regional Airport were nowhere near 115 degrees.

See HEAT A6

## HEAT from page A1

On both Friday and Saturday, Aug. 22 and 23, the recorded high temperature was 97 degrees Fahrenheit, seven degrees above the average high temperature for those dates, 90 degrees.

Rod Gasche, who maintains a home weather station in Carrabelle, said high temperatures there reached 98 degrees. Since no historical records are maintained, it is unclear whether this is a record.

Temperatures on St. George Island were somewhat lower. Wunderground.com, which has a weather station reporting in real time on the island, measured a high on Friday of 94 degrees and a Saturday high of 96 degrees.

On both Friday and Saturday the average percentage of humidity at the airport was about 70 percent. According to the National Weather Service heat index calculator, the perceived temperature at 70 percent humidity and 97 degrees Fahrenheit is about 130 degrees Fahrenheit.

Friday's high temperature broke the existing record by one degree. The former record of 96 degrees was set in 1980. Saturday's high tied the existing record set in 2007.

On Saturday, Aug. 23, portions of Apalachicola from the downtown business district to the Piggly Wiggly on Tenth Street were without power for about 40 minutes. About 1:55 p.m. a large limb from a water oak about 2 to 3 feet wide broke away and fell on a power line in the alley between 13th and 14th streets on Avenue D. The incident left residents and businesses in the area of 14th Street to the Gibson Inn off U.S. Highway 98 without power for about an hour.

The record low for Aug. 22 is 74 degrees set in 1997. The record low for Aug. 23 is 66 degrees set in 1959.

Recorded precipitation for the month of August to date is 2.86 inches, almost three inches below normal for the month. Apalachicola Airport has received 10.73 inches of rain since June 1, a little more than seven inches below normal, however, the airport has received 37.3 inches of rain since Jan. 1, a half inch above the average, so even without summer tropical storms, the county is not in drought conditions.

Temperatures dropped by about nine degrees following afternoon thundershowers on Sunday and daily highs remained in the low 90s through Wednesday.

### HOW TO BEAT THE HEAT

**Slow down:** reduce strenuous activity

**Stay hydrated:** drink plenty of water or other non-alcoholic fluids.

**Dress for summer:** lightweight, light-colored clothing reflects heat and sunlight

**Spend more time in air-conditioned places:** take breaks indoors

**Don't get too much sun:** sunburn reduces your body's ability to dissipate heat

Source: www.apalachtimes.com

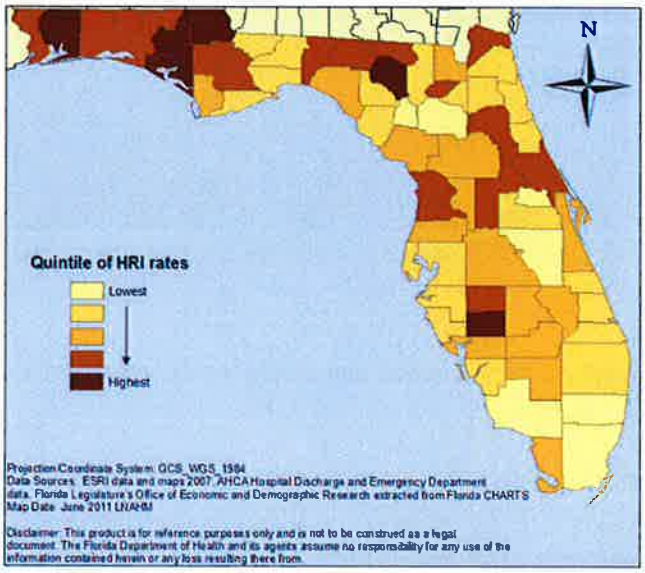
The article states that there were no historical records maintained on heat events, however, data was found on the Southeast Regional Climate Center that Carrabelle had a record temperature of 104 degrees in September 1899.

*Heat- Related Incident Information*

As reported by the Florida Department of Health, Division of Environmental Health, Bureau of Environmental Public Health Medicine, *Descriptive analysis of heat-related illness treated in Florida hospitals and emergency departments*... "Between 2005 and 2009, 18,572 Floridians were treated for non-occupational Heat Related Illness (HRI) in the Emergency Department (ED) or hospital (age adjusted rate = 20.2/100,000 Floridians; 95% CI = 17.3, 23.2). Among the cases of HRI identified, 53 deaths occurred (CFR = 2.8/1,000 HRI cases). The majority of HRI cases were treated in the ED (N = 15,576; 83.9%). For individuals admitted to the hospital the length of stay was a mean of 3.1 days (median = 2 days).

Figure U does show that Franklin County is ranked 2nd to the lowest for HRI, however according to the Franklin County Department of Health, data related to ED incidents for HRI is not recorded for the county.

**Figure U - Statistics on Heat-Related Incident Rates for the Florida Counties**




## Vulnerability

The vulnerability to drought and heat wave events can be defined as to the extent to which people will experience harm and property will be damaged from the natural hazard. During the onset of a drought, which can occur about once in every three years in a given area, can result in elevated fire risk and decreased crop growth which are the primary impacts to nature, while heat exhaustion and other heat-related illnesses are possible among vulnerable children, the sick and the elderly.

Florida was very vulnerable in the 1998 drought resulting in extensive drought-induced fires, which burned over 500,000 acres in Florida and cost over $460 million in damages to homes and the timber industry. With lower than normal precipitation, and stream flow records dating to the early 1900s, the drought was one of the worst ever to affect the State. In terms of severity, this drought was comparable to the drought of 1949-1957 in duration and had record-setting low flows in several basins. The drought was particularly severe over the 5-year period in the northwest, which also included Franklin County where rainfall deficits ranged from 38-40 inches below normal. Within these regions, the drought caused record-low stream flows in several river basins, increased freshwater withdrawals, and created hazardous conditions for wildfires.

*Drought*

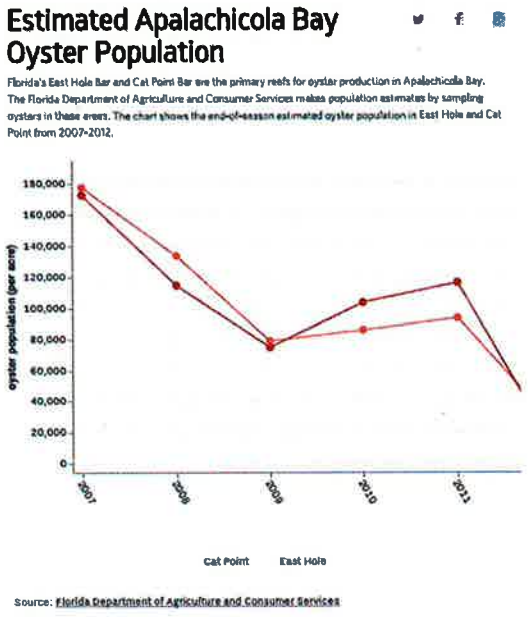
Alabama, Florida and Georgia have been fighting in federal court since 1990 over water from the Apalachicola-Chattahoochee-Flint river system. On Oct. 1, 2013, Florida claimed that Georgia was wasting water and asked the U. S. Supreme Court to allocate water among the states. Alabama and Georgia want water for cities and industry while Florida wants water to maintain the Apalachicola river ecology and the seafood industry around Apalachicola Bay.

In 2013, the U. S. Department of Commerce declared a fishery disaster for Apalachicola Bay oysters for what Florida officials initially blamed on lack of fresh water flowing from Georgia and

overfishing

The direct physical affects of drought in Franklin County have had a significant impact on the seafood industry, which is very important for the economy in Franklin County, over $200 million. The county's seafood harvest some of the finest seafood in the country, including more than 90% of Florida's oysters and approximately 10% of the nation's oyster supply. Over 2.6 million pounds of oyster meat is harvested annually. Drought, insufficient rainfall and salinity in the Apalachicola Bay have caused a dramatic fall in oyster populations.

Drought in the upper Apalachicola Bay Basin, agricultural water usage in the Flint River Basin, and domestic and industrial water usage in the Upper Chattahoochee River Basin are principle causes elevating the salinity problems in Apalachicola Bay into which the three rivers empty. As stated by the Florida Fish and Wildlife Conservation Commission, October 6, 2014, if restrictions are put in place for the coming winter don't help the imperiled fishery recover, shutting down the Bay might be the only option.




According to the Gulf Oyster Industry Council and a Gulf Seafood Institute, "this is just one more example of how "salinity changes" have produced growing challenges for Gulf Coast oyster production. In this case a dry climate cycle and increasing upstream usage and impoundment of freshwater has created an inhospitable environment for oyster growth and reproduction in the Apalachicola Bay system," the oyster expert told Gulf Seafood News.

Each part of the county and its municipality could be vulnerable to drought. Due to the widespread nature of the potential impacts of a drought, the entire population of the county could potentially be affected by a severe drought occurrence, especially those that depend on the seafood industry for employment.

### *Vulnerability for the Franklin County's Population*

Franklin County had a 2.6% growth rate from 2010 to 2015 from 11,549 residents in 2010 to a projected 11,844 residents in 2015. The population at risk and vulnerable to drought and heat wave occurrences especially water shortages, which could present a serious problem.

*Heat Wave Event*

A heat wave event does present a safety threat for the county's population, especially the elderly, the sick and the children. The vulnerability to heat depends on climatic factors such as the frequency of heat waves and on individual risk factors, which could include; medical, age, gender, pre-existing disease, use of certain medications, level of hydration, living alone, housing condition, the presence and use of air-conditioning in the home or residential institution. It also can be said that the vulnerability to heat wave could result as a function of sensitivity to exposure, the characteristics of the population, the exposure to heat wave duration and, the measures and actions in place to reduce the loss of life.

### *Vulnerability for Franklin County's Structures and Facilities*

The Franklin County's buildings, structures, facilities and infrastructure are not considered vulnerable to drought and heat wave events. It is important to note that a long-term drought event could present some vulnerability to the water wells, and the seafood industry is the most vulnerable in the county.

### *Problem Area for the County*

The highest risk for drought would be to the seafood industry in the Apalachicola Bay and a segment of the county's population that is employed in this industry.

The entire county could be affected by high temperatures with a high heat index especially the sick, the elderly, the special needs and the children who are the most vulnerable in a heat wave occurrence.

| **Probability** |
| --- |
| The probability for drought events is high for the entire county (at least one occurrence every year). The probability for heat wave occurrences is medium (at least one occurrence every 3 years). |
| **Location** |
| Drought presents a high risk for Franklin County especially for the seafood industry, which is located in Apalachicola Bay, and to maintain the Apalachicola River ecology. Due to water issues that plague the county, each part of the county and its municipalities are equally |

vulnerable to drought conditions.

The entire planning area (the City of Apalachicola, the City of Carrabelle, and the unincorporated area of Franklin County) could be a medium risk to a heat wave occurrence.

**Extent**

Drought
Based on the quantitative measurements for droughts, the extent and worse case scenario for a drought event would be the drought from 1998- 2002. As stated by the USGS… " Lower than normal precipitation caused a severe statewide drought in Florida from 1998 to 2002. Based on precipitation and stream flow records dating to the early 1900s, the drought was one of the worst ever to affect the State. In terms of severity, this drought was comparable to the drought of 1949-1957 in duration and had record-setting low flows in several basins. The drought was particularly severe over the 5-year period in the northwest, which included Franklin County where rainfall deficits ranged from 38-40 inches below normal. Within these regions, the drought caused record-low stream flows in several river basins, increased freshwater withdrawals, and created hazardous conditions ripe for wildfires, and even the draining of lakes."

In addition, drought has been a significant issue for the seafood industry over the past several years as it played a major role in the die off of the oysters as the decreased freshwater flow into Apalachicola Bay made it too saline to support healthy oyster growth.

Heat Wave

- ✓ In July 2010, above normal temperatures combined with high humidity produced heat index values about 100 degrees across parts of the Florida panhandle at the end of the month. Heat index values even exceeded 115 degrees in a few locations on occasion. Dewpoint values in the 80s combined with temperatures in the 90s produced a long stretch of heat index values frequently above 100 degrees from 10 am EDT to 8 pm EDT at the Apalachicola airport. **The heat index exceeded 115 degrees from 1 pm EDT until 3 pm EDT with a peak value of 124 degrees at 2:38 pm EDT**. The temperature at that time was 95 degrees and the dewpoint was 84.2 degrees.

- ✓ In August 2014, record high temperatures occurred in the unincorporated and incorporated areas of the county. The record set for **Apalachicola was 97 degrees with a 70% humidity** level. According to the NWS, **the heat index was about 130 degrees**.

- ✓ The recorded **high temperature for Carrabelle Florida was 104°F on September 26, 1899**. Although the relative humidity data was not available, the county is located in a humid subtropical climate zone and at the time, the humidity was probably high. An example of what the Heat Index might have been for this record temperature of 104°F, if the RH was only 50%, the Heat Index would have been 131°F based on the Heat Index Chart.

**Impact**

Drought
Drought occurrences are a prolonged period where there is a precipitation deficit from normal values. The duration of below normal precipitation amounts and their impact can affect Franklin County's water supply, present fire danger levels, and as noted drought has had a drastic impact to the seafood industry and on the county's economy.

According to the Florida Seafood and Aquaculture Statistical data from the Florida Department of Agriculture and Consumer Services, Florida Counties Seafood Harvest – 2012, Franklin County, ranked sixth in the State of Florida with 5,123,375 pounds of seafood harvested and revenue estimates of over $6.7+ million (just from the oysters) to the local seafood industry revenue. Harvests from the bay provided 90% of the Florida oysters and 10% of the U.S. oysters, in addition to supplying shrimp, crab and finfish.

The Franklin County seafood industry and community have experienced a significant impact from a damaging drought event after Tropical Storm Debby in June 2012. Although exact details are not recorded on the loss of revenue, in December 2012 federal disaster relief funds for families and businesses was awarded to assist the seafood workers that lost their livelihoods because of the oyster reef damage.

Heat Wave
The heat wave event in August 2014 in downtown Apalachicola caused an oak tree limb to break and fall from the tree onto a power line that resulted in loss of power for several residents and businesses in the area of 14th Street and Gibson Inn off US Hwy 98 for about an hour.

In addition, Franklin County does have heat-related incidents ranked 2nd to the lowest for HRI as noted in Figure U. The Franklin County residents can experience very high temperatures in the summer months as noted by the data, and the record temperatures have reached 104°F in the City of Carrabelle and 103°F in Apalachicola with a RH of only 50%, the heat index would have been 131°F for Carrabelle and 112 to 117°F based on the Heat Index Chart. Heat-related incidents can occur especially for the poor, the elderly, the sick and the children in the county, however according to the Franklin County Department of Health, data related to ED incidents for HRI is not recorded.

## Winter Storms/Freezing Temperatures

Winter storms may include extreme cold temperatures (freeze), high winds, snow, and ice, all of which have the potential to impact people, structures, and infrastructure. During the winter, the North Florida region is occasionally invaded by massive cold fronts that originate far to the north

and the results are carried to the Southern states. Although the temperature within these air masses rises significantly during their passage to Florida, they are capable of bringing intense cold to the State.

Florida has experienced occasional cold fronts that can bring high winds and relatively cooler temperatures for the entire state, with high temperatures that could remain into the 40s and 50s (4 to 15 °C) and lows of 20s and 30s (-7 to 4 °C) *for few days* in the northern and central parts of Florida, although below-freezing temperatures are very rare in the southern part of the state.

*Freezing Temperature Record*

The State's record minimum temperature was set in February 1899 when Tallahassee experienced -2° F. Once cold waves move onto the peninsula the relatively warm waters of the Atlantic and the Gulf of Mexico exert their influence, and the airmass' temperature rises.

Not a year goes by when there is not some damage to the citrus or vegetable crop somewhere in the State. Severe freezes in the 19th and 20th centuries gradually drove the center of citrus production southward from the Orlando area to southern Polk County.


Of the dozen or so devastating freezes that have impacted the citrus industry and other agriculture concerns over the last century or in the Southeast, nearly all of them occurred during times of Neutral conditions in the Pacific Ocean, when there is neither El Niño or La Niña present. An in-depth analysis of weather observations from across the Southeast over the last 60 years shows that the risk of severe freezes in Florida is up to three times greater during Neutral conditions in the Pacific Ocean.

*Winter Storms/Freezing Temperature Occurrences*

According to the NCDC there was one winter storm occurrence (same day for the inland and coastal area) that was reported in Franklin County.

**Table 4.45 – Winter Storm Occurrence in Franklin County (7/1/1950 – 7/31/2015)**

| Location or County | Date | Time | Type | Dth | Inj | PrD | CrD |
|---|---|---|---|---|---|---|---|
| Inland Franklin | 1/28/2014 | 16:00 | Winter Storm | 0 | 0 | 100K | 0.00K |
| Coastal Franklin | 1/28/2014 | 16:00 | Winter Storm | 0 | 0 | 100K | 0.00K |
| Total | | | | | | **Property Damage: $200,000** | |

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

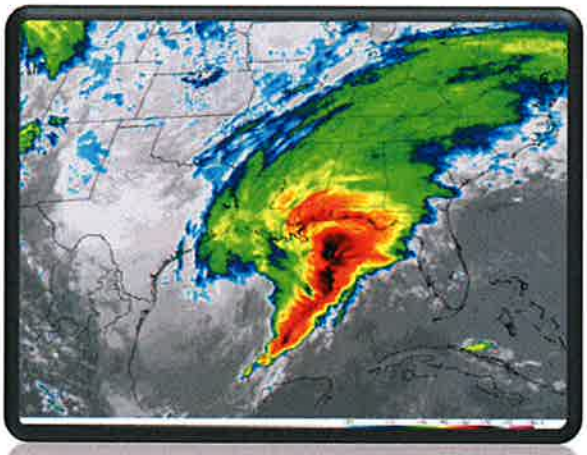
**Key Code**: Dth: Deaths; Inj: Injuries; PdD: Property Damage; CrD: Crop Damage

Hazard Event Narrative

1.) 1/28/2014, Inland and Coastal Franklin – The third winter storm to impact the NWS Tallahassee County warning area in 5 years brought a wintry mix of precipitation to virtually the entire forecast area. The predominant precipitation types were sleet and freezing rain. Total liquid equivalent estimates were greater than ¼ inch across of the most of the Florida Panhandle counties. Several roads were closed, including a large stretch of I-10. Most bridges were closed at one point from Tallahassee westward, and during the peak of the event, and there was no road access to cross over the Apalachicola River. This led to a significant transportation impact for some trucking companies with critical monetary loss. In addition, the bridge crossing to St. George Island was closed at one point due to ice. The estimated property damage was $200,000.

*Additional Winter Weather Occurrences*

(Recorded data from the following sources: NOAA News; NOAA Southern Region Headquarters; NWS and NCDC (not direct specific details for Franklin, however, for the entire State for the Storm of the Century).



1) 3/13/1993 – The No Name Storm (data from NCDC) - The "Storm of the Century" roared across Florida producing a variety of severe and unusual weather conditions for a period of about 18 hours from late Friday, 3/12 to late Saturday, 3/13. A severe squall line raced eastward at 50 mph ahead of an intense low producing several tornadoes and strong downbursts as it moved through the state and directly causing fatalities. From intense storm surge and flooding on the gulf coast to a period of 8 to 12 hours of high sustained winds of up to 50 mph with gusts to 70 mph to cold air which poured in behind the intense low with up to four inches of snow falling in the panhandle to a trace to 3 inches elsewhere across north Florida. Record or near record low temperatures occurred over much of the state the following two nights. Total property damage for the State was estimated at $1.6 billion and 47 fatalities, (specific

property damage for Franklin County statistics and fatality data was not available).

Upstream, the arctic, polar and subtropical jet streams were merging and a deep flow of tropical moisture over the Gulf was coming north from the Caribbean Sea. These merging factors set the timer for the impending explosion.

The winds howled as the storm moved north with the strongest recorded wind gusts at several locations:

- 110 mph Franklin County, FL

## Vulnerability

The vulnerability to winter storms and freezing temperature events can be defined as to the extent to which people will experience harm and property will be damaged from the natural hazard. A severe winter storm or freeze can have a substantial impact on Franklin County's communities, utilities, transportation systems, telecommunications, seafood, and possibly result in loss of life due to accidents or hypothermia.

Ice accumulation accompanied by high winds can have destructive impacts to trees, power lines, road and bridge closures, and utility services. Communications and power are often disrupted while utility companies work to repair the damage. Power and communication disruptions are potential consequences of ice storms and even snow in the county.

### *Vulnerability for the Franklin County's Population*

Franklin County had a 2.6% growth rate from 2010 to 2015 from 11,549 residents in 2010 to a projected 11,844 residents in 2015. The entire population would be at risk and vulnerable to winter storm and freezing temperature leaving several homes without heat or water resulting in shelter needs to assist and care. The most vulnerable residents would be the elderly, the poor, the sick, the special needs, and the mobile home residents, which account for approximately 25 – 29% of the population.

### *Vulnerability for Franklin County's Structures and Facilities*

The Franklin County's buildings, structures, facilities could have some impact from a winter storm or freeze event with power interruptions or frozen pipes. Back up power is recommended for the county's critical facilities and infrastructure.

### *Problem Area for the County*

Having backup power and an emergency shelter is important during a winter storm or freezing temperature event as the entire county could be affected especially the sick, the elderly, the special needs, the poor and the children who are the most vulnerable.

## Probability

The probability for winter storms or freezing temperature events is low to possibly medium for the entire county (at least one occurrence every 10 years to one occurrence every 3 years).

## Location

The entire planning area (the City of Apalachicola, the City of Carrabelle, and the unincorporated area of Franklin County) at risk to a winter storm or freezing temperature event. Especially the residents that live on the coastal line of the county with icy roads that could lead to road and bridge closures.

## Extent

Based on historical data for the State of Florida, the coldest temperature was -2 degrees in February 1899. This recorded temperature would be the extreme and worse case scenario. The coldest temperature ever recorded in the county was 9 °F on January 21, 1985. And, although rare for Franklin County, freezing temperatures in the 20s and 30s can potentially occur and last a few days. In addition, Franklin County experienced impact from extreme wind gusts from the "Storm of the Century" in March 1993.

## Impact

Freezing temperatures and winter storms can have a destructive impact on the county's infrastructure. In January 2014, total liquid equivalent estimates of sleet and freezing rain were greater than ¼ inch across of the most of the Florida Panhandle counties. Several roads were closed, including a large stretch of I-10. Most bridges were closed at one point from Tallahassee westward, and during the peak of the event, and there was no road access to cross over the Apalachicola River. This led to a significant transportation impact for some trucking companies with critical monetary loss. In addition, the bridge crossing to St. George Island was closed at one point due to ice. The estimated property damage was $200,000.

## *Repetitive Loss (RL) Property*

As noted by FEMA… "A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling ten-year period since 1978. The property may or may not be currently insured by the NFIP. Structures that flood frequently strain the National Flood Insurance Fund and these properties are the biggest draw on the Fund."

With the increase in NFIP's annual losses and the need for borrowing, the repetitive loss properties drain funds needed to prepare for catastrophic events. Community leaders and the county residents are also concerned with these properties because their lives are disrupted and may be threatened by the continual flooding. The primary objective of the RL properties strategy is to eliminate or reduce the damage to property and the disruption to life caused by repeated flooding of the same properties.

Properties that have been identified as specific areas of repetitive damage are located primarily in the following locations:

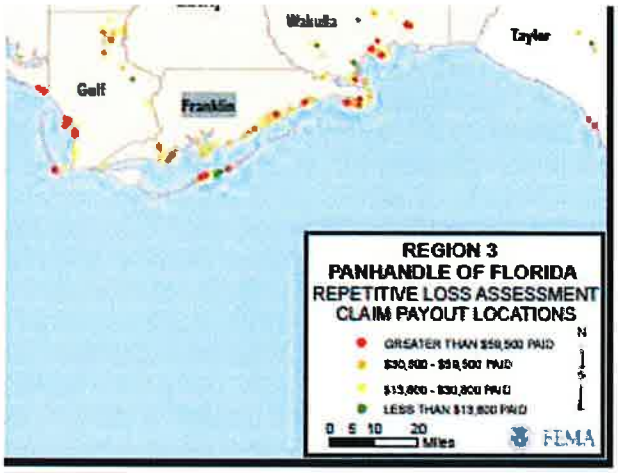
- St. George Island;
- Alligator Point; and
- Along the coastal US Highway 98 west of Carrabelle.

In addition: The inland areas of the county are largely within the boundaries of the 100-year flood plain.
Much of this land will not be developed because it is in public ownership and with the majority of the remaining inland area properties owned by private companies, it is unlikely it will be developed in the foreseeable future.

According to the statistics from FEMA repetitive loss property study (2013) reveals that the county had 129 repetitive loss properties in Franklin County, which account for 1.17% of all repetitive loss properties in the state of Florida. Franklin County received $4,513,987.47 or 1.46% of the total amount of repetitive loss payouts for the state.

*There was one change in the repetitive loss list for Franklin County. One property located on Dog Island – the owner received Cost of Compliance funds to elevate and relocate his house. His home was then removed from the repetitive loss list.*

**Figure V – Location of Property Losses by Claim Magnitude**




The repetitive loss properties in southwest Franklin County along the coast on the Gulf of Mexico and on St. George Island, see Figure V. The density estimation based on the amount received from insurance claims highlighted a hotspot in Carrabelle. Based on the map alone, it appears that there is only one repetitive loss property located in that area, however the underlying database suggests that there are 15 properties located in that area. This distortion is due to the fact that the points are all located in the same position. This is an issue that would be corrected though the field verification process.

According to the State of Florida Enhanced Hazard Mitigation Plan, Franklin County's Non-Mitigated Repetitive Loss Property (RLP) information is as follows:

- Non-Mitigated RLP count is: 104 properties
- Dollar Losses for RLP: $4,934,817.56