2017

Walker County
Hazard Mitigation Plan

Table of Contents

Acronym List

RHMP	Regional Hazard Mitigation Plan
HMAP	Hazard Mitigation Plan
H-GAC	Houston-Galveston Area Council
FEMA	Federal Emergency Management Agency
TDEM	Texas Division of Emergency Management
TX	Texas
CRS	Community Rating System
NFIP	National Flood Insurance Program
HGMP	Hazard Mitigation Grant Program
CHARM	Community Health and Resource Management
mph	miles per hour
NOAA	National Oceanic and Atmospheric Administration
NSSL	National Severe Storm Laboratory
OEM	Office of Emergency Management
ArcGIS	Geographic Information System
RL	repetitive loss
KBDI	Keetch-Byram Drought Index
WUI	Wildland Urban Interface
FM	Farm to Market road
PHDI	Palmers Hydrological Severity Index
USDA	United States Department of Agriculture
LAL	Lightning Activity Levels
NCDC	National Climate Data Center
CDC	Centers for Disease Control and Prevention
NCEI	National Centers for Environmental Information
SPIA	Sperry-Piltz Iace Accumulation
NWS	National Weather Service
LEP	Linear Extensibility Percent
COLE	Coefficient of Linear Extent

Part 1: Introduction

Part 1: INTRODUCTION

Walker County's previous Hazard Mitigation Plan was adopted in 2006 and updated in 2011 as part of a seven-county Regional Hazard Mitigation Plan (RHMP). Due to new regulation and planning recommendations, Walker County prepared a new countywide multi-jurisdictional Hazard Mitigation Plan (HMAP). Walker County partnered with the Houston-Galveston Area Council (H-GAC) for both the 2006 and 2011 plans and continued this partnership during the development and adoption of the HMAP.

Image source: https://www.wikipedia.org/

History

On April 28, 2006, the Federal Emergency Management Agency (FEMA) and the Texas Division of Emergency Management (TDEM) approved the first RHMP. H-GAC prepared the regional plan in coordination with FEMA and TDEM to ensure it met all applicable state and federal requirements. H-GAC updated the RHMP in 2011 to re-assess vulnerabilities and increase the number and diversity of mitigation action items. The plan includes a more robust assessment of natural hazards, newly uncovered vulnerabilities, more advanced analysis techniques, and a more effective and informed mitigation strategy.

Purpose of Plan

The purpose of Walker County's HMAP is to reduce the loss of life and property within the county and lessen the negative impacts of natural disasters. Vulnerability to several natural hazards has been identified through research, analysis, and public input. These hazards threaten the safety of residents and have the potential to damage or destroy both public and private property, disrupt the local economy, and impact the overall quality of life of individuals who live, work, and play in the county. While natural hazards cannot be eliminated, the effective reduction of a hazard's impact can be accomplished through thoughtful planning and action.

The concept and practice of reducing risks to people and property from known hazards is generally referred to as hazard mitigation. One of the most effective tools a community can use to reduce hazard vulnerability is developing, adopting, and updating a hazard mitigation plan as needed. A hazard mitigation plan establishes the broad community vision and guiding principles for reducing hazard risk, including the development of specific mitigation actions designed to eliminate or reduce identified vulnerabilities.

Scope of Plan

Walker County is in the east-central region of Texas, and scope of the HMAP includes the following participating jurisdictions:

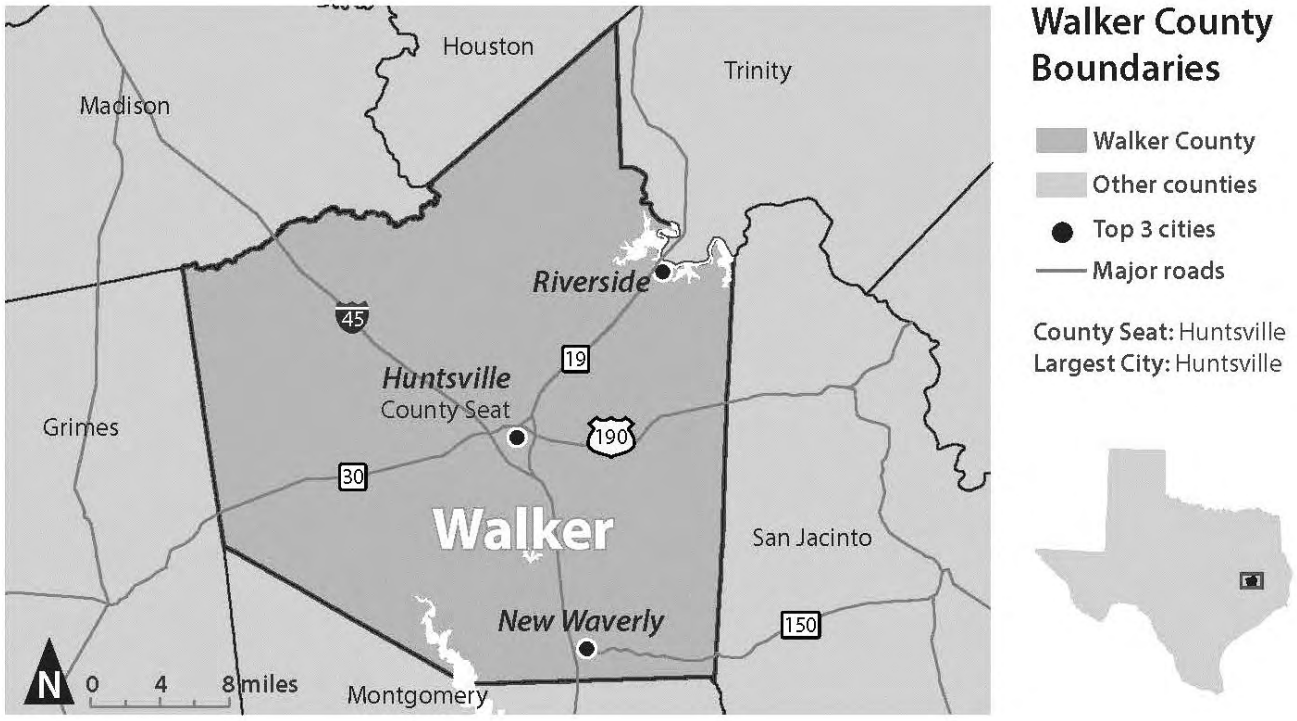
- Unincorporated Walker County
- New Waverly
- Riverside

Presidential Declared Disasters

Walker County has persevered through many natural disasters. The table below lists the presidential declared disasters that the County has experienced since 2000. Each disaster is costly and challenging. The goal of this HMAP is mitigation and reduce the impact of future disasters.

Year	Declaration Type	Title
2001	Major Disaster Declaration	Tx-Tropical Storm Allison-06-06-2001
2005	Major Disaster Declaration	Hurricane Rita
2007	Major Disaster Declaration	Severe Storms, Tornadoes, & Flooding
2008	Major Disaster Declaration	Hurricane Ike
2011	Major Disaster Declaration	Wildfires
2011	Major Disaster Declaration	Wildfires
2015	Major Disaster Declaration	Severe Storms, Tornadoes, Straight-Line Winds & Flooding
2015	Major Disaster Declaration	Severe Storms, Tornadoes, Straight-Line Winds, & Flooding
2016	Major Disaster Declaration	Severe Storms, Tornadoes, & Flooding
2016	Major Disaster Declaration	Severe Storms & Flooding
2016	Major Disaster Declaration	Severe Winter Storms, Tornadoes, Straight-Line Winds, & Flooding
1993	Emergency Declaration	Extreme Fire Hazard
1989	Major Disaster Declaration	Severe Storms, Tornadoes & Flooding
1996	Emergency Declaration	Extreme Fire Hazard
1991	Major Disaster Declaration	Severe Thunderstorms
1990	Major Disaster Declaration	Severe Storms, Tornadoes & Flooding
1999	Emergency Declaration	Extreme Fire Hazards
1994	Major Disaster Declaration	Severe Thunderstorms & Flooding
1998	Major Disaster Declaration	Tropical Storm Charley
2003	Emergency Declaration	Loss of The Space Shuttle Columbia
1998	Major Disaster Declaration	Tx-Flooding 10/18/98
2007	Emergency Declaration	Hurricane Dean
2008	Emergency Declaration	Wildfires
2002	Major Disaster Declaration	Severe Storms, Tornadoes & Flooding
2005	Emergency Declaration	Hurricane Rita
2005	Emergency Declaration	Hurricane Katrina Evacuation
2011	Fire Management Assistance Declaration	Cowboy Church Fire
2008	Emergency Declaration	Hurricane Ike
2006	Major Disaster Declaration	Extreme Wildfire Threat
2008	Emergency Declaration	Hurricane Gustav
2017	Major Disaster Declaration	Texas Hurricane Harvey

Planning Area Map



*Walker County's most populated city, Huntsville, will develop and adopt its own Hazard Mitigation Plan.

The HMAP profiles the following hazards:

- Flooding
- Hurricanes and Tropical Storms
- Wildfire
- Severe Thunderstorms
- Drought
- Lightning
- Excessive Heat
- Hail
- Winter Weather
- Tornado
- Dam/Levee Failure
- Expansive Soils

The plan, developed in accordance with state and federal rules and regulations governing local hazard mitigation plans, was adopted by the participating jurisdictions and shall be routinely monitored and revised to maintain compliance with all state and federal regulations.

Part 2: Planning Process

Part 2: PLANNING PROCESS

This section includes a description of the process used by H-GAC, the County, and participating jurisdictions to develop the 2017 HMAP.

Overview

Hazard mitigation planning can be described as the means to break the repetitive cycle of disaster loss. A core assumption of hazard mitigation is that pre-disaster investments will significantly reduce the demand for post-disaster assistance by alleviating the need for emergency response, repair, recovery, and reconstruction.

Hazard mitigation planning is the process of identifying natural hazards, understanding community capabilities and resources, identifying and assessing hazard vulnerability and risk, and determining how to minimize or manage those risks. In partnership with Walker County, H-GAC approached the hazard mitigation planning process by establishing a Planning Team. The next step of the planning process was the assessment of hazards and how they can impact specific assets. H-GAC conducted a hazard analysis that was provided to the Planning Team and presented at a public meeting on October 11, 2017.

After hazard identification and analysis, communities considered their vulnerability to the identified threats. Crucial input from the participating jurisdictions and members of the public helped inform a vulnerability and risk assessment for the entire county. H-GAC used information gathered from meetings with the Planning Team, online participation and input from the participating jurisdictions, and natural hazard modeling techniques to produce a comprehensive vulnerability assessment.

The planning process culminated in a mitigation strategy, i.e. identification of specific mitigation actions, which when viewed as a whole, represents a comprehensive strategy to reduce the impact of hazards. The Planning Team met on December 18, 2017, to begin the process of developing an overarching mitigation strategy, and a long-term approach to update and maintain the HMAP. Specific mitigation actions are identified in this plan and included in the Appendix E. Responsibility for each mitigation action is assigned to a specific individual, department or agency along with a schedule for its implementation. Plan Maintenance procedures (Part 8 of this plan) establish procedures to monitor progress, including the regular evaluation and enhancement of the Plan. Multijurisdictional coordination and integration of the HMAP into local planning mechanisms was also addressed. The established maintenance procedures ensure that the plan remains a dynamic and functional document over time.

Plan Development Resources

The Walker County HMAP was developed using existing plans, studies, reports, and technical information. Materials and historic data were used to inform participants throughout the planning process, evaluate and analyze hazards, and develop the mitigation strategy.

Plan Development Resources: Existing Documents and Data	
FEMA Disaster Declarations	FEMA Flood Map Services
H-GAC Land Use & Demography Database	Houston-Galveston Area Regional Plan
New Waverly Floodplain Management Plan	NOAA Storm Event Database
State of Texas Hazard Mitigation Plan	Texas A&M Forest Service Wildfire Reports
US Census American Fact Finder	USDA Census of Agriculture Reports
USGS Homeland Infrastructure Foundation-Level Data	Walker County Disaster Recovery Plan
Walker County Emergency Operations Plan	Walker County Floodplain Management Plan
2011 Regional Hazard Mitigation Plan	

Planning Team

Walker County and H-GAC established the Planning Team in Fall 2017 in preparation for the first public meeting and hazard mitigation planning workshop held on October 11, 2017. Members were asked to attend all public meetings in person, but were provided an online alternative if they were unable to do so. Walker County's webpage for online participation was hosted on the H-GAC website at the following website address: http://www.h-gac.com/community/community/hazard/walker-county-hazard-mitigation.aspx In the event the webpage address changes, online materials, surveys, forms, and documentation are provided in Appendix A.

Representatives from the County Office of Emergency Management served as liaisons between H-GAC and stakeholders, staff, and members of the public who were unable to attend the meetings.

Representative Name & Position/Title	Agency/Office
Butch Davis, Emergency Management Coordinator	Walker County Emergency Management
Sherri Pegoda, Deputy Emergency Management Coordinator	Walker County Emergency Management
Jimmy Henry, Commissioner: Road & Bridge Precinct 4	Walker County and City of Riverside
Danny Pierce, County Judge	Walker County and New Waverly
Andrew Isbell, Director of Planning & Development	Walker County Planning & Development
Chad Holton, Land & Emergency Management Coordinator	Trinity River Authority
Joey Kaspar, Senior Regional Planner	H-GAC
Amy Combs, Regional Planner	H-GAC

Meeting Dates & Details

October 11, 2017: Hazard Mitigation Kickoff Meeting
H-GAC and the Planning Team hosted a public meeting at the Walker County Storm Shelter on October 11, 2017. The purpose of the meeting was for H-GAC staff to gather feedback and input on the draft Hazard Analysis and discuss local vulnerabilities. The planning team and members of the community were given a presentation and provided large maps displaying the analysis of various hazards. Participants worked with H-GAC staff to improve the accuracy of the analysis and pinpoint the vulnerabilities of each hazard within their communities. Meeting participants also discussed their current ability to mitigate these threats and how to draft a mitigation action to address them. Prior to the meeting, community members and stakeholders were invited through press releases, public service announcements, and other advertisements in the Huntsville Item Newspaper and on KSAM Radio 101.7 FM. See Appendix A for the meeting agenda, attendee information, and press release.

December 18, 2017: Hazard Mitigation Strategy Meeting
H-GAC hosted a planning team meeting at its offices in Houston on December 18, 2017. The purpose of this meeting was to begin the development of a Mitigation Strategy and determine Plan Maintenance procedures. H-GAC staff gave a presentation on both topics and led a discussion about strategy development. Planning Team members outlined a mitigation strategy and refined their mitigation actions. Cross county cooperation was also discussed. See Appendix A for the meeting agenda and attendee information

February 22, 2018: Community Rating System Workshop
H-GAC hosted a public workshop on the Community Rating System (CRS) was held at Walker County Storm Shelter on February 22, 2018. The purpose of the workshop was to provide training for jurisdictions interested in becoming CRS communities and guidance on how to remain in compliance with the National Flood Insurance Program (NFIP). The workshop focused on complying with the NFIP, addressing obstacles communities face when it comes to improving their floodplain management programs, budget restraints, and Hazard Mitigation Grant

Program (HMGP) grant strategies. The workshop attendees then drafted mitigation actions and discussed multi-jurisdictional coordination. See Appendix A for the meeting agenda and attendee information.

Request for Public Comment
H-GAC hosted a draft of the HMAP on its website, and provided an online method for the public to submit comments and feedback on the draft. The jurisdictions' HMAP adoption meeting dates, public hearings, and locations were also provided on the same webpage. Press releases were then sent to all local media outlets to notify the public of the opportunity to comment online, by phone, or in person at each jurisdiction's public meeting. Each jurisdiction also notified the public as described in Part 8 of this plan. Please see Appendix E for public feedback and adoption documentation.

Plan Adoption

The HMAP was adopted by each participating jurisdiction through the governmental process unique to their community. The resolutions and accompanying information for each jurisdiction can be found in Appendix E.

Participation & Public Input

Public input and participation is a crucial element of hazard mitigation planning. Before the meeting, community members and stakeholders were invited through press releases, public service announcements, and other advertisements in the Huntsville Item Newspaper and on KSAM Radio 101.7 FM.

The public meetings followed shortly after Hurricane Harvey. Many residents and local staff were busy with recovery efforts at the time, and attendance was difficult for many. To ensure the public's ability to participate in the planning process, H-GAC hosted all HMAP-related materials online at the following web address: http://www.h-gac.com/community/community/hazard/walker-county-hazard-mitigation.aspx Online surveys, resources, a mitigation action submittal portal, and a place to submit comments on the draft plan were made public on this webpage for the duration of the planning process and after.

To develop a comprehensive plan, each jurisdiction was required to participate to the fullest of its ability. The chart below provides a brief overview of each jurisdiction's participation throughout the process. One or more representatives from each jurisdiction and/or a member of the public contributed during each stage of the plan development.

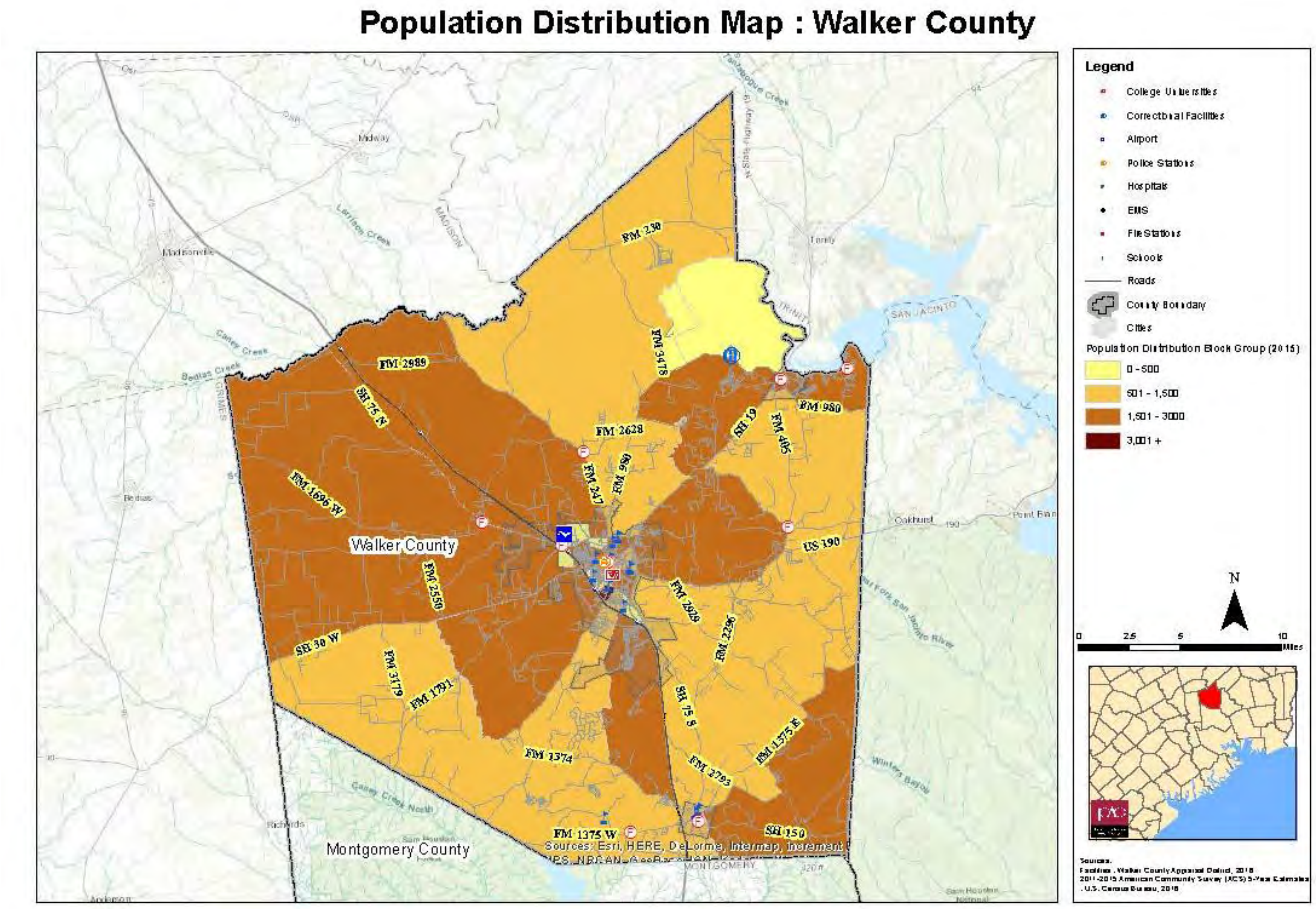
Jurisdiction	Attended Hazard Mitigation Kick-Off Meeting	Participated in Mitigation Strategy Development	Online Participation:			Attended optional Workshop	Attended Public Hearing
			Capability Assessment	Mitigation Actions	Provided Feedback on Draft		
Unincorporated Walker County	x	x	x	x	x	**x**	**x**
New Waverly	x	x	x	x	x	**x**	**x**
Riverside	x	x	x	x	x	**x**	**x**

Part 3: County Profile

Part 3: COUNTY PROFILE

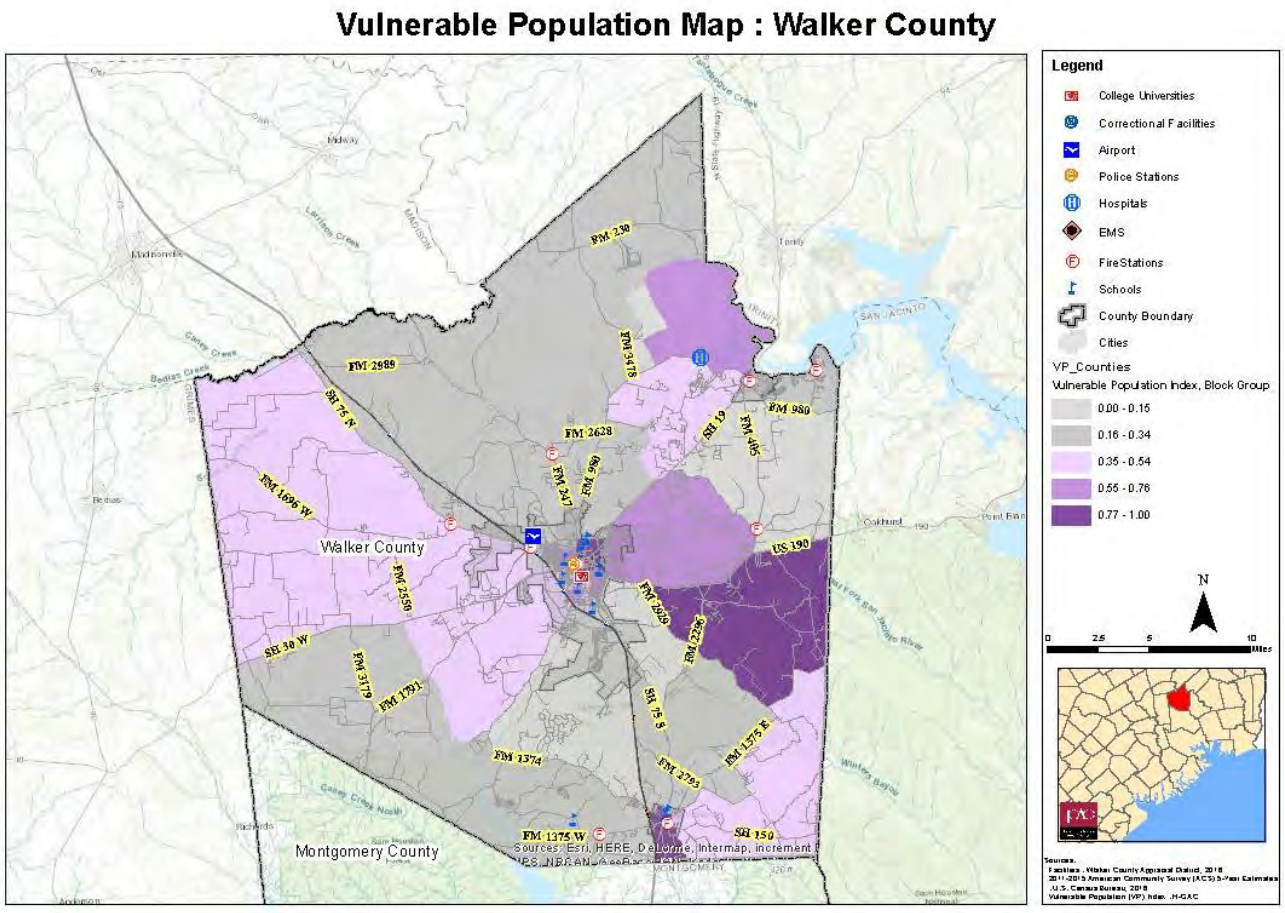
Walker County is in the Texas Piney Woods, north of the City of Houston. Pine forests cover around 70 percent of the county, which is home to the western half of the Sam Houston National Forest[i]. The San Jacinto and Trinity Rivers both run through Walker County, and it also has shorelines on both Lake Conroe and Lake Livingston.

Walker County's population in 2016 was estimated to be 71,484 and is expected to grow 66 percent by 2040 to 118,000[ii,iii]. Walker County has three cities: Huntsville, New Waverly and Riverside. Major transportation corridors include Interstate 45, U.S. Highway 190, and State Highways 19, 20, and 75. The largest concentration of Walker County's population is in southwest Huntsville with over 3,000 individuals. The City of Riverside to the northeast and the City of New Waverly in the southeast of the county have a similar concentration of Walker County's population, at 1,501 to 3,000 individuals.



Walker County's economy is dependent on the public sector. Approximately 40 percent of the county's employment is in public administration[iv]. The Texas Department of Criminal Justice is headquartered in Huntsville, and the county has more prisons than any other county in Texas. The county's other major employer, Sam Houston State University, is a public university serving over 20,000 students with nationally recognized programs in criminal justice, theater, and dance[v]. Due to its student population, Walker County has a larger relative percentage of residents ages 18 to 34 years[vi].

Walker County's annual median household income is $37,700, and around one-quarter of its residents live in poverty[vii,viii]. Partially due to a lower annual income, households in the county spend over 60 percent of their earnings on costs related to housing and transportation[ix]. The county also has a much higher share of households living in RVs and mobile homes (22 percent) compared to the State of Texas with only 8 percent[x].



The Vulnerable Population Index identifies areas throughout Walker County that may not have the means or the resources to act when a natural disaster occurs in Walker County. For the purposes of this plan, vulnerable populations include any households without a car, single female household with child/ children in the home, individuals living below the poverty line, individuals who are disabled, individuals who are Hispanic, individuals who are non-Hispanic, and non-white, and individuals 65 years and older. The areas in the county with the greatest proportion of these individuals is defined as the most vulnerable areas in Walker County. On the map, the areas in dark purple are the areas that have greatest proportion of the vulnerable population in Walker County. The map shows that New Waverly to the southeast is the city that has the largest proportion of the vulnerable population in Walker County. Defining and mapping vulnerable populations provides the opportunity to demonstrate where perhaps the most need is throughout Walker County.

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[v] Sam Houston State University
[vi] U.S. Census Bureau, 2011-2015 American Community Survey, 5-Year Estimates, Table B01001
[vii] U.S. Census Bureau, 2011-2015 American Community Survey, 5-Year Estimates, Table S2503
[viii] U.S. Census Bureau, 2011-2015 American Community Survey, 5-Year Estimates, Table S1701
[ix] Center for Neighborhood Technology 2013 H+T® Index
[x] U.S. Census Bureau, 2011-2015 American Community Survey, 5-Year Estimates, Table DP04

Part 4: Hazard Identification

Part 4: HAZARD IDENTIFICATION

The State of Texas's Hazard Mitigation Plan has identified 5 major natural hazards that affect the region. These include hurricane, flood, wildfire, drought, and tornado[i]. The local planning team identified 12 natural hazards which could affect the county and local jurisdictions.

Flooding

Flooding is one of the most frequently occurring, destructive, and costly natural hazards facing Texas.[ii] There are two main categories for floods: general and flash flooding. General flooding is typically a long-term event that can last from a couple of days to weeks. This type of flooding is characterized by an overflow of water from an existing waterway, including rivers, streams, and drainage ditches. Flash flooding is an event that typically lasts a few minutes to less than 6 hours. Either type of flooding is capable of destroying infrastructure, homes, and other structures, and pulling cars off roads. However, flash flooding typically is considered the most dangerous type of flooding, because of its "speed and the unpredictability"[iii]. Generally, the impact of flooding is intensified in urban areas because of less impervious surfaces and in suburban or rural areas because of building in vulnerable areas. While 100 and 500 year floodplains are identified throughout the county and local jurisdictions, flooding can occur outside of these areas.

Severe Thunderstorms

Thunderstorms are classified as severe when there is either 58 mile per hour (mph) winds and/ or hail that is one inch in diameter or greater. While there are over 100,000 thunderstorms annually throughout the United States, severe thunderstorms only account for 10 percent of thunderstorms in the United States.[iv] Hail, lightning, tornadoes, wind shear, and floods can be a part of thunderstorms. In the United States, flash flooding resulting from thunderstorms kills more people year than hurricanes, tornadoes, or lightning[v]. Along the Gulf Coast, severe thunderstorms are more likely to occur in the afternoon and in spring and summer months.[4]

On occasion, thunderstorms can produce a microburst. Microbursts are a localized column of sinking air (downdraft) within a thunderstorm and is usually less than or equal to 2.5 miles in diameter. Microbursts are dangerous and destructive because of the sudden winds reaching up to 100 mph and the potential for significant rain or hail in wet microburst.[vi]

Lightning

Lighting can be seen throughout thunderstorms, hurricanes, intense forest fires, and winter storms. Lightning occurs when positive and negative charges build within a cloud leading to a rapid discharge of electricity[vii]. While there are several types, lightning is typically classified as ground flashes or cloud flashes. One of the more common lightning strikes are cloud-to-ground lightning; these strikes are classified as ground flashes. Cloud-to-ground lighting starts as a channel of negative charge, called a stepped leader, zigzagging downward in roughly 50-yard segments in a forked pattern [viii]

Lightning often strikes tall structures, such as trees and skyscrapers, but can also strike open fields or other areas depending on where the electrical charges form. Lightning causes an average of 80 deaths and 300 injuries each year in the United States.[7] In 2017, 16 people were killed by lightning in the United States, two of these deaths occurred in Texas, but not in the county. [ix]

Hail

Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into balls of ice. To be considered hail, frozen precipitation needs to be at least .2 inches. Size of hail can range from pea-sized (1/4 inch in diameter) to softball-sized (4 ½ inches in diameter). Quarter sized hail (1 inch in diameter) and above is considered severe by the National Oceanic and Atmospheric Administration's (NOAA) National Severe Storm Laboratory. Hail storms can result in significant damage to vehicles, buildings, and crops. Severe hail and hail swaths can result in an accumulation of hail on roadways and roofs, which may result in car accidents or roofs collapsing.[x]. As of 2015, Texas had the highest level of hail loss claims throughout the country. According to the National Insurance Crimes Bureau, hail loss claims totaled 400,000 dollars in Texas from 2013 to 2015. However, damage from hail typically occurs in northern Texas rather than southern Texas.

Winter Weather

A winter storm is any event in which the main type of precipitation is snow, sleet, or freezing rain, according to (NOAA), 70 percent of injuries related to winter storms are in automobiles. Winter storms form with cold air, lift, and moisture.[xi] While there are several types of winter storms, ice storms and snow flurries or showers with light accumulation are the most likely in the region. The main concerns with winter weather are road conditions and power outages.

Hurricanes and Tropical Storms

Tropical cyclones with sustained winds of 74 mph and above are classified as hurricanes. Hurricanes can reach wind speeds of 156 mph or more, which would be considered a category five on the Saffir-Simpson scale with potential for catastrophic damage. Hurricanes generally have a well-defined center, called the eye. Hurricane season is generally June 1st through November 30th each year .[xii]However, hurricanes can and have formed outside of this season. Hurricanes are one of the top natural hazards affecting the region, with flooding considered one of the main impacts from hurricanes [xiii]

Tropical cyclones (rotating low-pressure weather systems that have organized thunderstorms, but no fronts) with sustain winds of at least 39 mph and no higher than 73 mph are classified as tropical storms. Tropical storms generally have ill-defined centers and slower moving winds than hurricanes.[12]

Hurricane Harvey is a recent example of the impact hurricanes and tropical storms have on the region, county, and local jurisdictions. Hurricane Harvey made landfall on August 25th 2017 as a category four hurricane near Rockport, Texas; Hurricane Harvey traveled further inland as a tropical storm over the next few days. The tropical storm triggered general and flash flooding throughout the region with recorded rainfall measuring as high as 60.58 inches in the region. Flooding was seen throughout the county and local jurisdictions.

Tornado

Tornadoes are a violently rotating column of air touching the ground, usually attached to the base of a thunderstorm.[xiv] However, tornadoes have formed during hurricanes and tropical storms. Tornadoes form when there is a change in a storm's speed and direction. Tornadoes can have wind speeds that range from 40 mph to 300 mph and move at 10 mph to 20 mph. However, tornadoes typically last a few minutes. The damage seen from a tornado is largely due to the strength of the winds, but strong hail and lighting often accompany tornadoes .[xv]

Wildfire

Wildfires are any non-structure fire, except prescribed fires that occur in wildland areas, including prairies or forest. as many as 90 percent of wildland fires in the United States are cause by humans and the other 10 percent are started by lava or lightning.[xvi] In understanding that most wildfires are started by people, the Texas Forest Service assigns a high priority to year-round wildfire prevention activities that reduce risks to residents and property. Texas Forest Service prevention campaigns use radio, TV, print, and web-based products along with local outreach programs to increase wildfire awareness and deliver fire safety messages. Texas Forest Service works with local and county officials to keep them informed of fire danger and the likelihood of large damaging wildfires. In 2017, five Texans died due to wildfires in north Texas; Texas faced more than 21 million dollars in damages from wildfires throughout the state .[xvii]

Drought

Drought varies greatly in length and extent. High temperatures, high winds, and low humidity can worsen drought conditions and can make areas more susceptible to wildfire. Human demands and actions, such as farming and animal grazing, can also hasten drought-related impacts. There are typically four types of drought: meteorological, agricultural, hydrological, and socio-economic. Meteorological droughts are typically defined by the level of dryness over a given period of time. Hydrological droughts are defined by the decline of soil/ground water or stream flow or lake/ river levels. Agricultural droughts refer to the impact of low rainfall and storm water or reduced ground water or reservoir levels needed for agriculture. Socio-economic drought considers the impact of drought conditions on supply and demand of some economic goods such as grains.[18, xviii] There are a wide range of effects that can occur from drought, including decreased land prices, loss of wetlands, increased energy demand, and increase of mental health disorders.[xix] Impacts seen in Texas from drought in the past, include wildfires, loss of agricultural crops including rice and wheat fields, and increase in energy cost and demand. [xx]

Expansive Soils

Expansive soils are soils and soft rock that tend to swell or shrink due to changes in moisture content. Expansive soils (bentonite, smectite, or other reactive clays) expand when the soil particles attract water and can shrink when the clay dries. Changes in soil volume present a hazard primarily to structures built on top of expansive soils. In Texas, most expansive soils are in a band 200 miles west of the coastline, stretching approximately from Beaumont to Brownsville. These areas receive the most moisture and are also vulnerable to droughts, which can cause the soils to contract. Problems associated with expansive soils are sinking or broken foundations or ruptured pipelines. In the region, the problems associated with expansive soils typically occur during drought periods.[xxi]

Heat Events

While the National Weather Service defines excessive heat as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks, a Heat Event is more loosely defined. A heat event could be a period where the county experiences high temperatures which could affect residents particularly children and the elderly. According to the National Weather Service, the county particularly in summer months experiences typical daily temperatures more than 90 degrees and humidity more than 75 percent. These high temperatures mixed with high percentage of humidity can affect the elderly and children even though these are not above average temperatures for the county.

Dam/ Levee Failure

Aging infrastructure and increased uncertainty of other natural hazards such as flooding are factors in the rising concern of dam and levee failure. Rising flood levels can create a levee breech or dam failure resulting in flashing flooding within as little as six hours or less. Aging infrastructure and other factors such as debris or melting snow may create a dam failure or levee breach over a greater period of time, weeks to months. The results of a dam failure or levee failure can result in residential and commercial buildings flooded outside of the identified 100 to 500 year floodplain and increase flood water levels during a flood event.[xxii] As a result of Hurricane Harvey, the jurisdictions feel there is a need to further investigate the potential impacts of dams and levees in their community. Several privately-owned dams in New Waverly may have caused upstream flooding of homes during Hurricane Harvey. Residents and officials in New Waverly were unable to determine if the upstream flooding was caused by the poorly maintained and clogged dams, or if the historic rainfall experienced during Hurricane Harvey was the cause of the flooding. A data deficiency exists.

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Part 5: Risk Assessment

Part 5: RISK ASSESSMENT

A Vulnerability Assessment is the process of identifying threats by natural hazards to the population and infrastructure. By identifying the greatest vulnerabilities within the County, it becomes possible to develop a Mitigation Strategy that effectively allocates resources for addressing the most serious vulnerabilities. For this assessment, the Planning Team conducted three main processes to identify the vulnerabilities within Walker County:

- Cataloging critical and valuable assets within the County.
- Conducting a capability assessment.
- Assessing the County's vulnerability to each hazard and ranking these hazards according to degree of risk.

H-GAC maintains a database of critical facilities. During a public meeting on October 11, 2017, Walker County officials reviewed and updated this list, including adding additional valuable assets within the community. Following this process, the Planning Team determined 126 facilities are critical or valuable assets. Through a Hazus analysis, the Planning Team identified residential and commercial units. Appendix B contains a comprehensive list of the facilities and the capability survey assessment. The full Hazus analysis is catalogued in Appendix C. A summary of the facilities is provided below.

Critical Facilities & Valuable Assets

Asset Description	Quantity
Schools and Universities	19
Dams	59
Electric Substation	5
EMS	8
Fire Station	7
Hazardous Waste Treatment Facility	1
Hospital	1
Emergency Operation Center	1
Police Station	8
Shelters & Housing Facilities	10
Pump Stations	4
Toxic Release Inventory Facility	1
Wastewater Treatment Plants	2
Residential Units	18,690
Commercial Units	850
*Although the City of Huntsville is developing a HMAP of their own, the HAZUS analysis includes their residential and commercial parcel data.	

Capability Assessment

The participating jurisdictions completed a capability assessment survey to collect data on hazards that affect communities, the communities' ability to mitigate damages from these hazards, and current plans or programs in place to help mitigate natural hazards. The jurisdictions also identified factors impacting their capability to address hazards in their communities. The Planning Team used information to assess the risk within each community and to determine a strategy to integrate the HMAP into their current planning mechanisms. A condensed version of the information is provided below.

Existing Plans & Regulations

HMAP: Hazard Mitigation Plan
DRP: Disaster Recovery Plan
FMP: Floodplain Management Plan
EOP: Emergency Operations Plan
COOP: Continuity of Operations Plan
RP: Regional Planning
SO: Subdivision Regulation
WPP: Wildfire Protection Plan
CRS: Community Rating System

Jurisdiction	HMAP	DRP	FMP	EOP	COOP	RP	SO	WPP	CRS
Unincorporated Walker County	x	x	x	x	x	x	x	x	x
New Waverly	x		x			x	x		
Riverside	x		x			x	x		

All participating jurisdictions identified an inadequate budget, shortage of technical staff, and shortage of administrative staff as factors that decreased their capability to implement mitigation actions and reduce future damages. Each participating jurisdiction will apply for state and federal funding to help fund mitigation actions that reduce the impact of natural hazards, send technical staff to continuing education courses, and work with elected officials and the public to increase their budget to meet their administrative staff needs and improve infrastructure.

Unincorporated Walker County is a CRS participant, but has not updated their regulation and enforcement practices in the last five years. The County will expand their floodplain regulations so they become more effective, and will further improve their documentation practices. They will also expand their existing Wildfire Protection Plan and partner with Sam Houston State Park to eliminate underbrush that serves as wildfire fuel.

New Waverly will join regional transportation planning efforts to improve their current hurricane evacuation plan, and improve their road infrastructure to improve economic resiliency. The New Waverly elected officials and staff will work to expand and strengthen subdivision and stormwater management regulation. The city will also consider drafting and implementing a disaster recovery plan and becoming a Firewise community.

Riverside plans to expand their subdivision regulations and improve their floodplain regulation practices to reduce the effects of flooding on their community. The city will also consider drafting and implementing a disaster recovery plan and becoming a Firewise community.

Risk Assessment Survey

The Planning Team ranked the hazards by scoring the frequency, impact, and vulnerability of each . Impact and vulnerability ratings were weighted more heavily than frequency scores when determining overall risk. Additionally, communities described the loss or damage, and provided specific data that expand on the descriptions provided below.

Frequency Ratings	Impact Ratings	Vulnerability Ratings
Rare and isolated occurrences; Unlikely to occur within the next 5 years.	**Negligible:** Less than 10 percent of property and population impacted in the planning area.	**Low:** Hazard results in little to no damage, and negligible loss of property, services, and no loss of life. Planning area is not vulnerable to this hazard.
Infrequent and irregular occurrences; Likely to occur once in the next 5-10 years.	**Limited:** 10 to 25 percent of property and population impacted in the planning area.	**Moderate:** Hazard results in some damage, and moderate loss of property, services, and potentially loss of life. Planning area is moderately vulnerable to this hazard.
Frequent and regular occurrences; Likely to occur within the next 5 years.	**Significant:** 25 to 75 percent of property and population impacted in the planning area.	**High:** Hazard results in extensive damage, and extensive loss of property, services, and potentially loss of life. Planning area is highly vulnerable to this hazard.
Consistent and predictable occurrences; Likely to occur more than once in the next 5 years.	**Extensive:** 75 to 100 percent of property and population impacted in the planning area.	**Extreme:** Hazard results in catastrophic damage, loss of property, services, and loss of life. Planning area is extremely vulnerable to this hazard.

Hazards Ranked by Risk

Each identified hazard poses a risk to Walker County. Ranking the hazards from greatest to lowest risk allows the communities to prioritize their resources and focus efforts where they are most needed.

Risk Rating	Ranking	Hazards
High	1	Flooding
	2	Hurricanes and Tropical Storms
	3	Wildfire
	4	Severe Thunderstorms
Moderate	5	Drought
	6	Lightning
	7	Excessive Heat
	8	Hail
Low	9	Winter Weather
	10	Tornado
	11	Dam and Levee Failure
	12	Expansive Soils

Part 6: Hazard & Vulnerability Assessment

Part 6: HAZARD & VULNERABILITY ANALYSIS

Introduction

After the potential hazards in the county were identified, the Planning Team reviewed historic data and conducted an analysis in ArcGIS for each hazard. This analysis was presented at the October 11, 2017, public meeting. At this meeting, stakeholders provided many firsthand accounts of damage caused by natural disasters. These reports were taken into consideration and included in the hazard analysis when possible. The result of that process has determined 12 different natural hazards require mitigation efforts. The maps and the discussion that follow are a compilation of data analysis, historic information, and public feedback.

Part 6.1 Flooding

6.1 Flooding

Floodplains are the primary tool used by FEMA to determine areas at risk of flooding. The periodic flooding of lands adjacent to rivers, streams, and shorelines is a natural and inevitable occurrence that can be expected based upon established recurrence intervals. The recurrence interval of a flood is the average time interval, in years, that can be anticipated between flood events of a certain magnitude. Using the recurrence interval with land and precipitation modeling, forecasters can estimate the probability and likely location of flooding. These are expressed as floodplains. The most commonly used floodplain measurements are the 100-year floodplain and the 500-year floodplain. The 100-year floodplain has a 1 in 100 chances of flooding each year. The 500-year floodplain is estimated to have a 1 in 500 chances of occurring each year.

Flooding causes widespread and varying degrees of damage. The magnitude or extent of flood damage is expressed by using the maximum depth of flood water during a specific flood event. Structures inundated by 4-feet or more of flood water are considered an absolute loss. Other forms of loss. such as roads, bridges, agriculture, services, or death or injury are also summarized by jurisdiction in this plan.

Historic Occurrences

Damage and occurrence data for Walker County flood events is listed below. The data reported no loss of life or injuries as the result of these events, but Walker County reported one drowning death as the result of Hurricane Harvey on August 27, 2017. The monetary impact for Hurricane Harvey has yet to be determined.

Date	Property Damage (2015 Dollars)	Crop Damage (2015 Dollars)	*(Cont...)* Date	Property Damage (2015 Dollars)	Crop Damage (2015 Dollars)
9/17/1996	$ 0	$ 0	2/20/2003	$ 8,000.00	$ 0
9/17/1996	$ 0	$ 0	9/2/2003	$ 3,000.00	$ 0
2/20/1997	$ 5,000.00	$ 0	5/13/2004	$ 60,000.00	$ 0
1/21/1998	$ 5,000.00	$ 0	6/27/2004	$ 5,000.00	$ 0
11/12/1998	$ 5,000.00	$ 0	11/23/2004	$ 0	$ 0
11/13/1998	$ 7,000.00	$ 0	10/18/2006	$ 3,000.00	$ 0
11/13/1998	$ 10,000.00	$ 0	11/6/2006	$ 2,000.00	$ 0
1/29/1999	$ 5,000.00	$ 0	1/14/2007	$ 0	$ 0
6/25/1999	$ 25,000.00	$ 0	5/1/2007	$ 0	$ 0
6/4/2000	$ 100,000.00	$ 0	10/5/2008	$ 0	$ 0
11/3/2000	$ 15,000.00	$ 0	2/15/2012	$ 50,000.00	$ 10,000.00
11/3/2000	$ 500,000.00	$ 0	7/18/2014	$ 5,000.00	$ 0
11/4/2000	$ 50,000.00	$ 0	4/16/2015	$ 100,000.00	$ 0
11/6/2000	$ 150,000.00	$ 0	5/11/2015	$ 0	$ 0
6/6/2001	$ 0	$ 0	5/25/2015	$ 0	$ 0
6/7/2001	$ 0	$ 0	5/27/2015	$ 4,000.00	$ 0
6/8/2001	$ 0	$ 0	6/18/2015	$ 0	$ 0
11/4/2002	$ 20,000.00	$ 0	8/27/2017	TBD	TBD

Source: https://www.ncdc.noaa.gov/stormevents/

Walker County Disaster Declarations

There have been six federally declared flood disasters Walker County since 1953. These events are considered the most significant flood events in Walker County's recent history.

Year	Description	Disaster Declaration Number
1991	Severe Thunderstorms	930
1994	Severe Thunderstorms and Flooding	1041
1998	TX- Flooding 10/18/98	1257
2016	Severe Thunderstorms and Flooding	4272
2016	Severe Storms, Tornadoes, and Flooding	4266
2017	Hurricane Harvey Flooding	4332

Source: https://www.FEMA.gov/

NFIP Participation & Repetive Loss Properties

The National Flood Insurance Program (NFIP) is a voluntary program that aims to reduce the impacts of flooding by incentivizing communities to adopt and enforce floodplain management regulations. The NFIP provides affordable flood insurance for property owners, renters, and businesses in participating communities. This reduces the socio-economic impacts of flooding on communities through risk reduction via flood insurance, and reduces the physical impacts of flooding through beneficial floodplain regulation.

All jurisdictions participating in this plan are NFIP participants, employ a full-time Certified Floodplain Manager (CFM), and regulate development in floodplains.

Floodplain Management Ordinances: Regulations for Flood Plain Management adopted on 5/4/1987
Amended 5/14/2001
Amended 8/15/2011

To remain NFIP compliant, the CFM's office conducts jurisdiction wide permitting of new development, permit review, engineering review, flood code enforcement, document development and flood zones using GIS, educate the public, and provide public assistance. To improve flood mitigation efforts and enhance their NFIP program, the participating jurisdictions will adopt and enforce stronger floodplain management regulations for new construction in Special Flood Hazard Areas (SFHAs).

Walker County held an NFIP compliance workshop on February 22, 2018, to ensure its participating jurisdictions are adequately addressing NFIP regulation and to revisit regulations in the wake of historic flooding caused by Hurricane Harvey. Community representatives evaluated current planning mechanisms for any contradictions with NFIP compliance and developed a variety of actions to promote the success of the NFIP.

Unincorporated Walker County, New Waverly, and Riverside have a total of three Repetitive loss properties (RL). RLs are properties that have received at least two insurance payments of $1,000 or more from the NFIP within the last 10 years.

Jurisdiction	Occupancy Type	# of Losses	Property ID #	SRL Indicator	Total Paid	Insured?
New Waverly	Single Family Residential	2	0168029	None	$14,752.86	No
New Waverly	Single Family Residential	3	0100612	None	$33,202.97	No
Unincorporated Walker County	Single Family Residential	4	0072413	None	$26,155.41	No

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The greatest historic occurrence data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. The extent is the worst the jurisdiction could possibly experience. Information from stakeholders, FEMA, NOAA, and the Department of Homeland Security (DHS) are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- FEMA's Hazus analysis software
- GIS analysis of critical facilities in the floodplain; and
- Stakeholder identified vulnerabilities.

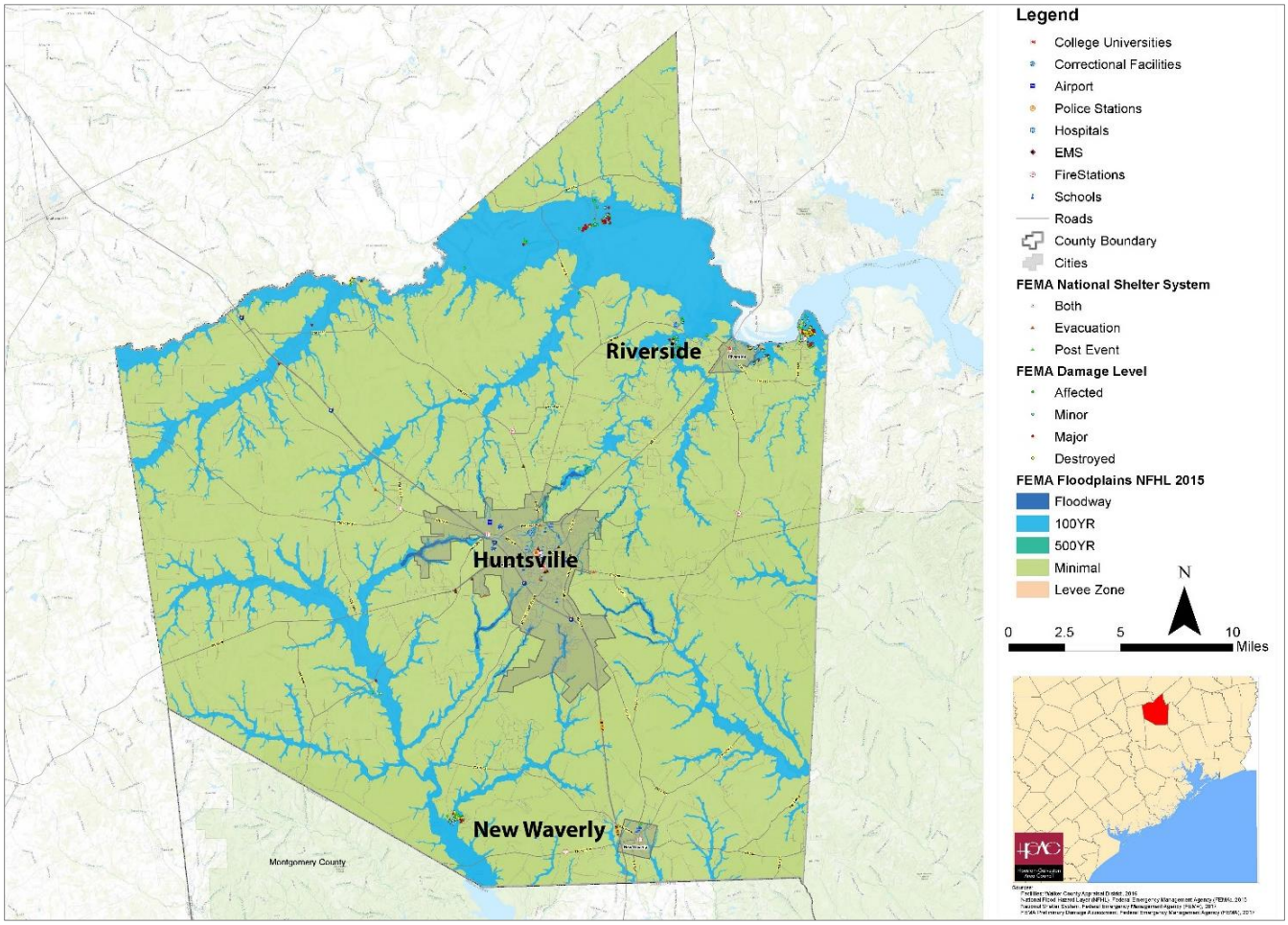
Hazus was used to determine the economic loss and calculate the buildings stock that's at risk of flooding in Walker County. Shelter needs were also projected using this method. The complete HAZUS report is located in Appendix C. H-GAC maintains a database of critical facilities in Walker County. Using GIS, this plan identifies any critical assets located within the 500-year floodplain. Stakeholders then provided valuable insight into additional vulnerabilities within their communities.

The worst flooding reported by Walker County was due to Hurricane Harvey in 2017. Although the floodplain covers approximately 15.35% of Unincorporated Walker County planning area, Walker County officials and residents reported that 25% of the county flooded with one or more feet of water. City officials and residents also reported that 50% of New Waverly and Riverside also flooded. One death was also reported, but data is not yet available regarding the event.

All Participating Jurisdictions			
Planning Area:	Walker County and all participating jurisdictions; 762.3 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence	12’ of flood water in residences 14’ of flood water over roads	**Occurrence:**	36 events in 21 years
		Event Average:	1.7 flood events a year
Extent:	Up to 14' of flood water in residences Up to 16' of flood water over roads.	**Probability:**	Very likely; 8 events estimated to occur within next 5 years

Vulnerability	**Impact**
Lack of a proper alert system to notify public of impending hazards.	Without a timely and effective warning system, there is the potential for greater loss of life of property during hurricanes.
Hazus estimated that 100 homes and commercial structures would be destroyed, and up to 300 structures damaged.	$78.66 million in direct property damage $0.12 million in business interruption loss
Hazus estimates that 878 persons seeking temporary shelter, and there will be 547 displaced households.	Displaced households and individuals cannot be safely housed during major flood events.

Floodplains: Unincorporated Walker County

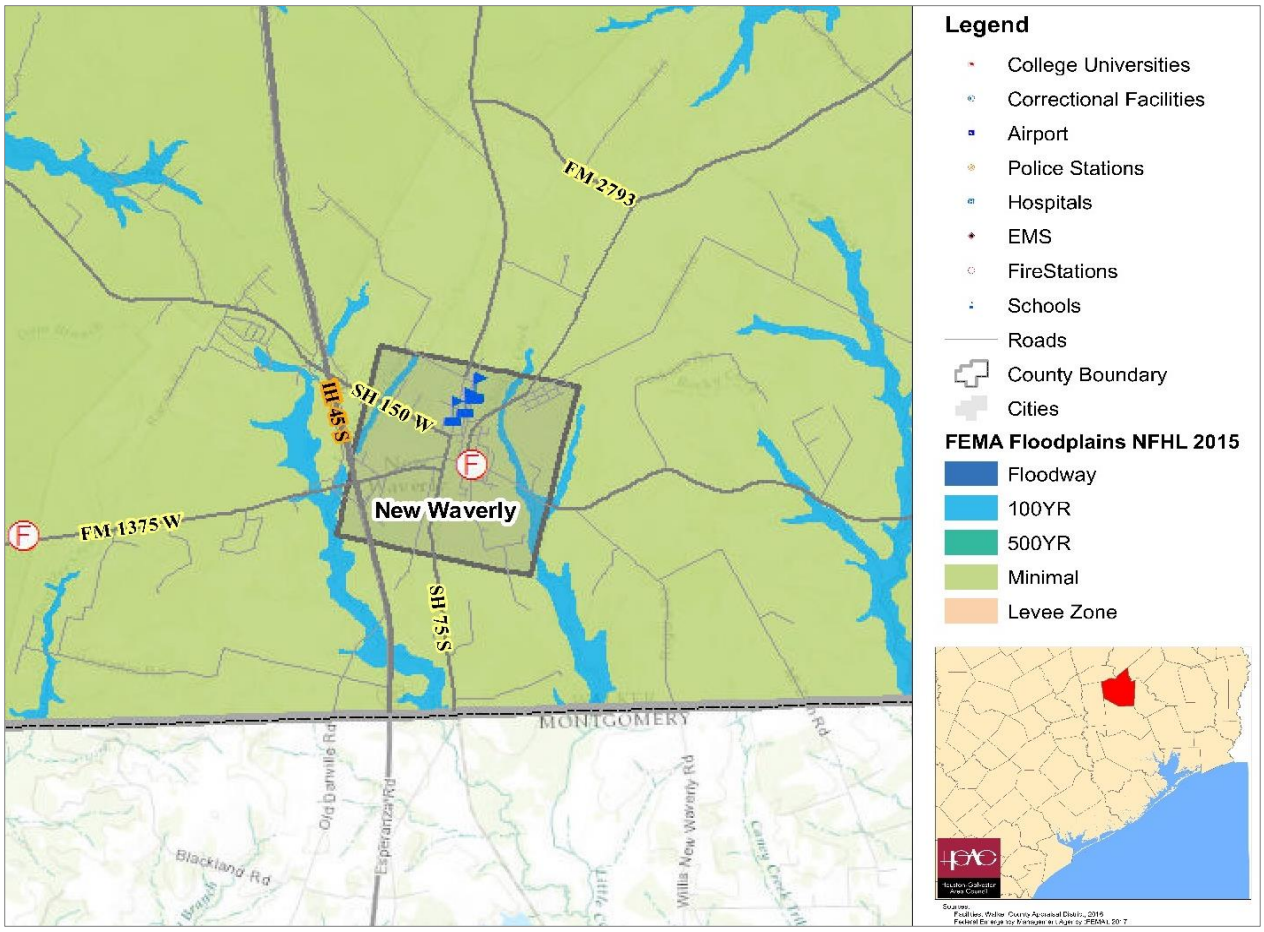


Unincorporated Walker County			
Planning Area:	Unincorporated Walker County 761 square miles	**Area Affected:**	15.35% 16.8 square miles
Greatest historic occurrence:	4’ of flood water in residences 8’ of flood water over roads 1 death reported	**Occurrence:** **Event Average:**	36 events in 21 years 1.7 flood events a year
Extent:	Up to 10' of flood water in residences Up to 12' of flood water over roads	**Probability:**	Very likely; 8 events estimated to occur within next 5 years.

Vulnerability	**Impact**
No flood gauge at the South Fork of the Bedias River crossing at the Madison County border. This specific river crossing also floods first in the county and is an indicator of downstream flooding that will occur downstream throughout the rest of the county.	Potential loss of life and damage to vehicles if resident try to cross the road before county officials can close it.
The bridge on FM 3478 and becomes impassible during flood events	Flooded roadway prevents emergency response and evacuations during major flood events.

Vulnerability continued...	Impact continued...
FM 2296 floods during major rain events.	Flooded roadway prevents emergency response efforts and evacuations during major flood events.
Walker County owns 2 rescue boats, but they need at least 1 more.	Rescues efforts are not adequate during major flooding events and could result in loss of life.
The County Annex floods during major rain events.	Disrupts county services housed in the building and is costly to repair.
Walker County has an inadequate number of shelters during 500-year flood events.	Overcrowded shelters and inability to meet the needs of displaced residents during major flood events.
One fire station is located in the 500-year floodplain.	Communication at this fire station would be destroyed during a flood event, and emergency response by this station would be hampered.

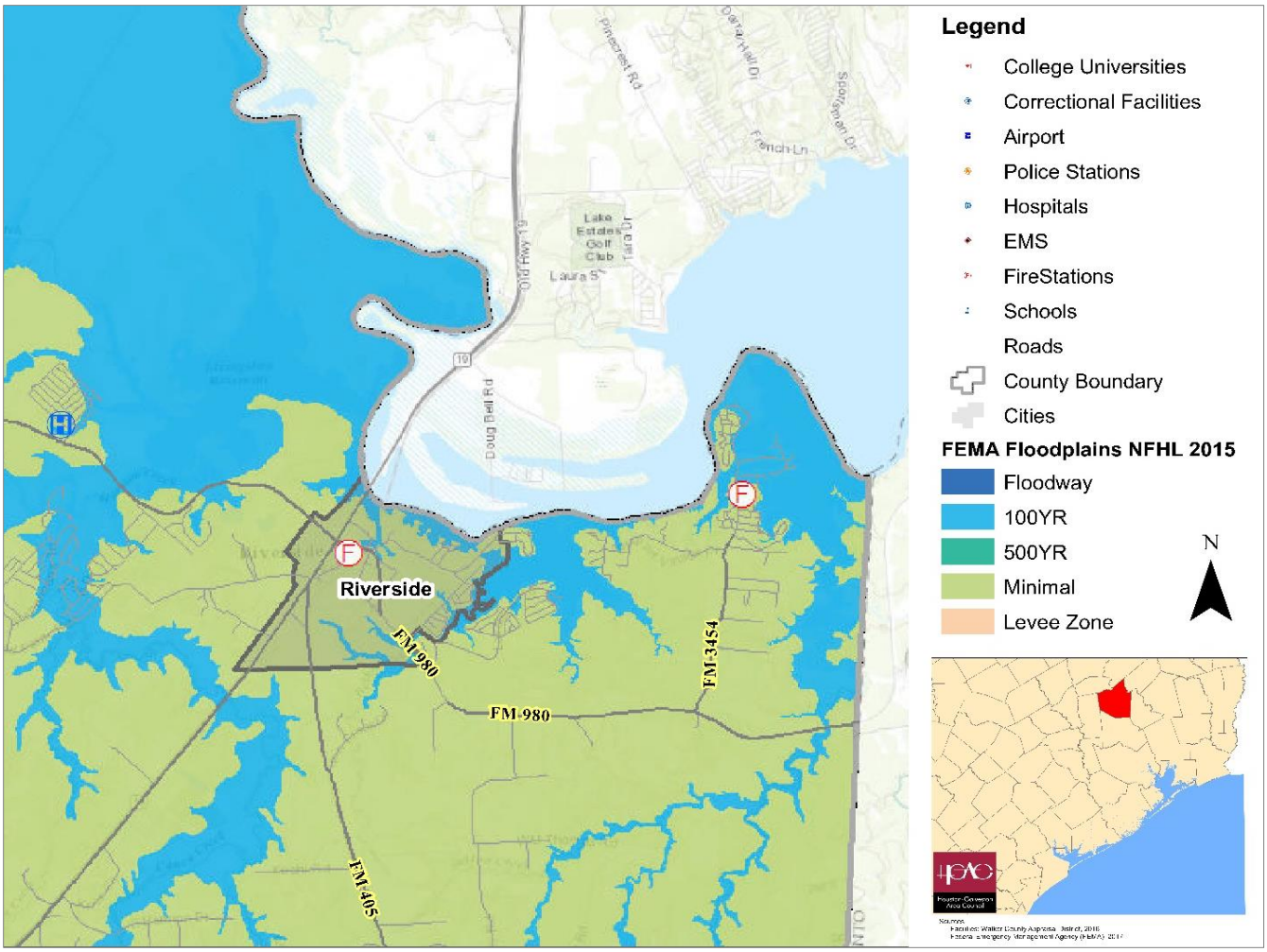
Floodplains: New Waverly



New Waverly			
Planning Area:	City of New Waverly 2.2 square miles	**Area Affected:**	5.39% 0.12 square miles
Greatest historic occurrence	8’ of flood water in residences 8’ of flood water over roads	**Occurrence:**	36 events in 21 years
		Event Average:	1.7 flood events a year
Extent:	Up to 12' of flood water in residences Up to 12' of flood water over roads.	**Probability:**	Very likely; 8 events estimated to occur within next 5 years

Vulnerability	Impact
Back-up generators are needed at designated fueling stations: Pilot Truck Stop and Hitching Post Truck Stop.	Fueling stations lost power during flooding, and evacuees were unable to refuel their vehicles.
This jurisdiction experiences flooding up to 2 feet during most major rain events.	Impassible and dangerous road travel during flash floods.
Lack of a proper alert system to notify public of impending hazards.	Public is not warned of impeding flood hazards, and there's a potential of greater loss of life of property during floods.
It was reported that poorly maintained private dams became clogged during Harvey, and caused upstream flooding of roadways and homes. The source cause of flooding may have been rain. A data deficiency exists.	Costly home repairs.

Floodplains: Riverside



Riverside			
Planning Area:	City of Riverside 2.1 square miles	**Area Affected:**	10.9% 0.23 square miles
Greatest historic occurrence	12’ of flood water in residences 14’ of flood water over roads	**Occurrence:**	36 events in 21 years
		Event Average:	1.7 flood events a year
Extent:	Up to 14' of flood water in residences Up to 16' of flood water over roads.	**Probability:**	Very likely; 8 events estimated to occur within next 5 years

Vulnerability	Impact
Sterling Island & Green Rich shores subdivision, Bear Creek Subdivision, Riverside Harbor, Harmon Creek Marina and RV Park, Deep River Plantation flood during a 100-year flood events.	Damage to homes is frequent and expensive.
Lack of a proper alert system to notify public of impending hazards.	Public is not warned of impeding flood hazards, and there's a potential of greater loss of life of property during floods.

Part 6.2 Hurricane & Tropical Storms

6.2 Hurricanes and Tropical Storms

The Saffir-Simpson Scale ranks hurricanes that are formed in the Atlantic Ocean and Northern Pacific Ocean east of the international date line. The scale considers winds and the amount of damages that could be sustained by the storm. Category 1 is the lowest category of storm, while Category 5 is the strongest level storm. Tropical storms are tropical cyclones that have winds between 39 to 73 mph. While tropical cyclone winds do not reach the wind speeds for the Saffir- Simpson scale, according to the Beaufort Wind Scale, tropical storms are capable of producing winds that could break or uproot trees or create considerable structural damage.

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph 64-82 kt. 119-153 km/h	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large 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 83-95 kt. 154-177 km/h	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (Major)	111-129 mph 96-112 kt. 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 113-136 kt. 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 min. 137 kt. min. 252 km/h	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: https://www.nhc.noaa.gov/

Historic Occurrence

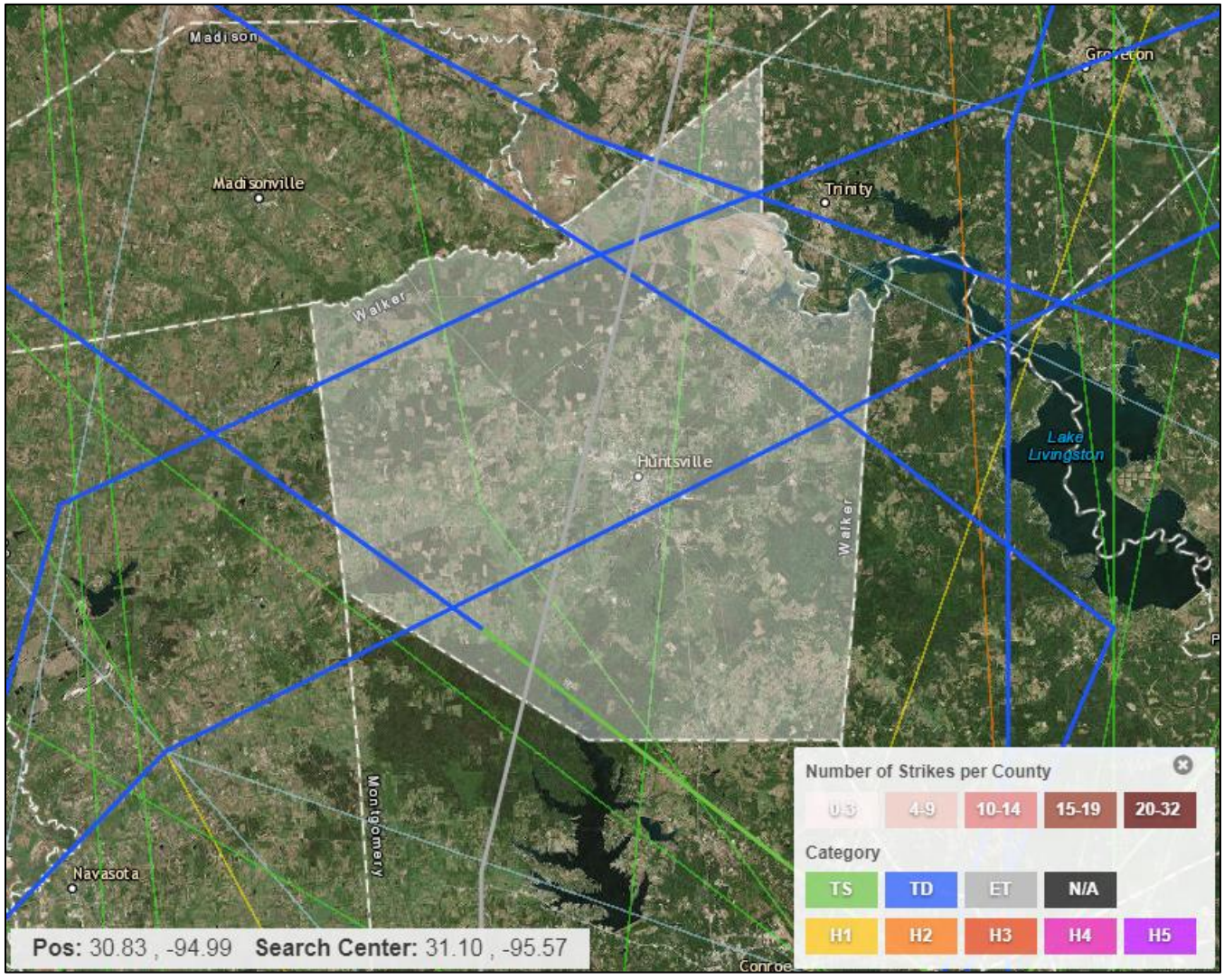
Based on recorded data, six hurricanes and tropical storms had direct paths over Walker County. Those Hurricanes are denoted with an asterisk in the chart below. Several other hurricanes and tropical storms since 1950 are in included in the list below, and their monetary impact is also noted. Wind gusts up to 117 mph were reported during Hurricane Rita, though no official recorded data was found.

Year	Storm	Property Damage (2015 Dollars)
1942	Unnamed Hurricane	No data available
1954	Hurricane Barbara*	No data available
1958	Tropical Storm Gerda*	No data available
1979	Tropical Storm Claudette*	No data available
1989	Hurricane Allison*	No data available
1989	Hurricane Chantal	No data available
1998	Unnamed Tropical Storm	$ 25,000.00
2001	Tropical Storm Allison*	$ 741,000.00

2003	Unnamed Tropical Storm	$ 7,000.00
2005	Hurricane Rita	$ 1,500,000.00
2008	Hurricane Edouard	$ -
2008	Hurricane Ike	$ 20,000,000.00
2015	Unnamed Tropical Storm	$ 4,000.00
2015	Tropical Storm Bill	$ -
2017	Hurricane Harvey	$ 600,010,000.00

NCDC; https://www.ncdc.noaa.gov/stormevents/

NOAA: Historical Hurricane Tracks in Walker County



Source: NOAA https://coast.noaa.gov/hurricanes/

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The greatest historic occurrence data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. The extent is the worst the jurisdiction could possibly experience. Information from stakeholders, FEMA, NOAA, and the Department of Homeland Security (DHS) are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- FEMA's Hazus analysis software
- Stakeholder identified vulnerabilities

Hazus was used to determine the economic loss and calculate the building stock at risk of hurricane damage in Walker County for a 500-year event. The complete Hazus report is located in Appendix C. Stakeholders provided valuable insight into additional vulnerabilities within their communities. These findings are provided in condensed charts for each jurisdiction.

All Participating Jurisdictions			
Planning Area:	Walker County and all participating jurisdictions; 765.3 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence:	Hurricane Rita (Category 3 at Landfall); 117 mph wind gusts reported during Hurricane Rita in 2005, and 33 mph sustained winds.	**Occurrence:** **Event Average:**	3 events in 12 years 0.25 events per year
Extent:	Up to Category 5; 157 mph winds	**Probability:**	Very likely; 1 event estimated to occur within next 5 years.

Vulnerability	Impact
Lack of a proper alert system to notify public of impending hazards.	Without a timely and effective warning system, there is the potential for greater loss of life of property during hurricanes.
Hazus estimates that 1,738 homes and commercial structures would be destroyed or damaged.	$224 million in direct property damage $23 million in business interruption loss
Hazus estimates that 587 persons seeking temporary shelter, and there will be 411 displaced households.	Displaced households and individuals cannot be safely housed during major hurricane events.

Unincorporated Walker County			
Planning Area:	Unincorporated Walker County 761 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence:	Hurricane Rita (Category 3 at Landfall); 117 mph wind gusts with 33 mph sustained winds.	**Occurrence:** **Event Average:**	3 events in 12 years 0.25 events per year
Extent:	Up to Category 5; 157 mph winds	**Probability:**	Very likely; 1 event estimated to occur within next 5 years.

Vulnerability	Impact
Inadequate number of shelters for hurricane evacuees.	Displaced households and individuals cannot be safely housed during major hurricane events.
Gas stations located on I-45 need backup generators. Walker County is the mid-point of evacuee travel during major hurricane events. When the gas stations lose power, evacuees become stranded when they run out of fuel.	Stranded vehicles during hurricane evacuations can result in the loss of life and require additional emergency response resources.

New Waverly			
Planning Area:	City of New Waverly 2.2 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence	Hurricane Rita (Category 3 at landfall); 117 mph wind gusts	**Occurrence:** **Event Average:**	3 events in 12 years 0.25 events per year
Extent:	Up to Category 5; 157 mph winds	**Probability:**	Very likely; 1 event estimated to occur within next 5 years.

Vulnerability	Impact
Back-up generators are needed at designated fueling stations: Pilot Truck Stop and Hitching Post Truck Stop.	Loss of power results in stranded evacuees and emergency response vehicles.

Riverside			
Planning Area:	City of Riverside 2.1 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence	Hurricane Rita (Category 3 at landfall); 117 mph wind gusts	**Occurrence:** **Event Average:**	3 events in 12 years 0.25 events per year
Extent:	Up to Category 5; 157 mph winds	**Probability:**	Very likely; 1 event estimated to occur within next 5 years.

Vulnerability	Impact
Inadequate budget to address infrastructure improvements that reduce the impact of hurricanes.	Residents and businesses are repeatedly damaged and destroyed at a great financial expense.
Three gas stations located on Highway 19 need back-up generators.	Stranded vehicles during hurricane evacuations can result in the loss of life and require additional emergency response resources.

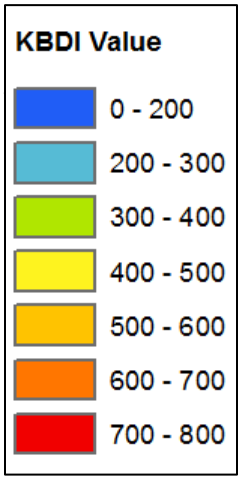
Part 6.3 Wildfire

6.3 Wildfire

A combination of the Keetch-Byram Drought Index (KBDI) and the Texas Wildfire Risk Assessment are used to assess the risk of wildfire. KBDI is an index that measures the daily water balance, precipitation, and moisture in the soil to determine the potential for wildfires. KBDI ranges from 0 to 800 units. Zero represents fully saturated soil or no indication of drought. A measurement of 800 is the maximum measurement for drought and indicates no moisture is present in the soil. In August 2011, the maximum KBDI value recorded in Walker County was 792. The minimum KBDI value, 41, was recorded in September of 2017. KBDI conditions can change rapidly based on short-term weather conditions, so the most extreme values should be considered when addressing wildfire risk.

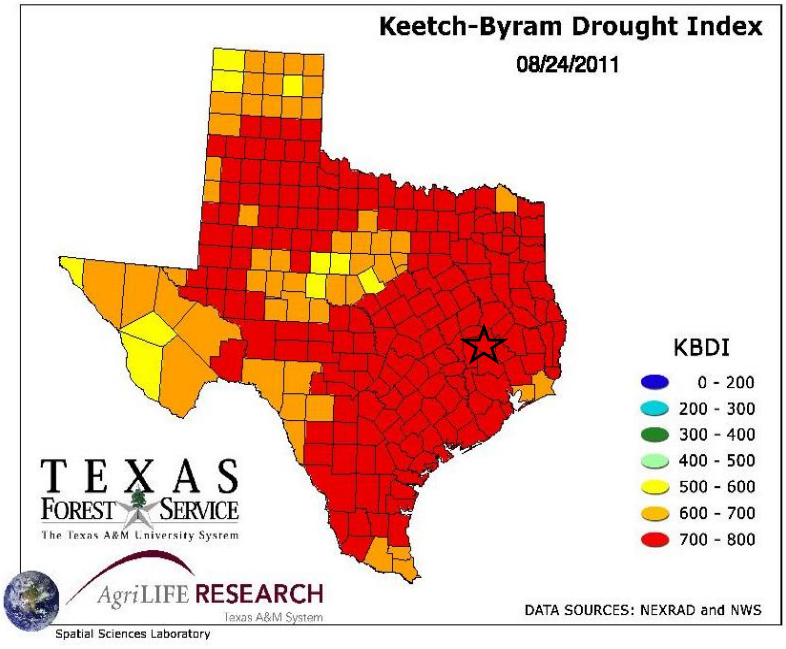
The Texas Wildfire Risk Assessment uses a variety of factors, such as fuels, vegetation, weather, and topography, to determine the fire potential of a specific land area. Particularly vulnerable are the Wildland Urban Interface (WUI) areas. These areas occur at the intersection of development and wildland. With continued population growth throughout the county, the WUI zones will become more abundant. Because most wildfires are caused by human activities, the intersection of WUI and drought are particularly dangerous.

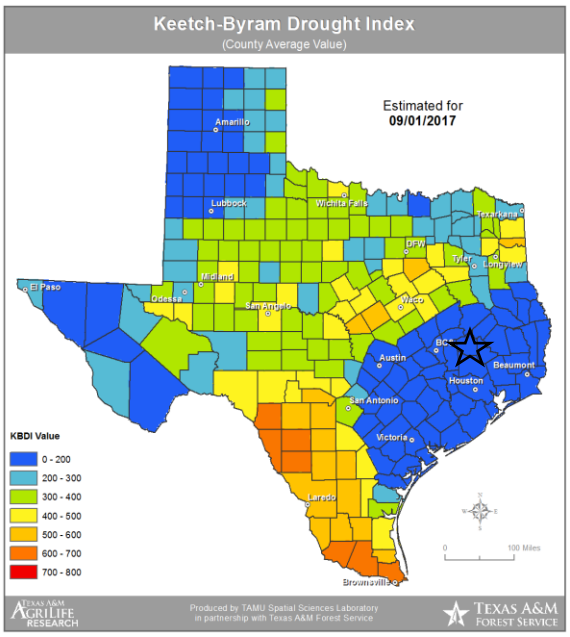
Wildland Fire Assessment System (WFAS) KBDI Value Scale:



Score	Description
0 - 200	Soil moisture and large class fuel moistures are high and do not contribute much to fire intensity. Typical of early spring following winter precipitation.
200 – 400	Fuels are beginning to dry and contribute to wildfire intensity. Heavier fuels will still not readily ignite and burn. This is often seen in late spring or early summer.
400 – 600	Lower litter and duff layers contribute to fire intensity and will burn actively. Wildfire intensity begins to increase significantly. Larger fuels could burn or smolder for several days. This is often seen in late summer and early fall.
600 – 800	Often associated with more severe drought with increased wildfire occurrence. Intense, deep-burning fires with extreme intensities can be expected. Live fuels can also be expected to burn actively at these levels.

Source: https://twc.tamu.edu/kbdi





Source: https://twc.tamu.edu/kbdi

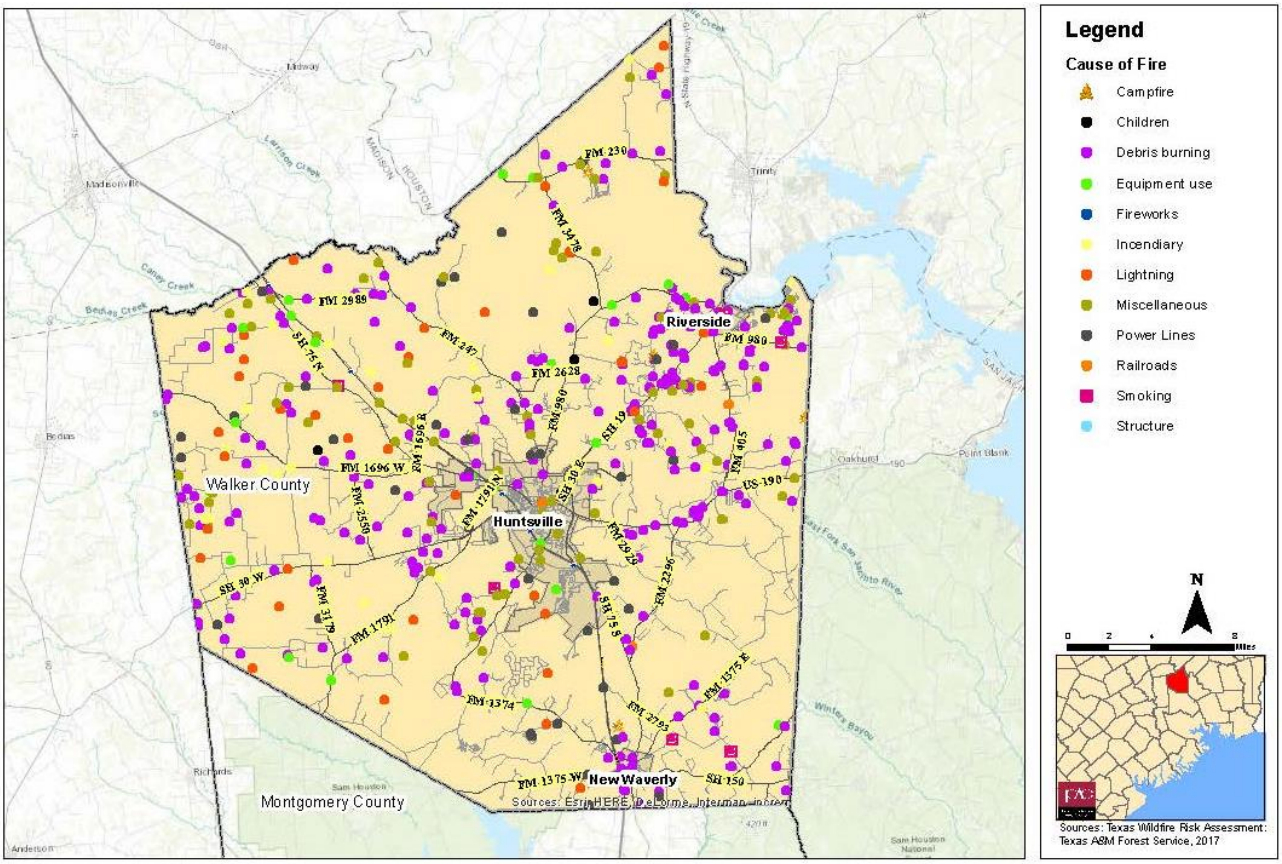
Historic Occurrence

The Texas A&M Forest Service tracks wildfire events, acres destroyed, and the initial ignition cause of the fire. Below is the historic data associated with any burns that caused recorded damage.

Year	Cause	Damaged Acres	Year (cont..)	Cause (cont..)	Damaged Acres (cont..)	Year (cont..)	Cause (cont..)	Damaged Acres (cont..)
2005	Children	4.0	2008	Debris burning	15.0	2011	Lightning	321.0
2005	Debris burning	116.0	2008	Debris burning	15.0	2011	Lightning	205.0
2005	Debris burning	75.0	2008	Debris burning	10.0	2011	Lightning	151.0
2005	Debris burning	65.0	2008	Debris burning	7.0	2011	Lightning	85.0
2005	Debris burning	30.0	2008	Debris burning	7.0	2011	Lightning	79.0
2005	Debris burning	21.0	2008	Debris burning	7.0	2011	Lightning	57.0
2005	Debris burning	20.0	2008	Debris burning	4.0	2011	Lightning	30.0
2005	Debris burning	15.0	2008	Debris burning	3.0	2011	Lightning	10.0
2005	Debris burning	9.0	2008	Equipment use	80.0	2011	Lightning	7.0
2005	Debris burning	7.0	2008	Equipment use	8.0	2011	Miscellaneous	2,047.0
2005	Debris burning	5.0	2008	Incendiary	375.0	2011	Miscellaneous	1,035.0
2005	Debris burning	5.0	2008	Incendiary	117.0	2011	Miscellaneous	900.0
2005	Debris burning	5.0	2008	Lightning	415.0	2011	Miscellaneous	85.0
2005	Debris burning	4.0	2008	Lightning	20.0	2011	Miscellaneous	15.0
2005	Debris burning	3.0	2008	Miscellaneous	10.0	2011	Miscellaneous	10.2
2005	Debris burning	3.0	2008	Miscellaneous	7.0	2011	Miscellaneous	5.0
2005	Debris burning	3.0	2008	Miscellaneous	4.0	2011	Miscellaneous	3.0
2005	Debris burning	3.0	2008	Miscellaneous	3.0	2011	Miscellaneous	3.0
2005	Debris burning	3.0	2008	Power Lines	50.0	2011	Miscellaneous	3.0
2005	Debris burning	3.0	2009	Campfire	40.0	2011	Power Lines	46.0
2005	Incendiary	60.0	2009	Debris burning	18.0	2011	Power Lines	20.0
2005	Incendiary	20.0	2009	Debris burning	8.0	2011	Power Lines	15.0
2005	Lightning	118.0	2009	Debris burning	5.0	2011	Power Lines	6.0
2005	Lightning	10.0	2009	Debris burning	5.0	2011	Power Lines	4.2
2005	Miscellaneous	50.0	2009	Debris burning	4.0	2011	Power Lines	4.0
2005	Miscellaneous	15.0	2009	Debris burning	4.0	2011	Power Lines	3.0
2005	Miscellaneous	7.0	2009	Debris burning	4.0	2011	Power Lines	3.0
2005	Miscellaneous	6.0	2009	Debris burning	3.0	2011	Smoking	130.0
2005	Miscellaneous	5.0	2009	Equipment use	29.0	2012	Debris burning	7.0
2005	Miscellaneous	5.0	2009	Incendiary	381.0	2012	Debris burning	3.0
2005	Miscellaneous	5.0	2009	Incendiary	102.0	2012	Debris burning	3.0
2005	Miscellaneous	4.0	2009	Incendiary	52.0	2012	Debris burning	3.0
2006	Campfire	3.0	2009	Incendiary	47.0	2012	Equipment use	570.0
2006	Debris burning	20.0	2009	Incendiary	32.0	2012	Equipment use	25.0
2006	Debris burning	20.0	2009	Incendiary	19.0	2012	Lightning	25.0
2006	Debris burning	15.0	2009	Incendiary	10.0	2012	Miscellaneous	3.0
2006	Debris burning	15.0	2009	Incendiary	3.0	2012	Power Lines	10.0

2006	Debris burning	10.0	2009	Incendiary	3.0	2012	Power Lines	4.0
2006	Debris burning	10.0	2009	Lightning	54.0	2013	Debris burning	67.0
2006	Debris burning	10.0	2009	Lightning	5.0	2013	Debris burning	21.0
2006	Debris burning	8.0	2009	Lightning	4.0	2013	Debris burning	15.0
2006	Debris burning	7.0	2009	Miscellaneous	50.0	2013	Debris burning	4.0
2006	Debris burning	7.0	2009	Miscellaneous	12.0	2013	Debris burning	3.0
2006	Debris burning	6.0	2009	Miscellaneous	10.0	2013	Debris burning	3.0
2006	Debris burning	5.0	2009	Miscellaneous	10.0	2013	Debris burning	3.0
2006	Debris burning	5.0	2009	Miscellaneous	5.0	2013	Lightning	100.0
2006	Debris burning	4.0	2010	Children	5.0	2013	Miscellaneous	10.0
2006	Debris burning	4.0	2010	Debris burning	57.0	2013	Power Lines	5.9
2006	Debris burning	3.0	2010	Debris burning	10.1	2014	Debris burning	21.0
2006	Debris burning	3.0	2010	Debris burning	8.0	2014	Debris burning	17.3
2006	Equipment use	10.0	2010	Debris burning	5.0	2014	Debris burning	16.0
2006	Incendiary	253.0	2010	Debris burning	5.0	2014	Debris burning	13.0
2006	Incendiary	5.0	2010	Debris burning	5.0	2014	Debris burning	12.8
2006	Lightning	15.0	2010	Debris burning	3.0	2014	Debris burning	12.5
2006	Miscellaneous	270.0	2010	Lightning	101.0	2014	Debris burning	11.0
2006	Miscellaneous	50.0	2010	Lightning	8.0	2014	Debris burning	5.0
2006	Miscellaneous	15.0	2011	Debris burning	40.0	2014	Debris burning	5.0
2006	Miscellaneous	10.0	2011	Debris burning	35.0	2014	Debris burning	5.0
2006	Miscellaneous	10.0	2011	Debris burning	20.0	2014	Debris burning	3.7
2006	Miscellaneous	10.0	2011	Debris burning	20.0	2014	Debris burning	3.0
2006	Miscellaneous	5.0	2011	Debris burning	18.0	2014	Debris burning	3.0
2006	Miscellaneous	5.0	2011	Debris burning	14.0	2014	Incendiary	19.9
2006	Power Lines	206.0	2011	Debris burning	10.0	2014	Lightning	3.0
2006	Power Lines	7.0	2011	Debris burning	10.0	2014	Miscellaneous	71.8
2006	Smoking	3.0	2011	Debris burning	9.0	2014	Power Lines	14.0
2007	Campfire	15.0	2011	Debris burning	8.0	2014	Railroads	10.0
2007	Debris burning	25.0	2011	Debris burning	7.0	2015	Debris burning	26.1
2007	Debris burning	20.0	2011	Debris burning	6.0	2015	Debris burning	9.5
2007	Debris burning	10.0	2011	Debris burning	5.0	2015	Debris burning	9.5
2007	Debris burning	10.0	2011	Debris burning	3.0	2015	Debris burning	8.5
2007	Debris burning	10.0	2011	Debris burning	3.0	2015	Debris burning	5.9
2007	Debris burning	7.0	2011	Debris burning	3.0	2015	Debris burning	5.4
2007	Incendiary	50.0	2011	Equipment use	1,008.0	2015	Debris burning	4.0
2007	Miscellaneous	3.0	2011	Equipment use	183.0	2015	Debris burning	3.7
2008	Children	300.0	2011	Equipment use	5.0	2015	Equipment use	755.0
2008	Debris burning	50.0	2011	Equipment use	5.0	2015	Lightning	16.0
2008	Debris burning	30.0	2011	Incendiary	14.0	2015	Miscellaneous	80.0
2008	Debris burning	25.0	2011	Incendiary	5.0	2015	Miscellaneous	4.7
2008	Debris burning	20.0	2011	Lightning	466.0			

Fire Ignition Point (2000 – 2015)



Walker County Disaster Declarations

There have been seven wildfire disaster declarations for Walker County since 1953. These events are considered the most significant wildfire events in Walker County's recent history.

Year	Title	Disaster Number
1996	Extreme Fire Hazard	3117
1999	Extreme Fire Hazard	3142
2006	Extreme Wildfire Threat	1624
2008	Wildfires	3284
2011	Cowboy Church Fire	2929
2011	Wildfires	1999
2011	Wildfires	4029

https://www.FEMA.gov/

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

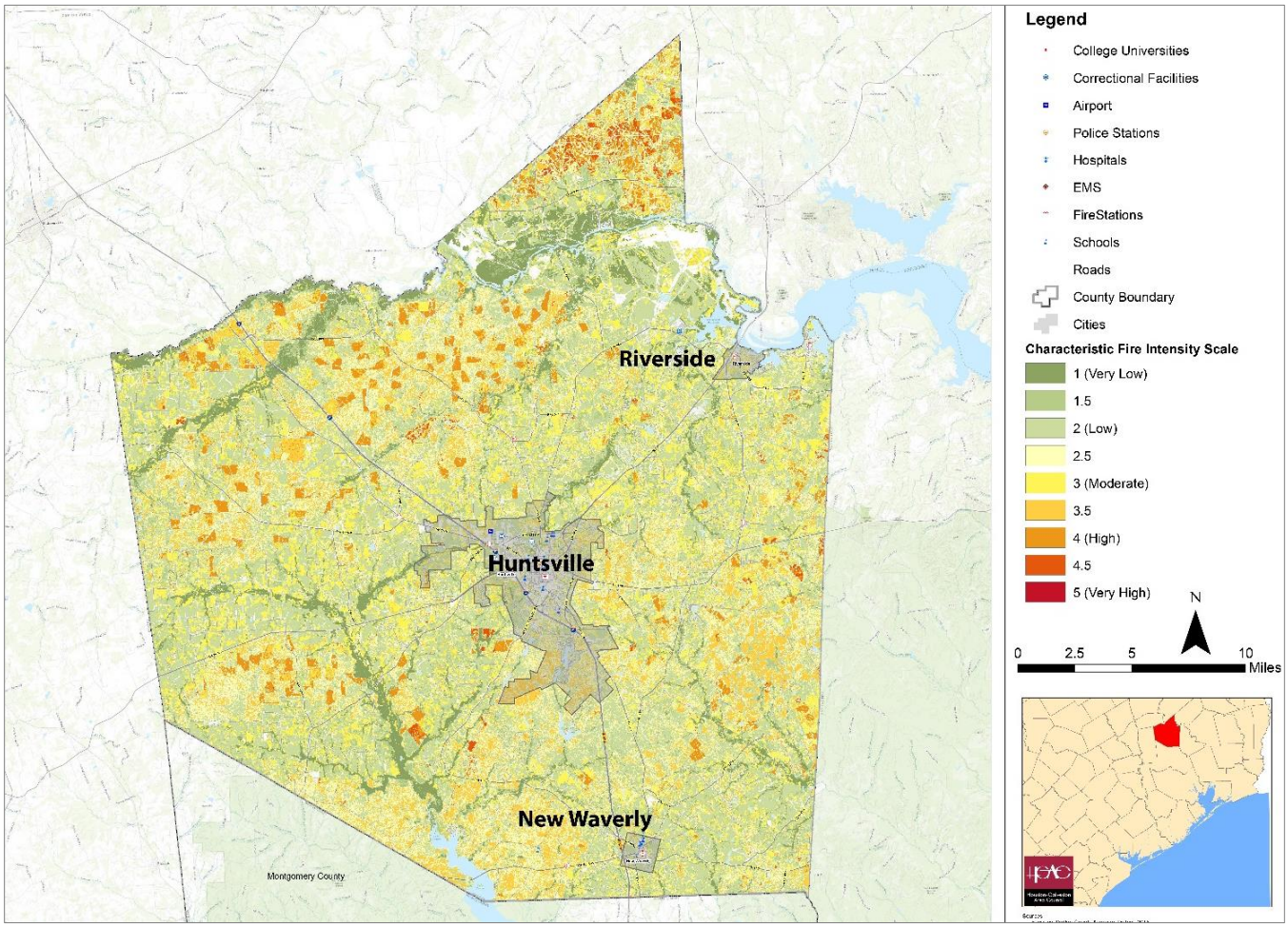
The hazard analysis also provides hazard extent data for each participating jurisdiction. The greatest historic occurrence data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. The extent is the worst the jurisdiction could possibly experience. Information from stakeholders, Texas Forest Service, FEMA, and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of residential structures within 500 to 800 KBDI zones; and
- Stakeholder identified vulnerabilities.

Wildfires pose a greater threat to the Unincorporated Walker County than to New Waverly or Riverside. The undeveloped state parks and dense vegetation in the less populated areas of the county present the greatest wildfire risk. Agricultural lands and homes located in the WUI are most vulnerable to wildfires.

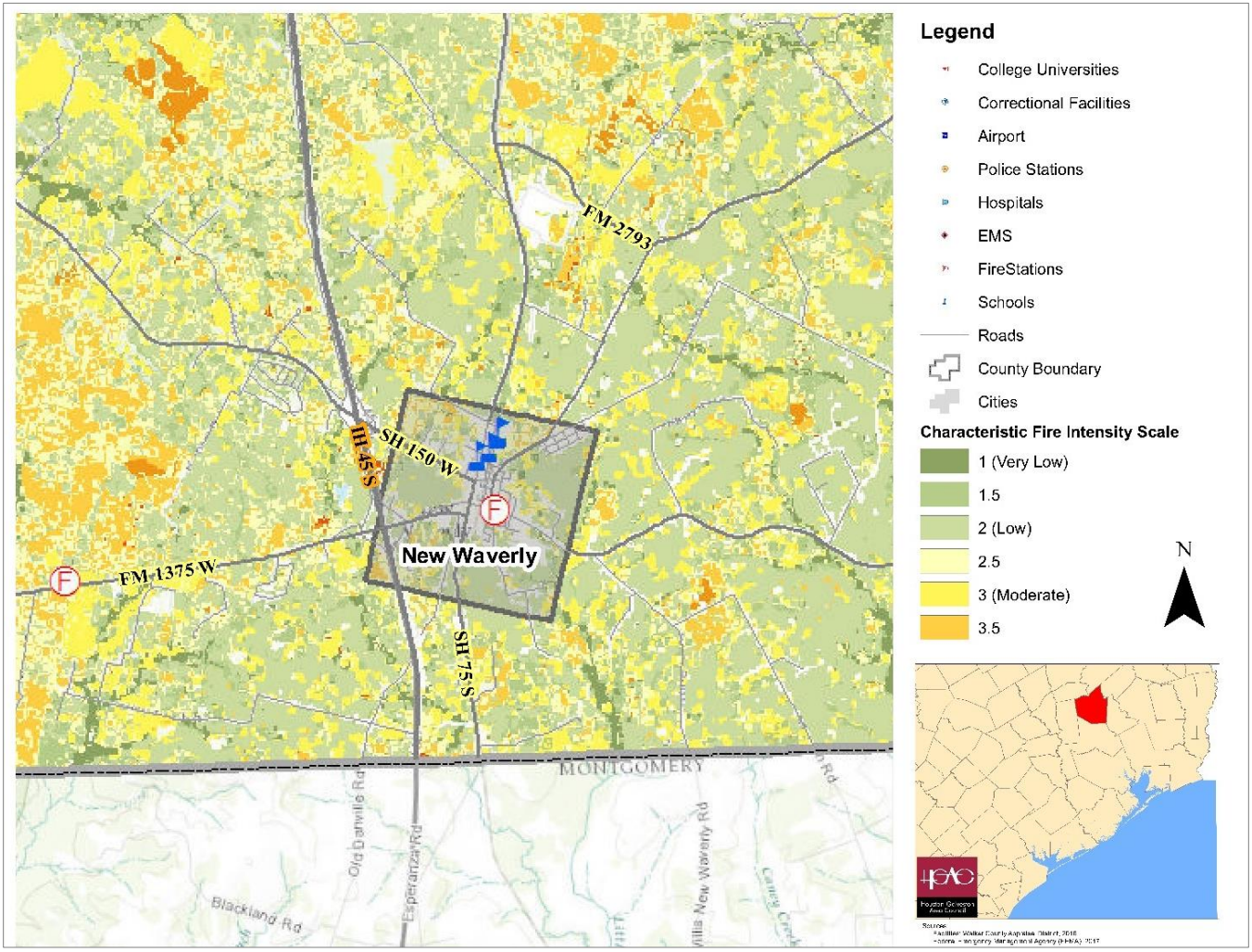
Wildfire Risk Assessment: Walker County Map



Unincorporated Walker County			
Planning Area:	Unincorporated Walker County 761 square miles (487,040 acres)	**Area Affected:**	23.3% land area 13,830 acres
Greatest historic occurrence:	More than 2,400 acres burned in summer of 2011;	**Occurrence:**	453 events in 10 years
		Event Average:	45.3 events per year
Extent:	Up to 5,000 acres burned	**Probability:**	Very Likely; 226 events estimated to occur within next 5 years.

Vulnerability	**Impact**
The state parks create a serious wildfire threat during droughts.	Larger and more destructive wildfires can occur.
280,512 acres of agricultural production are at risk.	Risk of $170,158 of agricultural activity lost annually.

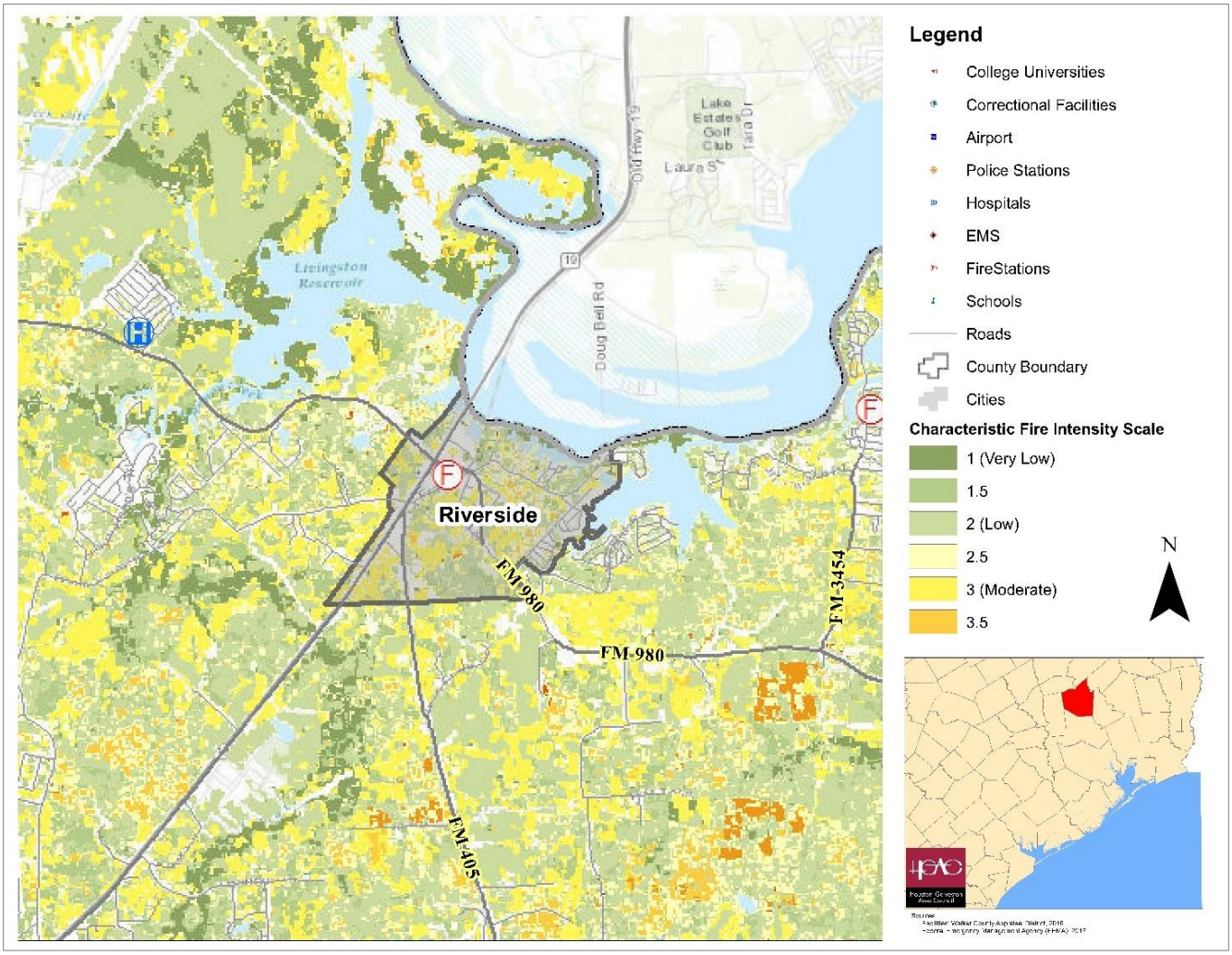
Wildfire Risk Assessment: New Waverly



New Waverly			
Planning Area:	City of New Waverly 2.2 square miles	**Area Affected:**	9% of land area 126 acres
Greatest historic occurrence	8 acres burned in one event	**Occurrence:**	7 events in 10 years
		Event Average:	0.7 events per year
Extent:	Up to 15 acres burn in one event	**Probability:**	Very likely; 3 events estimated to occur within next 5 years.

Vulnerability	Impact
Not a designated Firewise community.	The lack of an organized and systematic removal of wildfire fuel can result in a greater loss of life of property.

Wildfire Risk Assessment: Riverside



Riverside			
Planning Area:	City of Riverside 2.1 square miles	**Area Affected:**	19% of land area 255 acres
Greatest historic occurrence	75 acres burned in one event	**Occurrence:**	48 events in 10 years
		Event Average:	4.8 events per year
Extent:	Up to 150 acres burn in one event.	**Probability:**	Very Likely; 24 events estimated to occur within next 5 years.

Vulnerability	Impact
Not a designated Firewise community.	The lack of an organized and systematic removal of wildfire fuel can result in a greater loss of life of property.

Part 6.4 Severe Thunderstorm

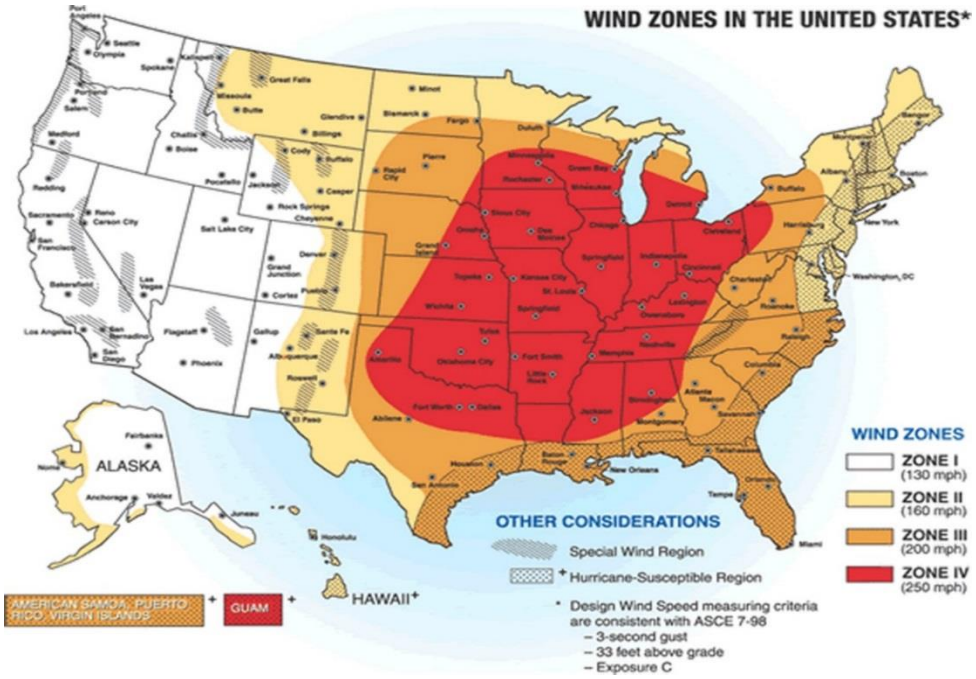
6.4 Severe Thunderstorm

A thunderstorm's magnitude is measured by the Beaufort Wind Scale. This scale considers visual and physical effects of wind to determine the force, displayed from 0 to 12. Severe gale to hurricane winds are typically considered more dangerous or damaging winds.

Force	Wind (Mph)	WMO Classification	Wind Effects
0	Less than 1	Calm	Calm, Smoke rises vertically
1	1 to 3	Light Air	Smoke drift indicates wind direction
2	4 to 8	Light Breese	Wind felt on face, leaves rustle, vanes begin to move
3	9 to 14	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	15-21	Moderate Breeze	Dust, leaves, and loose paper lifted, small tree branches move
5	22-28	Fresh Breeze	Small trees in leaf begin to sway
6	29-36	Strong Breeze	Larger tree branches moving, whistling in wires
7	37-44	Near Gale	Whole trees moving, resistance felt walking against wind
8	45-53	Gale	Whole trees in motion, resistance felt walking against wind
9	54-62	Strong Gale	Slight structural damage occurs, shingles blow off roofs
10	63-72	Storm	Trees broken or uprooted, considerable structural damage occurs
11	73-83	Violent Storm	Widespread damage
12	84 +	Hurricane	Violence and destruction

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

A second tool to help measure the potential magnitude of a thunderstorm is the Wind Zone map. This map from FEMA shows the variety of wind speeds and depicts the frequency and strength of potential storms throughout the United States. Walker County is in Wind Zone III meaning that the county could experience winds up to 200 mph.



Map source: http://www.fema.gov

Historic Occurrences

Severe Thunderstorm events are listed below:

Date	Jurisdiction	Wind MPH	Total Damage (2015 Dollars)	Notes
11/5/2000	New Waverly	Information not available	$150,000	Large tree blown onto home. Roof blown off home, and barns damaged in area.
3/12/2001	New Waverly	Information not available	$13,400	Trees down at FM 1791 near Highway 30.
5/5/2001	New Waverly	Information not available	$4,020	Reports of trees down.
10/13/2001	Riverside	Information not available	$15,000	Newspaper reported wind damage to a mobile home.
6/16/2002	New Waverly	Information not available	$6,600	Trees blown down at FM 1374.
6/12/2003	Walker County Unincorporated	62	$7,740	Trees down across the county.
11/11/2003	Riverside	63	$3,870	Tree down.
5/31/2004	Unincorporated Walker County	69	$81,250	Numerous trees down countywide, including the Huntsville area, FM 247, FM 1696 and FM 1791.
2/16/2008	Riverside	64	$0	Trees reported down on Hill and Sam Houston streets.
5/14/2008	New Waverly	60	$14,300	Tree reported down in the Highway 75 and the FM 1375 area.
8/28/2009	New Waverly	64	$7,700	Trees were down across SH 150 East near Rogers Road. One tree fell on a vehicle, trapping and injuring two occupants.
4/26/2011	Unincorporated Walker County	83	$31,500	Area of damage in the Horseshoe Lake area of Walker County. Intermittent damage was over a large area with trees pointing toward the northeast. One area near the lake was especially hard it with large trees uprooted and snapped and some mobile homes shifted.
4/27/2015	New Waverly	63	$75,000	A late night through early morning storm system moved east and southeast across the area and produced strong winds and an EF-0 tornado. Numerous trees were reported down in the area.
4/27/2016	New Waverly	64	$0	Trees down near Bartee Street.
3/24/2017	Riverside	60	$5,000	A line of thunderstorms produced strong winds, large hail, and a tornado across Southeast Texas. Trees were down near the intersection of FM 980 and Sunrise Loop.

Source: https://www.ncdc.noaa.gov/

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

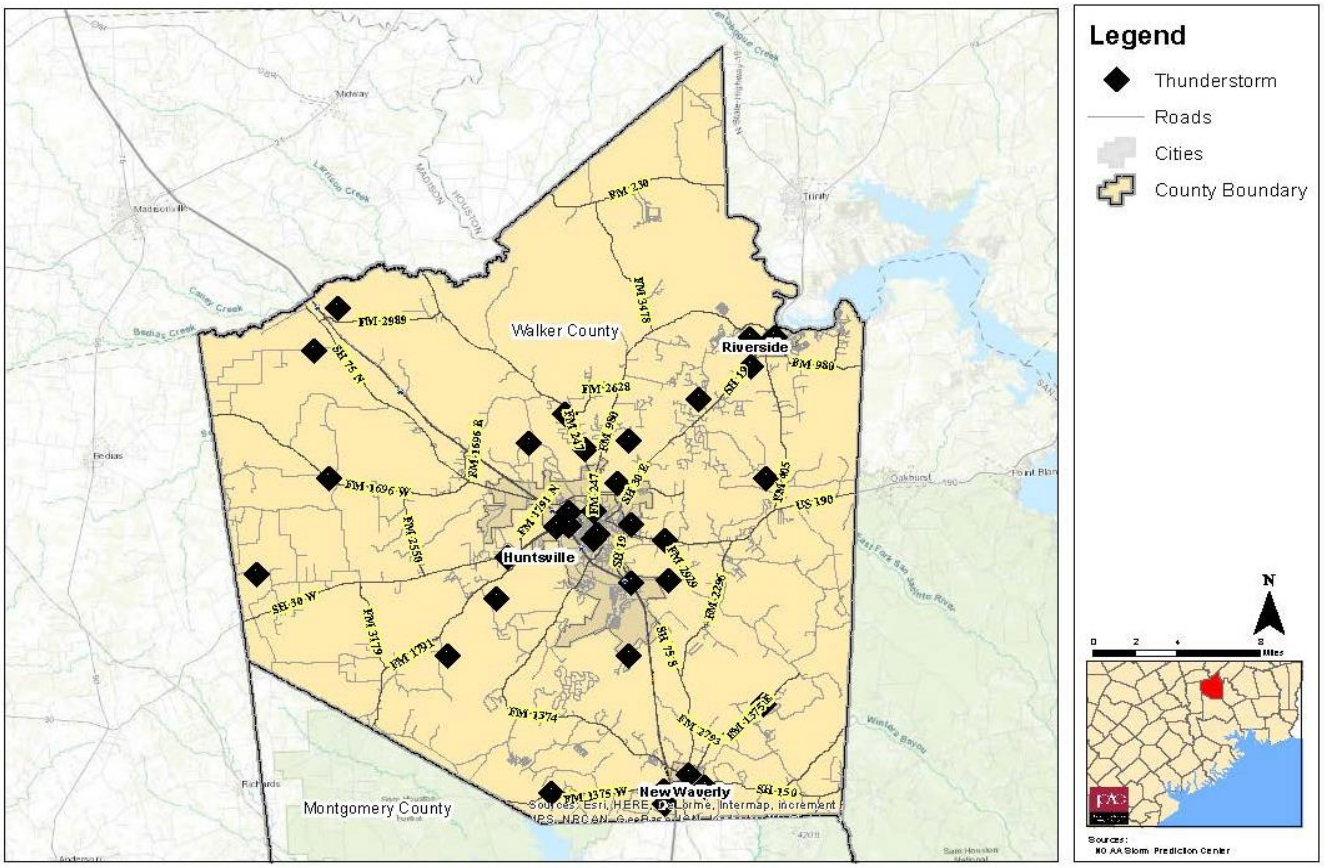
The hazard analysis also provides hazard extent data for each participating jurisdiction. The greatest historic occurrence data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. The extent is the worst the jurisdiction could possibly experience. Information from stakeholders, FEMA, and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used three methods:

- GIS analysis to estimate structural damage costs in each jurisdiction; and
- Stakeholder identified vulnerabilities.

Due to its inland location, severe thunderstorms often produce stronger gusts of winds than hurricanes. These winds have caused damage to roofs, homes, agricultural structures, trees, and powerlines. According to Walker County's historic events, the County experiences one notable thunderstorm on average per year. Since 2000, the county has experienced one thunderstorm event with 84 mph winds or a Force 11 event on the Beaufort Wind Scale.

Location of Severe Thunderstorms



Unincorporated Walker County			
Planning Area:	Unincorporated Walker County 761 square miles	**Area Affected:**	Entire planning Area
Greatest historic occurrence:	83 mph Winds Force 11 Storm $120,490 total damages	**Occurrence:**	15 events in 15 years
		Event Average:	1 thunderstorm per year; 1 event causes damage.
Extent:	Up to a Force 12 storm	**Probability:**	Very likely; 5 events estimated to occur again within 5 years, and 1 event likely to cause damage.

Vulnerability	Impact
Lack of a proper alert system to notify public of impending hazards.	Without a timely and effective warning system, there is the potential for greater loss of life of property during hurricanes.
Agricultural production and 8,687 structures at risk of damage from severe thunderstorms.	$27,692 annual property and crop loss estimated.

New Waverly			
Planning Area:	City of New Waverly 2.2 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence	64 mph Winds Force 10 Storm $271,020 total damages	**Occurrence:**	8 events in 15 years that cause damage to property.
		Event Average:	1 event per year, 0.53 events causes damage.
Extent:	Up to a Force 12 storm	**Probability:**	Very likely; 5 events estimated to occur again within 5 years, and 2.6 events are likely to cause damage.

Vulnerability	Impact
428 structures at risk of damage from severe thunderstorms winds.	$18,068 annual loss due to damaged structures.

Riverside			
Planning Area:	City of Riverside 2.1 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence	64 mph Winds Force 10 Storm $23,870 total damages	**Occurrence:**	4 events in 15 years that cause damage to property.
		Event Average:	1 thunderstorm per year; 0.26 events a year cause damage to property.
Extent:	Up to a Force 12 storm	**Probability:**	Very likely; 5 events estimated to occur again within 5 years, and 1 event likely to cause damage.

Vulnerability	Impact
218 structures at risk of damage from severe thunderstorms winds.	$1,591 annual loss due to damaged structures.

Part 6.5 Drought

6.5 Drought

The Palmers Hydrological Drought Severity Index (PHDI) is the typical way extent of drought is observed throughout the United States. This regional index considers dry and wet spells over an extended period of time to calculate the range in the Index. The greater the number the more extreme the drought in a specific area.

Drought has particularly adverse effects on agriculture which is major industry in Walker County. The most extreme conditions occurred in 2011. The county's PHDI rating was < -4.0 (Extreme Drought) from March 2011 through January 2012. There were periods of severe drought preceding and following this period from August 2010 through October 2014. The agricultural loses are estimated at $5.2 billion, though specific numbers by county are not available for this event.

Palmers Drought Severity Index	
< -4.0	Extreme Drought
-3.99 to -3.0	Severe Drought
-2.99 to -2.0	Moderate Drought
-1.99 to -1.0	Mild Drought
-0.99 to -0.5	Incipient Drought
-0.49 to 0.49	Near Normal
0.5 to 0.99	Incipient Moist Spell
1.0 to 1.99	Moist Spell
2.0 to 2.99	Unusual Moist Spell
3.0 to 3.99	Very Moist Spell
> 4.0	Extreme Moist Spell

Source: https://www.ncdc.noaa.gov/

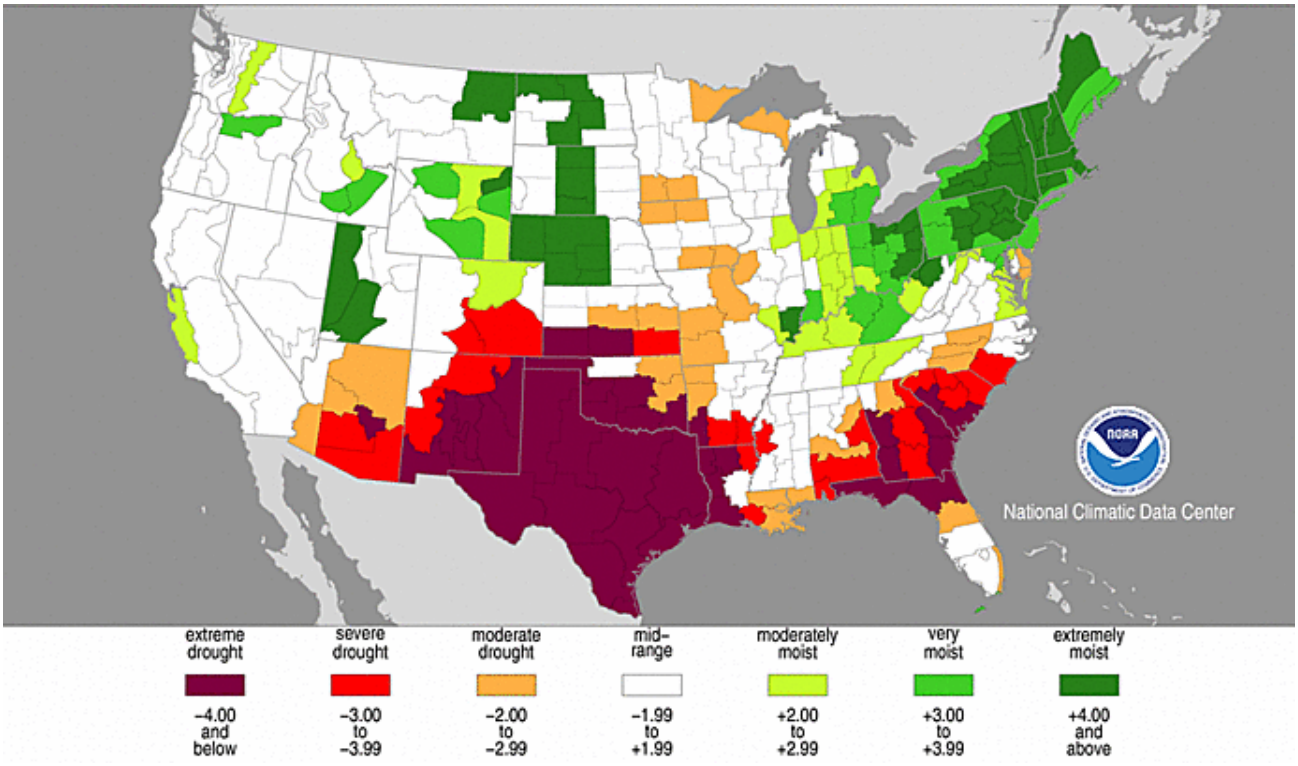
Historic Occurrence

In Walker County's recent history, there have been two major droughts causing agricultural losses. This information is listed below at the county level. There is no county-level data available for property and agricultural losses for the most recent and most extreme drought event.

Date	Description	Property Damage (2015 Dollars)	Crop Damage (2015 Dollars)
1998 - 2000	Declared Agricultural disaster by USDA	$1,000,000	$7,300,000
2010 - 2014	Declared Agricultural disaster by USDA	Information not available	Information not available

Source: https://www.ncdc.noaa.gov/

Palmers Drought Severity Index: October 2011



Map source: https://www.ncdc.noaa.gov/

Hazard Analysis & Vulnerability Identification

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To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of structures exposed to hail damage; and
- Stakeholder identified vulnerabilities.

Droughts often last multiple years have economic impacts that last longer than the droughts themselves. Walker County's agricultural industry has been determined the most vulnerable asset to drought. Walker County has 280,512 acres in agricultural production. According to the United States Department of Agriculture (USDA) Census of Agriculture, the market value of agricultural production in the county is $415,000 annually; with 54% of revenues from crops, and 46% of revenue from livestock production.

All Participating jurisdictions			
Planning Area:	Unincorporated Walker County, City of New Waverly, and the City of Riverside. 765.3 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence:	1 year of extreme drought conditions; < -4.0 PHDI rating	**Occurrence:**	2 events in 20 years
		Event Average:	0.1 events per year
Extent:	18 months of extreme drought conditions; < -4.0 PHDI rating	**Probability:**	Likely; 50% chance that 1 event will occur within next 5 years.

Vulnerability	**Impact**
Livestock and Agricultural production; 280,512 acres of agricultural land.	$8.3 million in agricultural losses are estimated long-term losses due to one year of extreme drought.

Part 6.6 Lightning

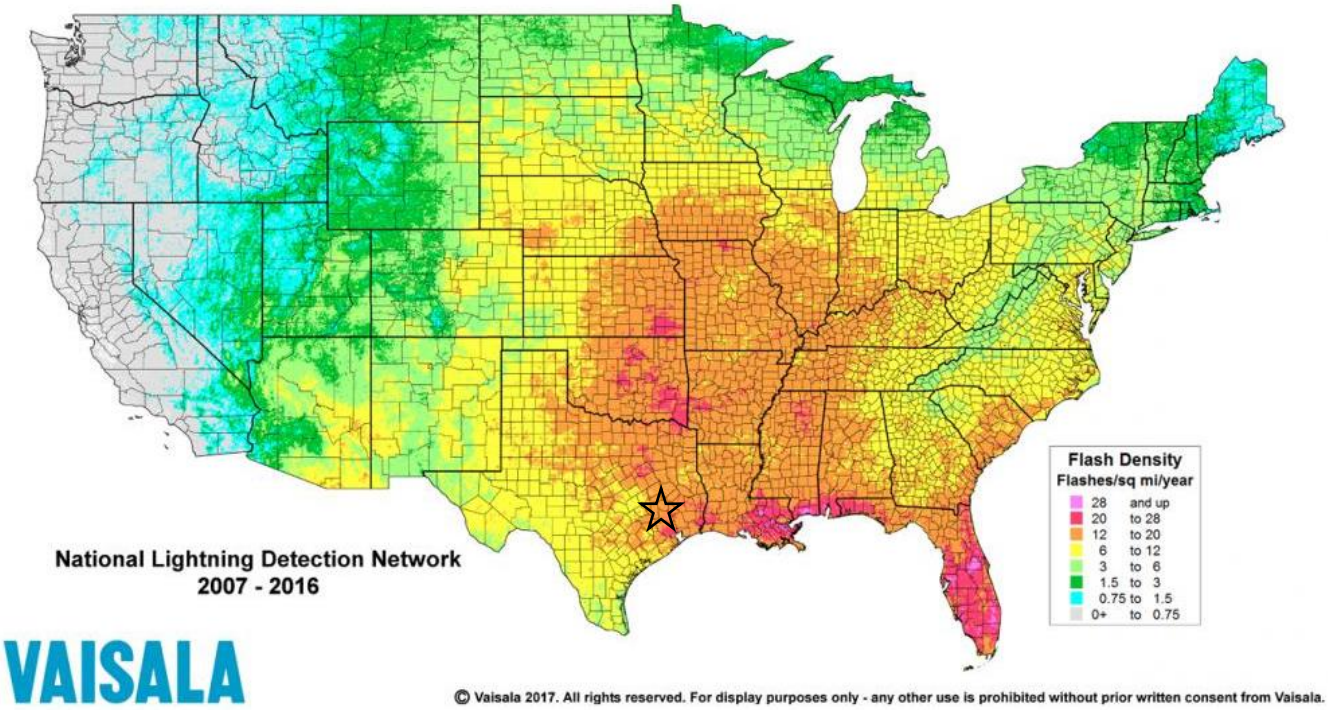
6.6 Lightning

There are two typical ways the magnitude of lightning is measured. The first is through the Lightning Activity Levels (LAL) grid. The National Oceanic and Atmospheric Administration (NOAA) considers how many cloud to ground strikes occur over a given period as well as rainfall to measure the amount of lighting activity occurring.

LAL	Cloud & Storm Development	Lighting Strikes/15 per minute
1	No thunderstorms	None
2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 clouds to ground strikes in a five-minute period.	1 to 8
3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 clouds to ground strikes in a 5-minute period.	9 to 15
4	Scattered thunderstorms. Moderate rain is commonly produced Lightning is frequent, 11 to 15 clouds to ground strikes in a 5-minute period	16 to 25
5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 clouds to ground strikes in a 5-minute period.	Greater than 25
6	Dry lightning (same as LAL 3 but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag Warning.	Greater than 25

Source: https://www.ncdc.noaa.gov/

The second method is through the National Lightning Detection Network by Vaisala. This Network works by recording when lightning strikes the ground, taking into account the location, time, and polarity of the strike. According to this Network, Walker County is rated 12-20 flashes per square mile per year.



Historic Events

National Climatic Data Center (NCDC) records from 1960-2017 confirm one reported lightning strike in Walker County causing $8,000 property damage in 2008. No deaths or injuries were reported.

From 2005-2015 the Texas A&M Forest Service reported 23 wildfires were caused by lightning strikes. One lightning strike was recorded in Riverside, and the other 22 strikes were recorded in unincorporated Walker County. Property damage, loss of life, and injuries were attributed to the wildfires and are captured in Section 6.3.

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The greatest historic occurrence data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. The extent is the worst the jurisdiction could possibly experience. Information from stakeholders, Texas Forest Service, and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of structures and critical facilities exposed to lightning damage; and
- Stakeholder identified vulnerabilities

Walker County's greatest vulnerabilities to lightning are the loss of communication when lightning strikes a communication tower, and the finical loss of property from direct strikes.

Unincorporated Walker County			
Planning Area:	Unincorporated Walker County 761 square miles	**Area Affected:**	Entire Planning Area
Greatest historic occurrence:	Communication towers were damaged by a direct lightning strike.	**Occurrence:**	23 reported lightning strikes in last 15 years.
		Event Average:	1.5 recorded lightning strikes per year.
Extent:	Up to 30 direct lightning strikes in one year, and up to $1000 of property loss in next 5 years.	**Probability:**	Very likely; 7 events estimated to occur within the next 5 years.

Vulnerability	Impact
2 communication towers	Loss of communication due to lightning strikes on communication towers.
Livestock and property loss	$140 annual property loss estimate (assets damaged by direct lightning strikes)

New Waverly			
Planning Area:	City of New Waverly 2.2 square miles	**Area Affected:**	Entire Planning Area
Greatest historic occurrence	No recorded strikes causing damage to property or life.	**Occurrence:**	No recorded lightning strikes
		Event Average:	Viasala estimates 26.4 - 44 strikes per year.
Extent:	5 direct lighting strikes in one year, and up to $700 of property loss in next 5 years.	**Probability:**	Unlikely; less than 10% chance that 1 event will occur within the next 5 years

Vulnerability	Impact
1 communication tower	Loss of communication.

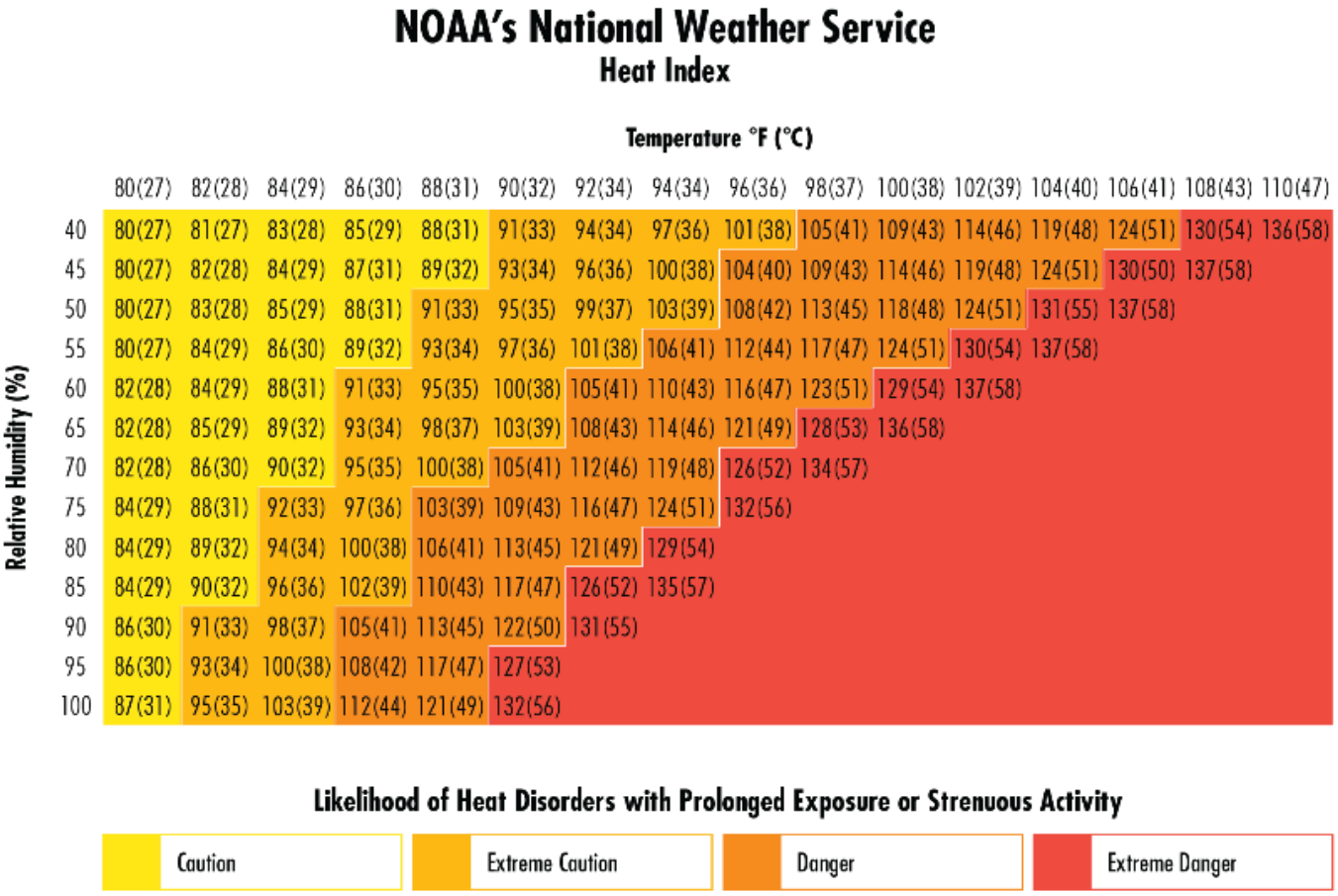
Riverside			
Planning Area:	City of Riverside 2.1 square miles	**Area Affected:**	Entire Planning Area
Greatest historic occurrence	1 direct lightning strike ignited a fire; not damage was recorded.	**Occurrence:**	1 recorded lightning strike in 15 years
		Event Average:	0.07 recorded lightning strikes per year.
Extent:	5 direct lighting strikes in one year, and up to $700 of property loss in next 5 years.	**Probability:**	Likely; 33% chance that 1 event will occur within the next 5 years.

Vulnerability	Impact
Lack of a proper alert or alarm system to notify public of risk of lightning strike; Individuals that live on the Trinity River are especially at risk.	Loss of life.

Part 6.7 Heat Event

6.7 Heat Event

Heat Events are defined by NOAA as a period of heat resulting from the combination of elevated temperatures and relative humidity. A Heat Event occurs whenever heat index values meet or exceed locally/regionally established advisory thresholds. Fatalities or major impacts on human health occurring when ambient weather conditions meet heat advisory criteria are reported using the Heat Event. (NCDC)



Historic Occurrence

June to August are the months that Walker County could experience the most severe heat, with average temperatures between 90 and 100 degrees. According to NOAA's database no deaths were reported between 1950 to 2017 due to Heat Events, but the heat index reached dangerous levels on six dates.

Date	Event	Deaths	Injuries	Property Damage	Crop Damage
6/26/1999	Heat Event	0	0	0	0
8/1/1999	Heat Event	0	0	0	0
7/6/2000	Heat Event	0	0	0	0
8/29/2000	Heat Event	0	0	0	0
9/1/2000	Heat Event	0	0	0	0
6/24/2009	Heat Event	0	0	0	0

Hazard Impact

Heat-related fatalities can go unreported because they occur several days after a Heat Event. Heat-related illnesses or crop damage are more likely to occur after several days of hot temperatures. As a result, analysis should consider extreme maximum temperatures and number of days of high temperatures. Listed below are maximum temperatures recorded each year and the number of days over 90 degrees as reported by NCDC.

The average number of days over 90 degrees in the region is 103 days. For the purposes of this plan, years that experienced more than a 10% increase in days of 90-degrees are considered notable events.

Year	Extreme maximum temperature	Number of days over 90 degrees F.
2000	110	114
2001	99	83
2002	98	104
2003	103	87
2004	99	100
2005	102	125
2006	101	114
2007	103	96
2008	103	102
2009	105	111
2010	105	120
2011	108	146
2012	103	101
2013	101	99
2014	98	78
2015	104	105
2016	99	97

Source: https://www.ncdc.noaa.gov/

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The greatest historic occurrence data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. The extent is the worst the jurisdiction could possibly experience. Information from stakeholders, USDA, US Census, CDC, and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of vulnerable populations
- US Census Data
- USDA livestock production projections; and
- Stakeholder identified vulnerabilities

According to the Centers for Disease Control and Prevention (CDC), adults over 65 years of age, infants, children, individuals with chronic illnesses, low-income, outdoor workers, and athletes are the most vulnerable populations to heat related illnesses. The data available on the populations suggests that approximately 44% of the population in Walker County is vulnerable to heat related illnesses.

Agriculture and livestock are vulnerable to heat events. Walker County has 280,512 acres in agricultural production. According to the USDA Census of Agriculture, the market value of agricultural production in the county is $34,513,000 annually; with 54% of revenues from crops, and 46% of revenue from livestock production.

Unincorporated Walker County			
Planning Area:	Unincorporated Walker County 761 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence:	146 days over 90-degree F. 57 days over 100-degree F.	**Occurrence:** **Event Average:**	5 events in 17 years 0.3 events per year
Extent:	Up to 75 days over 100 degrees F.	**Probability:**	Very likely; 1 event estimated to occur within next 5 years.

Vulnerability	Impact
Livestock and Agricultural production; 280,512 acres of agricultural land.	Loss of livestock and agricultural assets would negatively impact the local economy.
44% of the population is estimated to be vulnerable to heat events.	In the event of a power outage during a heat event, there are not sufficient cooling stations for all vulnerable populations, and potential loss of life.

New Waverly			
Planning Area:	City of New Waverly 2.2 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence	146 days over 90-degree F. 57 days over 100-degree F.	**Occurrence:** **Event Average:**	5 events in 17 years 0.3 events per year
Extent:	Up to 75 days over 100 degrees F.	**Probability:**	Very likely; 1 event estimated to occur within next 5 years.

Vulnerability	Impact
42% of the population is estimated to be vulnerable to heat events, and there are no designated cooling stations in New Waverly.	Potential loss of life.

Riverside			
Planning Area:	City of Riverside 2.1 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence	146 days over 90-degree F. 57 days over 100-degree F.	**Occurrence:** **Event Average:**	5 events in 17 years 0.3 events per year
Extent:	Up to 75 days over 100 degrees F.	**Probability:**	Very likely; 1 event estimated to occur within next 5 years.

Vulnerability	Impact
36.3% of the population is estimated to be vulnerable to heat events, and there are no designated cooling stations in Riverside	Potential loss of life.

Part 6.8 Hail

6.8 Hail

NOAA's National Centers for Environmental Information (NCEI) intensity scale for hail is the typical way to measure the extent for hail storms. This scale considers the size of an individual piece of hail. A hail storm is considered severe if hail reaches one inch in diameter or roughly the size of a quarter.

Size	Hail Diameter (Inches)	Description
H0	1/4	Pea Size
H1	1/2	Small Marble Size
H2	¾	Penny or Large Marble Size
H3	7/8	Nickel Size
H4	1	Quarter Size
H5	1 ¼	Half Dollar Size
H6	1 ½	Walnut or Ping Pong Ball Size
H7	1 ¾	Golfball Size
H8	2	Hen Egg Size
H9	2 ½	Tennis Ball Size
H10	2 ¾	Baseball Size
H11	3	Teacup Size
H12	4	Grapefruit Size
H13	4 ½	Softball Size

Source: https://www.ncei.noaa.gov/

Since 2000, Walker County experienced 13 hail events. Eleven were considered severe (quarter sized and above). Golf ball sized hail or size H7 is the largest size hail the County experienced, with four of the nine events having a magnitude of 1 ¾ inches.

Historic Occurrences

Event Date	Jurisdiction	Size	Total Damage (2015 Dollars)
July 13, 2002	Riverside	0.75	$5,000
April 7, 2004	Riverside	1.75	$15,000
May 17, 2004	Unincorporated Walker County	1.75	$20,000
May 31, 2004	Countywide	1	$6,000
November 23, 2004	Unincorporated Walker County	0.75	$0
May 28, 2005	Riverside	1.75	$12,000
June 18, 2008	New Waverly	0.75	$4,000
February 2, 2009	Unincorporated Walker County	0.75	$0
August 21, 2009	Unincorporated Walker County	0.75	$0
August 21, 2009	Unincorporated Walker County	1	$0
April 7, 2010	Riverside	0.75	$0
May 25, 2011	Unincorporated Walker County	1.75	$5,000
April 20, 2012	Unincorporated Walker County	1	$0
May 11, 2012	Riverside	1.75	$3,000
August 10, 2012	New Waverly	0.88	$0
May 21, 2013	Unincorporated Walker County	1	$0
April 16, 2015	Unincorporated Walker County	0.75	$0
April 16, 2015	Unincorporated Walker County	1	$0
April 18, 2015	Unincorporated Walker County	0.88	$0
January 8, 2016	Unincorporated Walker County	2.5	$10,000

Source: https://www.ncdc.noaa.gov/stormevents/

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

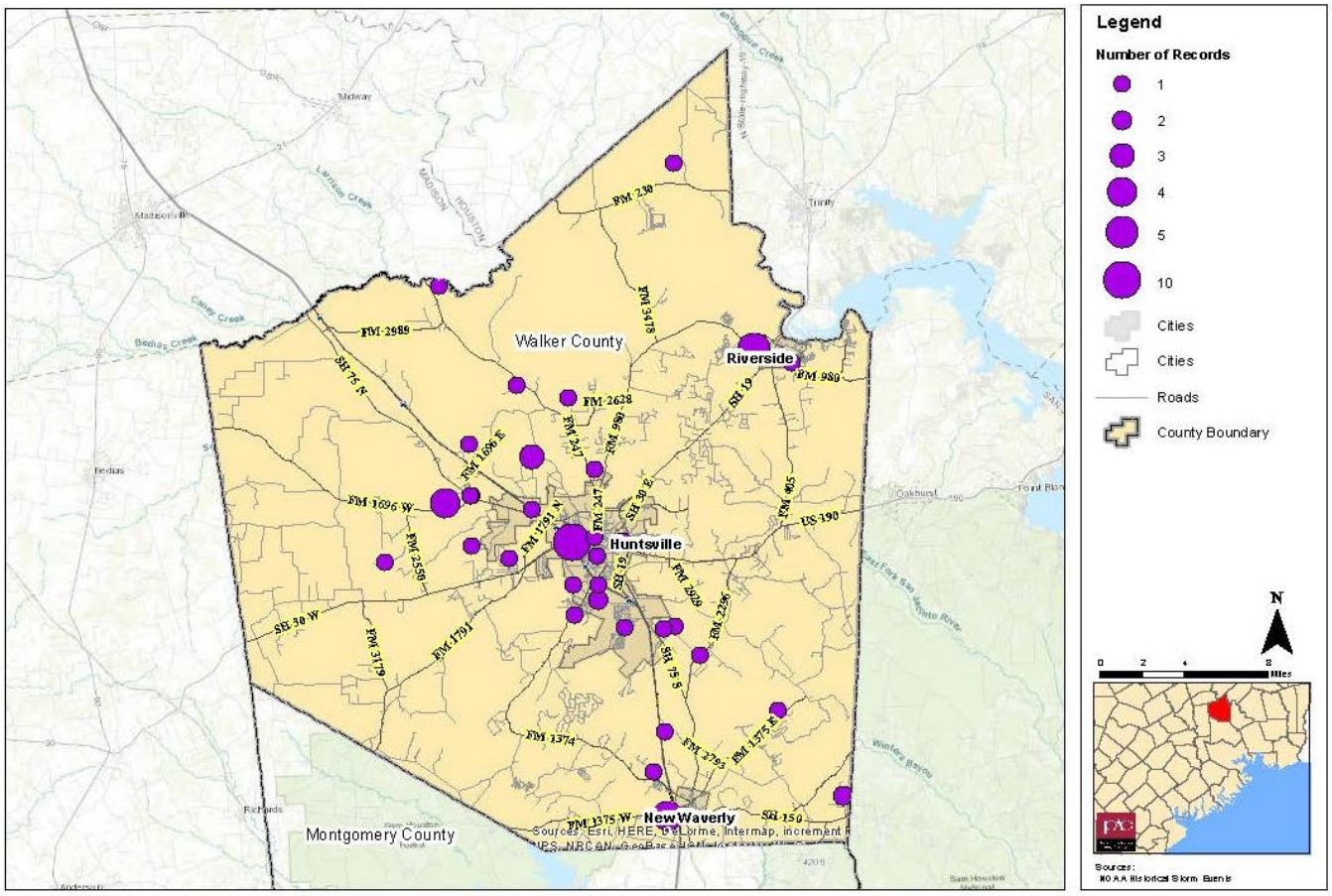
The hazard analysis also provides hazard extent data for each participating jurisdiction. The greatest historic occurrence data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. The extent is the worst the jurisdiction could possibly experience. Information from stakeholders and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- NOAA historic event data; and
- Stakeholder identified vulnerabilities.

The map below demonstrates the location and quantity of hail events that have occurred throughout the County from 2002 to present.

Location of Hail Events



Unincorporated Walker County			
Planning Area:	Unincorporated Walker County 761 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence:	H7 size hail stones (1.75 inch) $20,000 in damage from single hail event	**Occurrence:**	13 events in 15 years
		Event Average:	0.87 hail events per year
Extent:	H11 size hail stones (3" inch)	**Probability:**	Very likely; 4 events estimated to occur within next 5 years.

Vulnerability	Impact
Not all county vehicles have covered parking.	Hail damage to county vehicles would be costly to repair.
Property and crop loss	Estimated $5,256 in annual losses due to hail.

New Waverly			
Planning Area:	City of New Waverly 2.2 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence	H3 size Hail (0.88 inch) $4,000 in damage to city owned fire truck	**Occurrence:**	3 events in 15 years
		Event Average:	0.2 hail events per year
Extent:	H11 size hail stones (3" inch)	**Probability:**	Very likely; 1 event estimated to occur within next 5 years.

Vulnerability	Impact
City's firetruck does not have protective, covered parking.	Costly repair of vehicle, and impacted emergency response capability while repairs were made.
Many homes do not have hail resistant windows or roofing.	Injuries and costly repairs.

Riverside			
Planning Area:	City of Riverside 2.1 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence	H7 size Hail (1.75 inch) $15,000 in damage from a single hail event	**Occurrence:**	6 events in 15 years
		Event Average:	0.4 events per year
Extent:	H11 size hail stones (3" inch)	**Probability:**	Very likely; 2 events estimated to occur within next 5 years.

Vulnerability	Impact
Many homes do not have hail resistant windows or roofing.	Injuries and costly repairs.

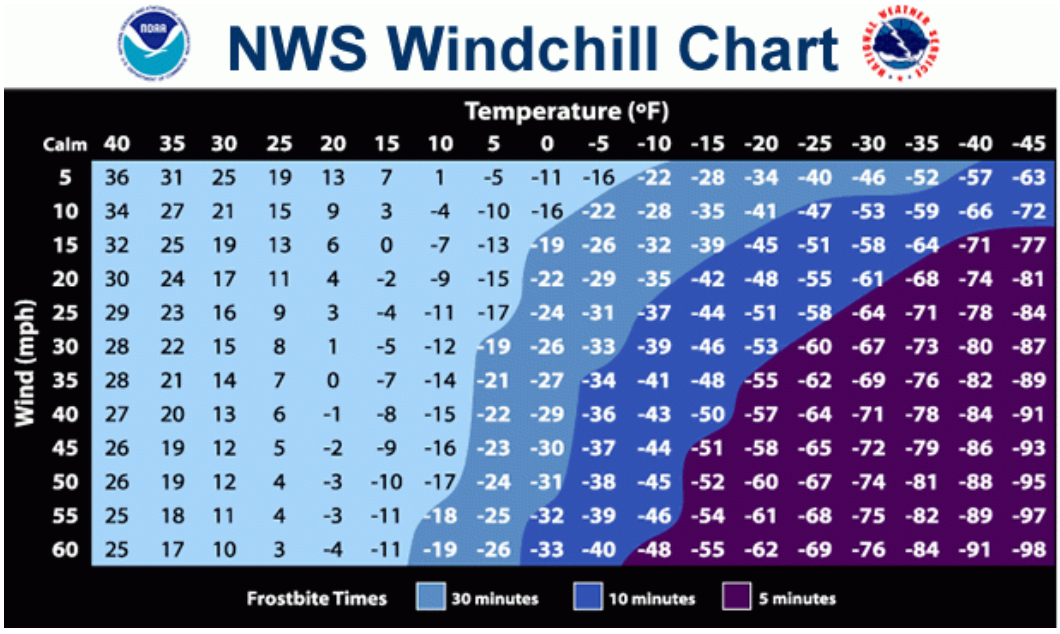
Part 6.9 Winter Weather

6.9 Winter Weather

The two main charts used to measure the magnitude of winter storms is the Sperry-Piltz Iace Accumulation (SPIA) Index Parameters and the National Weather Service's Windchill Chart. The SPIA chart measures the extent of ice in a region considering wind speed and the depth of ice on surfaces. The NWS Windchill Chart considers wind speed and temperatures to determine the amount of time frostbite may occur.

ICE DAMAGE INDEX	* AVERAGE NWS ICE AMOUNT (in inches) *Revised-October, 2011	WIND (mph)	DAMAGE AND IMPACT DESCRIPTIONS
0	< 0.25	< 15	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	0.10 – 0.25	15 - 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
	0.25 – 0.50	> 15	
2	0.10 – 0.25	25 - 35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
	0.25 – 0.50	15 - 25	
	0.50 – 0.75	< 15	
3	0.10 – 0.25	> = 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
	0.25 – 0.50	25 - 35	
	0.50 – 0.75	15 - 25	
	0.75 – 1.00	< 15	
4	0.25 – 0.50	> = 35	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
	0.50 – 0.75	25 - 35	
	0.75 – 1.00	15 - 25	
	1.00 – 1.50	< 15	
5	0.50 – 0.75	> = 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75 – 1.00	> = 25	
	1.00 – 1.50	> = 15	
	> 1.50	Any	

Source: http://www.spia-index.com/



Source: http://www.nws.noaa.gov/om/cold/wind_chill.shtml

The national weather service and NOAA also have a variety of watches and warnings for freeze, frost, wind, and ice events; these have been organized in a chart below.

Watch/ Warning/ Advisory	Description
Winter Storm Watch	Issued when there is the potential for significant and hazardous winter weather within 48 hours. It is possible hazardous weather may occur. Significant and hazardous winter weather is defined as: 5 inches or more of snow/sleet within a 12-hour period or 7 inches or more of snow/sleet within a 24-hour period. And/ or enough ice accumulation to cause damage to trees or powerlines and/or a life threatening or damaging combination of snow and/or ice accumulation with wind.
Winter Storm Warning	Issued when a significant combination of hazardous winter weather is occurring or imminent. Significant and hazardous winter weather is defined as above.
Ice Storm Warning	¼ inch or more of ice accumulation.
Winter Weather Advisory	Issued for any amount of freezing rain, or when 2 to 4 inches of snow (alone or in combination with sleet and freezing rain) is expected to cause a significant inconvenience, but not serious enough to warrant a warning.
Freeze Watch	Issued when there is a potential for significant, widespread freezing temperatures within the next 24-36 hours.
Freeze Warning	Issued when significant, widespread freezing temperatures are expected.
Frost Advisory	Issued when the minimum temperature is forecast to be 33 to 36 degrees on clear and calm nights during the growing season.
Wind Chill Advisory	Issued when wind chills of -5F to -19F are expected east of the Blue Ridge Mountains and when wind chills of -10 to -24F are expected along and west of the Blue Ridge Mountains and in Frederick and Carroll Counties in Maryland.
Wind Chill Warning	Issued when wind chills of -20F or lower are expected east of the Blue Ridge Mountains, and when wind chills of -25F or lower are expected along and west of the Blue Ridge Mountains and in Frederick and Carroll Counties in Maryland.

Source: www.weather.gov/lwx/WarningsDefined#Winter Storm Watch

Historic Occurrences

Date	Description	Death/Injury	Property Damage (2015 Dollars)	Crop Damage (2015 Dollars)
1/12/1997	Ice Storm	0	$0	$0
12/22/1998	Winter Storm	0	$15,000	$0
12/13/2000	Ice Storm	0	$50,000	$0
1/16/2007	Ice Storm	0	$4,000	$0
2/3/2011	Winter Storm	0	$0	$0
1/23/2014	Winter Storm	0	$0	$0
1/28/2014	Winter Storm	0	$0	$0
3/3/2014	Winter Weather	0	$0	$0
1/17/2018	Winter Weather	1	TBD	TBD

Source: https://www.ncdc.noaa.gov/stormevents/

Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The greatest historic occurrence data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. The extent is the worst the jurisdiction could possibly experience. Information from stakeholders, Centers for Disease Control and Prevention (CDC), and NOAA are the sources of data for the analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of vulnerable populations;
- Stakeholder identified vulnerabilities

According to the CDC, adults over 65 years of age and children are the most vulnerable populations to winter weather related illnesses. The data available on these populations suggests that approximately 38% of the population in Walker County is vulnerable to winter weather.

Walker County experienced an average of 19 days a year at or below freezing since 2000. In 2010, the county experienced its only recorded snow accumulation of 3 inches since 2000. The extreme average minimum temperature from 2000 to 2017 was 22 degrees. The County experienced several freeze warnings, frost advisories and winter weather advisories. However, on January 16 and 17, 2018, temperatures hit new record lows throughout the region, including Walker County. The recorded minimum record temperatures were 19 degrees and 12 degrees respectively with the highest wind speeds at 36 mph on the 1/16/18 and 23 mph on 1/17/18. One death was reported due to winter weather conditions, but no recorded data was available when this plan was drafted.

Walker County experiences significant financial annual losses to winter weather. Most of these losses are attributed ice storms that cause dangerous driving conditions, falling trees, and power outages in homes. The most notable vulnerabilities throughout the county are the dangerous driving conditions and power outages.

According to the Centers for Disease Control and Prevention (CDC), adults over 65 years of age and children are the most vulnerable populations to winter weather related illnesses. The data available on these populations suggests that approximately 31.9% of the population in Walker County is vulnerable to winter weather.

Unincorporated Walker County			
Planning Area:	Unincorporated Walker County 761 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence:	1 death reported due to icy road conditions 12 degrees Fahrenheit	**Occurrence:** **Event Average:**	6 events in 20 years 0.3 events per year
Extent:	Down to 7 degrees Fahrenheit	**Probability:**	Very likely; 1 event estimated to occur within next 5 years.

Vulnerability	Impact
Frozen limbs fall onto to above ground powerline and cause power outages. 31.9% of the population is estimated to be vulnerable to winter weather.	Potential loss of life.
Crops and agricultural production.	$3,450 annual property and crop loss estimate
Roads and bridges freeze, but the county does not have the capability to de-ice roads.	Hinders emergency response and endangers emergency responders trying to drive on icy roads.

New Waverly			
Planning Area:	City of New Waverly 2.2 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence	12 degrees Fahrenheit Highway closures and power outages	**Occurrence:** **Event Average:**	6 events in 20 years 0.3 events per year
Extent:	Down to 7 degrees Fahrenheit	**Probability:**	Very likely; 1 event estimated to occur within next 5 years.

Vulnerability	Impact
House fires caused by residents trying to heat their homes; 21.9% of the population is at risk.	Potential loss of life.

Riverside			
Planning Area:	City of Riverside 2.1 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence	12 degrees Fahrenheit Highway closures and power outages	**Occurrence:** **Event Average:**	6 events in 20 years 0.3 events per year
Extent:	Down to 7 degrees Fahrenheit	**Probability:**	Very likely; 1 event estimated to occur within next 5 years.

Vulnerability	Impact
House fires caused by residents trying to heat their homes. 32.2% of the population is at risk	Potential loss of life.

Part 6.10 Tornado

6.10 Tornado

Before 2007, tornadoes were ranked through the Fujita Scale. The Enhanced Fujita Scale replaced the Fujita Scale in 2007 and is a set of wind estimates (not measurements) based on damage. The higher the number the more intense the tornado. Both the Fujita Scale and the Enhanced Fujita Scale are below.

Fujita Scale			Enhanced Fujita Scale		
Scale	**Fastest 1/4 mile (mph)**	**3 second gust (mph)**	**EF Number**	**3 Second Gust (mph)**	**Typical Damage**
F0	40-72	45-78	0	65-85	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
F1	73-112	79-117	1	86-109	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
F2	113-157	118-161	2	110-137	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-207	162-209	3	138-167	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
F4	208-260	210-261	4	168-199	Devastating damage. Whole frame houses Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
F5	261-318	262-317	5	200-234	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 109 yards; high-rise buildings have significant structural deformation; incredible phenomena will occur.

Source: http://www.spc.noaa.gov/

Historic Occurrence

Walker County has reported three tornados in the last five years, though specific information regarding rating, damage, and location could not be identified. Recorded data from NCDC is listed below.

Date	Rating	Location	Property Damage (2015 Dollars)	Crop Damage (2015 Dollars)	Deaths
10/16/1971	F0	Unincorporated Walker County	$2,500	$0	0
6/4/1973	F2	Unincorporated Walker County	$250,000	$0	0
2/10/1981	F2	Unincorporated Walker County	$250,000	$0	1
2/9/1983	F1	Unincorporated Walker County	$250,000	$0	0
2/9/1983	F0	Unincorporated Walker County	$250,000	$0	0
5/13/1994	F0	Unincorporated Walker County	$0	$0	0

1/21/1998	F1	New Waverly	$0	$200,000	0
1/1/1999	F0	Riverside	$10,000	$0	0
4/3/1999	F0	New Waverly	$25,000	$0	0
6/20/2008	EF0	Unincorporated Walker County	$0	$0	0
4/2/2017	EF0	Unincorporated Walker County	$15,000	$0	0

Source: https://www.ncdc.noaa.gov/stormevents/

Hazard Analysis & Vulnerability Identification

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To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of structures exposed to tornado damage; and
- Stakeholder identified vulnerabilities.

Walker County stakeholders have identified the lack of strategically located tornado shelters as their biggest vulnerability to this hazard. The tornado shelters are not adequately dispersed throughout the county and cannot be quickly accessed by residents.

Unincorporated Walker County			
Planning Area:	Unincorporated Walker County 761 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence:	F2 Tornado $250,000 property loss 1 death	**Occurrence:** **Event Average:**	11 events in 46 years 0.24 events per year
Extent:	Up to F5 Tornado	**Probability:**	Very Likely; 1 event estimated to occur within next 5 years.

Vulnerability	Impact
Need additional tornado shelters and safe rooms installed in the county facilitates and schools.	Potential loss of life
20,068 structures in the county could be hit by a tornado.	Estimated $31,576 annual property loss estimate

New Waverly			
Planning Area:	City of New Waverly 2.2 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence	F1 Tornado $200,000 in property loss	**Occurrence:** **Event Average:**	2 events in 46 years 0.04 events per year
Extent:	Up to F5 Tornado	**Probability:**	Likely; 21% chance that 1 event will occur within the next 5 years.

Vulnerability	Impact
Need additional tornado shelters and safe rooms installed in city facilitates and schools.	Potential loss of life

Riverside			
Planning Area:	City of Riverside 2.1 square miles	**Area Affected:**	Entire planning area
Greatest historic occurrence	F0 Tornado	**Occurrence:** **Event Average:**	1 events in 46 years 0.02 events per year
Extent:	Up to F5 Tornado	**Probability:**	Unlikely; 10% chance that 1 event will occur within the next 5 years.

Vulnerability	Impact
Need additional tornado shelters and safe rooms installed in city facilitates and schools.	Potential loss of life

Part 6.11 Dam & Levee Failure

6.11 Dam and Levee Failure

According to FEMA's Federal Guidelines for Dam Safety: Hazard Potential Classification System for Dams, extent is measured through judging the potential for human, economic, lifeline, and environmental loss.

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None Expected	Low and generally limited to owner
Significant	None Expected	Yes
High	Probable. One or more expected.	Yes (But not necessary for this classification)

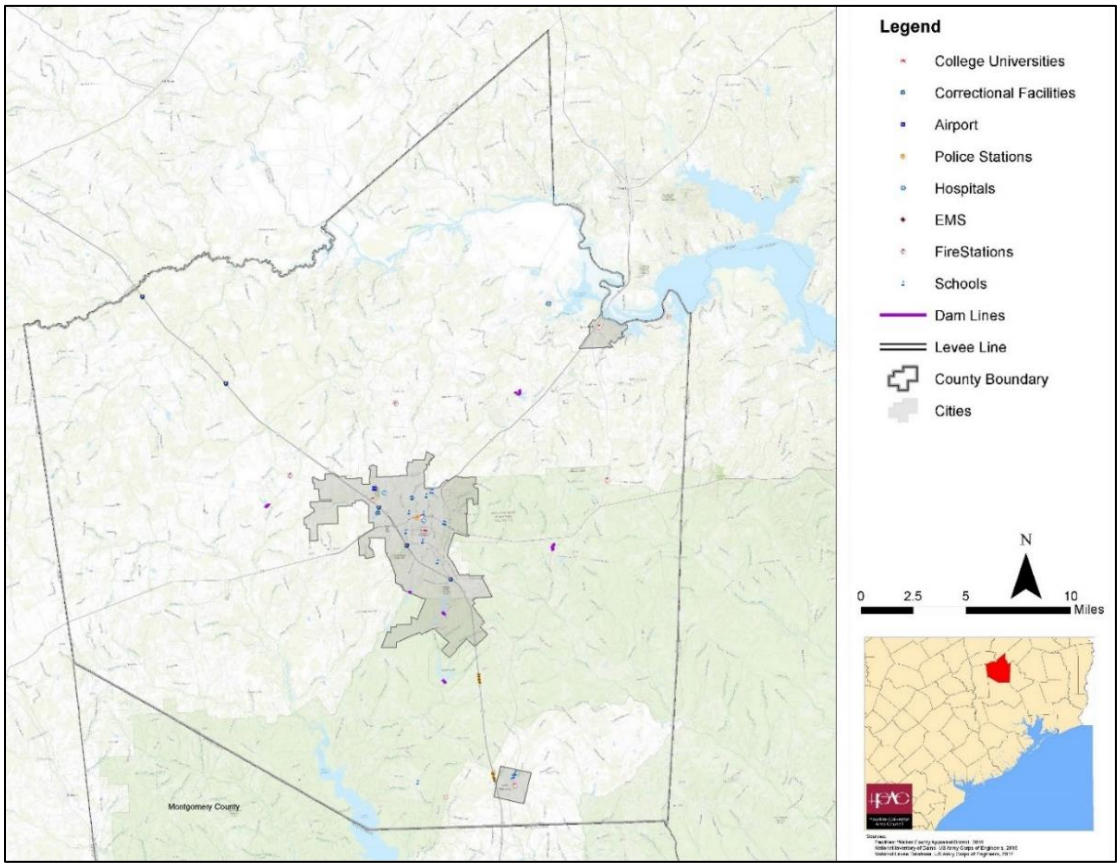
Source: https://www.fema.gov/

Historic Occurrence & Hazard Analysis

Walker County does not have any dam or levee failures to report. There are 51 known dams in Unincorporated Walker County, Riverside, and New Waverly. Each dam has been classified as 'Low' in the hazard potential classification and pose no risk to critical assets or the participating communities. The Lake Livingston Dam in neighboring Polk County is the closest dam or levee with rated with a high hazard potential if it were to fail. The Lake Livingston Dam is located northeast of Walker County and poses no threat to the participating jurisdictions in the event of a dam failure.

As a result of Hurricane Harvey, the jurisdictions feel there is a need to further investigate the potential impacts of dams and levees in their community. A perceived risk was reported by residents of New Waverly that clogged and improperly maintained dams caused upstream flooding of homes during Hurricane Harvey. The risk assessment was unable to validate these claims due to a data deficiency.

Dam & Levee Locations: Walker County



Part 6.12 Expansive Soils

6.12 Expansive Soils

The chart below shows the Linear Extensibility Percent (LEP) and Coefficient of Linear Extent (COLE) to show the Shrink-Swell Class of expansive soils. COLE is a test frequently used to characterize expansive soils. COLE is a measure expressed as a fraction of the change in a soil sample dimension from the moist to dry state. The LEP is a measure expressed as a percentage of the change in a soil sample dimension from the moist to dry state. The Shrink-Swell Class is found in comparing these two measurements. A Moderate to Very High rating marks soils that have the potential to contract and expand, leading to broken foundations and water pipes, for example.

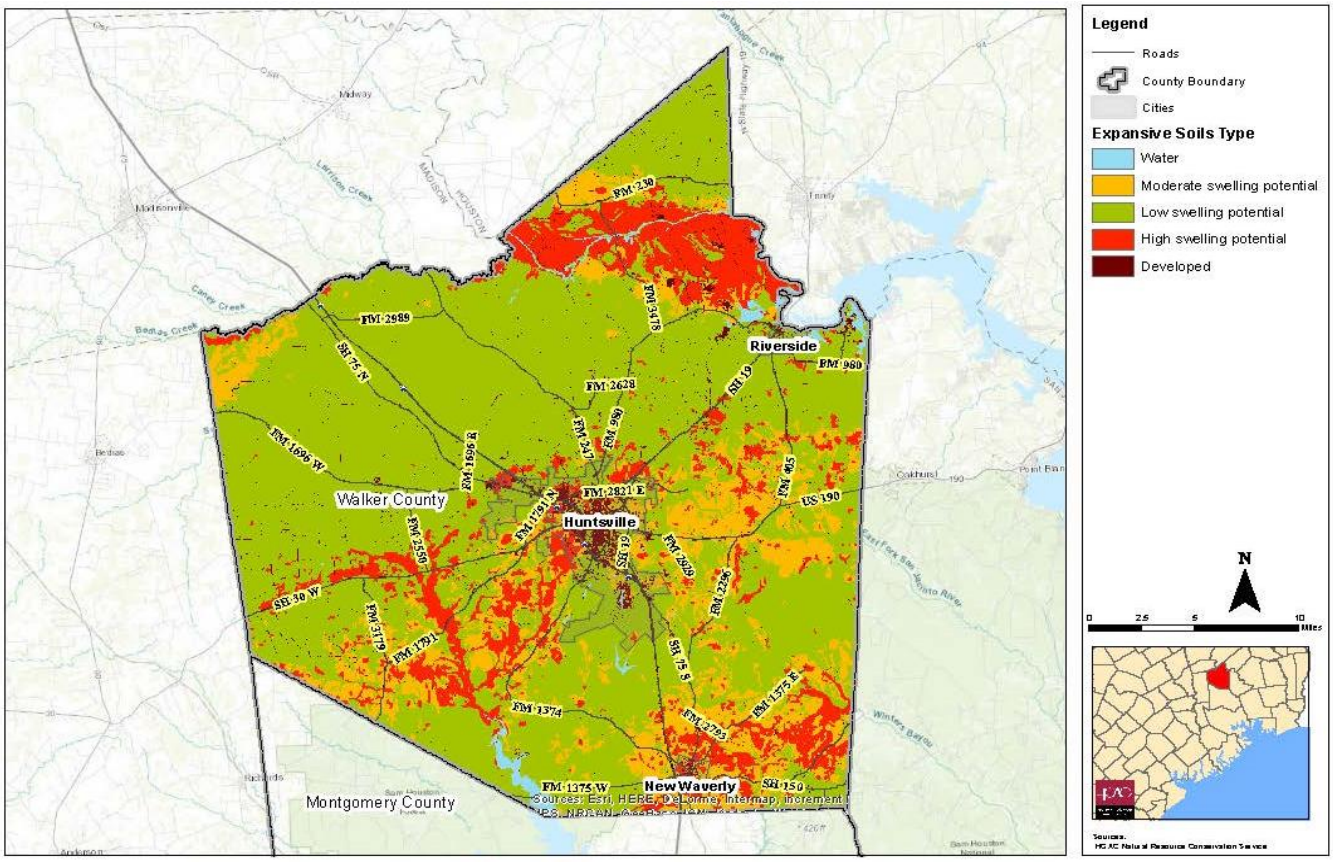
Shrink-Swell Class	Linear Extensibility Percent (LEP)	Coefficient of Linear Extent (COLE)
Low	3	0.03
Moderate	3 to 6	.03-.06
High	6 to 9	.06-.09
Very High	Greater than or equal to 9	Greater than or equal to 0.09

Source: https://www.nrcs.usda.gov

Expansive Soil Data by Jurisdiction

	Low Swelling Potential	Moderate Swelling Potential	High Swelling Potential
Walker County	67.9%	14.9%	12.9%
New Waverly	6.8%	33.8%	38.2%
Riverside	73.0%	0.0%	0.0%

Expansive Soil Map: Walker County



Hazard Analysis & Vulnerability Identification

The hazard analysis uses historic hazard event data to determine the probability of an event occurring again within the next five years. The analysis calculates the average number of events in each jurisdiction annually and then multiplies by five.

The hazard analysis also provides hazard extent data for each participating jurisdiction. The greatest historic occurrence data is the most extreme data recorded during a storm or hazard event and represents the worst damage a jurisdiction has experienced in recent history. The extent data is the worst a jurisdiction could ever experience. Information from stakeholders, USDA's Natural Resource Conservation Services**,** and H-GAC's critical facilities database were used for this analysis.

To identify vulnerabilities for each jurisdiction, this plan used the following methods:

- GIS analysis of structures within the high to very high shrink swell classes; and
- Stakeholder identified vulnerabilities.

High to Very High shrink swell classes marks soils that have the potential to contract and expand. This can lead to broken foundations and water pipes, and will be used to measure the area effected in the hazard impact analysis

There is no soil with moderate to high swelling potential within the City of Riverside, and there have been no reported occurrences of damage causes by expansive soils. Because expansive soils pose no threat to the City of Riverside, they will not profile expansive soils.

Unincorporated Walker County			
Planning Area:	Unincorporated Walker County 761 square miles	**Area Affected:**	27.7% 210.797 square miles
Greatest historic occurrence:	Cracks in county facilities discovered in 2012; No financial impact.	**Occurrence:**	1 event in 5 years
		Event Average:	0.2 events a year
Extent:	Potentially 1,742 structures experience moderate to severe foundation damage.	**Probability:**	Very likely; at least 1 event estimated to occur within next 5 years.
Vulnerability		**Impact**	
1 county facility is located on highly expansive soils.		Expensive repairs to pipes and foundation.	

New Waverly			
Planning Area:	City of New Waverly 2.2 square miles	**Area Affected:**	72% 0.12 square miles
Greatest historic occurrence	Reports of residences with minor foundation problems	**Occurrence:**	1 event in 5 years
		Event Average:	0.2 events a year
Extent:	Up to 159 housing units could suffer damage.	**Probability:**	Very likely; at least 1 event estimated to occur within next 5 years.
Vulnerability		**Impact**	
38.2% of residential lots are located on highly expansive soils.		Significant monetary impact to home owners.	

Part 7: Mitigation Strategy

Part 7: MITIGATION STRATEGY

The planning process, hazard analysis, and vulnerability assessment serve as a foundation for a meaningful hazard mitigation strategy. The mitigation strategy provides an outline for how the county and the local jurisdictions aim to address and reduce the risks associated with the natural hazards identified in the HMAP and reduce the potential impact on residents and structures identified through the Vulnerability Analysis. The mitigation strategy is divided into three sections the mission statement, goals and objectives, and the mitigation action plan. The mission statement provides the overall purpose of the mitigation strategy and the HMAP. The goals and objectives provide milestones for how the county aims to meet this purpose. The mitigation action plan details specific mitigation actions, or projects, programs, and polices the county aims to meet these goals and objectives.

Mission Statement

The HMAP aims to implement new policies, programs, and projects to reduce the risks and impacts associated with natural hazards, including public education and partnerships between local officials and residents.

Mitigation Goals

Based on the planning process and the vulnerability assessment, the planning team developed the following goals and objectives. The goals and objectives explain what is to be achieved through implementing the HMAP. These goals and objectives work with the mitigation actions to outline what the county aims to accomplish in the next five years.

Goal

Reduce agriculture and infrastructure losses due to wildfires throughout the county

Objective

Encourage all local jurisdictions to participate and become certified as a Firewise community.

Objective

Provide educational opportunities for the public to learn about defensible spaces and wildfire mitigation techniques

Goal

Reduce loss of infrastructure from inland and riverine flooding throughout the county

Objective

Widen identified culverts and ditches throughout the county and install flood gates on identified critical county and city facilities

Objective

Acquire repetitive loss properties and properties prone to flooding throughout the county

Objective

Revise and update floodplain regulations to increase base flood elevation in identified areas of the county

Goal

Maintain continuing of government operations during power outages due to all natural hazards

Objective

Implement backup power at special utility district water wells, critical facilities, and volunteer fire departments.

Mitigation Action Plan

The mitigation action plan explains the specific programs, policies, and projects that the county and the local jurisdictions aim to implement for the county to reach its HMAP objectives and goals. The mitigation action plan provides the details of each mitigation action including which local department will be in charge of implementing the actions, how the county or local jurisdiction plan to pay for these actions, and the estimated time for implementing these actions. Any mitigation action that did not meet a cost-benefit ratio of 1:4 was re-evaluated and amended, or excluded.

Each jurisdiction and the county then prioritized mitigation actions based on their greatest vulnerabilities and needs. Actions were rated 1, 2, or 3 with 1 being the highest priority. Within each of the priority categories, a sub-category for feasibility was created. Each action was evaluated for feasibility using FEMA's mitigation action evaluation worksheet (Appendix A). The actions were then ranked by highest priority and feasibility scores to the lowest priority and feasibility scores. The actions were then assigned a number that dictates their overall priority ranking with 1 being the highest and 35 being the lowest. The mitigation actions are listed by this priority ranking in Appendix E.

In Section 8 of this HMAP, the mitigation actions are organized by jurisdiction.

All Participating Jurisdictions

Jurisdiction:	All participating Jurisdictions	**Action:**	15
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Hail Winter Storms Dam/Levee Failure		
Project Title:	Public Information and Awareness		
Project Description:	Install Outdoor Early warning System to provide citizens early warning of an impending disaster, or an event that would affect the life and/or property of the citizens.		
Responsible Entity:	Walker County OEM, City of Riverside, City of New Waverly, City of Huntsville OEM, and Sam Houston State University Risk Management Office		
Partners:			
Losses avoided:	Multijurisdictional effort and benefit. Prevent loss of life and property through improved communication system before and during natural disasters.		
Cost Estimate:	$850,000	**Timeframe:**	24-36 months
Potential Funding Sources:	PDM Program, HMGP	**Potential Funding Sources:**	PDM Program, HMGP
Priority Rating	2 = Mid-Level Priority Rating	**Feasibility Score:**	6
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	All Participating Jurisdictions	**Action:**	17
Hazard(s) Addressed:	Flood		
Project Title:	Voluntary Buy-Out Program		
Project Description:	The county and partnering jurisdictions will begin a voluntary buyout program for insured severe repetitive loss properties that are in the floodplain.		
Responsible Entity:	Walker County OEM Public		
Partners:	Public		
Losses avoided:	Prevent homes that have been flooded multiple times in the past 10 years from continuing to flood. A reduction NFIP insurance claims reduces long-term costs, and the removal of structures from the floodplain will reduce flooding. Reduce loss of life and		
Cost Estimate:	$2,000,000.00	**Timeframe:**	24-36 months
Potential Funding Sources:	HMGP, FMA, Local budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	2 = Mid-Level Priority Rating	**Feasibility Score:**	3
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	All Participating Jurisdictions	**Action:**	20
Hazard(s) Addressed:	Lightning Wildfire Severe Thunderstorms		
Project Title:	Lightning and Fire Protection		
Project Description:	Purchase 2 lightning rods for 2 communication towers in the county.		
Responsible Entity:	Walker County OEM		
Losses avoided:	Prevent the loss of communication because of a lightning strikes on communication towers. Prevent the loss of life of property during a hazard events that could have been prevented if communication was continuous.		
Cost Estimate:	150000	**Timeframe:**	12-18 months
Potential Funding Sources:	HMGP, FP&S Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	2 = Mid-Level Priority Rating	**Feasibility Score:**	3
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	All Participating Jurisdictions	**Action:**	22
Hazard(s) Addressed:	Lightning Winter Weather Severe Thunderstorms		
Project Title:	Protect Powerlines		
Project Description:	Bury critical powerlines underground and remove trees that pose a threat to powerlines in the event of freezing weather or strong winds.		
Responsible Entity:	Emergency Management Coordinator		
Losses avoided:	Prevent the loss of power during hazard events that in turn prevents the loss of life and property.		
Cost Estimate:	$1,500,000	**Timeframe:**	48-56 months
Potential Funding Sources:	HMGP, Local Budget	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	2 = Mid-Level Priority Rating	**Feasibility Score:**	0
Does this action reduce effects of hazards on existing buildings?			yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			no

Jurisdiction:	All Participating Jurisdictions	**Action:**	25
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Tornado		
Project Title:	Structural Project		
Project Description:	Purchase property and construct individual community safe rooms in or near potentially impacted areas.		
Responsible Entity:	Emergency management		
Losses avoided:	Prevents loss of life during natural disaster		
Cost Estimate:	$2,000,000	**Timeframe:**	24-36 months
Potential Funding Sources:	FEMA Emergency Management Planning Grants, FEMA-Emergency Operations Center, PDM program, HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	5
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	All Participating Jurisdictions	**Action:**	27
Hazard(s) Addressed:	Floods		
Project Title:	Structural Project		
Project Description:	Develop a community-wide drainage system in Southwood Forest Subdivision and Forgotten Forest Subdivision.		
Responsible Entity:	County commissioner, Precinct 4 Road and Bridge Dept.		
Losses avoided:	Prevent loss of life and property through improve drainage system		
Cost Estimate:	$500,000	**Timeframe:**	12-24 months
Potential Funding Sources:	USACE Small Flood Control Projects, USDA NRCS-Emergency Watershed Protection Agency, TWDB Clean Water State Revolving Fund, TWDB (Development Fund II)-Texas Water Development Fund, USDA NRCS-Watershed Protection and Flood Prevention Program, EPA NPS Grant	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	4
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	All Participating Jurisdictions	**Action:**	28
Hazard(s) Addressed:	Lightning Wildfire Severe Thunderstorms		
Project Title:	Lightning and Fire Protection		
Project Description:	Develop a program that offers reduced price lightning rods and technical assistance for homeowners throughout the city.		
Responsible Entity:	Walker County OEM		
Losses avoided:	Prevent the loss of homes and residents who could be affected by lightning throughout the county.		
Cost Estimate:	150000	**Timeframe:**	12-18 months
Potential Funding Sources:	HMGP, FP&S Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	4
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	All Participating Jurisdictions	**Action:**	33
Hazard(s) Addressed:	Expansive Soils		
Project Title:	Foundation Protection		
Project Description:	Install moisture sensing irrigation systems at all existing and future county, local, and critical facilities. Irrigation systems automatically water building to reduce the impacts of shrinking and swelling soils during drought.		
Responsible Entity:	Emergency Management Coordinator		
Losses avoided:	Structural foundations and anticipated cost of repairs		
Cost Estimate:	$500,000	**Timeframe:**	12-18 months
Potential Funding Sources:	Local Budget and HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	1
Does this action reduce effects of hazards on existing buildings?			yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			no

Jurisdiction:	All Participating Jurisdictions	**Action:**	34
Hazard(s) Addressed:	Hail		
Project Title:	Hail Damage Protection		
Project Description:	The county and partnering jurisdictions will retrofit city and county owned structures with roofs and window panes that can withstand hail damage, and protect county vehicles with covered parking.		
Responsible Entity:	Walker County OEM and Local Building Departments		
Losses avoided:	Buildings, residents, and city/ county employees in county and city buildings when a hail storm hits.		
Cost Estimate:	$820,000	**Timeframe:**	36-48 Months
Potential Funding Sources:	HMGP, Housing Preservation Grants, Weatherization Assistance Program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	0
Does this action reduce effects of hazards on existing buildings?			yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			no

Jurisdiction:	All Participating Jurisdictions	**Action:**	35
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Heat Events Wildfire Severe Thunderstorms Tornado		
Project Title:	Structural Project		
Project Description:	Construct safe room with generator at KSAM radio station.		
Responsible Entity:	Emergency Management		
Partners:			
Losses avoided:	Prevent loss of life		
Cost Estimate:	$150,000	**Timeframe:**	24-36 months
Potential Funding Sources:	PDM, HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	-1
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	All participating Jurisdictions	**Action:**	36
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado Lightning Drought Expansive Soils Heat Events Hail Winter Weather Dam/Levee Failure		
Project Title:	Public Information and Awareness		
Project Description:	The county and participating jurisdictions will create and implement an education campaign to educate the public on mitigation techniques for all hazards.		
Responsible Entity:	Walker County OEM, City of Riverside, City of New Waverly		
Partners:			
Losses avoided:	Prevent and reduce the loss of life and property		
Cost Estimate:	$2500.00	**Timeframe:**	12 months
Potential Funding Sources:	PDM Program, HMGP		
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	8
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	All participating Jurisdictions	**Action:**	37
Hazard(s) Addressed:	Drought		
Project Title:	Drought Tolerant Plants		
Project Description:	The county and participating jurisdictions will install drought tolerant plants at all county and city buildings.		
Responsible Entity:	Walker County OEM, City of Riverside, City of New Waverly		
Partners:			
Losses avoided:	Prevent and reduce the loss of life and property		
Cost Estimate:	$12,500.00	**Timeframe:**	6 months
Potential Funding Sources:	PDM Program, HMGP		
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	8
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	All participating Jurisdictions	**Action:**	38
Hazard(s) Addressed:	Drought		
Project Title:	Water Conversation		
Project Description:	The county and participating jurisdictions will install low-flow water systems into any new or renovated public buildings.		
Responsible Entity:	Walker County OEM, City of Riverside, City of New Waverly		
Partners:			
Losses avoided:	Prevent and reduce the loss of life and property		
Cost Estimate:	$25,000	**Timeframe:**	12-24 months
Potential Funding Sources:	PDM Program, HMGP		
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	-3
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Unincorporated Walker County

Jurisdiction:	Walker County	**Action:**	1
Hazard(s) Addressed:	Floods		
Project Title:	Public Information and Awareness		
Project Description:	Purchase high water (flood) indicator for Bedias Creek Crossing.		
Responsible Entity:	Walker County OEM and Madison County OEM		
Losses avoided:	Prevent loss of life and property with better notification system. Multijurisdictional benefit because it located on the Madison County and Walker County border.		
Cost Estimate:	$500,000	**Timeframe:**	6-12 months
Potential Funding Sources:	HMGP, PDM	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	1 = Highest Priority Rating	**Feasibility Score:**	7
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Walker County	**Action:**	3
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado		
Project Title:	Property Protection		
Project Description:	Install permanently mounted 100 kw generator on a concrete pad at Courthouse Annex building #3 to provide continuous critical services to County and continuity of government		
Responsible Entity:	Emergency management		
Losses avoided:	Prevent loss of life and property by providing emergency power at critical facility during a natural disaster.		
Cost Estimate:	$200,000	**Timeframe:**	12 MONTHS
Potential Funding Sources:	HMGP, PDM	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	1 = Highest Priority Rating	**Feasibility Score:**	5
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Walker County	**Action:**	4
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado		
Project Title:	Property Protection		
Project Description:	Install permanently mounted 50KW generator, three (3) phase, on a concrete pad at the Walker County District Attorney's Office to provide continuous Critical services to the County and continuity of government.		
Responsible Entity:	Emergency Management		
Losses avoided:	Prevent loss of life and property by providing emergency power at critical facility during a natural disaster.		
Cost Estimate:	$50,000	**Timeframe:**	12 months
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	1 = Highest Priority Rating	**Feasibility Score:**	5
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Walker County	**Action:**	6
Hazard(s) Addressed:	Hurricane/ Tropical Storms Severe Thunderstorms Tornado Hail Winter Storms		
Project Title:	Property Protection		
Project Description:	Install permanently mounted 600 KW generator on a concrete pad to ensure continuity of critical services at Walker county courthouse.		
Responsible Entity:	Emergency management		
Losses avoided:	Prevent loss of life and property by providing emergency power at critical facility during a natural disaster.		
Cost Estimate:	$400,000	**Timeframe:**	12 MONTHS
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	1 = Highest Priority Rating	**Feasibility Score:**	5
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Walker County	**Action:**	5
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Tornado		
Project Title:	Structural Project		
Project Description:	Construct an emergency animal shelter that will house animals of all kinds and size for use during events where sheltering will be needed.		
Responsible Entity:	Emergency Management		
Losses avoided:	Prevent loss of animal life and reduce livestock economic losses during natural disasters.		
Cost Estimate:	$5,500,000	**Timeframe:**	24-36 Months
Potential Funding Sources:	PDM Program, HMGP, HUD Disaster Recovery Initiative Program, FEMA-Emergency Management Planning Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	1 = Highest Priority Rating	**Feasibility Score:**	5
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Walker County	**Action:**	7
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Structural Project		
Project Description:	Retrofit and harden the Emergency Operations Center serving Walker County including city of Huntsville, New Waverly and Riverside.		
Responsible Entity:	Emergency Management		
Losses avoided:	Prevent loss of life		
Cost Estimate:	$4,000,000	**Timeframe:**	18-24 months
Potential Funding Sources:	FEMA Emergency Operations Center, Department of Justice-State Homeland Security Program, FEMA Emergency Management Planning Grants	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	1 = Highest Priority Rating	**Feasibility Score:**	4
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Walker County	**Action:**	9
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms		
Project Title:	Emergency Services		
Project Description:	Purchase multi-purpose high water rescue/dive team/patrol boat.		
Responsible Entity:	Emergency Management		
Losses avoided:	Prevent loss of life during floods and hurricane.		
Cost Estimate:	$150,000	**Timeframe:**	12 months
Potential Funding Sources:	PDM program, HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	1 = Highest Priority Rating	**Feasibility Score:**	3
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Walker County	**Action:**	10
Hazard(s) Addressed:	Hurricane/ Tropical Storms Severe Thunderstorms Tornado Hail Winter Storms		
Project Title:	Property Protection		
Project Description:	Install permanently mounted 60 KW generator on a concrete pad at KSAM Radio Station to provide continuous broadcast services to citizens of the County.		
Responsible Entity:	Emergency Management		
Losses avoided:	Prevent loss of life and property through improved communication system during natural disasters.		
Cost Estimate:	$1,000,000	**Timeframe:**	12 months
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	1 = Highest Priority Rating	**Feasibility Score:**	3
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Walker County	**Action:**	11
Hazard(s) Addressed:	Floods		
Project Title:	Public Information and Awareness		
Project Description:	Purchase high water (flood) indicators for low water river crossing for county roads.		
Responsible Entity:	Planning and Development Dept.		
Partners:			
Losses avoided:	Prevent loss of life and property with better notification system.		
Cost Estimate:	$500,000	**Timeframe:**	12-48 months
Potential Funding Sources:	HMGP, Flood Mitigation Assistance Program, PDM Program, HUD-Disaster Recovery Initiative Program, CDBG, FEMA-Emergency Management Performance Grant, USACE-Small Flood Control Projects, USDA NRCS-Watershed Protection and Flood Prevention Program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	2 = Mid-Level Priority Rating	**Feasibility Score:**	6
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Walker County	**Action:**	13
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado		
Project Title:	Property Protection		
Project Description:	Permanently install 100kw generator at Road & Bridge Precincts 1,2 & 3 barns to maintain continuity of government		
Responsible Entity:	Emergency Management		
Partners:			
Losses avoided:	Prevent loss of life and property by providing emergency power at critical facility during a natural disaster.		
Cost Estimate:	$500,000	**Timeframe:**	12 months
Potential Funding Sources:	PDM Program, HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	2 = Mid-Level Priority Rating	**Feasibility Score:**	5
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Walker County	**Action:**	14
Hazard(s) Addressed:	Floods Wildfire		
Project Title:	Prevention		
Project Description:	Obtain topographical maps and aerial photography for Walker County to identify flood hazards and wildfire hazard areas. Notify and educate public in these areas of risk, and work to develop mitigation actions to address vulnerable areas.		
Responsible Entity:	Planning and Development Department		
Partners:			
Losses avoided:	Prevent loss of life and property		
Cost Estimate:	$500,000	**Timeframe:**	6-12 months
Potential Funding Sources:	FEMA Map Modernization Program, FEMA-Flood Hazard mapping Program Dept. of the Interior, USGS Mapping Standards Support, FEMA Flood Recovery Program	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	2 = Mid-Level Priority Rating	**Feasibility Score:**	5
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Walker County	**Action:**	16
Hazard(s) Addressed:	Floods Hurricane/ Tropical Storms Wildfire Tornado		
Project Title:	Structural Project		
Project Description:	Purchase the property and construct two (2) 7,000 square foot self sufficient, self contained storm shelter as we are a State Shelter Hub.		
Responsible Entity:	Emergency Management		
Partners:			
Losses avoided:	Prevent loss of life during natural disasters		
Cost Estimate:	$8,000,000	**Timeframe:**	36-60 months
Potential Funding Sources:	FEMA Emergency Management Planning Grants, FEMA-Emergency Operations Center, PDM program, HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	2 = Mid-Level Priority Rating	**Feasibility Score:**	4
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Walker County	**Action:**	18
Hazard(s) Addressed:	Floods		
Project Title:	Structural Project		
Project Description:	Install removable facility flood gates at Walker County Annex #2		
Responsible Entity:	Emergency Management		
Partners:			
Losses avoided:	Prevent loss of county property during flood events.		
Cost Estimate:	$20,000	**Timeframe:**	12-24 months
Potential Funding Sources:	USACE-Small Flood Control Projects, USDA NRCS-Emergency Watershed Protection Agency, TWDB-Clean Water State Revolving Fund, TWDB (Development Fund II) - Texas Water Development Fund, USDA NRCS-Watershed Protection and Flood Prevention Program, EPA, NPS, G	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	2 = Mid-Level Priority Rating	**Feasibility Score:**	3
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Walker County	**Action:**	19
Hazard(s) Addressed:	Hurricane/ Tropical Storms Wildfire Severe Thunderstorms Tornado		
Project Title:	Emergency Services		
Project Description:	Finish fiber optic communications project		
Responsible Entity:	Information Technology		
Losses avoided:	Prevent loss of life and property through improved communication system during natural disasters.		
Cost Estimate:	$125,000	**Timeframe:**	48-60 months
Potential Funding Sources:	PDM Program, HMGP FEMA-All Hazards Operational Planning, FEMA-Fire Management Assistance Program, FEMA Emergency Operation Center Funding	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	2 = Mid-Level Priority Rating	**Feasibility Score:**	3
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	Walker County	**Action:**	21
Hazard(s) Addressed:	Hurricane/ Tropical Storms Tornado		
Project Title:	Structural Project		
Project Description:	Protection for emergency generators at all county facilities, from high winds and/or debris due to hurricanes or tornadoes.		
Responsible Entity:	Emergency Management		
Losses avoided:	Prevent loss of generators and power at critical facilities during natural disasters		
Cost Estimate:	150000	**Timeframe:**	12 months
Potential Funding Sources:	USACE-Small Flood Control Projects, USDA NRCS-Emergency Watershed Protection Agency, TWDB-Clean Water State Revolving Fund, TWDB (Development Find II)-Texas Water Development Fund, USDA NRCS-Watershed Protection and Flood Prevention Program, EPA NPS Gran	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	2 = Mid-Level Priority Rating	**Feasibility Score:**	2
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Walker County	**Action:**	24
Hazard(s) Addressed:	Floods		
Project Title:	Structural Project		
Project Description:	Elevate and install culverts on Hostetter and Gourd Creek roadways to prevent flooding and/or flood damage on roadway.		
Responsible Entity:	County Commissioner, Precinct 4 Road and Bridge Dept.		
Losses avoided:	Prevent loss of life and property during flood events		
Cost Estimate:	$2,500,000	**Timeframe:**	24-36 months
Potential Funding Sources:	USACE-Small Flood Control Projects, USDA NRCS-Emergency Watershed Protection Agency, TWDB-Clean Water State Revolving Fund, TWDB (Development Fund II)-Texas Water Development Fund, EPA NPS Grant Program, PDM, HMGP, 406 Public Assistance Program USDA NRCS	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio

Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	7
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Walker County	**Action:**	26
Hazard(s) Addressed:	Floods		
Project Title:	Property Protection		
Project Description:	Acquire repetitive flood loss properties and properties prone to flooding in the Deep River Plantation Subdivision.		
Responsible Entity:	Planning and Development dept.		
Losses avoided:	Prevent loss of life and property		
Cost Estimate:	$5,000,000	**Timeframe:**	48-60 months
Potential Funding Sources:	HMGP, Flood Mitigation Assistance Program, PDM Program, HUD-Disaster recovery Initiative Program, CDBG	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	4
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	Walker County	**Action:**	31
Hazard(s) Addressed:	Wildfire		
Project Title:	Property Protection		
Project Description:	Create defensible space per Walker County Wildland Protection Plan around buildings in, Lost Meadows, Smith Hill/Gospel Hill Community, Forgotten Forest, Sunset Lake, Club Lake, Watson Lake Subdivision, Texas Grand Ranch, Canyon Ranch, Sterling Ridge Subdivision, Wildwood Sores Subdivision and Sam Houston Estates.		
Responsible Entity:	Emergency Management		
Losses avoided:	Prevent loss of life and property due to wildfires		
Cost Estimate:	$2,000,000	**Timeframe:**	36-60 months
Potential Funding Sources:	PDM Program, HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	4
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

New Waverly & Riverside

Jurisdiction:	City of New Waverly and City of Riverside	**Action:**	12
Hazard(s) Addressed:	Floods		
Project Title:	Public Information and Awareness, Prevention		
Project Description:	Rewrite, improve, and implement new local floodplain regulations, to include a public information campaign on regulatory awareness.		
Responsible Entity:	City of Riverside and City of New Waverly		
Partners:			
Losses avoided:	Prevent loss of life and property through education.		
Cost Estimate:	$10,000	**Timeframe:**	36-48 Months
Potential Funding Sources:	HMGP, PDM, FMA	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	2 = Mid-Level Priority Rating	**Feasibility Score:**	5
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of New Waverly and City of Riverside	**Action:**	32
Hazard(s) Addressed:	Floods		
Project Title:	Public Information and Awareness		
Project Description:	Become a CRS communities.		
Responsible Entity:	City of New Waverly and City of Riverside		
Partners:			
Losses avoided:	Become a more resilient community through the CRS program, and mitigate the effects of flooding.		
Cost Estimate:	$5,000	**Timeframe:**	1 month
Potential Funding Sources:	Local budget via staff time	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	2
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

New Waverly

Jurisdiction:	City of New Waverly	**Action:**	2
Hazard(s) Addressed:	Floods		
Project Title:	Property Protection, Structural Project		
Project Description:	Generate base flood elevation data for flood map revisions. Use a floodplain study to identify future mitigation activities to improve water ways and flood carrying capacities for watersheds affecting the City's municipal areas. Area to include approximately 4 miles of floodway in New Waverly.		
Responsible Entity:	City of New Waverly		
Partners:			
Losses avoided:	Prevent future loss of life and property		
Cost Estimate:	$2,500,000	**Timeframe:**	24-36 months
Potential Funding Sources:	PDM Program, HMGP, FMA	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	1 = Highest Priority Rating	**Feasibility Score:**	5
Does this action reduce effects of hazards on existing buildings?			No
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			No
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			Yes

Jurisdiction:	City of New Waverly	**Action:**	8
Hazard(s) Addressed:	Hurricane/ Tropical Storms Severe Thunderstorms Tornado Hail Winter Storms		
Project Title:	Property Protection		
Project Description:	Install permanently mounted 250kw generator to power the New Waverly ISD operations center and fuel pumps during a disaster or power outage		
Responsible Entity:	New Waverly ISD		
Partners:			
Losses avoided:	Prevent loss of life and communication by providing emergency power at critical facility during a natural disaster.		
Cost Estimate:	$80,000	**Timeframe:**	12-18 months
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	1 = Highest Priority Rating	**Feasibility Score:**	4
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	City of New Waverly	**Action:**	30
Hazard(s) Addressed:	Wildfire		
Project Title:	Property Protection		
Project Description:	Create defensible space per Walker County County-Wide Wildland Protection Plan in Wildwood Shores Subdivision, Sam Houston Estates and Little Road Loop areas.		
Responsible Entity:	Fire Dept. and VFDs		
Partners:			
Losses avoided:	Prevent loss of life and property due to wildfires		
Cost Estimate:	$1,500,000	**Timeframe:**	36-48 months
Potential Funding Sources:	FEMA-Assistance to Fire Fighters Grants, FEMA-Fire Management Assistance Grants, FEMA-All Hazards Operational Planning Grants, USDA NRCS-Emergency Watershed Protection Program, HMGP, PDM	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	4
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Jurisdiction:	New Waverly	**Action:**	23
Hazard(s) Addressed:	Dam / Levee Failure		
Project Title:	Remedy Data Deficiency		
Project Description:	Conduct a proper risk assessment of the dams residents suspect are causing upstream flooding, and determine all potential inundation areas.		
Responsible Entity:	City of New Waverly		
Partners:	Walker County OEM		
Losses avoided:	Prevent loss of life and property		
Cost Estimate:	$60,000	**Timeframe:**	12 months
Potential Funding Sources:	HMGP	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	7
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Riverside

Jurisdiction:	City of Riverside	**Action:**	29
Hazard(s) Addressed:	Wildfire		
Project Title:	Property Protection		
Project Description:	Create defensible space per Walker County County-Wide Wild land Protection Plan in Acorn Hill subdivision		
Responsible Entity:	Emergency Management		
Partners:			
Losses avoided:	Prevent loss of life and property due to wildfires.		
Cost Estimate:	$500,000	**Timeframe:**	36-48 months
Potential Funding Sources:	FEMA-Assistance to Fire Fighters Grant, FEMA-Fire Management Assistance Grants, FEMA-All Hazards Operational Planning Grants, USDA NRCS-Emergency Watershed Protection Program, HMGP, PDM	**Benefit-Cost Ratio:**	More than a 1:4 cost-benefit ratio
Priority Rating	3 = Lowest Priority Rating	**Feasibility Score:**	4
Does this action reduce effects of hazards on existing buildings?			Yes
Does this action reduce effects of hazards for new buildings, infrastructure, or future development?			Yes
Does mitigation action identify, analyze, and prioritize actions related to continued compliance with NFIP?			No

Part 8: Plan Maintenance

Part 8: PLAN MAINTENANCE

To remain an effective tool, the HMAP will undergo continuous review and updates. This practice is known as plan maintenance and requires monitoring, evaluating, updating, and implementing the plan. To accomplish this, a Plan Maintenance Team (PMT) has been determined and is comprised of representatives from each of the County's participating jurisdictions.

Plan Maintenance Team	
Plan Maintenance Team Leader	Walker County Emergency Management Coordinator
Jurisdiction	**Responsible Entity**
Unincorporated Walker County	Walker County OEM and County Judge
City of New Waverly	Mayor
City of Riverside	Mayor
Members of the Public	Public

Public Involvement

Continued stakeholder and public involvement will remain a vital component of the HMAP. The HMAP will be hosted on the County and H-GAC websites, and public input can be submitted at any time. The PMT is responsible for documenting public feedback, and presenting the comments for discussion at each annual Plan Maintenance Meeting.

The PMT Leader will also conduct outreach and invite the public to annual Plan Maintenance meetings. The PMT Leader will advertise all annual meetings in local newspapers, post invitations on the County social media pages, and post fliers at city and county buildings 30 days prior to the meetings.

In addition, each participating jurisdiction will seek input from the public on the status of existing hazards, emerging vulnerabilities, and evaluate the HMAP's strategy with the public. During each meeting, the PMT will provide an open comment forum for interactive discussion with the public. The development of new goals and strategies will be a joint effort between the PMT and public participants.

Procedures & Schedule

Procedures to monitor and evaluate the HMAP were determined during the December 18th meeting. This ensures that the goals, objectives, and the mitigation strategy are regularly examined for feasibility, and that the HMAP remains a relevant and adaptive tool. The PMT will meet annually, and hold its first meeting within one year after the plan's approval date. An additional mid-year meeting will be held 18 months prior to the plan's expiration to develop a timeline and strategy to update the HMAP.

Plan Maintenance: Evaluation & Monitoring Procedures

Method and Procedures	Schedule	Responsible Entity
The PMT Leader will advertise all annual meetings in local newspapers, post invitations on the County social media pages, and post fliers at city and county buildings 30 days prior to the meetings.	30 days prior to annual meetings	Plan Maintenance Team Leader
The PMT Leader is responsible for evaluating the entire plan prior to the meeting. Each PMT member will be asked to identify and discuss any deficiencies in the plan as it relates to their jurisdiction. Each PMT member will discuss their findings followed by public input and comments.	Annually	PMT Leader, PMT member for each participating jurisdiction, and Public
Emerging hazards, risks, and vulnerabilities will be identified and discussed. 1) PMT members are responsible for monitoring each natural hazard in their jurisdiction, and providing a written and/or verbal update on any new occurrences and emerging risks. 2) The PMT Leader will seek input from participants and the public at the annual meetings by opening the meeting for public comment. 3) Newly identified hazards, risks, and vulnerabilities will be assigned to a PMT member to research and monitor.	Annually	Public and all participating jurisdictions
The PMT will evaluate the mitigation goals and objectives to ensure the HMAP remains relevant and the strategy continues to be effective. 1) PMT members will identify new projects and/or re-prioritize existing strategies based on changes in their jurisdiction, emerging hazards, and shifting priorities. 2) Mitigation strategies for the newly identified hazards, risks, and vulnerabilities will be proposed and discussed. 3) Funding sources and multijurisdictional cooperation for new initiatives will be determined.	Annually	PMT member for each participating jurisdiction
Each participating jurisdiction will evaluate their progress implementing the mitigation strategy. 1) Representatives will publicly discuss progress and submit written progress reports to the team leader. 2) Completed and ongoing mitigation actions will be discussed by responsible entity. 3) Unaddressed mitigation actions will be evaluated for relevancy and/or amended to increase feasibility. 4) Feasibility of the mitigation strategy will be evaluated, and any necessary revisions will be proposed. 5) The team leader will seek comment from the public after each participating jurisdiction's presentation.	Annually	PMT, the responsible department identified in the mitigation action up for discussion, and the public.
The PMT will develop a timeline and strategy to update the plan 18 months before it expires. The update strategy will include: 1) Establish entities responsible for drafting and submitting the update to TDEM 2) Send appropriate representatives to G-318 training. 3) Determine funding needs and funding sources for plan update.	Every 5 years	PMT

Plan Integration

Integrating the HMAP into county and local planning mechanisms is key to its success. Effective integration allows communities to benefit from existing plans and procedures to further reduce their vulnerability and risk. Upon approval of the plan and approval of updates or revisions as proposed by the Plan Maintenance team, each participating jurisdiction will follow the pre-determined actions:

Chart 1: Hazard Mitigation Plan Adoption and Integration Procedures	
Walker County	HMAP will be presented to the Commissioner's Court by the Walker County Emergency Management Office. An agenda for the meeting will be posted 60 days in advance, and a 30-day period of public comment will be provided. Upon approval by Commissioner's Court, the approved HMAP will be integrated into existing planning mechanisms described in Chart 2.
City of New Waverly & City of Riverside	The HMAP will be presented to the mayor and alderpersons by the Walker County Office of Emergency Management. Upon review and approval by the mayor, approved actions, amendments, and revisions will be acted upon and/or integrated into existing planning mechanisms detailed in Chart 2.

To update and revise existing planning mechanisms to further integrate the HMAP, each participating jurisdiction will follow a basic process(es) described in this section.

1.) Propose a policy, strategy, or regulatory amendment to the proper governing body.
2.) Advertise the amendment 15 days prior to meeting where it will be discussed. Advertising procedures for the public meeting(s) is outlined in the public involvement measures described in Section 8 of this plan.
3.) Provide the public, elected officials, and governing bodies the opportunity to discuss and comment upon proposed change(s).
4.) If the proposal is accepted, the change is implemented by the appropriate governing authority.

Several existing plans and programs that require integration of the HMAP have been identified by the participating jurisdictions. The PMT will initiate the process described above. As each participating jurisdiction develops or approves new planning mechanisms, the mechanism's name and the integration method will be added to the HMAP

Chart 2: Integration of HMAP and Planning Mechanisms

Planning Mechanism	Integration Method
Disaster Recovery Plan	Both plans should be updated and maintained in accordance with the other plan's goals and strategies. The HMAP will be consulted before any revisions or update to the disaster recovery plans are made.
Emergency Operations Plan	Both plans will be continuously evaluated and monitored. Any Emergency Operations Plan updates will refer to, incorporate, and/or complement the HMAP.
Subdivision Regulations	New Waverly and Riverside will review their codes, and propose the adoption of codes that support mitigation activities defined in the HMAP when appropriate.
Planning & Development Regulations	Each participating jurisdiction has reviewed the vulnerabilities defined in the HMAP and will adopt codes that support mitigation strategy and mitigation activities. PMT members will propose code amendments to the appropriate governing body, following to process to amend codes in the jurisdiction, and document any regulation amendments to be included in the HMAP update.
Annual Budget	Walker County and each participating jurisdiction will review their annual budget in July for opportunities to fund their highest priority mitigation actions.

Mutual Aid Agreements	Walker County and each participating jurisdiction was satisfied with their mutual aid agreements when the HMAP was drafted. If any mutual aid agreements change and negatively impact a participating jurisdiction(s), Walker County and each participating jurisdiction will amend the HMAP to include the new vulnerability and include a mitigation action to address it.
Floodplain Regulations	Walker County's floodplain regulations provide preventative measures to prevent future development in the floodplains, and it also provides corrective guidance on development in the floodplain. When the regulations are updated, it will be reflected the mitigation action strategy for flooding in Section 7 of this plan.
Transportation Plan	When the plan is updated or revised, the PMT will propose the adoption of codes that support mitigation strategy and mitigation activities.
Huntsville Hazard Mitigation Plan	The City of Huntsville within Walker County is developing its own Hazard Mitigation Plan. Upon approval, the Walker County Hazard Mitigation Plan will be provided to the City of Huntsville Emergency Management Coordinator to ensure the plans are complementary.

2017

Appendix A: Planning Process

APPENDIX A: Planning Process Documentation

Public Meeting Attendees: October 11, 2017

Name	Title	Organization/Jurisdiction/Agency
Lorena Reyes	Hazard Mitigation Planner	Texas Department of Emergency Management
Alexis Hall	Community Planner: Reserve	Federal Emergency Management Agency
Jamie Leigh Price	Community Planner	Federal Emergency Management Agency
Josh Owens	Senior Regional Planner	Houston - Galveston Area Council
Jimmy Henry	Commissioner	Walker County and City of Riverside
Joey Kaspar	Senior Regional Planner	Houston - Galveston Area Council
Amy Combs	Regional Planner	Houston - Galveston Area Council
Danny Pierce	Walker County Judge	Walker County and City of New Waverly
Butch Davis	Emergency Management Coordinator	Walker County Office of Emergency Management
Joe Connell	CERT Coordinator	Walker County Office of Emergency Management
Jeff Taebel	Director of Community & Environmental Planning	Houston - Galveston Area Council

Multi-jurisdictional Meeting Attendees: December 18, 2017

Name		Organization
Brian Cantrell	Emergency Management Coordinator	Waller County Office of Emergency Management
Glenn LaMont	Deputy Emergency Management Coordinator	Brazoria County Office of Emergency Management
Ray Chislett	Emergency Management Coordinator	Austin County Office of Emergency Management
Butch Davis	Emergency Management Coordinator	Walker County Office of Emergency Management
Sherri Pegoda	Deputy Emergency Management Coordinator	Walker County Office of Emergency Management
Morgan Lumbley	Hazard and Community Planner	Montgomery County Office of Emergency Management
Darren Hess	Emergency Management Coordinator	Montgomery County Office of Emergency Management
Tom Branch	Emergency Management Coordinator	Liberty County Office of Emergency Management
Yancy Scott	Waller County Engineer	Waller County Office of Emergency Management
Joey Kaspar	Senior Regional Planer	Houston - Galveston Area Council
Amy Combs	Regional Planner	Houston - Galveston Area Council
Cheryl Mergo	Project Manager	Houston - Galveston Area Council
Jeff Taebel	Director of C&E	Houston - Galveston Area Council

Public Meeting Attendees: February 22, 2018

Name	Organization or Jurisdiction Represented
Lynn Scott	Panorama Village
Royce Engler	Panorama Village
James Nowak	City of Willis – City Engineer
Joe Connell	Walker County Office of Emergency Management – CERT Coordinator
Butch Davis	Walker County Office of Emergency Management - EMC
Sherri Pegoda	Walker County Office of Emergency Management- Deputy EMC
Tom Branch	Liberty County Office of Emergency Management - EMC
Doug Odom	Sam Houston State University – Emergency Services Manager
Kassie Laughlin	City of Conroe – Emergency Services Coordinator
Andrew Isbell	Walker County – County CFM
Jon Henderson	Walker County
Jennifer Manuel	Ernest Bailes State Representative's Office – Outreach Coordinator
Joey Kaspar	Houston - Galveston Area Council – Sr Regional Planner
Amy Combs	Houston - Galveston Area Council -- Regional Planner
Danny Pierce	Walker County and City of New Waverly -Walker County Judge
Tak Makino	Lockwood, Andrew, and Newnam, Inc – Hazard Mitigation Planner
Janine Ellington	Lockwood, Andrew, and Newnam, Inc – Hazard Mitigation planner
Brandon Decker	City of New Waverly – Public Works Dept
Brenda Bartee	Walker County
John Waldo	Huntsville, Texas
Dena Daniel	Huntsville Memorial Hospital
Pam Peterson	Texas Department of State Health Services
Sandra Allen	Texas Department of State Health Services

Public Meeting Press Release & Advertisement

HOUSTON-GALVESTON AREA COUNCIL

PO Box 22777 • Houston, Texas 77227-2777• 713-627-3200

NEWS RELEASE

FOR IMMEDIATE RELEASE
September 29, 2017

Contact: Joey Kaspar: (713) 993-4547 or Joey.Kaspar@h-gac.com

Becki Begley: (713) 993-2410 or Becki.Begley@h-gac.com (Media Inquiries Only)

WALKER COUNTY HAZARD MITIGATION PLAN KICK-OFF MEETING

The Houston-Galveston Area Council (H-GAC), in partnership with Walker County, City of Waverly, and City of Riverside, is hosting the first public meeting to develop Walker County's Hazard Mitigation Plan. The meeting will be held from 9:00 a.m. to noon, October 11, at the Walker County Storm Shelter, 455 SH 75 N, Huntsville, TX, 77320.

A Hazard Mitigation Plan is a strategic plan that proposes actions to reduce or eliminate long-term risk to people and property from future natural disasters. Public input and involvement is important for developing a comprehensive approach to reduce the effects of natural disasters on communities.

All Walker County residents are invited to participate and contribute their local expertise during the planning process. Mitigation actions developed by participants will be considered for inclusion in the County's Hazard Mitigation Plan to be submitted to the Federal Emergency Management Agency (FEMA).

The meeting agenda is available on H-GAC's website at http://www.h-gac.com/community/community/hazard/documents/10-11-17-Walker-County-Meeting-Agenda.pdf

More information on hazard mitigation plans is available on FEMA's website at https://www.fema.gov/hazard-mitigation-planning.

For more information about the meeting, contact Joey Kaspar at (713) 993-4547 or at Joey.Kaspar@h-gac.com, or Amy Combs, (713) 993-4544 or at Amy.Combs@h-gac.com.

Houston-Galveston Area Council

The Houston-Galveston Area Council (www.h-gac.com) is a voluntary association of local governments in the 13-county Gulf Coast Planning Region—an area of 12,500 square miles and more than 6 million people. H-GAC works to promote efficient and accountable use of local, state, and federal tax dollars and serves as a problem-solving and information forum for local government needs.

Public Meeting Press Release & Advertisement: February 22, 2018

Good Morning,

Walker County is working with the Houston-Galveston Area Council to develop a county-specific hazard mitigation plan. You are invited to a public Hazard Mitigation Workshop on February 22, 2018. The workshop will focus on flood mitigation initiatives through the two sessions below.

Session 1 (9am-12pm)
The morning session will cover the National Flood Insurance Program (NFIP) and the Community Rating System (CRS). These programs aim to reduce the negative impacts of flooding while also reducing the cost of flood insurance.

Session 2 (1:30pm – 3:00pm)
In the afternoon session, participants will work together to add to the Walker County Hazard Mitigation Plan based on the lessons learned in the morning session.

The workshop will be at the Walker County Storm Shelter, 455 SH 75 N, Huntsville. An RSVP would be greatly appreciated, but is not required to attend the workshop.

I'm Joey Kaspar, a senior regional planner at H-GAC and your point of contact for this planning effort. Please contact me if you have any questions.

Thanks,
Joey Kaspar
Houston-Galveston Area Council
Direct Line: 713.993.4547

Public Meeting Agenda: October 11, 2017

Walker County
Hazard Mitigation Plan Kick-Off Meeting

October 11, 2017
9:00 am – 12:00 pm
Walker County Storm Shelter
455 SH 75 N Huntsville, TX 77320

Agenda

8:30-9:00 am **Registration**

9:00 am **Welcome & Overview of Hazard Mitigation Plans & Procedures**
H-GAC Staff will provide an overview of meeting objectives, activities, and H-GAC's planning process. The presentation will also include project timelines, partner roles and responsibilities, in-kind match requirements, and exemptions.

9:15 am **Review 2017 Risk Assessment**
H-GAC staff will present the County's draft risk assessment. Attendees will participate in a breakout session to review the draft risk assessment maps, charts, and provide feedback.

10:10 am **Local Risk Assessment & Capability Form**
Meeting attendees will fill out a form describing the frequency of a hazard, and rate their mitigation capabilities in their jurisdiction.

10:15 am **15-minute Break**

10:30 am **Mitigation Actions Presentation & Activity**
H-GAC staff will give a presentation on creating mitigation actions and facilitate a practice exercise in writing a mitigation action.

11:00 am **Update 2011 Mitigation Actions & Write New Actions**
Review 2011 mitigation actions for viability, and update actions to meet new FEMA standards. With remaining time, draft new mitigations for 2017.

12:00 pm **Adjourn**

Multi-jurisdictional Meeting Agenda: December 18, 2017

Hazard Mitigation Plan Meeting

December 18, 2017
1:30 pm – 3:30 pm
Conference Room D
Houston-Galveston Area Council
3555 Timmons Lane, 2nd Floor
Houston, TX 77027

Agenda

1:15pm **Registration**

1:30pm **Welcome by Jeff Taebel, Director of Community & Environmental Planning**

1:35pm **Progress Update& Meeting Objectives**

1:40pm **Mitigation Strategy &Goals Presentation**
A brief presentation over mitigation strategy goals, and the importance of multi-jurisdictional coordination.

1:50pm – 2:15pm **Goal Development Activity**
H-GAC staff will guide an activity that demonstrates how to draft goals for a Mitigation Strategy. Participants will then draft their County specific goals to be included in their plan's Mitigation Strategy.

2:15pm **15Minute Break**

2:30pm **Plan Maintenance Presentation**
Maintenance Plans are a required component of every Hazard Mitigation Plan. H-GAC staff will give a presentation on the required components and provide example maintenance plans.

2:40pm – 3:00pm **Plan Maintenance Activity**
Participants will develop and draft their 5-year Hazard Mitigation Maintenance Plans.

3:00pm **Project Checklist Review**
A review of the required components for the Hazard Mitigation Plan will be provided for each county. This checklist will provide guidance on completed and remaining tasks. H-GAC staff will field questions and comments regarding the checklist.

3:30pm **Adjourn**

Hazard Mitigation Planning Team

Jurisdiction:

Primary Point of Contact

Name:	
Title:	
Email:	
Phone:	

Please include the information of your jurisidiction's planning team. The planning team consists of anyone who will help your jurisdiction with the Hazard Mitigation Plan:

Other Team Members:

Name:	
Title:	
Email:	

Name:	
Title:	
Email:	

Name:	
Title:	
Email:	

Name:	
Title:	
Email:	

Capability Assessment

City Name (if applicable)

County representatives should list the county

Name

First Name Last Name

Your Title *

Please review the plans and programs listed below. Check which plans and programs your county/city currently has in place.

- [ ] HMP: Hazard Mitigation Plan
- [ ] DRP: Disaster Recovery Plan
- [ ] COMP: Comprehensive Land Use Plan
- [ ] FMP: Floodplain Management Plan
- [ ] SMP: Stormwater Management Plan
- [ ] EOP: Emergency Operations Plan
- [ ] COOP: Continuity of Operations Plan
- [ ] REP: Radiological Emergency Plan
- [ ] SARA: SARA Title III Emergency Response Plan
- [ ] TRANS: Transportation Plan
- [ ] REG-PL: Regional Planning
- [ ] HPP: Historic Preservation Plan
- [ ] SO: Subdivision Ordinance
- [ ] FDPO: Flood Damage Prevention Ordinance
- [ ] CRS: Community Rating System
- [ ] CIP: Capital Improvements Plan (that regulates infrastructure in hazard areas)

Does your county/city have current building codes in place?

○ Yes ○ No ○ Unsure

Does your county/city have current fire codes in place?

○ Yes ○ No ○ Unsure

For codes that apply to your jurisdiction, please indicate their effectiveness in mitigating damages.

	High	Medium	Low	None	Not Applicable
IRC (International Residential Code)	○	○	○	○	○
National Flood Insurance Program Compliance	○	○	○	○	○
Fire Protection Compliance	○	○	○	○	○
Cities zoning, building codes, upgraded NFIP ordinances	○	○	○	○	○

Risk Assessment Survey

Hazard	Planning Area Affected (Jurisdiction/Geographic Area)	Probability (How Likely)	Frequency (How Often)	Extent (Severity of Hazard)	Impact (Severity over Planning Area)	Vulnerability (Risk Assessment)
Floods						
Hurricane/Tropical Storms				Category: 1 2 3 4 or 5		
Wildfire						
Severe Thunderstorms						
Tornado				F1 F2 F3 F4 or F5		
Drought						
Coastal Erosion						
Dam/Levee Failure						
Expansive Soils						
Extreme Heat						
Hail						
Winter Storms						

Score	Area Ratings	Probability Ratings	Frequency Ratings	Extent Ratings	Impact Ratings	Vulnerability Ratings
1	**Negligible:** Less than 10 percent of planning area.	**Unlikely:** Less than 1 percent probability of occurrence in the next 5 years.	**Rare** and isolated occurrences	**Weak:** Limited classification on scientific scale. Results in little to no damage.	**Negligible:** Less than 10 percent of property and population impacted in the planning area.	**Low:** Hazard results in little to no damage, and negligible loss of property, services, and no loss of life. Planning area is not vulnerable to this hazard.
2	**Limited:** 10 to 25 percent of the planning area	**Occasional:** 1 to 10 percent probability of occurrence in the next 5 years	**Infrequent** and irregular occurrences	**Moderate:** classification on scientific scale. Results in some damage and temporary loss of services.	**Limited:** 10 to 25 percent of property and population impacted in the planning area	**Moderate:** Hazard results in some damage, and moderate loss of property, services, and potentially loss of life. Planning area is moderately vulnerable to this hazard.
3	**Significant:** 25 to 75 percent of planning area or	**Likely:** 10 to 90 percent probability of occurrence in the next 5 years.	**Frequent** and regular occurrences	**Severe:** classification on scientific scale. Results in devastating damage and loss of services for weeks or months	**Significant:** 25 to 75 percent of property and population impacted in the planning area	**High:** Hazard results in extensive damage, and extensive loss of property, services, and potentially loss of life. Planning area is highly vulnerable to this hazard.
4	**Extensive:** 75 to 100 percent of planning area	**Highly Likely**: 90 to 100 percent probability of occurrence in the next 5 years	**Consistent** and Predictable Occurrences	**Extreme:** classification on scientific scale. Results in catastrophic damage and uninhabitable conditions	**Extensive:** 75 to 100 percent of property and population impacted in the planning area	**Extreme:** Hazard results in catastrophic damage, loss of property, services, and loss of life. Planning area is extremely vulnerable to this hazard.

Local Risk & Capability Survey

Please rate the cities/ counties ability to reduce the impact of the listed natural hazards.

Hazard	Applicable to your Community?			Current Perceived Risk			Current Ability to Reduce Damages from Hazard			Future Ability to Reduce Damages from Hazard		
Floods	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Hurricane/Tropical Storms	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Wildfire	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Severe Thunderstorms	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Tornado	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Drought	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Coastal Erosion	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Dam/Levee Failure	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Expansive Soils	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Extreme Heat	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Hail	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High
Winter Storms	Yes	No	Unknown	Low	Medium	High	Low	Medium	High	Low	Medium	High

Please rate the cities/ counties ability to reduce the impact of the listed natural hazards.

Hazard	Local Budget			Administrative Staffing			Technical Staffing			Political Determination/Resolve		
Floods	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Hurricane/Tropical Storms	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Wildfire	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Severe Thunderstorms	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Tornado	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Drought	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Coastal Erosion	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Dam/Levee Failure	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Expansive Soils	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Extreme Heat	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Hail	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Winter Storms	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High

NFIP & Flood Plain Management Capability

Name

First Name Last Name

Your Title *

Email

example@example.com

Name of Jurisdiction

County representatives should list the county

Is your jurisdiction a National Flood Insurance Program (NFIP) Participant?

- Yes
- No

NFIP Policy Summary

	Total Number of Policies	Total Coverage	Total Number of Losses	Total Dollars Paid
Summary				

NFIP Staff Assessment

The following questions seek information on your community's participation in and continued compliance with the NFIP. Indicate the source of information.

Is the Community FPA or NFIP Coordinator certified?

- Yes
- No

Source Information

Community FPA

Comments

Is floodplain management an auxiliary function?

- Yes
- No

Source Information

Community FPA

Comments

Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)

Source Information

Community FPA

What are the barriers to running an effective NFIP program in the community, if any?

Source Information

Community FPA

NFIP Compliance History

The following questions seek information on your community's participation in and continued compliance with the NFIP. Indicate the source of information.

Is the community in good standing with the NFIP?

- Yes
- No

Source Information

State NFIP Coordinator, FEMA NFIP Specialist, community records

Comments

Are there any outstanding compliance issues (i.e., current violations)?

- Yes
- No

When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?

Source Information

Comments

Is a CAV or CAC scheduled or needed?

Source Information

2017

Appendix B: Critical Facilities

APPENDIX B: Critical Facilities

NAME	TYPE
Ad Brown Parker	Wastewater Treatments Plant
Adams Lake Dam	Dam
Alpha Omega Academy	Shelter
Armadillo Drive Lake Dam	Dam
Azalea Lake Dam	Dam
Baldwin Dam	Dam
Brod Lake Dam	Dam
Calvary Baptist Church	Shelter
Camellia Lake Dam	Dam
Campbell Lake Dam	Dam
Cook Lake Dam	Dam
Cook Springs Baptist Church	Shelter
Corlay Lake No 1 Dam	Dam
Corlay Lake No 2 Dam	Dam
Crabbs Prairie Fire Department	Fire Station
Crabbs Prairie Volunteer Fire Department	Ems
Dawson Lake Dam	Dam
Dodge Vfd	Fire Station
Dodge Volunteer Fire Department	Ems
Dogwood Lake Dam	Dam
Duke Lake Dam	Dam
Easam Mill Seat Lake Dam	Dam
Eastham And Thomason Ranches Lake Dam	Dam
Elkins Lake Dam	Dam
Elmore Dam	Dam
Fails Lake Dam	Dam
Family Faith Church	Shelter
Fellowship Of Huntsville	Shelter
Fellowship Of Huntsville Church	Shelter
First Baptist Church	Shelter
First Baptist Church Family Life Center	Shelter
First United Methodist Church Of Huntsville	Shelter
Forest Glen Camp	Shelter
Forest Office And Work Center	Fire Station
Gardner Glass Products	Toxic Release Inventory Facility
Gibbs Bros Lake Dam	Dam
Gibbs Brothers Lake No 2 Dam	Dam
Gibbs Pre-K Center	School
Grace Lake Dam	Dam
Griffin Lake Dam	Dam
Hardy Dam	Dam
Hatchery Lake Dam	Dam

Haynes Lake Dam	Dam
Heath Branch Fishing Club Lake Dam	Dam
Hendricks Lake Dam	Dam
Horseshoe Lake No 1 Dam	Dam
Horseshoe Lake No 2 Dam	Dam
Huntsville	Electric Substation
Huntsville - Walker County Emergency Medical Services	Ems
Huntsville Church Of Christ	Shelter
Huntsville El	School
Huntsville H S	High Schools
Huntsville High School	Shelter
Huntsville High School Msn	Shelter
Huntsville Int	School
Huntsville Isd Technology Center	Shelter
Huntsville Memorial Hospital	Hospital
Huntsville State Park Dam	Dam
Indian Hill Lake Dam	Dam
Jameson Dam	Dam
King Lake Dam	Dam
Lake Forest Dam	Dam
Lake Palomas Dam	Dam
Lake Picidae Dam	Dam
Lakeland Levee	Dam
Lost Indian Lake Dam	Dam
Louisiana-Pacific New Waverly Plywood	Toxic Release Inventory Facility
Mallery Lake Dam	Dam
Mance Park Middle	School
Mance Park Middle School	Shelter
Maria Lake Dam	Dam
Master Chemical Corp	Toxic Release Inventory Facility
Materia Inc	Toxic Release Inventory Facility
Mathews Lake Dam	Dam
Mcmillian Lake Dam	Dam
Medpro Emergency Medical Services	Ems
Mitcham Lake Dam	Dam
Morgan South Lake Dam	Dam
Moten Lake Dam	Dam
Muecke Lake Dam	Dam
Murff Lake Dam	Dam
New Waverly El	School
New Waverly H S	High Schools
New Waverly Int	School
New Waverly J H	School
New Waverly Junior High Gym	Shelter
New Waverly Vfd	Fire Station

New Waverly Volunteer Fire Department	Ems
Park Lake Dam	Dam
Pine Prairie Volunteer Fire Department	Ems
Premier H S Of Huntsville	High Schools
Raven School	School
Riverside United Methodist Church	Shelter
Riverside United Methodist Church	Shelter
Riverside Vfd	Fire Station
Riverside Volunteer Fire Department	Ems
Robinson Creek Wwtp	Wastewater Treatments Plant
Romano Lake Dam	Dam
Rose Lake Dam	Dam
Sam Houston State U-Johnson Coliseum	Shelter
Sam Houston State University	Colleges_Universities
Sam Houston State University	Shelter
Sam Houston State University Health & Kinesiology Cente	Shelter
Sam Houston State University Police Department	Police Station
Samuel Houston El	School
Scott Johnson El	School
Spring Lake Dam	Dam
Stewart El	School
Sunset Lake Dam	Dam
Tdcj Ellis Unit	Hazardous Waste Teratment Facility
Tdcj Ellis Unit Dam	Dam
Texas Department Of Public Safety - Highway Patrol Region 2 District C Sergeant 0 Area 3	Police Station
Texas Online Preparatory El	School
Texas Online Preparatory H S	High Schools
Texas Online Preparatory Middle	School
Tfs - Huntsville	Fire Station
Thomas Lake Rd. Vfd	Fire Station
Thomas Lake Road Volunteer Fire Department	Ems
Tillie Lake Lower Dam	Dam
Tillie Lake Upper Dam	Dam
Unknown307803	Electric Substation
Unknown307805	Electric Substation
Unknown307806	Electric Substation
Unknown307807	Electric Substation
Vista Academy Of Huntsville	School
Walker County Constable - Precinct 1	Police Station
Walker County Constable - Precinct 2	Police Station
Walker County Constable - Precinct 3	Police Station
Walker County Constable - Precinct 4	Police Station
Walker County Emergency Operations Center	Local Emergency Operation Center
Walker County Jail	Police Station

Walker County Sheriffs Office	Police Station
Walker County Storm Shelter	Shelter
Waller Lake Dam	Dam
Watson East Dam	Dam
Watson South Dam	Dam
Watson West Dam	Dam
Wesley Memorial United Methodist Church	Shelter
Willey Lake Dam	Dam

Capability Assessment HMP Survey

Submission Date	2017-09-26 15:47:13
City Name (if applicable)	Walker County
Name	Butch Davis
Your Title	Emergency Management Corrdinator
Email	bdavis@co.walker.tx.us
Please review the plans and programs listed below. Check which plans and programs your county/city currently has in place.	HMP: Hazard Mitigation Plan DRP: Disaster Recovery Plan FMP: Floodplain Management Plan EOP: Emergency Operations Plan SO: Subdivision Ordinance
Please provide a link for your DRP: Disaster Recovery Plan, if applicable.	N/A
Please provide a link for your FMP: Floodplain Management Plan, if applicable.	N/A
Please provide a link for your EOP: Emergency Operations Plan, if applicable.	N/A
Please provide a link for your SO: Subdivision Ordinance, if applicable.	N/A
Does your county/city have current building codes in place?	No
Does your county/city have current fire codes in place?	No
Date of Most Recent Evaluation	8-29-2017

For codes that apply to your jurisdiction, please indicate their effectiveness in mitigating damages.

	High	Medium	Low	None	Not Applicable
IRC (International Residential Code)	-	✔	-	-	-
National Flood Insurance Program Compliance	-	✔	-	-	-
Fire Protection Compliance	✔	-	-	-	-
Cities zoning, building codes, upgraded NFIP ordinances	-	-	-	-	✔

Please indicate effectiveness of your jurisdiction's ability to implement mitigation actions and reduce future damages.

	High	Medium	Low	None	Not Applicable
Local Budget	-	-	✔	-	-
Administrative Staffing	-	-	✔	-	-
Technical Staffing	-	-	✔	-	-
Political Determination/Resolve	-	-	✔	-	-

Capability Assessment HMP Survey

Submission Date	2018-01-19 13:03:25
City Name (if applicable)	New Waverly
Name	Rosemary Bartee
Your Title	City Secretary
Email	newwaverly2004@yahoo.com
Please review the plans and programs listed below. Check which plans and programs your county/city currently has in place.	HMP: Hazard Mitigation Plan FMP: Floodplain Management Plan SO: Subdivision Ordinance
Do any of the plans or programs in your jurisdiction contradict your hazard mitigation plan?	No
Does your county/city have current building codes in place?	No
Does your county/city have current fire codes in place?	No

For codes that apply to your jurisdiction, please indicate their effectiveness in mitigating damages.

	High	Medium	Low	None	Not Applicable
IRC (International Residential Code)	-	-	-	-	-
National Flood Insurance Program Compliance	-	-	✔	-	-
Fire Protection Compliance	-	-	-	-	-
Cities zoning, building codes, upgraded NFIP ordinances	-	-	✔	-	-

Please indicate effectiveness of your jurisdiction's ability to implement mitigation actions and reduce future damages.

	High	Medium	Low	None	Not Applicable
Local Budget	-	-	✔	-	-
Administrative Staffing	-	-	✔	-	-
Technical Staffing	-	-	✔	-	-
Political Determination/Resolve	-	-	✔	-	-

Capability Assessment HMP Survey

Submission Date	2018-01-18 11:21:37
City Name (if applicable)	City of Riverside
Name	John LeMaire
Your Title	Mayor
Email	riversidetx@windstream.net
Do any of the plans or programs in your jurisdiction contradict your hazard mitigation plan?	No
Does your county/city have current building codes in place?	No
Does your county/city have current fire codes in place?	No
Date of Most Recent Evaluation	???

For codes that apply to your jurisdiction, please indicate their effectiveness in mitigating damages.

	High	Medium	Low	None	Not Applicable
IRC (International Residential Code)	-	-	-	-	✔
National Flood Insurance Program Compliance	-	-	-	-	✔
Fire Protection Compliance	-	-	-	-	✔
Cities zoning, building codes, upgraded NFIP ordinances	-	-	-	-	✔

Please indicate effectiveness of your jurisdiction's ability to implement mitigation actions and reduce future damages.

	High	Medium	Low	None	Not Applicable
Local Budget	-	-	-	-	✔
Administrative Staffing	-	-	-	-	✔
Technical Staffing	-	-	-	-	✔
Political Determination/Resolve	-	-	-	-	✔

2017

Appendix C: Hazus Analysis

Hazus-MH: Hurricane Global Risk Report

Region Name: Walker County

Hurricane Scenario: Probabilistic 1000-year Return Period

Print Date: Tuesday, November 07, 2017

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

Table of Contents

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Texas

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 801.50 square miles and contains 10 census tracts. There are over 20 thousand households in the region and has a total population of 67,861 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 20 thousand buildings in the region with a total building replacement value (excluding contents) of 4,912 million dollars (2014 dollars). Approximately 93% of the buildings (and 84% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 20,068 buildings in the region which have an aggregate total replacement value of 4,912 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

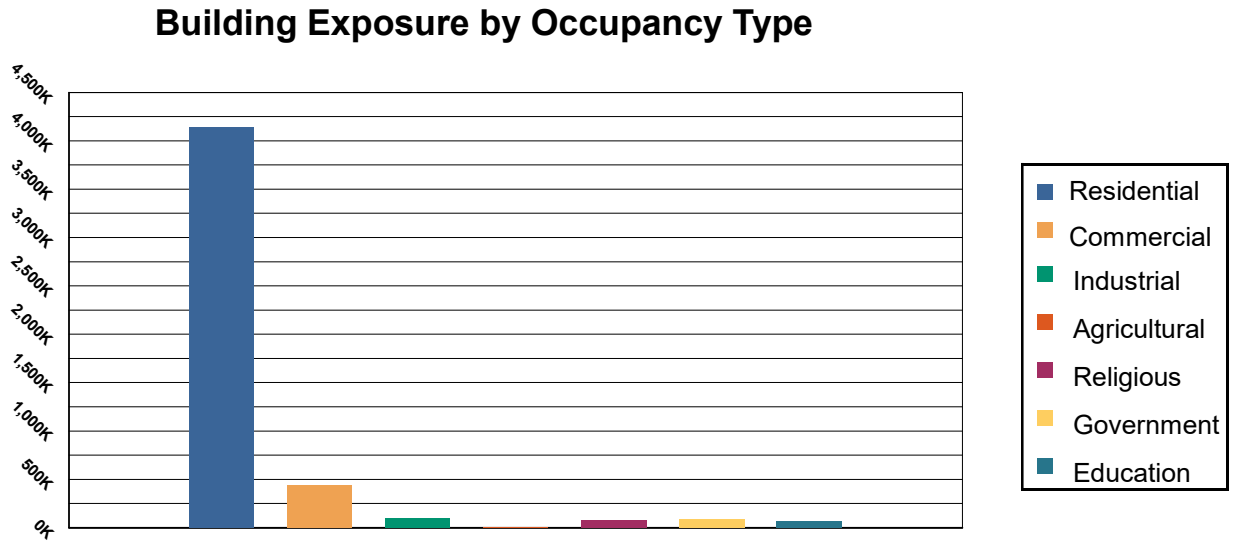


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	4,138,237	84.25 %
Commercial	440,902	8.98%
Industrial	96,235	1.96%
Agricultural	10,037	0.20%
Religious	76,596	1.56%
Government	87,987	1.79%
Education	61,575	1.25%
Total	**4,911,569**	**100.00%**

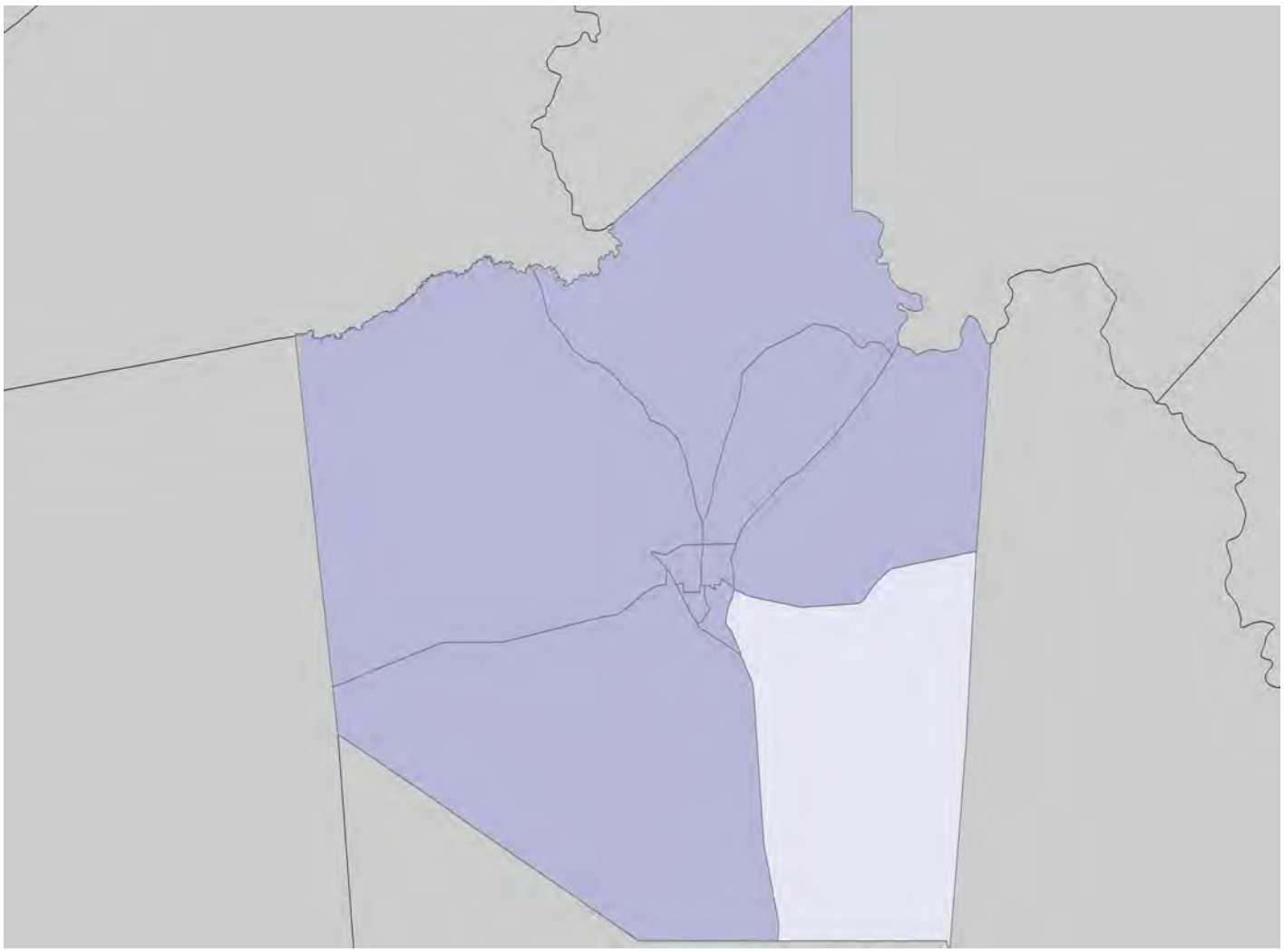
Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 106 beds. There are 19 schools, 7 fire stations, 1 police stations and no emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Thematic Map with peak gust windfield and HU track



Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 1,738 buildings will be at least moderately damaged. This is over 9% of the total number of buildings in the region. There are an estimated 144 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 6 of the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

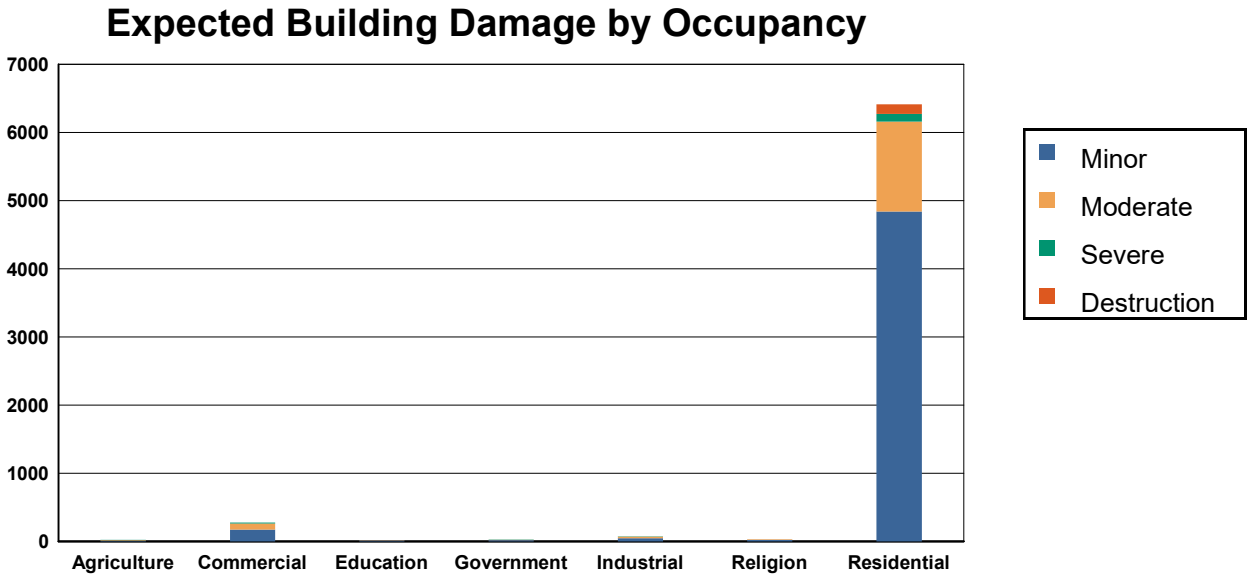


Table 2: Expected Building Damage by Occupancy : 1000 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	33	60.36	10	17.99	7	12.50	4	7.88	1	1.27
Commercial	576	67.72	173	20.37	88	10.32	13	1.56	0	0.03
Education	38	70.87	10	19.11	5	8.74	1	1.29	0	0.00
Government	57	70.08	16	19.82	7	8.78	1	1.33	0	0.00
Industrial	159	67.80	47	19.92	23	9.83	6	2.38	0	0.07
Religion	71	68.57	22	21.41	9	8.65	1	1.37	0	0.00
Residential	12,279	65.70	4,840	25.89	1,320	7.06	109	0.58	143	0.76
Total	**13,212**		**5,118**		**1,458**		**136**		**144**	

Table 3: Expected Building Damage by Building Type : 1000 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	121	62.49	41	21.04	29	14.86	3	1.60	0	0.00
Masonry	1,076	62.91	417	24.39	198	11.60	15	0.87	4	0.22
MH	4,948	96.58	93	1.81	57	1.12	3	0.06	22	0.43
Steel	212	67.64	55	17.66	38	12.10	8	2.55	0	0.04
Wood	7,384	60.86	3,761	31.00	829	6.83	86	0.71	74	0.61

Essential Facility Damage

Before the hurricane, the region had 106 hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (only 0.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 0.00% of the beds will be in service. By 30 days, 100.00% will be operational.

Thematic Map of Essential Facilities with greater than 50% moderate

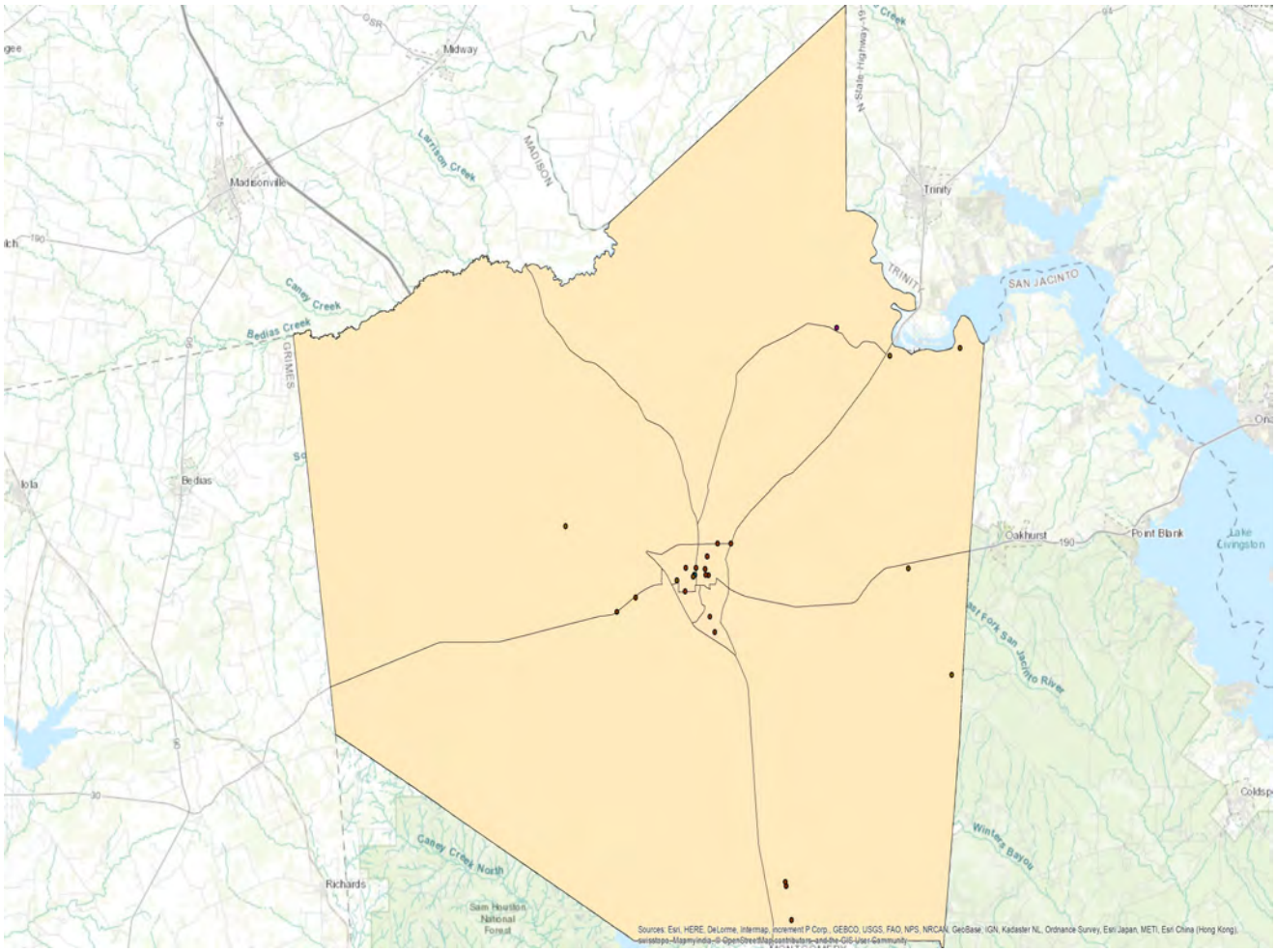
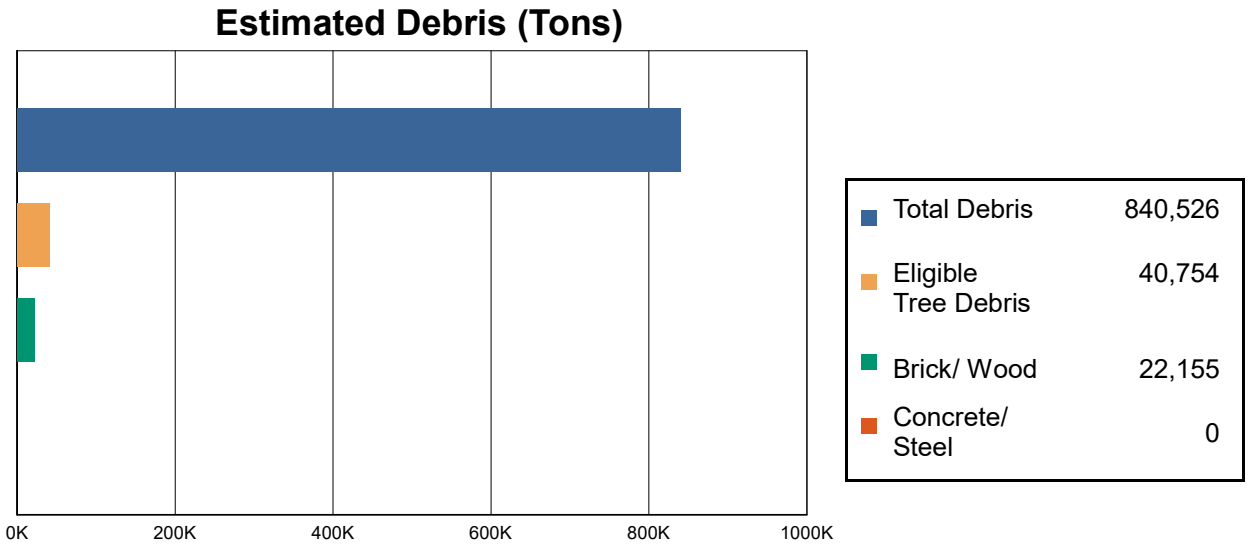


Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
Fire Stations	7	0	0	7
Hospitals	1	1	0	0
Police Stations	1	0	0	1
Schools	19	0	0	0

Induced Hurricane Damage

Debris Generation

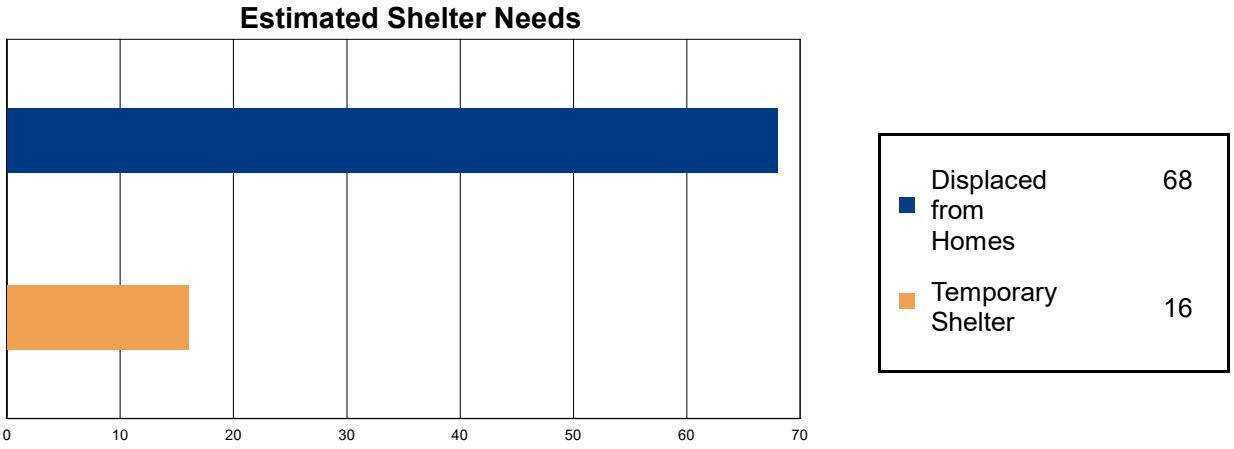


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 840,526 tons of debris will be generated. Of the total amount, 777,226 tons (92%) is Other Tree Debris. Of the remaining 63,300 tons, Brick/Wood comprises 35% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 902 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 40,754 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 68 households to be displaced due to the hurricane. Of these, 16 people (out of a total population of 67,861) will seek temporary shelter in public shelters.

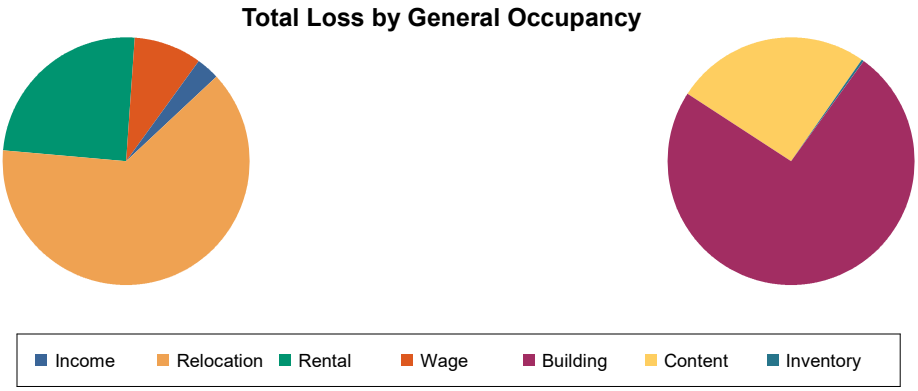
Economic Loss

The total economic loss estimated for the hurricane is 246.9 million dollars, which represents 5.03 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 247 million dollars. 3% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 91% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.



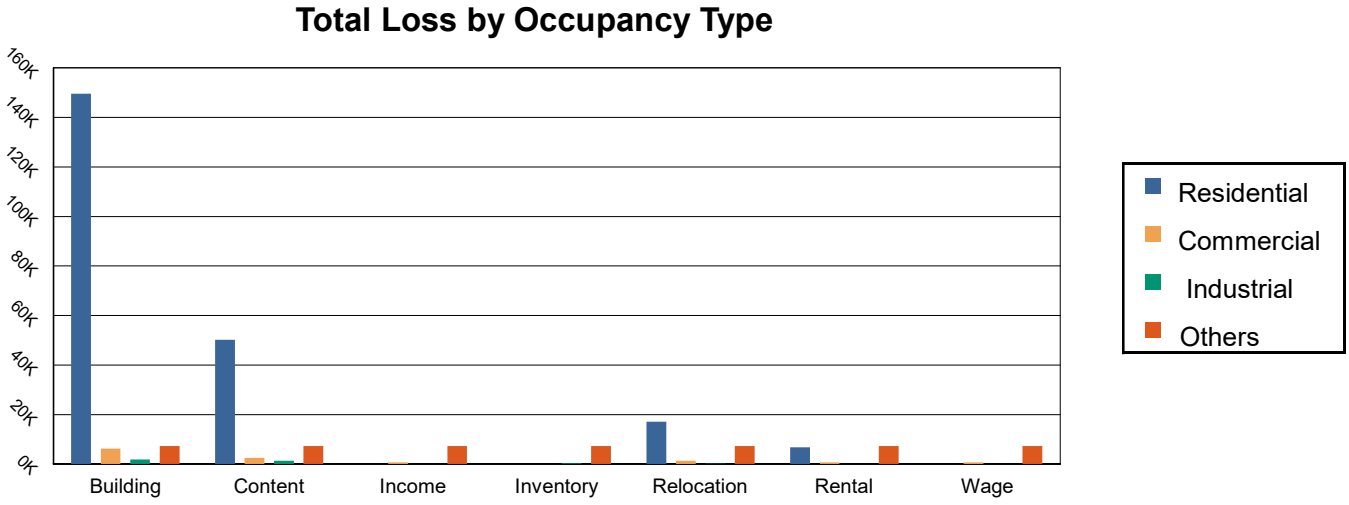


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	149,578.15	6,254.44	1,809.57	2,903.64	160,545.80
	Content	50,244.57	2,453.30	1,322.53	1,286.20	55,306.60
	Inventory	0.00	78.02	261.72	38.27	378.01
	Subtotal	**199,822.72**	**8,785.76**	**3,393.81**	**4,228.11**	**216,230.41**
Business Interruption Loss						
	Income	7.15	635.85	32.27	243.66	918.93
	Relocation	17,105.37	1,374.27	160.86	776.14	19,416.64
	Rental	6,739.30	709.86	26.67	112.94	7,588.77
	Wage	16.75	719.37	53.09	1,920.45	2,709.66
	Subtotal	**23,868.58**	**3,439.35**	**272.89**	**3,053.18**	**30,634.00**
Total						
	Total	**223,691.30**	**12,225.11**	**3,666.70**	**7,281.30**	**246,864.41**

Appendix A: County Listing for the Region

Texas
- Walker

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Texas				
Walker	67,861	4,138,237	773,332	4,911,569
Total	**67,861**	**4,138,237**	**773,332**	**4,911,569**
Study Region Total	**67,861**	**4,138,237**	**773,332**	**4,911,569**

Quick Assessment Report

November 7, 2017

Study Region : Walker County

Scenario : Probabilistic

Regional Statistics

Area (Square Miles)	801
Number of Census Tracts	10
Number of People in the Region	67,861

General Building Stock

Occupancy	*Building Count*	*Dollar Exposure ($ K)*
Residential	18,690	4,138,237
Commercial	850	440,902
Other	528	332,430
Total	20,068	4,911,569

Scenario Results

Number of Residential Buildings Damaged

Return Period	*Minor*	*Moderate*	*Severe*	*Destruction*	*Total*
10	0	0	0	0	0
20	10	0	0	0	10
50	210	10	0	0	221
100	851	67	1	2	921
200	1,851	240	7	16	2,113
500	3,646	702	32	52	4,433
1000	4,840	1,320	109	143	6,411

Number of Buildings Damaged

Return Period	*Minor*	*Moderate*	*Severe*	*Destruction*	*Total*
10	0	0	0	0	0
20	15	0	0	0	15
50	228	11	0	0	240
100	898	74	1	2	976
200	1,949	263	9	16	2,236
500	3,858	779	43	53	4,733
1000	5,118	1,458	136	144	6,856

Shelter Requirements

Return Period	*Displaced Households (#Households)*	*Short Term Shelter (#People)*
10	0	0
20	0	0
50	0	0
100	0	0
200	0	0
500	13	3
1000	68	16

Economic Loss (x 1000)

	Property Damage (Capital Stock) Losses		***Business Interruption***
ReturnPeriod	***Residential***	***Total***	***(Income) Losses***
10	0	0	0
20	2,328	2,348	1
50	14,447	14,673	450
100	31,732	32,578	1,730
200	58,179	60,539	4,866
500	119,180	127,273	15,087
1000	199,823	216,230	30,634
Annualized	1,461	1,543	143

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

Hazus-MH: Flood Global Risk Report

Region Name: Walker County

Flood Scenario: 100-Year

Print Date: Tuesday, November 07, 2017

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

Table of Contents

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Texas

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 801 square miles and contains 2,514 census blocks. The region contains over 21 thousand households and has a total population of 67,861 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 20,068 buildings in the region with a total building replacement value (excluding contents) of 4,912 million dollars (2010 dollars). Approximately 93.13% of the buildings (and 84.25% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 20,068 buildings in the region which have an aggregate total replacement value of 4,912 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	4,138,237	84.3%
Commercial	440,902	9.0%
Industrial	96,235	2.0%
Agricultural	10,037	0.2%
Religion	76,596	1.6%
Government	87,987	1.8%
Education	61,575	1.3%
Total	**4,911,569**	**100.0%**

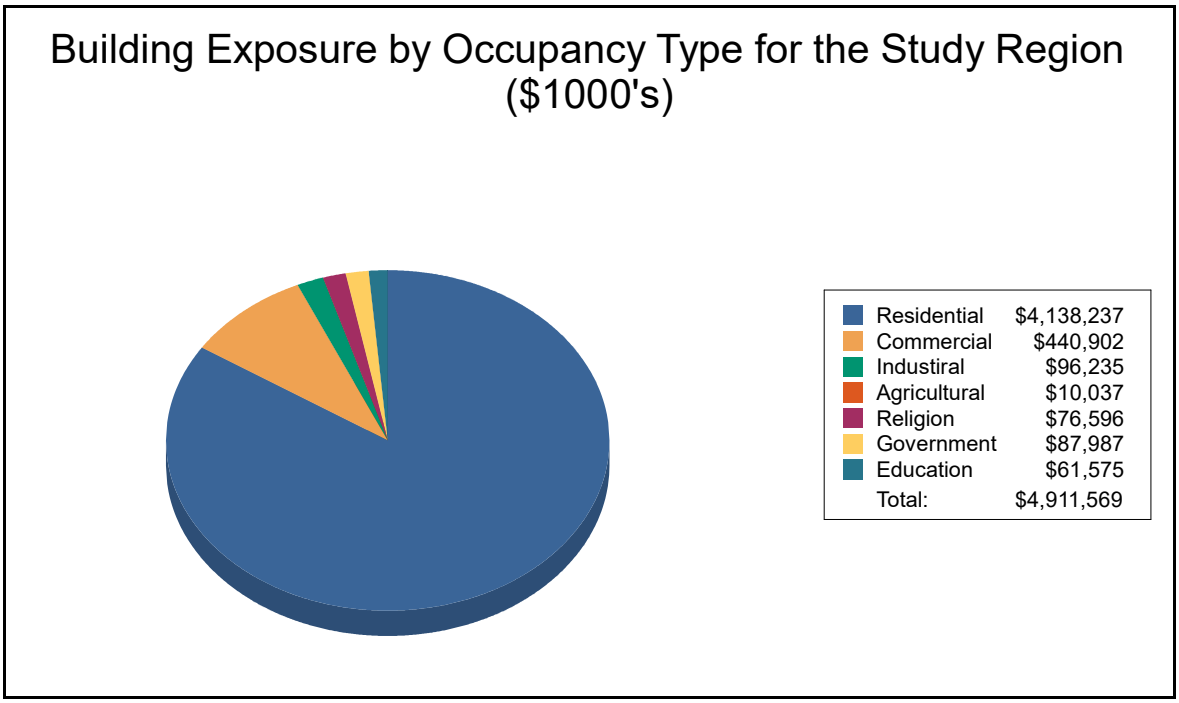
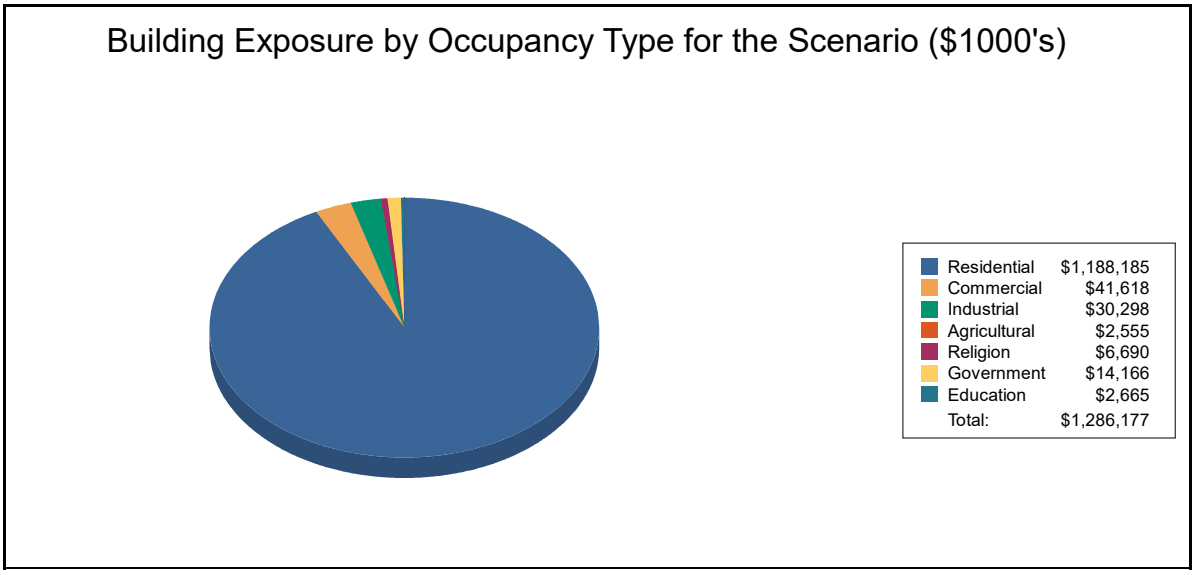


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,188,185	92.4%
Commercial	41,618	3.2%
Industrial	30,298	2.4%
Agricultural	2,555	0.2%
Religion	6,690	0.5%
Government	14,166	1.1%
Education	2,665	0.2%
Total	**1,286,177**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 106 beds. There are 19 schools, 7 fire stations, 1 police station and no emergency operation centers.

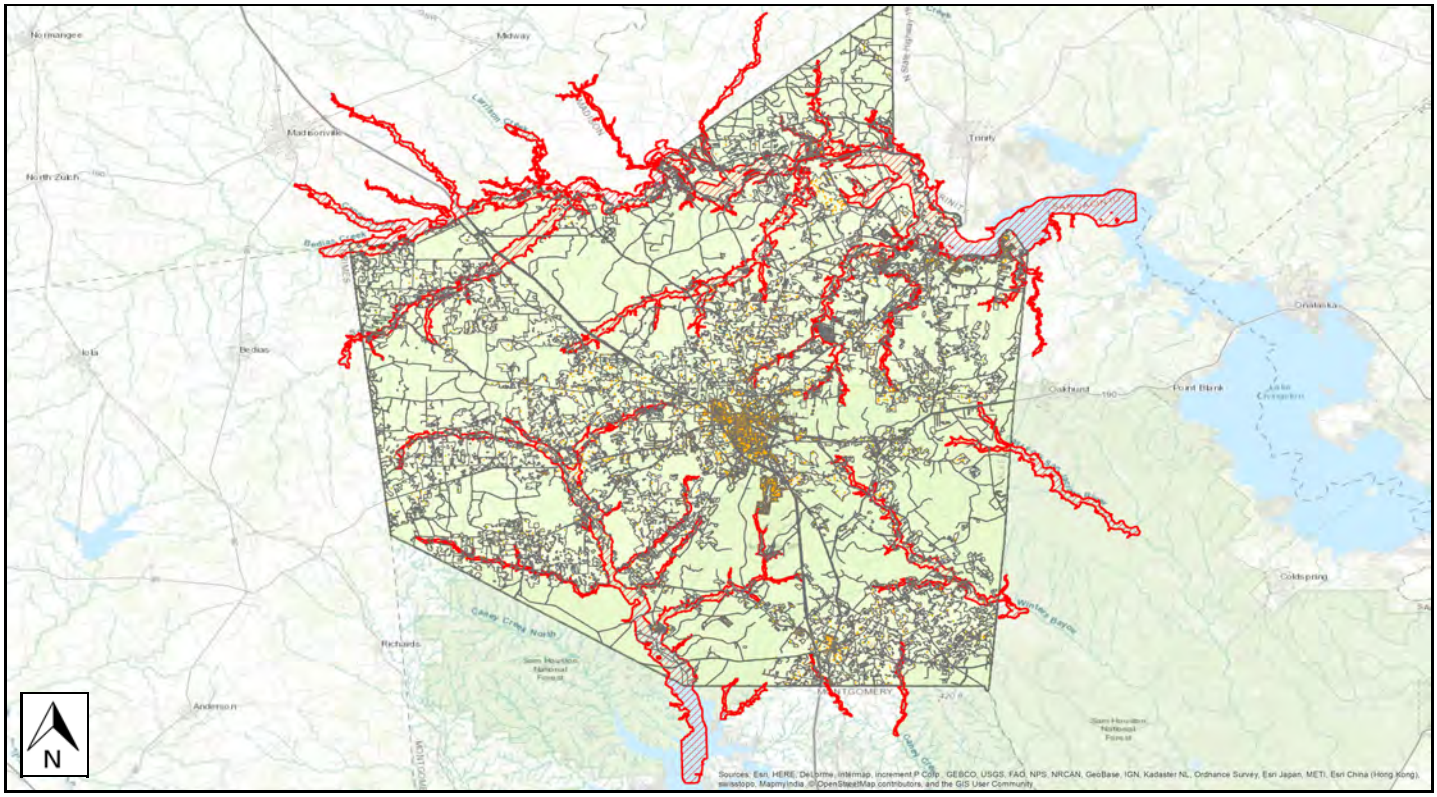
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Walker County
Scenario Name:	100-Year
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 201 buildings will be at least moderately damaged. This is over 55% of the total number of buildings in the scenario. There are an estimated 42 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

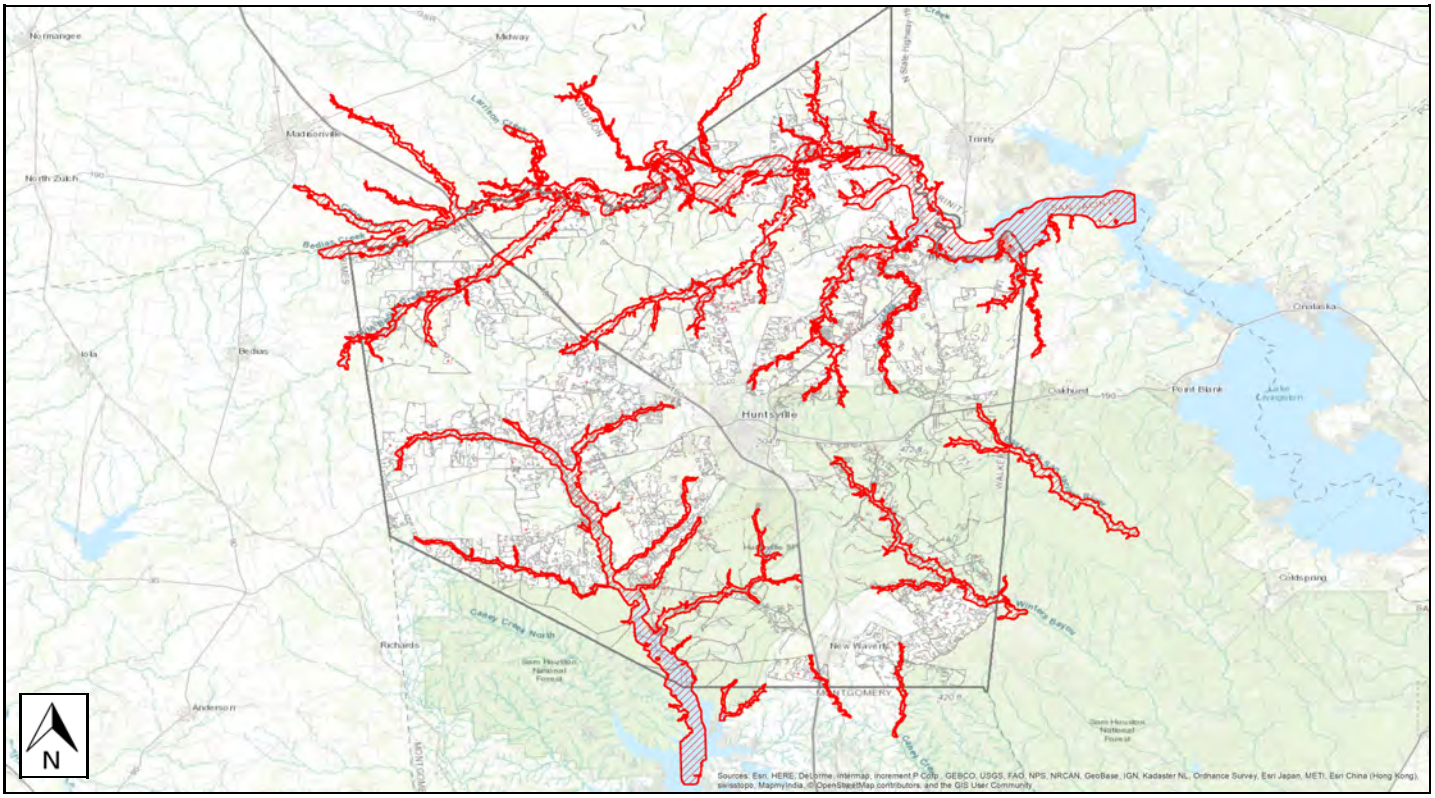


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	27	11.84	72	31.58	37	16.23	31	13.60	19	8.33	42	18.42
Total	**27**		**72**		**37**		**31**		**19**		**42**	

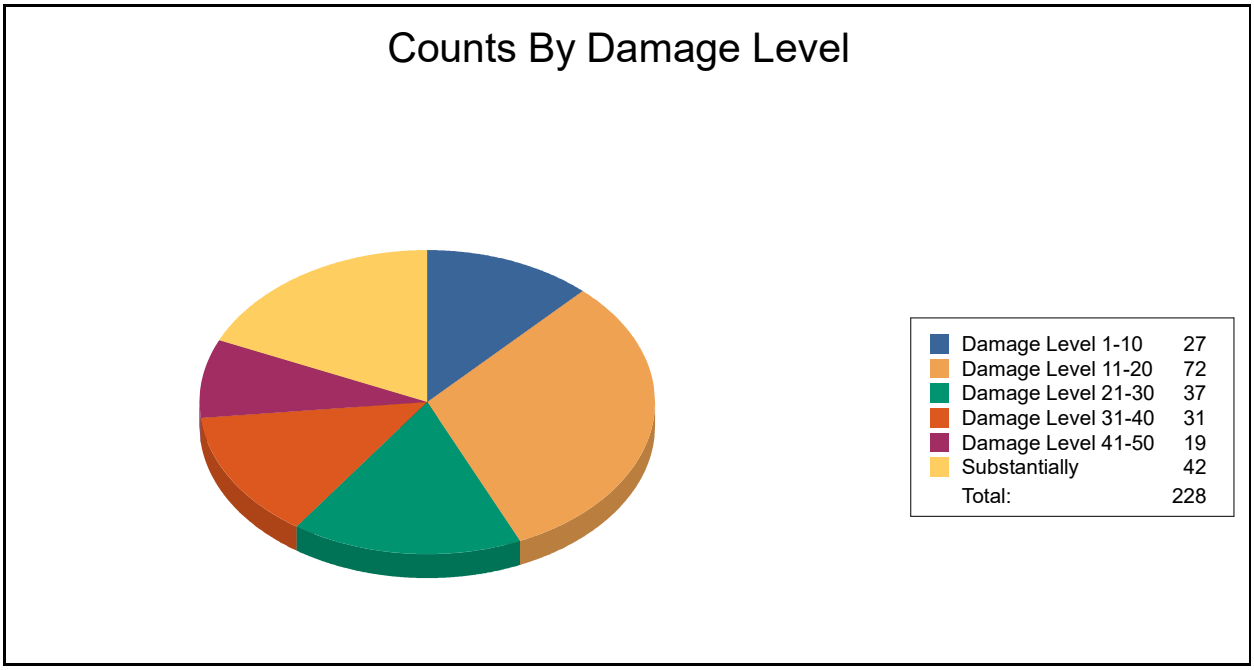


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	1	2	2	5	3	7	0	0	4	9	34	77
Masonry	1	10	5	50	2	20	2	20	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	25	14	65	37	32	18	29	17	15	9	8	5

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 106 hospital beds available for use. On the day of the scenario flood event, the model estimates that 106 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	7	0	0	0
Hospitals	1	0	0	0
Police Stations	1	0	0	0
Schools	19	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

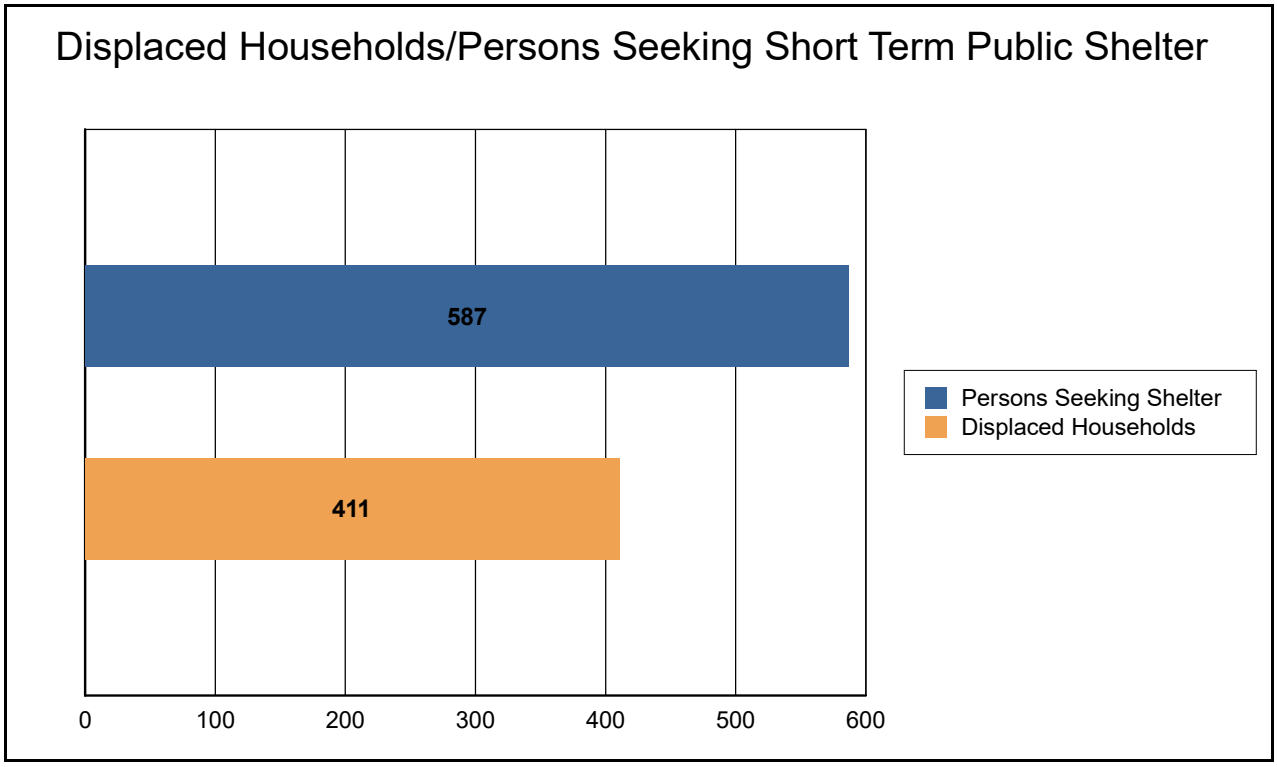
Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

Analysis has not been performed for this Scenario.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 411 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 587 people (out of a total population of 67,861) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 51.55 million dollars, which represents 4.01 % of the total replacement value of the scenario buildings.

Building-Related Losses

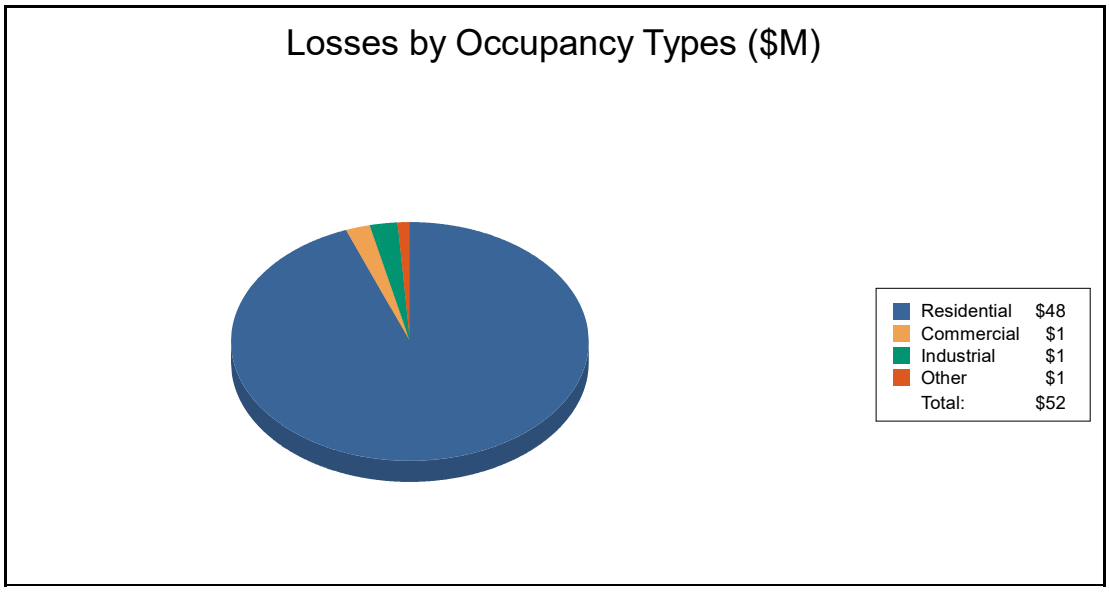
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 51.47 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 94.08% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	31.46	0.29	0.31	0.09	32.16
	Content	16.98	0.91	0.74	0.52	19.14
	Inventory	0.00	0.04	0.12	0.01	0.17
	Subtotal	**48.45**	**1.24**	**1.17**	**0.62**	**51.47**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.05	0.00	0.00	0.00	0.05
	Rental Income	0.01	0.00	0.00	0.00	0.01
	Wage	0.00	0.00	0.00	0.03	0.03
	Subtotal	**0.05**	**0.00**	**0.00**	**0.03**	**0.08**
ALL	**Total**	**48.50**	**1.24**	**1.17**	**0.64**	**51.55**



Appendix A: County Listing for the Region

Texas

- Walker

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Texas				
Walker	67,861	4,138,237	773,332	4,911,569
Total	**67,861**	**4,138,237**	**773,332**	**4,911,569**
Total Study Region	**67,861**	**4,138,237**	**773,332**	**4,911,569**

Hazus-MH: Flood Global Risk Report

Region Name: Walker County

Flood Scenario: 500-Year

Print Date: Tuesday, November 07, 2017

Disclaimer:
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FEMA

RiskMAP
Increasing Resilience Together

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Building Inventory

General Building Stock

Hazus estimates that there are 20,068 buildings in the region which have an aggregate total replacement value of 4,912 million (2014 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

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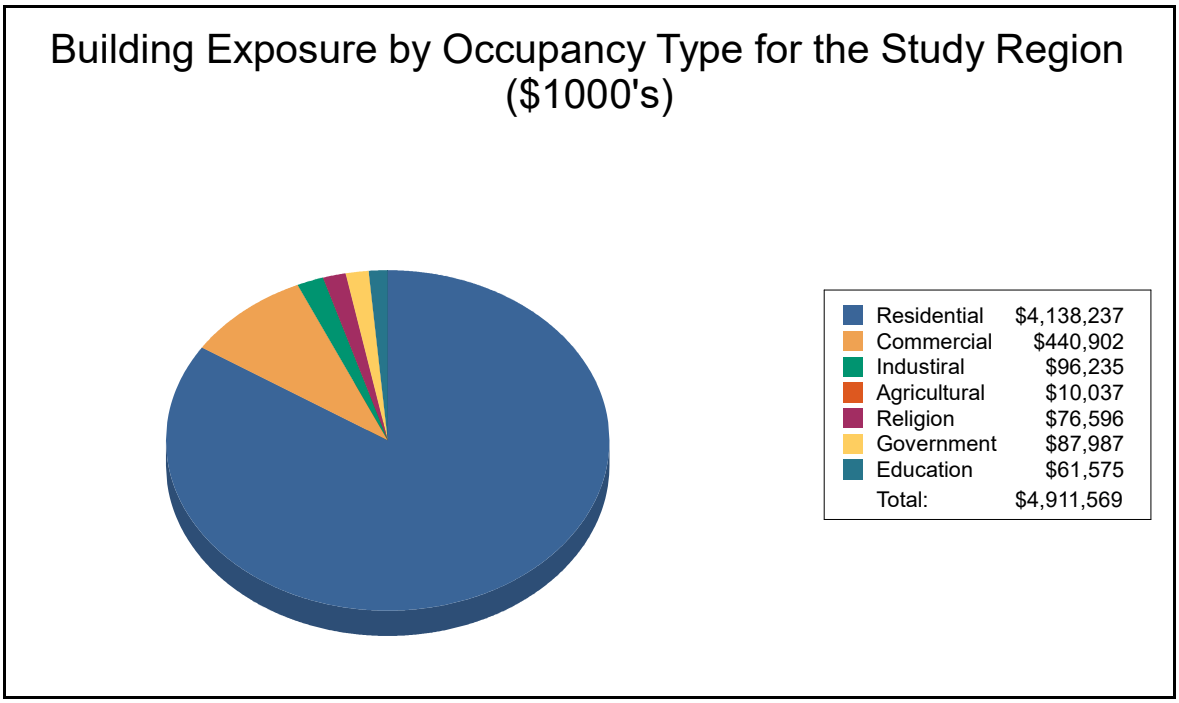
Government	87,987	1.8%
Education	61,575	1.3%
Total	**4,911,569**	**100.0%**



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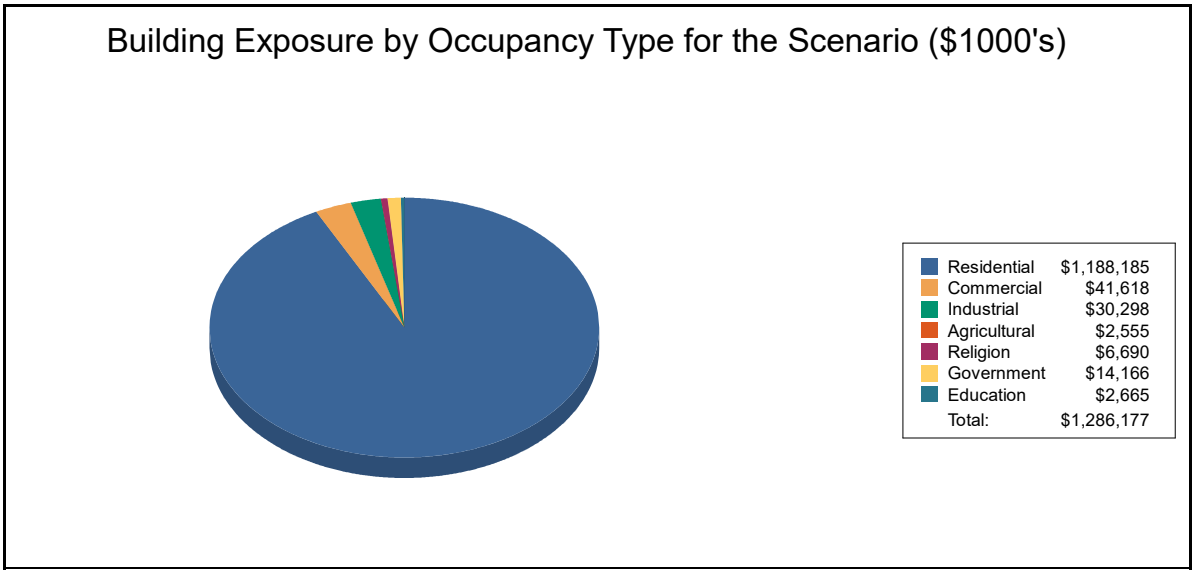
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,188,185	92.4%
Commercial	41,618	3.2%
Industrial	30,298	2.4%
Agricultural	2,555	0.2%
Religion	6,690	0.5%
Government	14,166	1.1%
Education	2,665	0.2%
Total	**1,286,177**	**100.0%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 106 beds. There are 19 schools, 7 fire stations, 1 police station and no emergency operation centers.

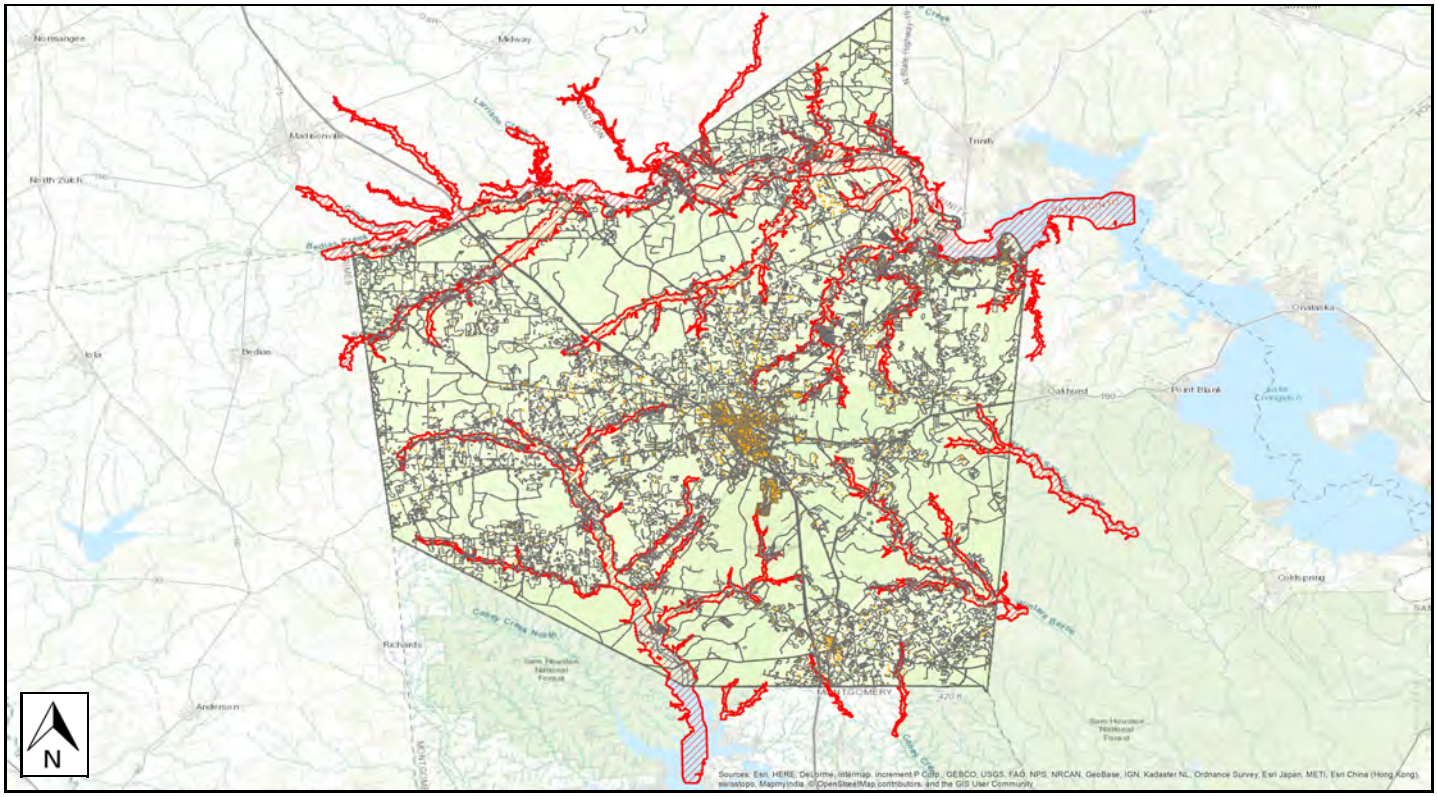
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Walker County
Scenario Name:	500-Year
Return Period Analyzed:	500
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 300 buildings will be at least moderately damaged. This is over 44% of the total number of buildings in the scenario. There are an estimated 100 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

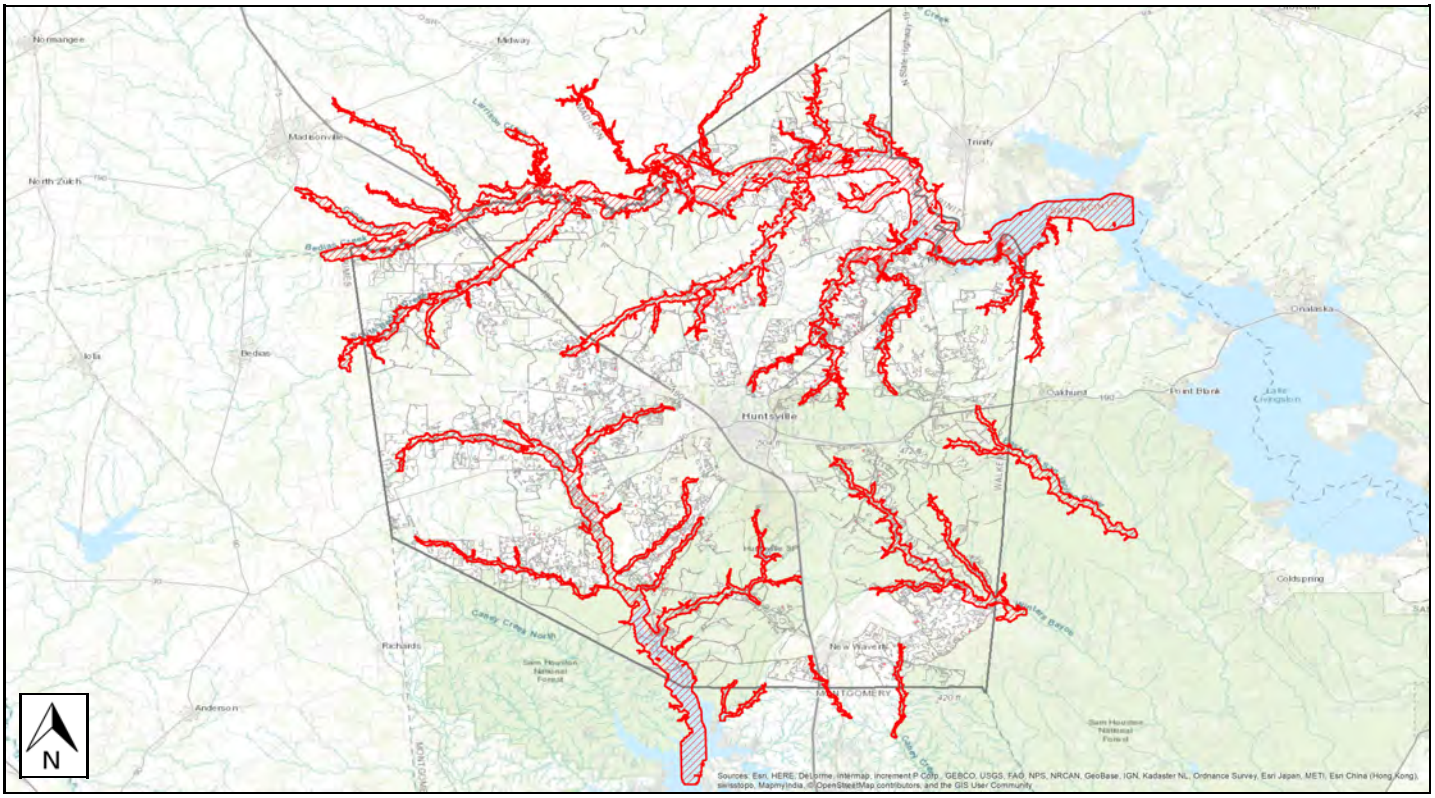


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	30	9.09	77	23.33	49	14.85	40	12.12	34	10.30	100	30.30
Total	**30**		**77**		**49**		**40**		**34**		**100**	

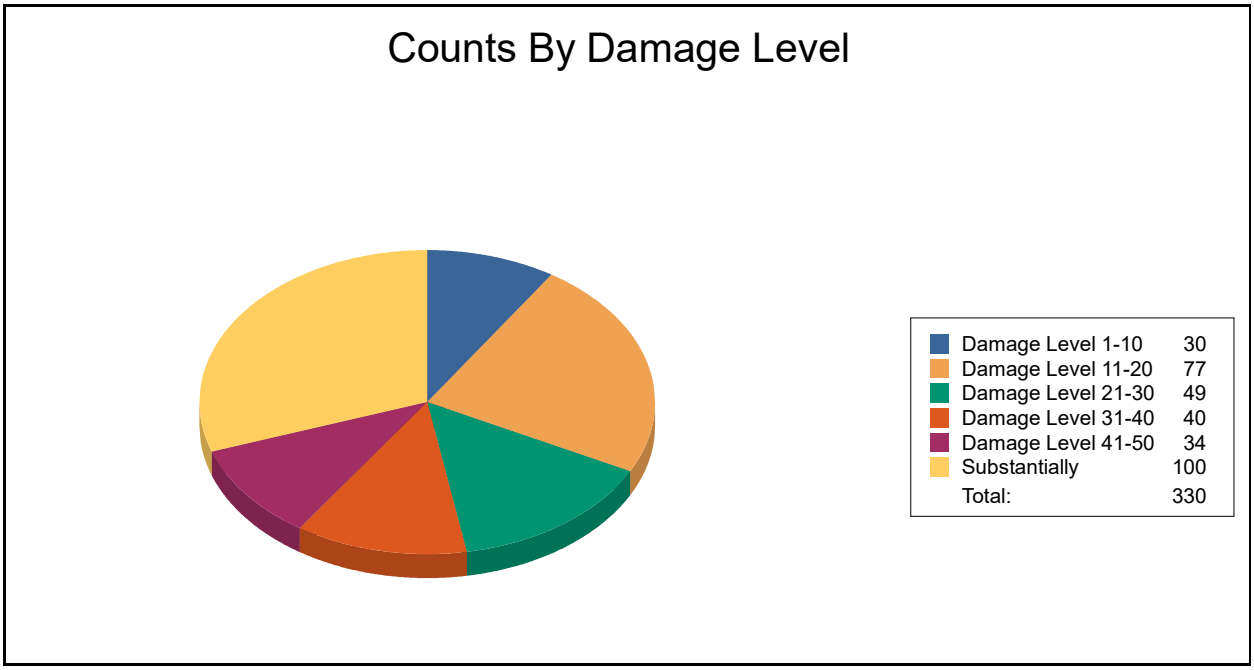


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	2	3	1	1	1	1	0	0	2	3	70	92
Masonry	1	8	4	33	3	25	2	17	2	17	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	27	11	72	30	45	19	38	16	30	12	30	12

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 106 hospital beds available for use. On the day of the scenario flood event, the model estimates that 106 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	7	0	0	0
Hospitals	1	0	0	0
Police Stations	1	0	0	0
Schools	19	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

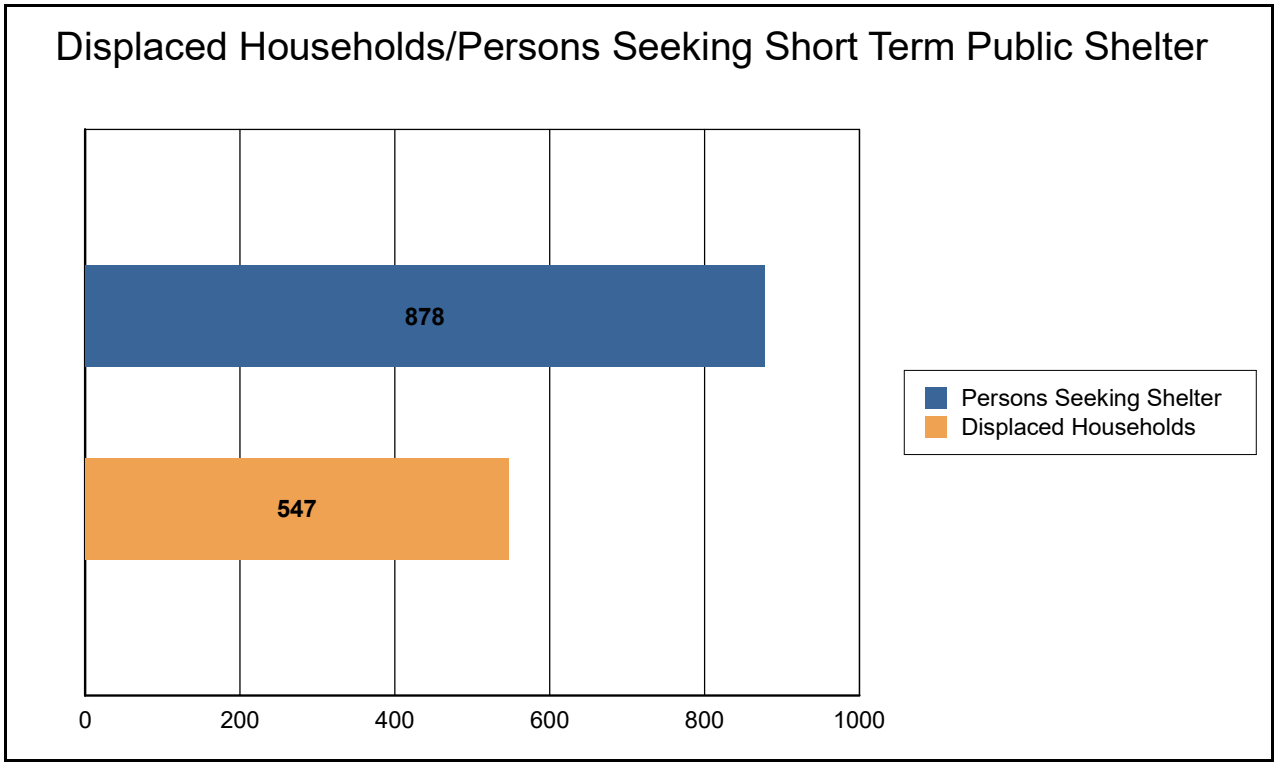
Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

Analysis has not been performed for this Scenario.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 547 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 878 people (out of a total population of 67,861) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 78.78 million dollars, which represents 6.12 % of the total replacement value of the scenario buildings.

Building-Related Losses

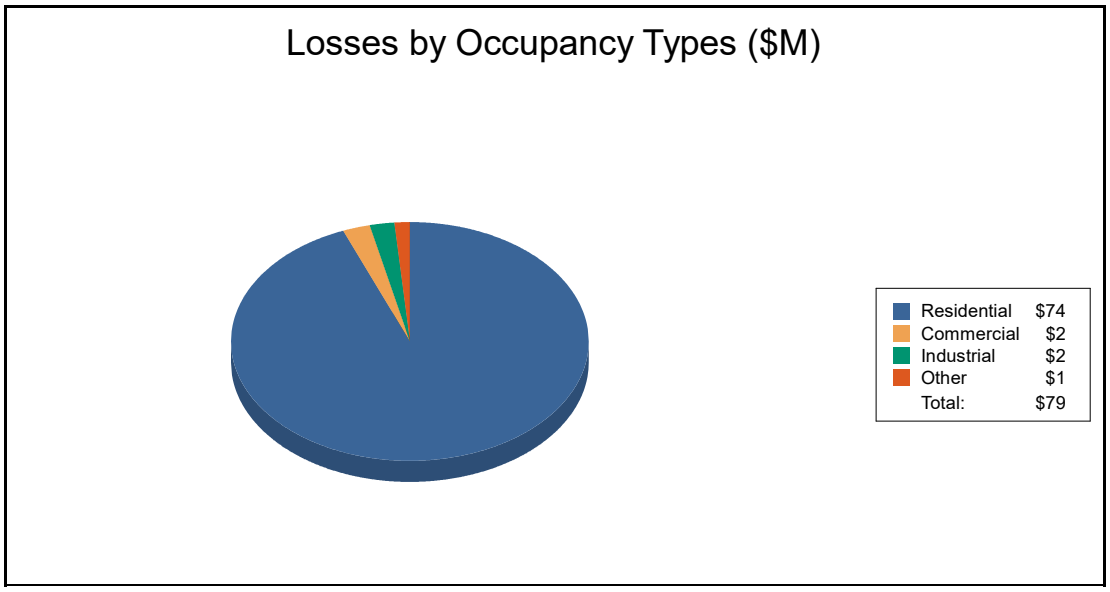
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 78.66 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 93.79% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	47.87	0.50	0.51	0.15	49.02
	Content	25.93	1.44	1.17	0.83	29.36
	Inventory	0.00	0.06	0.20	0.01	0.27
	Subtotal	**73.80**	**2.00**	**1.87**	**0.99**	**78.66**
Business Interruption						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.07	0.00	0.00	0.00	0.07
	Rental Income	0.01	0.00	0.00	0.00	0.01
	Wage	0.00	0.00	0.00	0.04	0.04
	Subtotal	**0.08**	**0.00**	**0.00**	**0.04**	**0.12**
ALL	**Total**	**73.88**	**2.00**	**1.87**	**1.03**	**78.78**



Appendix A: County Listing for the Region

Texas

- Walker

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Texas				
Walker	67,861	4,138,237	773,332	4,911,569
Total	**67,861**	**4,138,237**	**773,332**	**4,911,569**
Total Study Region	**67,861**	**4,138,237**	**773,332**	**4,911,569**

2017

Appendix D – Repetitive Loss Properties

APPENDIX D: REPETITIVE LOSS PROPERTIES

County	Jurisdiction	Repetitive Loss #	Occupancy	# of Losses	Total Paid
Walker	Unincorporated Walker County	0010682	Single Family Residential	2	$ 88,351.36
Walker	Unincorporated Walker County	0075348	Single Family Residential	2	$ 36,042.32
Walker	Unincorporated Walker County	0114434	Single Family Residential	2	$ 53,085.73
Walker	Unincorporated Walker County	0242693	Single Family Residential	3	$ 107,329.14
Walker	Unincorporated Walker County	0005825	Single Family Residential	2	$ 17,593.72
Walker	Unincorporated Walker County	0010699	Single Family Residential	3	$ 122,427.57
Walker	Unincorporated Walker County	0071166	Single Family Residential	4	$ 61,418.08
Walker	Unincorporated Walker County	0245123	Single Family Residential	3	$ 115,636.32
Walker	Unincorporated Walker County	0010654	Single Family Residential	5	$ 120,594.86
Walker	Unincorporated Walker County	0010655	Single Family Residential	5	$ 31,955.05
Walker	Unincorporated Walker County	0246909	Single Family Residential	2	$ 85,584.56
Walker	Unincorporated Walker County	0245028	Single Family Residential	3	$ 50,023.35
Walker	Unincorporated Walker County	0071168	Single Family Residential	2	$ 19,340.48
Walker	Unincorporated Walker County	0245125	Single Family Residential	3	$ 94,784.68
Walker	Unincorporated Walker County	0007851	Single Family Residential	5	$ 34,644.68
Walker	Unincorporated Walker County	0112636	Single Family Residential	4	$ 110,393.56
Walker	Unincorporated Walker County	0010695	Single Family Residential	5	$ 61,804.39
Walker	Unincorporated Walker County	0072413	Single Family Residential	4	$ 26,155.41
Walker	Unincorporated Walker County	0005827	Single Family Residential	5	$ 64,693.12
Walker	Unincorporated Walker County	0074074	Single Family Residential	2	$ 10,399.02
Walker	Unincorporated Walker County	0003559	Single Family Residential	2	$ 4,743.38
Walker	Unincorporated Walker County	0007852	Single Family Residential	2	$ 77,574.13
Walker	Unincorporated Walker County	0114283	Single Family Residential	6	$ 127,472.35
Walker	Unincorporated Walker County	0067260	Single Family Residential	2	$ 5,692.10
Walker	Unincorporated Walker County	0057546	Single Family Residential	2	$ 16,477.57
Walker	Unincorporated Walker County	0010701	Single Family Residential	5	$ 42,751.47
Walker	Unincorporated Walker County	0005826	Single Family Residential	5	$ 50,540.10
Walker	Unincorporated Walker County	0057540	Single Family Residential	5	$ 36,658.62
Walker	Unincorporated Walker County	0122223	Single Family Residential	2	$ 19,969.93
Walker	Unincorporated Walker County	0070342	Single Family Residential	2	$ 24,113.34
Walker	Unincorporated Walker County	0071167	Single Family Residential	3	$ 25,302.99
Walker	Unincorporated Walker County	0245461	Single Family Residential	2	$ 68,946.70
Walker	Unincorporated Walker County	0169316	Single Family Residential	2	$ 9,240.38
Walker	Unincorporated Walker County	0249200	Single Family Residential	2	$ 8,593.31
Walker	Unincorporated Walker County	0014117	Single Family Residential	4	$ 102,377.32
Walker	Unincorporated Walker County	0075353	Single Family Residential	2	$ 9,563.15
Walker	Unincorporated Walker County	0071164	Single Family Residential	2	$ 11,569.62
Walker	Unincorporated Walker County	0005668	Single Family Residential	3	$ 76,424.11
Walker	New Waverly	0168029	Single Family Residential	2	$ 14,752.86
Walker	New Waverly	0100612	Single Family Residential	3	$ 33,202.97
Walker	Unincorporated Walker County	0212637	Single Family Residential	2	$ 29,598.10
Walker	Unincorporated Walker County	0237894	Single Family Residential	2	$ 43,482.40

2017

Appendix F: Plan Adoption

WALKER COUNTY COMMISSIONERS COURT
1100 University Avenue
Huntsville, Texas 77340
936-436-4910

DANNY PIERCE
County Judge

DANNY KUYKENDALL
Commissioner, Precinct 1

RONNIE WHITE
Commissioner, Precinct 2

AGENDA
REGULAR SESSION
TUESDAY, MAY 29, 2018
9:30 A.M.
ROOM 104

BILL DAUGETTE
Commissioner, Precinct 3

JIMMY D. HENRY
Commissioner, Precinct 4

CALL TO ORDER

- Announcement by the County Judge whether a quorum is present.
- Certification that public Notice of Meeting was given in accordance with the provisions of Section 551.001 et. Seq. of the Texas Government Code.

GENERAL ITEMS

- Prayer – Pastor James Necker
- Pledge of Allegiance
- Texas Pledge – "Honor the Texas Flag, I pledge allegiance to thee, Texas, one state under God, one and indivisible"
- Citizen Input

CONSENT AGENDA

1. Approve minutes from Commissioners Court Regular Session on May 14, 2018
2. Approve minutes from Commissioners Court Special Session on May 21, 2018
3. Receive Financial Information as of May 22, 2018 for the fiscal year ended September 30, 2018

DEPARTMENT REPORTS

4. Receive District Clerk's monthly report for April 2018
5. Receive Justice of the Peace Precinct 1 monthly report for April 2018
6. Receive Justice of the Peace Precinct 2 monthly report for April 2018
7. Receive Justice of the Peace Precinct 3 monthly report for April 2018
8. Receive Justice of the Peace Precinct 4 monthly report for April 2018

STATUTORY AGENDA

Emergency Management

9. Discuss and take action on Resolution 2018-61, accepting and approving Walker County Hazard Mitigation Plan 2017 – Butch Davis

District Clerk

10. Discuss and take action on the funds spent for Juror Appreciate Week (first full week of May), in the amount of $96.89 – Robyn Flowers

Treasurer

11. Discuss and take action on Disbursement Report for 05/14/18– 05/22/18 – Amy Klawinsky

Purchasing

12. Discuss and take action on recommendation to award bid C2360-18-014 Building Automation to Entech Sales and Service for $72,051. To be paid from project funds - Mike Williford

Auditor

13. Discuss and take action on approving claims and invoices for payment – Patricia Allen

Commissioners Court

14. Discuss and take action on Precinct 4 adopting Swearingen Road off of Mathis Dairy Road for maintenance – Commissioner Henry
15. Discuss and take action on moving a position budgeted in the IT Department that was budgeted for the support of the County Sheriff and County Jail functions to the budget of the County Sheriff as requested by Sheriff McRae – Judge Pierce
16. Receive Employee Injury Report – Judge Pierce

EXECUTIVE SESSION

If during the course of the meeting covered by this notice, Commissioners Court shall determine that a closed meeting of the Court is required, then such closed meeting as authorized by Texas Government Code 551, sub-chapter D, will be held by the Commissioners Court at the date, hour, and place given in this notice or as soon after the commencement of the meeting covered by this notice as the Commissioners Court may conveniently meet in such closed meeting concerning any and all subjects and for any and all purposes permitted by Chapter 551, sub-chapter D, inclusive of said Texas Government Code, including but not limited to:

Section 551.071 For the purpose of private consultation between the Commissioners Court and its attorney when the attorney's advice with respect to pending or contemplated litigation settlement offers, and matters where the duty of the Commissioners Court counsel to his client pursuant to the Code of Professional Responsibility of the State Bar of Texas clearly conflicts with the Open Meetings Act.

RESOLUTION 2018-61

"Hazard Mitigation Plan for Walker County and the City of New Waverly and the City of Riverside"

WHEREAS, Certain areas of Walker County are subject to periodic flooding and other natural hazards with the potential to cause damage to people's properties within the area; and

WHEREAS, Walker County desires to prepare and mitigate for such circumstances; and

WHEREAS, Under the Disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Walker County and the City of New Waverly and the City of Riverside, in order to meet this requirement, have initiated development of a local Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED, that Walker County hereby:

Adopts the Walker County Hazard Mitigation Plan; and

Vests the Emergency Management Coordinator with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action.

(b) Develop an addendum to this Hazard Mitigation Plan if the county's unique situation warrants such an addendum.

Appoints the Emergency Management Coordinator to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to Walker County's addendum to the Hazard Mitigation Plan be developed and presented to the Walker County Commissioners' Court for consideration.

Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted on May 29, 2018

Danny Pierce
County Judge

Danny Kuykendall
Commissioner Precinct 1

Ronnie White
Commissioner Precinct 2

Bill Daugette
Commissioner Precinct 3

Jimmy D. Henry
Commissioner Precinct 4

Attest: Kari A. French
County Clerk

COMMISSIONERS COURT ★ WALKER COUNTY, TEXAS ★

RESOLUTION
06-18
Adoption of the Hazard Mitigation Plan for Walker County and The City of New Waverly and The City of Riverside

WHEREAS, certain areas of the City of Riverside are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties with in the area; and

WHEREAS, the City of Riverside desires to prepare and mitigate for such circumstances; and

WHEREAS, under the Disaster Mitigation act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA-approved Hazard Mitigation Action Plan as a condition of receipt of certain future Federal mitigation funding after November 1, 2004; and

WHEREAS, Walker County, in order to meet this requirement, have initiated development of a local Hazard Mitigation Plan, including the City of Riverside;

NOW, therefore, be it resolved that this Riverside City Council hereby:

Adopts the Walker County local Hazard Mitigation Plan, and

Vests Mayor John LeMaire with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action.

(b) Develop and addendum to this Hazard Mitigation Plan if the town's unique situation warrants such an addendum.

Appoints John LeMaire to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City of Riverside addendum to the Hazard Mitigation Plan be developed and presented to the City Council for consideration.
Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the hazard mitigation plan.

RESOLUTION #2018-01
HAZARD MITIGATION PLAN FOR
WALKER COUNTY, CITY OF NEW WAVERLY, CITY OF RIVERSIDE

WHEREAS, certain areas of the City of New Waverly in Walker County are subject to periodic flooding and other natural hazards with the potential to cause damages to people properties within the area; and

WHEREAS, the City of New Waverly desires to prepare and mitigate for such circumstances; and;

WHEREAS, under the disaster Mitigation Act of 2000, the United States Federal Emergency Management Agency (FEMA) requires that local jurisdictions have in place a FEMA approved Hazard Mitigation Action Plan as a condition of receipt of certain future federal mitigation funding after November 1, 2004; and

WHEREAS, Walker County, in order to meet this requirement has initiated development of a Local Hazard Mitigation Plan, including the City of New Waverly;

NOW, therefore, be it resolved that this New Waverly City Council hereby:

Adopts the Walker County Local Hazard Mitigation Plan; and

Vest Nathaniel James with the responsibility, authority, and the means to:

(A) Inform all concerned parties of his action.

(B) Develop an addendum to this Hazard Mitigation Plan if the town's unique situation warrants such an addendum.

Appoints Steve Widner to assure that the Hazard Mitigation Plan be reviewed at least annually and that any needed adjustment to the City of New Waverly addendum to the Hazard Mitigation Plan be developed and presented to the City Council for consideration.

Agrees to take such other official action as may be reasonable necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted on June 12, 2018 by:

Mayor _____

Councilmember _____

Councilmember _____

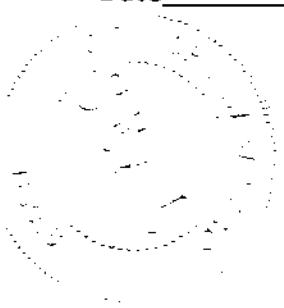
Councilmember Joseph C Maynard

Councilmember _____

Councilmember _____

Certified by: Rosemary Bartee
Rosemary Bartee, City Secretary

Date 6/12/18



Adopted on June 05, 2018

BY CITY OF RIVERSIDE MAYOR AND CITY COUNCIL

John L. Maire
Mayor, John LeMaire

Mayor Pro Tem Billy Philio

G. Frank Rich
Council Member, G. Frank Rich

Jimmy Brummett
Council Member, Jimmy Brummett

Monty Zunker
Council Member, Monty Zunker

Bill Tutor
Council Member, Bill Tutor

Certified by: Stacey Peters
City of Riverside, City Secretary

Date: June 5, 2018